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WASTE RESOURCE MANAGEMENT

PERSIMMON HOMES SOUTH MIDLANDS

MALVERN TECHNOLOGY CENTRE

HISTROIC BUILDING RECORDING

DECEMBER 2019

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MALVERN TECHNOLOGY CENTRE

HISTROIC BUILDING RECORDING

DECEMBER 2019

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ACRONYMS AND ABBREVIATIONS

TRE	Telecommunications Research Establishment
ADRDE	Air Defence Research and Development Establishment
RADAR	Radio Detection and Ranging
RRE	Royal Research Establishment
RRDE	Radar Research and Development Establishment
NATO	North Atlantic Treaty Organisation
SOC	Sector Operations Centre
UKADGE	United Kingdom Air Defence Ground Environment
MALMAG	A patented crystal growth process developed at Malvern
TREAC	Telecommunications Research Establishment Automated Computer
SRDE	Signals Research and Development Establishment
RSRE	Royal Signals and Radar Establishment
DRE	Defence Research Establishment
DERA	Defence and Evaluation Research Agency
Dstl	Defence Science and technology Laboratory
MOD	Ministry of Defence
AOD	Above Ordnance Datum
MRATHS	Malvern Radar and Technology History Society

SUMMARY

Wardell Armstrong LLP (WA) was commissioned by Persimmon Homes South Midlands to undertake a programme of historic building recording, equivalent to Historic England's Level 3 survey, of former five former WWII buildings known as A, D, E and KF Blocks and the former library building at the former Malvern Technology Centre site centred on NGR .

The Level 3 survey also included H Building which is of a slightly later date being constructed in 1952 however considered to be of a higher level of historic interest through its origins as prototype R4 bunker built as part of the development and implementation of project Rotor which sought to modernise the UK's air defence following WWII.

A basic Level 1 recording was undertaken in relation to other extant buildings within the Site.

This work was required to meet requirements of condition of planning consent reference 18/01088/FUL for the demolition of existing buildings and re-development of the site with 310 dwellings and associated road network, landscaping and infrastructure.

The military complex was not established until c1940 when it was developed as WWII Navel Training Base known as HMS Duke.

This initial operation was short lived terminating at the end of the war subsequent to which the Site was occupied by the Telecommunications Research Establishment (TRE), who had been relocated temporarily to nearby Malvern College in 1942.

The complex became the established base for the TRE and its later abbreviations, and the site was developed and expanded with a series of purpose-built research, laboratory and office buildings as well as ancillary service buildings, of varied design, scale and individual function.

The remains of the former bunker area of the building are of most value evidentially providing physical evidence of the fear and perceived threat of attack experienced during the Cold War. The architecture employed in its original core construction provides evidence of the technology available at the time to offer protection to the operations undertaken internally within the bunker, which as discussed above, were integral to the operation of an effective air defence system.

The simplicity of the external appearance of all the buildings subject to the programme of recording is conceals of the complexity of the works being undertaken and performed within the buildings. This is possibly deliberate with the work being undertaken highly sensitive and secretive as well as functional.

The later use of the buildings at the Malvern site as part of progressive and often secretive military and scientific research and development along with the wider, general association of the Site with noted scientists, mathematicians, products and events adds to the historic interest of the Site generally.

All the buildings which comprise the former Malvern Technology Centre site will be permanently preserved in this record as a result of the programme of historic building recording undertaken in line with Historic England Guidance and condition 6 of the associated planning approval (Application Ref: 18/01088/FUL).

ACKNOWLEDGEMENTS

Wardell Armstrong thanks Persimmon Homes South Midlands, who commissioned the project and facilitated access to the buildings.

Wardell Armstrong would also like to thank Aida Smyth, Malvern Hills District Council County Archaeologist for his support in agreeing the methodology for the programme of recording.

Particular thanks are offered to the Malvern Radar and Technology History Society (MRATHS) specifically Hugh Williams, Martin Hutchinson and Mike Burstow for their time, valuable insight and input into the history and operation of the Site and for the providing access to their digital archives and members wiki pages.

1 INTRODUCTION

1.1 Project circumstances and planning background

1.1.1 Wardell Armstrong was commissioned by Persimmon Homes South Midlands, to undertake a programme of historic building recording of the extant buildings on the former Malvern Technology Centre site (Centred on NGR: SO 78576 44681), hereafter referred to as the 'Site'. The programme of building recording comprises two levels, Level 1 and Level 3 as described by Historic England within their 2016 guidance 'Understanding Historic Buildings: A guide to Good Recording Practice. Drawing BM11422-012 depicts the buildings subject to the programme of recording and at which level.

1.1.2 An application for full planning permission (Application Reference 18/01088/FUL) comprising the demolition of existing buildings and re-development of the Site with 310 dwellings (Use Class C3) (including 20% provision of affordable housing) and a 66-bed care home facility (Use Class C2), to include new access junction onto Longridge Road; Upgraded access arrangements to St Andrews Road; The principal road bisecting the site between St Andrews Road and Longridge Road; Internal roads, footpaths and cycleways; Car parking; Public open space, including formal and informal play areas; Landscaping, boundary treatments and green infrastructure; Sustainable drainage systems; and related works including earthworks, remediation, tree clearance, utilities service diversion, connections and ancillary structures was approved by Malvern Hill District Council 6th September 2019.

1.1.3 Condition 6 of the planning approval requires that:

(A) No development shall take place until a programme of archaeological work, including a Written Scheme of Investigation, has been submitted to and approved by the local planning authority in writing. The scheme shall include an assessment of significance and research questions; and:

1) The programme and methodology of site investigation and recording, including the recording of buildings to be demolished (Level III in accordance with the Historic England guidelines).

2) The programme for post investigation assessment.

3) Provision to be made for analysis of the site investigation and recording.

4) Provision to be made for publication and dissemination of the analysis and records of the site investigation.

5) Provision to be made for archive deposition of the analysis and records of the site investigation.

6) Nomination of a competent person or persons/organisation to undertake the works set out within the Written Scheme of Investigation.

(B) The development shall not be occupied until the site investigation and post investigation assessment has been completed in accordance with the programme set out in the Written Scheme of Investigation approved under condition (A) and the provision made for analysis, publication and dissemination of results and archive deposition has been secured.

1.1.4 A Written Scheme of Investigation (WSI) prepared by Wardell Armstrong, and included within Appendix 11, has been agreed with Aidan Smyth, County Archaeologist for Malvern Hills District Council. The WSI sets out a methodology for the undertaking, preparation and disposition of a historic building recording in accordance with Historic England guidance.

1.1.5 The WSI established the structures currently extant on the Site to be subject to the Level 3 recording to comprise five remaining WWII buildings known as A Block, E Block, D Block, KF Block and the Library Building and a later building, known as H Building only.

1.1.6 All other extant buildings within the former Technology Centre Site boundary have been subject to a basic Level 1 recording only.

1.1.7 The buildings subject to the programme of recording include those within the planning application site area to be demolished to make way for housing and those within the wider Technology Centre boundary for which demolition is also proposed.

1.1.8 A request to include H Building (annotated on Drawing BM11422-012) on the statutory list of buildings of special architectural and historic interest was submitted to Historic England in April 2018. Following a considered assessment of its special architectural and historic interest, H Building was not considered to meet the relevant statutory criteria to warrant inclusion on the list. As a means of mitigation to its permanent removal, a programme of building recording was agreed.

1.2 Location

1.2.1 The former Malvern Technology Centre is located off St Andrews Road in the south-eastern suburbs of Great Malvern, Worcestershire (NGR SO 78576 44681).

1.2.2 The Site comprises an irregular shaped parcel of land which was predominantly developed from the 1940s onwards, initially for military use before later being used for research and development of technologies to support military and intelligence functions of the UK, NATO and the Joint Intelligence Committee.

1.2.3 Extant buildings within the Site include former military buildings of 1940s and 1950s date and other non-military buildings of various date.

1.3 Planning Context

1.3.1 National planning policies on the conservation of the historic environment are set out in the *National Planning Policy Framework* (NPPF), which was revised by the Ministry for Housing, Communities and Local Government (MHCLG) in July 2018. This is supported by *National Planning Practice Guidance* (NPPG) which was published in March 2014.

1.3.2 The policy and guidance documents emphasize that all heritage assets should be conserved "*in a manner appropriate to their significance" (paragraph 184). Sites of archaeological or cultural heritage significance that are valued components of the historic environment and merit consideration in planning decisions are grouped as 'heritage assets'.*

1.3.3 The NPPF draws a distinction between designated heritage assets and other remains considered to be of lesser significance, known as non-designated heritage assets, however recognises that all heritage assets contribute to the understanding and interpretation of our past (Planning Practice Guidance Paragraph: 003 Reference ID: 18a-003-20140306). The planning practice guidance goes on to state *"Where the complete or partial loss of a heritage asset is justified, the aim then is to capture and record the evidence of the asset's significance which is to be lost, interpret its contribution to the understanding of our past, and make that publicly available".* (Paragraph: 003 Reference ID: 18a-003-20140306).

1.3.4 There is a general acceptance that non-designated assets can be preserved by record, in accordance with their significance and the magnitude of the harm to or loss of the site as a result of the proposals, to '*avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposals*' (paragraph 190).

1.4 Local Planning Policies

1.4.1 The South Worcestershire Development Plan (adopted 2016) contains the following relevant policies with regards to the historic environment:

Strategic Policy 6: Historic Environment

A. Development proposals should conserve and enhance heritage assets, including assets of potential archaeological interest, subject to the provisions of SWDP 24. Their contribution to the character of the landscape or townscape should be protected in order to sustain the historic quality, sense of place, environmental quality and economic vibrancy of south Worcestershire.

B. Development proposals will be supported where they conserve and enhance the significance of heritage assets, including their setting. In particular this applies to:

I. Designated heritage assets; i.e. listed buildings, conservation areas, scheduled monuments, registered parks and gardens and registered battlefields, as well as undesignated heritage assets (25).

II. The historic landscape, including locally distinctive settlement patterns, field systems, woodlands and commons and historic farmsteads and smallholdings.

III. Designed landscapes, including parkland, gardens, cemeteries, churchyards, public parks, urban open spaces and industrial, military or institutional landscapes.

IV. Archaeological remains of all periods.

V. Historic transportation networks and infrastructure including roads and trackways, canals, river navigations, railways and their associated industries.

VI. The historic core of the cathedral city of Worcester, with its complex heritage of street and plot patterns, buildings, open spaces and archaeological remains, along with their settings and views of the city.

VII. The civic, religious and market cores of south Worcestershire's city, town and village fabric with their wide variety of building styles, materials and street and plot patterns.

Generic Policy 24: Management of the Historic Environment

A. Development proposals affecting heritage assets will be considered in accordance with the Framework, relevant legislation and published national and local guidance;

B. Proposals likely to affect the significance of a heritage asset, including the contribution made by its setting, should be accompanied by a description of its significance in sufficient detail to allow the potential impacts to be adequately assessed. Where there is potential for heritage assets with archaeological interest to be affected, this

description should be informed by available evidence, desk-based assessment and, where appropriate, field evaluation to establish the significance of known or potential heritage assets;

C. *The sympathetic and creative reuse and adaptation of historic buildings will be encouraged. Such proposals, and other proposals for enabling development that provide a sustainable future for heritage assets identified as at risk, will be considered in accordance with SWDP 24 A;*

D. *Where a material change to a heritage asset has been agreed, recording and interpretation should be undertaken to document and understand the asset's archaeological, architectural, artistic or historic significance. The scope of the recording should be proportionate to the asset's significance and the impact of the development on the asset. The information and understanding gained should be made publicly available, as a minimum through the relevant Historic Environment Record and where appropriate at the asset itself through on-site interpretation.*

1.4.2 The site is allocated for mixed use development comprising housing and commercial uses within the South Warwickshire Development Plan (Policy SWDP 53: Malvern Technology Centre). In reference to the wider site this policy states that:

Within the area identified on the Policies Map (26ha), a sustainable mixed-use development of 15.4ha (as identified as Area A on the diagram for SWDP53) will be provided including:

i. *At least 4.5ha of B1(b) (or associated uses) employment land;*

ii. *Provision of approximately 300 dwellings, of which up to 40% will be affordable housing in accordance with the requirements of policy SWDP15;*

iii. *Public open space and creational facilities including children's play facilities and informal open space, linking to green corridors, such as the common land to the south;*

iv. *Proposals for the development of the site will address:*

   a. *Vehicular access to the site through existing residential areas;*

   b. *Existing congestion in the vicinity of the current site entrances; and*

   c. *Segregation of employment and housing land uses.*

2 METHODOLOGY

2.1 Standards and Guidance

2.1.1 A Level 1 Historic Building Survey, as described by Historic England is a basic visual record. The visual record is supplemented by the minimum of information needed to identify the building's location, age and type (Historic England 2016).

2.1.2 A Level 3 Historic Building Survey, as described by Historic England, is an analytical record of a building or buildings which provides an introductory description followed by a systematic account of each building's origins, development and use. A building record to this level is appropriate when the fabric of a building is under threat, but time or resources are insufficient to allow for detailed documentary research, or where the scope for such research is limited (Historic England 2016).

2.1.3 The two levels of recording undertaken are considered to be thorough enough for each building given their low level of significance as non-designated heritage assets.

2.1.4 The survey was also undertaken following Historic England 'Understanding Historic Buildings: A Guide to Good Recording Practice' and the appropriate standards and guidance issued by the Chartered Institute for Archaeologists (CIfA 2014).

2.2 Level 1 Building Recording

2.2.1 The buildings subject to the Level 1 survey are shown in pink on Drawing BM11422-012 and labelled numbers 1 to 37 and include the buildings to the west of the Site known as S and T Blocks.

2.2.2 The Level 1 building recording comprised external observations, where accessible, only to produce a basic photographic record.

2.2.3 In summary the photographic record for each building comprised:

- A photograph of the building in its wider context;
- A series of oblique views of all external elevations, where accessible, to provide an impression of size and shape; and
- Photographs of any complex features at right angles.

2.2.4 The written record for each building comprised:

- A National Grid Reference for each building;
- A note of any designated status – in this case, none; and

- A summary of the building's type/function historically and at present, materials and date as far as is apparent from this inspection.

2.3 Level 3 Building Recording

2.3.1 The six buildings subject to the Level 3 survey are depicted as green on Drawing BM11422-012 and are known as H Building, Library Building, A, D, E and KF Blocks.

2.3.2 The recording comprised internal and external observations of the buildings, where accessible, to produce a photographic and written record. Photographs were taken of all external elevations and internal rooms, where possible, including structural architectural details, details of fixtures and fittings, and more general views showing the structures in their urban context. In summary, the photographic survey included:

- A photograph of the building in its wider context;
- A series of oblique views of all external elevations to provide an impression of size and shape;
- Photographs of any complex features at right angles;
- Photographs illustrative of original design intentions (known from documentary or inferred on Site;
- Internal photography to illustrate principal rooms and circulation areas (to demonstrate shape and size);
- External and internal details (structural or decorative) illustrative of the building's design, development and use (with scale where appropriate);
- Any machinery, plant or building contents which attest to its former use; and
- Any dates or inscriptions, signage or graffiti which contribute towards and understanding of the building (a transcription should be referenced where necessary); and
- Any copies of maps, drawings, views or photographs present within the building which attest to it of the Site's historic development.

2.3.4 The written record comprises:

- The precise location of the buildings as an address and in the form of a National Grid reference;
- The date when the record was made, the name(s) of the recorder(s) and the

location of any archive material;

- An introduction briefly setting out the circumstance in which the record was made, its objectives, methods, scope and limitations, and any constraints. Where appropriate the brief for the work or project design should be stated or appended;
- Acknowledgements to all those who have made a significant contribution to the making of the record, or who have given permission for copyright items to be reproduced;
- A discussion of the published sources relating to the Site and its setting, an account of its history as given in published sources;
- An analysis of historic map evidence (map regression) for each building;
- An account of each building's overall form (structure, materials, layout) and of its successive phases of development, together with the evidence supporting the analysis;
- An account of each building's past and present uses and the uses of its parts with the evidence for these interpretations including an analysis of the circulation pattern and an account of any fixtures, fittings, plant or machinery associated with the buildings, and their purpose; and
- Any evidence for the former existence of demolished structures or removed plant associated with the building.
- Selected copies of historic maps, views or historic photographs deemed appropriate to provide an understanding of the building; and
- A full bibliography.

2.3.3 The extent of the drawn record was established in consultation with Aidan Smyth, the MHDC Archaeology and Planning Advisor. The drawn record is considered to be secondary to the photographic record in this instance with the scope of the drawn record limited to the following annotated recently produced floor plans of:

- H building;
- A Block;
- D Block;
- E Block;

- KF Block;
- Library Building;
- Existing site layout plan;
- Building Development Plan; and
- Building Uses (as of 2004) Plan.

2.3.4 The drawn record also includes copies of the original floor, section and elevation plans for H Building, floor plans dated 1983 for H Building and an original floor plan for E Block dated 1940 which shows the typical arrangement to the original WWII HMS Duke buildings which are indicative of the extent and type of alteration undertaken to each of the remaining WWII building subject to detailed recording.

2.3.5 Drawings will be annotated, where relevant using the standard presented by Historic England in their 2016 guidance 'Understanding Historic Buildings: A guide to good recording practice'. Internal late locations will also be included on the floor plans.

2.4 Purpose and Aims

2.4.1 The purpose of the historic building recording is to comply with Policies SWDP 6 and 24 specifically SWDP 24D which requires documentation and interpretation be undertaken to understand the significance of an asset.

2.4.2 The general aim of the building recording is to document the buildings which are to be demolished.

2.4.3 The buildings originating from WWII and the 'H building' are of particular interest and have therefore been subject to a higher level of recording (Level 3).

2.4.4 The other buildings within the Site are of less interest and have been subject to the lowest level of recording (Level 1).

2.4.5 The buildings subject to the programme of recording include those within the planning application area proposed for redevelopment for dwellings and those within the wider centre for which demolition is also proposed.

2.4.6 The general aims of the building recording were to:

- disseminate the results of the building recording through an appropriate level of reporting; and
- ensure an accurate and comprehensive record as part of the archive to be

disseminated to the Lancashire HER.

2.5 Reporting and Project Archive

2.5.1 A digital copy of the report will be offered for deposition with the Worcestershire Historic Environment Record and with the Malvern Radar and Telecommunications History Society.

2.5.2 Wardell Armstrong supports the Online Access to Index of Archaeological Investigations (OASIS) project (http://www.oasis.ac.uk). The aim of the OASIS project is to provide an online index to archaeological grey literature that has been produced as a result of developer-funded fieldwork. Details of this project have been included on the OASIS database under the identifier **Wardella2-338721.**

3 HISTORICAL BACKGROUND

3.1 Introduction

3.1.1 This historical background has been compiled from information derived from historical mapping consulted online including early Ordnance Survey maps, from information published on MRATHS website and held within their archives and from planning information held online by Malvern Hills District Council. Information on similar building types and materials has been obtained from secondary sources including academic books and previous reports held by the Archaeological Data Service in their online grey literature library (consulted 2017).

3.1.2 Consultation with Worcestershire Historic Environment Record was for entries within the Site boundary was undertaken in 2017 as part of the preparation of an Archaeological Desk Based Assessment (Wardell Armstrong Report Reference BM11422-001).

3.1.3 Analysis of the HER data identified that several of the extant WWII buildings were recorded as non-designated assets (HER Refs: WSM42821, WSM69538, WSM42813, WSM29424 and WSM17187).

3.1.4 No previous building recording work is recorded within the application site area.

3.2 Historic Landscape Characterisation

3.2.1 The site is situated within Historic Landscape Character (HLC) type of 'Defence Research Establishment'. This HLC type makes up 0.03% of the County's total area in the current historic landscape character.

3.3 Aerial Photographs

3.3.1 Image 1 below, provided by MRATHS, shows the extent of the site in 1949 and arrangement of the original HMS Duke complex. The image is taken from the north east corner of the site facing south east. A Block, positioned to the base of the image, is clearly visible as are D Block and E Block within the centre of the image. KF Block is shown to the top right of the image as part of the original, larger F Block complex. The image depicts the former B and C Blocks which flank A Block as well G Block to the far right of the image which have since been demolished.

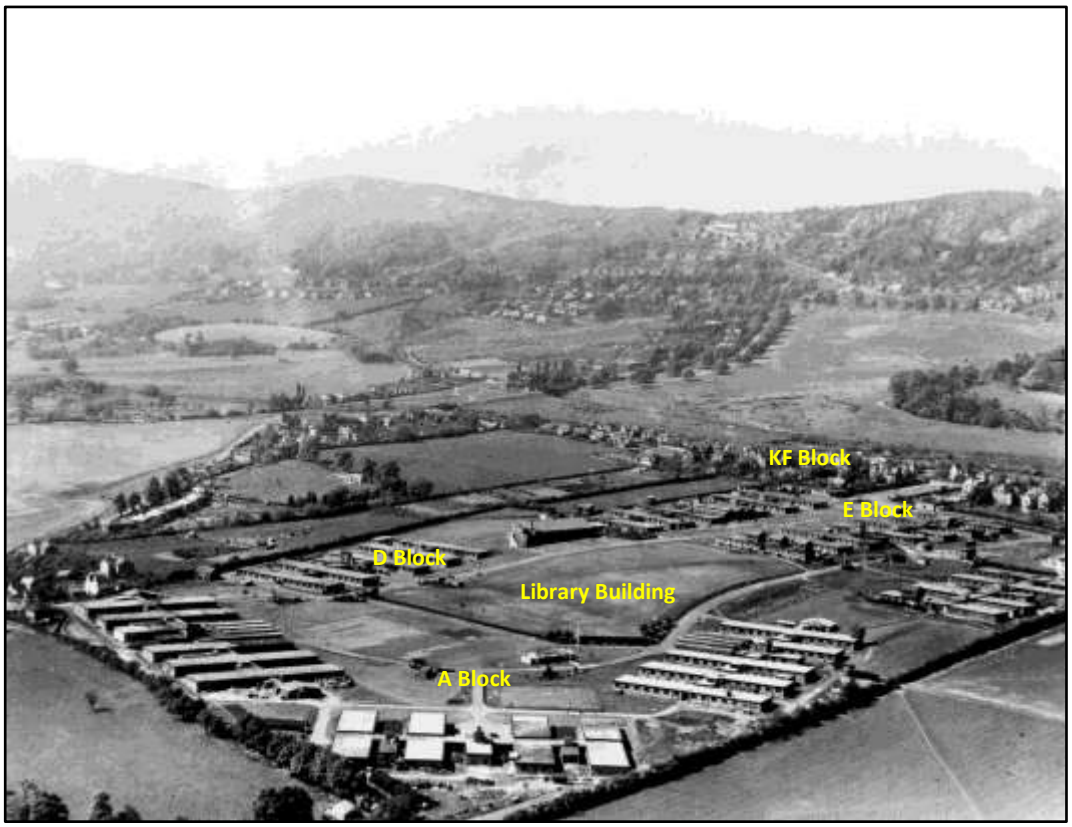

Image 1 – Copy of aerial photograph of the Site from 1949 (Image sourced from MRATHS digital archive and reproduced with their permission)

3.3.2 The image depicts projecting roof huts to E and F Block which according to MRATHS were added shortly after the occupation of the Site by the Telecommunications Research Establishment (TRE) in 1947 and housed radar equipment.

Image 2 – Copy of aerial photograph of the Site from 1972 (Image sourced from MRATHS digital archive)

Image 3 – Copy of aerial image of the Site from 1985 looking north west (Image sourced from MRATHS digital archives)

3.3.3 Due to the sensitive nature of the Site in the mid to late 20th Century, publicly available early aerial photographs are lacking. The earliest publicly available aerial photographs which show details of the Site and buildings are on GoogleEarth and date from 1999. The photograph shows a number of the original WWII buildings still standing on the Site including B Block and part of G Block. F Block had been replaced with M Block (depicted as Building Number 37 on drawing BM11422-012) with only KF Block remaining of the original building.

3.3.4 The 2005 GoogleEarth aerial photograph showed that B Block, positioned in the far eastern part of the Site had been demolished (HER reference WSM42813). To the north of the Site, a number of buildings had been erected and carparks constructed.

3.3.5 The 2009 GoogleEarth aerial photograph showed the Site as it is visible now, although at this time, it was still in use by Qiniteq.

3.4 General Historic Background

3.4.1 It is believed that the Site was not built upon until 1940 when it was developed by the military. The exact date of origin is not known, it was certainly present by 1942 as depicted within a Site plan of the same date however early drawings held by the MRATHS archive and included within Appendix 10 are dated 1940 and it is possible that the Site was established at the very outbreak of war.

3.4.2 The Site, known as originally as HMS Duke was used as an inland navel basic training establishment (HER references WSM42821, WSM69538, WSM42813, WSM29424, WSM17187 and WSM25017). However it is possible that the original intention for the base was related to the relocation of the Admiralty to Malvern College in 1939. Each of the original buildings were named after Naval admirals with the current names retaining the first letter of each original name; A Block after Anson, E Block after Effingham, D Block after Drake and KF (F) Block after Frobisher. H Building was so named following this alphabetical naming pattern and attests to it being the first building erected as part of the Telecommunications Research Establishment (TRE) Site.

3.4.3 Although it was disbanded in 1946 several of the original buildings still stand today. These are highlighted on Drawing BM11422-013. The original blocks of buildings accommodated various uses including general training, lecture rooms, administration, school, gymnasium, a morgue, cinema, staff quarters and WREN's quarters. The building depicted as number 8 on drawing BM11422-012 is known as Nelson, retaining

its original name and housing the gymnasium and cinema before later being used as the Theatre for the Telecommunication Research Establishment Theatrical Society (TRETS) until they relocated to Great Malvern in the late 1970s[1]. A block was also originally given over to the Surgeon-Captain as a sick bay.

3.4.4 After WWII, the former naval training establishment was adapted for use by the Telecommunication Research Establishment Unit who relocated to the Site in 1946.

3.4.5 During the war, the Telecommunications Research Establishment (TRE) had already established themselves at Malvern College relocating from London to continue their research. The TRE unit relocated in 1942, along with the Air Defence Research and Development Establishment (ADRDE), who had been based at Christchurch near Bournemouth[2]. The TRE and ADRDE were responsible for Radar (Radio Detection and Ranging) which had played a vital role in winning the Battle of Britain in 1941.

3.4.6 The relocation of these research units to Malvern became necessary following a special commando raid on German Radar station at Bruneval on the French Coast which captured information on plans for air attack on the TRE station at Swanage and their relocation to Malvern was undertaken with some urgency (Blumeneau, 1965).

3.4.7 It was during their occupation of Malvern College that Robert Watson-Watt of the TRE and his team invented radar; Radar was one element of an elaborate air defence system that had evolved during the Second World War, allowing identification of approaching hostile aircraft and enabling the accurate tracking of their courses. This information was then filtered and disseminated, to co-ordinate the response of the fighter interceptor airfields and the ground based anti-aircraft gun and/or missile batteries and was a significant contributor to the nation's defence strategy.

3.4.8 At the end of the Second World War over 200 radar stations defended the United Kingdom. By 1946, this was reduced to just 36 stations (of which only 26 were fully manned) sited between Flamborough Head and Portland Bill, in a strip known as the 'Defended Area' (Schofield, 2004).

3.4.9 The ADRDE occupied a Site at Pale Manor which became known as the 'North Site' when the ADRDE, soon renamed the Radar Research and Development Establishment

[1] https://mraths.org.uk/?page_id=638

[2] https://mraths.org.uk/?page_id=649

merged with the TRE in 1953. Following this merger, the establishment became collectively known as the Radar Research Establishment, becoming the Royal Research Establishment in 1957 after being renamed by Elizabeth II.

3.4.10 Soon after their relocation to the Site, the TRE began to make incremental changes to the internal arrangement of the buildings to accommodate their research functions as well as external alterations comprising the erection roof huts; these are clearly visible in the early aerial photography for the Site (Image 1 included above). Early plans held within the MRATHS archives show how A and E Block were readily adapted from their early configurations with new partition walls inserted within the former larger open plan spaces, which were likely used as dormitory accommodation originally. This pattern of adaptation to the interior spaces appears to have been consistent across each of the original blocks with matching internal brick tile constructed partition walls observed within each of the extant blocks.

3.4.11 Following the war, divisions between the western democratic and capitalist countries and the communist states of the east expanded and new political vocabulary emerged with Churchill announcing during a lecture in 1946 that 'The iron curtain had descended across Europe' (Cocroft and Thomas, 2003). Further demonstration of the west's resolve to counter the expansion of communism came in the signing of the North Atlantic Treaty in Washington in 1949 which led to the creation of the North Atlantic Treaty Organisation (NATO) which committed the United States to the defence of Europe.

3.4.12 The post WWII tensions were coined 'The Cold War' and one of the defining features of the 'war' was the stockpiling of nuclear weapons and arsenals to launch and carry weapons, by both the 'west' and 'east'. The argument from the west that neither side would risk launching a pre-emptive nuclear attack as long as a par between the two side was maintained; this became known as Mutually Assured Destruction (MAD) (ibid).

3.4.13 At a domestic level, the threat of nuclear destruction overshadowed spheres of national political, economic, cultural and scientific life. In response to the threat of incoming attacks, which within the immediate years following WWII were likely to come via air strike, the use of radar as part of a modern air defence system became critical once again. To ensure the defence work was ready military sites and airbases were bought back into use, with previous separate interceptor and operations function brought together (Cocroft, 1998).

3.4.14 The TRE, and later the Radar Research Establishment (RRE) were the leaders in radar research for the UK military and the RRE was responsible for the design of both the replacement radars for the Chain Home radars and the command and control systems for UK National Air Defence (MRATHS, 2017). The Malvern Site was instrumental in the development the technologies and systems that would form the basis of the early warning detection systems in the UK and the commonwealth. This was known as the 'Rotor' programme, an ambitious military engineering project to urgently modernise the UK's radar defence system initiated in the late 1940s with a priority on early warning systems.

3.4.15 The largest structures built as part of the 'Rotor' programme were the operations blocks or bunkers which were designed to be bomb-proof against armour piercing bombs. These bunkers were predominantly built underground or partially submerged. H building (HER reference WSM69538), was built in 1952 and has a prototype version of the Rotor R4 standard radar station building type for Sector Operations Centre (SOC) at its core.

3.4.16 Schofield (2004) notes that the importance of Research and Development establishments grew throughout the Cold War, also dubbed as 'The Scientists War' with dedicated and highly specialised test equipment becoming a common part of the defence estate of 20th Century Britain.

3.4.17 The Malvern site was therefore a very important base for the research and development of radar technology in the late 1950s into the 1960s with the site reputedly involved in the prototypes of the Type 80 Centimetric Early Warning (CEW) radar (Malvern Radar and Technology History Society, 2017) and the 'Linesman' project which offered the opportunity to have a fully computerised air defence system based on a mainframe computer. The consolidation of the existing technology offered by 'Linesman' meant that fewer radar were needed to monitor a much wider area (Cocroft and Thomas, 2003).

3.4.18 The Malvern site was used for the research and development of the United Kingdom Air Defence Ground Environment (UKADGE) in the 1970s. This programme took into account the 'Flexible Response' approach to air defence used by NATO and suggested further rationalisation of the existing radar sites.

3.4.19 Minutes from questions posed to the Minister for Technology in the House of Commons in 1968 attest to research being undertaken by Royal Research Establishment recording that the RRE are 'collaborating with private industrial firms

to keep them informed of the advanced development work in progress at Malvern and to discuss commercial and Market Plans'.

3.4.20 During the same period Malvern was also crucial in the research and development of other technologies beneficial to modern intelligence and warfare beyond radar. At the South Site, development and testing of early automated computers was underway and MOSIAC was installed in the North Site[3] and was used to calculate aircraft trajectories from data collected by radar.

3.4.21 Technologies were researched, developed and rigorously tested at Malvern with laboratories for replicating physical and tropical conditions that the technologies and their important components would be required to survive included within A Block and within Building 37 [4] (as identified on drawing BM11422-012).

3.4.22 Research into computers continued post WWII building upon the works by America and the Bletchley code breakers who used the ENIAC and Colossus systems, the TRE looked at options to improve memory capability and reliability. The TRE Automated Computer (TREAC) was constructed in 1950 in F Block which incorporated the latest research and technologies[5].

3.4.23 During the same period, integrated electronic circuit technology was being researched and developed and this technology is now included in every electronic device.

3.4.24 The South Site was involved in the development of Air Traffic Control systems which also saw the development of the development of the first touchscreen system in 1965, designed to benefit air traffic control operators [6].

3.4.25 In 1976 the Royal Research Establishment (RRE) at Malvern was merged with the Signals Research and Development Establishment (SRDE) to form the Royal Signal and Radar Establishment (RSRE).

3.4.26 A visit from the Queen in 1976 to confirm the name change, resulted in her being the first monarch to send an email which was sent between computers on the South Site using a standard programming language developed in collaboration between the UK

[3] https://mraths.org.uk/?page_id=582

[4] https://mraths.org.uk/?page_id=495

[5] https://mraths.org.uk/?page_id=633

[6] https://mraths.org.uk/?page_id=531

and the USA [7].

3.4.27 Other collaborative work between the UK and the USA is noted by former employees with joint intelligence activities into the collection and interpretation of radar, electronic and photographic information and data undertaken within the security of the former Rotor bunker within H Building; its internal configuration and inclusion of faraday cages and sound proof office and conference rooms (as detailed in Section 4) specifically designed to offer high level security and privacy to the employees.

3.4.28 Later research saw the creation of MALMAG which was developed on the South Site. This was a patented process developed in the 1980s to improve silicon chip production through improving crystal quality and uniformity by controlling adverse effects of forced convective flow by electromagnetism [8].

3.4.29 Laser research was also undertaken and was used to understand the benefits of photon entanglement in to transmit the 'keys' used to encrypt information for secure communications[9]

3.4.30 The Site later became known as DRE (Defence Research Establishment) Malvern in 1991, followed by DERA (Defence and Evaluation Research Agency) Malvern in 1995; these agencies forming the science and technology divisions of the Ministry of Defence.

3.4.31 In 2000, DERA was dissolved with the private arm known as Qinetiq and the government arm renamed Dstl (The Defence Science and Technology Laboratory). The Site continued to operate under Qinetiq before being abandoned in late 2008 when Qinetiq relocated to new science park to the north of the Site.

3.4.32 Today, the Site is disused and comprises a complex of WWII and later buildings in a deteriorating condition.

3.5 Map Regression

3.5.1 Map regression of the Site has been based on the available Ordnance Survey Mapping and copies of Site Plans held by MRATHS.

3.5.2 The first mapping available for the Site was a Site Plan dated 1942 held by MRATHS

[7] https://mraths.org.uk/?page_id=588

[8] https://mraths.org.uk/?page_id=2905

[9] https://mraths.org.uk/?page_id=2866

(See drawing BM11422-018). The plan shows that the original complex comprised seven large blocks of the distinctive connective 'H' plan form named A to G block consecutively. These large blocks are placed around the perimeter of the naval base and were served by a single road identified as 'Main Road' and which is now named T.R.E Road to the south and the R.R.D.E Road to the north that extends through the site with a distinctive semi-circular loop to the east.

3.5.3 Also depicted within the complex at this time is a Church of England Chapel. This structure is shown close to the site currently occupied by H Building and it is likely the sub-station (building 23) occupies the footprint, in part of the original chapel.

3.5.4 To the south of this chapel on the site now occupied by H Building and its former car park is a parade ground, this area of the Site providing an expanse of level ground.

3.5.5 To the west of the chapel the extant Library Building is depicted as single rectangular structure and labelled as a lecture room.

3.5.6 To the north west corner of the complex is the canteen building and the Ship Company Civilian Mess; both of these buildings fall outside of the current Site boundary and have since been removed.

3.5.7 Nelson building (Building 8) is depicted as 'Gymnasium and Cinema' and comprises a rectangular block aligned east to west sandwiched between F Block and D Block which are both shown in their original configuration; F Block consisting of 12 projecting spurs connected by an east to west aligned central corridor range and D Block consisting of 10 projecting spurs connected by an east to west aligned central corridor range.

3.5.8 A later plan available for the Site is dated 1957 (see drawing BM11422-020). This plan depicts the development of the naval complex following the relocation of the Telecommunication Research Establishment (TRE) to the Site in 1947 and the subsequent merging of the TRE with the ADRDE (Air Defence Research and Development Establishment) to become the Royal Research Establishment (RRE).

3.5.9 New development within the Site comprises H Building and J Block (building 37) both located to the north east corner of the site. A giraffe building (building 29) is also shown located to the south east corner of spur 7 of A Block.

3.5.10 The original connective 'H' plan blocks are shown to be unchanged.

3.5.11 The boundary of the original naval complex as depicted in 1942 had been altered by 1957 with expansion to the north and west and south west; to the south building 3

(known as K Building) is depicted as rectangular structure aligned east to west and positioned to the south of F Block. To the north west, a further rectangular block is shown close to the mess building.

3.5.12 A junction to the north of T.R.E Road is shown and is depicted to lead to the Engineering Unit.

3.5.13 The 1963 Site Plan (drawing BM11422-021) shows further development to have occurred within the north east corner of the Site; BY Block (Building 24) has been erected and J Block has been extended to the east to house a centrifuge test chamber.

3.5.14 A Block has been subject to extension between spurs 1 and 3 and spurs 2 and 4 completely infilled.

3.5.15 The chapel building is still depicted on this plan to the north of H Building.

3.5.16 To the west of the chapel, the lecture theatre has been extended to the south east.

3.5.17 Further small-scale development has been undertaken to the south west corner around K Building (building 3) with building numbers 5, 6 and 7 depicted in part; building 7 is depicted as Highfield House.

3.5.18 A building is depicted to the south west of Nelson and may form the most western part of building 9 (known as N Block).

3.5.19 Building 1 the former guard room is depicted as 'Police Lodge' which provides some evidence as the security required on the site.

3.5.20 The most southerly end of Spur 3 of D Block is depicted as 'Surgery'.

3.5.21 The former mess block positioned to the north west of the complex is depicted as the 'Canteen'.

3.5.22 There is no key accompanying the plan to understand the different colours and hatching applied to some of the buildings however the buildings identified as being black are mainly public buildings and this coding could infer that they are open to the public. The buildings shown hatched are principally concentrated to the north west corner of the Site and comprise A Block, BY Block (building 24) and H Building as well as parts of the now demolished C and B Blocks. Some sections of F Block, K building and E Block are also hatched. It is possible that the hatching identifies these buildings/parts of buildings as research labs.

3.5.23 The first publicly available mapping for the Site is the 1967-73 Ordnance Survey Map

(drawing BM11422-022). By the this time the central part of the F Block had been demolished with Block M (building 37) erected; the most easterly extent of F Block comprising spurs 1 to 6 and the most westerly extent comprising spurs 11 and 12 are shown to be retained as a smaller blocks.

3.5.24 Building 9 (N Block) has been extended to the east and further extension has been undertaken to the south west around building K.

3.5.25 The chapel to the north of H Building has been removed and sub-station is now shown.

3.5.26 The most westerly spurs (9 and 10) of Block D have been removed with this block now having a symmetrical arrangement. To the west of the remains of D Block are two boiler houses with four flues.

3.5.27 Extensions to spurs 4, 9 and 12 of E Block comprising rectangular units set perpendicular to the spurs are depicted.

3.5.28 A Site Plan dated 1977 (drawing BM11422-023) appears to have been produced as part of the construction of building 21 (Q Block) which depicts a contained and secure driveway to access this building for contractors from the north west of the larger Technology park complex.

3.5.29 The main developments to have occurred between the 1967-73 OS map and 1977 are the erection of building 21 (Q Block) and the extension of Nelson building (building 8) to the north.

3.5.30 A Site Plan produced in 1990 (drawing BM11422-024) identifies that buildings 10, 15 and 17 (known as NX, EX and ET Blocks respectively) were added during this period. These buildings are all located within the eastern half of the site with little development noted to the buildings within the western half.

3.5.31 The most recent additions to the Site consisted of buildings 26 and 27 which were erected sometime in the early 1990s to support the commercial arm of the Defence Research Agency/Defence and Evaluation Research Agency.

4 HISTORIC BUILDING RECORDING

4.1 Introduction

4.1.1 The building recording was undertaken on 13th and 24th September 2019. Weather conditions varied between the visits with dry and bright conditions experienced on the 13th and wet, windy and overcast conditions experienced on the 24th September.

4.1.2 Table 1 below and paragraphs 4.3.1 to 4.8.48 inclusive should be read in conjunction with drawings BM11422-026 – BM11422-030 annotated by Wardell Armstrong and included within the appendices of this report.

4.1.3 The Site comprises a variety of extant building structures that originate from c.1941, when the site was originally developed during WWII as a naval training base known as HMS Duke, through to the late 20th Century. The Site retains carparks and roads, and an area of grassland in the north. It is bound by a metal fence with authorised access within the Site only. None of the extant buildings within the Site were in use and it was apparent that the buildings had been subject to vandalism, unauthorised access and anti-social activities.

4.1.4 The Site is situated on an east-facing slope, which is at approximately 80m AOD (Above Ordnance Datum) in the west and at approximately 61m AOD in the east.

4.1.5 The Site is enclosed by residential developments to its south, west and east (in part) boundaries. The Chase School bounds the site to the north east and the existing Malvern Technology Centre, occupied by Qinetiq, directly bounds the Site to the north. Within its wider setting, the Site lies to the east of the Malvern Hills Area of Outstanding Natural Beauty which forms an impressive backdrop to views westwards through the site. The sloping topography of the Site also offers far reaching views eastwards from the site over Worcestershire.

4.1.6 A series of existing estate roads serve the site; Poolbrook Way, T.R.E Road and R.R.D.E Road are the main arterial routes through the Site and cross the Site on an east to west axis. Minor connective roads run on a north to south axis between the main routes.

4.1.7 Access to the interior of the extant buildings was limited to those buildings subject to the Level 3 survey only as set out within the agreed WSI. These buildings, A, E, D and KF Blocks, Library Building and H Building, are depicted as green on drawing BM11244-012.

4.2 Level 1 Building Recording

4.2.1 Table 1 below provides details of the extant buildings on site that are subject to the basic Level 1 Building Recording. These buildings are depicted as pink on drawing BM11422-012.

4.2.2 Within this report, the majority of the buildings subject to the Level 1 record are referred to numerically in accordance with the numbering sequence labelled on drawing reference BM11422-012. Where the original building reference is known this is referred within the building description column.

TABLE 1 – LEVEL 1 BUILDING RECORDING

Building Reference (As shown on drawing ref BM11422-012)	Date of Record	NGR	Building Description	Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)
Building 1	24/09/19	SO 78256 44632	Former Guard Room. Depicted on 1942 Plan of HMS Duke and formed part of the original WWII complex. Shown on later plan as the police room. Single storey flat roof brick building with rendered brickwork to the south elevation and painted brickwork to the west. Renewed windows and doors in a mix of white UPVC and timber. Main entrance frontage face north towards the former main gate and is symmetrically arranged. The entrance is defined by a central glazed timber frame door flanked by glazed side lights. The entrance is flanked by two three light casements. Later extensions to the north and west identified by a change in brickwork. A timber veranda is present to the east elevation.	1a, 1b, 1c, 1d, 1e, 1f
Building 2	24/09/19	SO 78281 44577	Date of origin unknown. Possibly shown as 'Tank' on 1967-73 Ordnance Survey	2a

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			map. Positioned to the immediate north of Building 3 (K Block) and likely is ancillary to the operations of K Block. Single storey building of corrugated metal cladding to match building 3, rectangular plan form with very shallow gabled corrugated metal sheet roof. No windows were observed to the north, east and west elevations. The building appears to have been refurbed contemporary with the refurb of Building 3 and possibly conceals an earlier building or structure relating to the late 1950s.	
Building 3	24/09/19	SO 78285 44562	Positioned in the south west corner of the Site. Known as K Block. Main block is rectangular in plan form with later extensions to the south and west. Rectangular block is aligned roughly east to west through the site. It is first depicted on a 1957 Site Plan as a hashed outline however has been subject to extension to the south and most recently in west (early 2000s) when an entrance lobby was added. Aerial photography held by MRATHS identifies that the extant building has been subject to significant modification and has been substantially reduced in scale with the southern addition shown on the 1967-73 Ordnance Survey plan being multi-storey. These modifications were undertaken in the mid-1990s when the building was refurbished under planning reference 94/00064/CRO. No evidence of the earlier configuration or removal of former additions was observed due to the cladding of exterior.	3a, 3b, 3c, 3d, 3e, 3f, 3g

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			The extant building comprises a large block of industrial character; the main range is four storeys with single storey additions to the south and west. Clad in modern grey panels with recessed grey metal windows to the upper storeys. Ground floor is of green corrugated metal cladding. Main roof comprises shallow gabled roof aligned east to west with grey metal sheet covering. Lobby extension to the west elevation defines the main frontage and is orientated towards the main gate entrance from St Andrew's Road. Lobby is of dark blue/grey brickwork with full glazed panels. The building housed laboratories specialising in scientific materials research, specifically activities focusing upon the development of new electric materials. The technologies investigated in K Block have been used to inform the materials used in X Ray detection amongst others.	
Building 4	24/09/19	SO 78258 44546	Known as KX building. Positioned in the south west corner of the Site and close to Building K. L plan form set perpendicular to K Building and is connected via a covered external walkway which along with proximity suggests a former functional connection. First depicted on the 1990 Site Plan, likely erected sometime between 1977 and 1990. Most recently used for office accommodation. Single storey building with pebbledash render panel walls set on a red brick base; timber door in the east elevation of the base reveals the internal ground level raised up above the external	4a, 4b, 4c, 4d, 4e, 4f

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			ground level likely to take account of the declining topography of the Site generally from west to east. Windows and doors are UPVC.	
Building 5	24/09/19	SO 78285 44546	First depicted on the 1990 Site Plan. Located immediately adjacent to the west elevation of a single storey south addition to K Block (building 3). Single storey red brick (Stretcher Bond) building with a flat felt covered roof. East and north elevations not visible due to position of the adjacent building however the west elevation is blank with paired, timber door painted white positioned off-centre (right) of the south elevation. Lack of openings and proximity to K Block are indicative of its ancillary function, possibly as a plant room.	5a
Building 6	24/09/19	SO 78311 44534	Building appears to be present in a reduced footprint on the 1963 Site Plan. 1967-73 Ordnance Survey plan depicts the building to its current extent. The building is positioned close to the southern boundary of the Site, to the south east of the single storey addition to K Block (Building 3) and to west of Building 7. Identified to have most recently been used as offices however the external configuration suggest it has more likely been used as storage, possibly ancillary to office use. Small building of red brick construction laid in a stretch bond with a flat felt covered roof. The north elevation faces a small area served by an access road and contains two sets of double timber garage doors; those to the right side being slightly larger. The left	6a, 6b, 6c

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			half of the building is taller, this half possibly been added sometime after the 1963 Site Plan, with the garage doors being positioned under an obscurely glazed over-light. Smaller, square plan addition to the east elevation. This addition is set back from the main north elevation and contains a single half glazed timber pedestrian door. Access to the door is ramped with grab rails set either side. South elevation not observed due to vegetation growth. Connected to Building 7 by a covered walkway/storage area.	
Building 7	24/09/19	SO 78339 44542	Multi-phase building located to the south of the Site to the east of Building 3 (K Block). It is first depicted on the 1963 Site Plan as Highfield House and more recently known as O Block. The Building extended to the south and east by time of the 1967-73 Ordnance Survey map with further addition added to the east by 1977. Single storey building with first floor concrete range over part of the southern. Red brick construction laid in a stretcher bond with flat roof, rendered plinth in part. Windows are mix of timber and UPVC. Later plant additions to the west elevation. Most recently used as offices and labs with internal evidence of laser testing within the southern half of the building as attested to by an extant laser warning alarm and sign. Building was used for a significant period of time for super conductive research where large magnetic fields would be created to investigate ways to insulate electric supplies and reduce loss. Later addition to the east comprises concrete pre-fab	7a, 7b, 7c, 7d, 7e, 7f

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			garage structure which displayed evidence to the interior of being used for vehicle repairs.	
Building 8	24/09/19	SO 78467 44610	Known as Nelson building. Multi-phase building comprising two adjoining rectangular ranges connected by a central flat roof extension. Both ranges are orientated east to west. Main entrance frontage faces north towards T.R.E Road. Comprises two distinct phases, entrance housed within later phase. To the south are buildings 9 and 10 (N and NX Blocks). Original phase is to the south. Brick gabled building with rectangular plan form. Two storeys in part. Most recently used as conferencing facilities with primary pedestrian access via the north and east elevations of the north range. North range is a later addition first appearing on the 1977 Site Plan. It is of simple appearance extending to two storeys under a flat roof. External walls are pebble dash concrete panels and windows have been renewed in UPVC and have a strong horizontal emphasis. South range comprises the original building. This range is present on the 1942 Site Plan and formed part of the original HMS Duke complex and is depicted on the 1942 Site Plan as 'Gymnasium/Cinema'. This range was used by the TRE Theatrical Society until 1977. The original range is of red brick construction laid in a stretcher bond. It has a gabled roof which has renewed metal roof covering and renewed metal fascia boards. At the east and west ends are two storey tapered projections with flat roofs; that to the west has oculi	8a, 8b, 8c, 8d, 8e, 8f, 8g, 8h, 8i, 8j, 8k, 8l, 8m, 8n, 8o

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			windows. To the east an external brick staircase leads to a bricked-up former doorway. South elevation presents phases of alteration with altered windows and an inserted galvanised metal roller shutter door suggesting vehicular access was necessary to the interior space which still retains the proportions and sense of scale of an auditorium.	
Building 9	24/09/19	SO 78452 44575	Known as N Block. The building is positioned towards the southern boundary of the Site and is bound by Poolbrook Way to the south and Nelson Block to the north. The building is adjoined to NX Block (Building 10) by a glazed first-floor walkway extending from its east elevation. The extant building is of rectangular plan form aligned roughly east to west through the site. It is of single storey and two storey construction; the eastern extent being two-storey where the design of the building has taken account of the sloping topography and to the west and north the building appears to be single storey. The building has a flat roof and is of pre-fab brick panel construction where each metal frame panel is bricked to the bottom half and glazed to the upper half. The brickwork is dark brown and matches that used to Buildings 18 and 19 which is suggestive of these building forming a contemporary phase of development within the Site. There is a UPVC porch addition to the west elevation with the main entrance provided to the south east corner where the first floor creates an overhang to the recessed main entrance. The building is multi-phase in	9a, 9b, 9c, 9d, 9e, 9f, 9g, 9h, 9i, 9j

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			its development; the western third of the building is the earliest phase with this section first depicted on the 1963 Site Plan. The building was purpose built as a computing research facility and designed to the specification of Philip Woodward, a noted scientific researcher who had worked for the TRE since 1942, and who built and developed the REACT computer. The original building is rectangular in form however it is aligned north to south and is positioned parallel to spur 2 of the former F Block. By the time of the 1967-73 Ordnance Survey map, the building has been extended to the east to its extant footprint. It is likely that the original west building was re-fronted/re-furbished as part of these later works given the consistency in appearance across the building phases. The phasing of the building is more apparent in aerial photography where the changes in roof join are clearly visible.	
Building 10	24/09/19	SO 78484 44565	Known as NX Block and adjoined to N Block by a first-floor walkway extending between the west elevation of NX Block and the east elevation of N Block. The building is first depicted on the 1990 Site Plan and was therefore likely erected sometime between 1977 and 1990. The building is aligned north to south with rectangular plan form. It is partially two storeys in height to the south where the design, similar to N Block, has taken account of the changes in topography; to the north the building appears to be single storey with this northern portion of the building supported on concrete pillars visible from the south. It is of pebble dash	10a, 10b, 10c, 10d, 10e

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			concrete panel construction supported on a metal frame with a flat roof. Windows are regularly spaced and arranged within the panels of the exterior and comprise metal framed casements. Building has most recently been used for offices, the arrangement of windows and the connection to N Block, also offices, indicative of this former use.	
Building 11	24/09/19	SO 78280 44684	Depicted on the 1942 Site Plan and forms part of the original ancillary buildings to support the operation of the WWII. Former sub-station that retains some pipework to the interior. Small, 4 bay wide rectangular building located to the south of spur 1 of E Block. To the north elevation each bay is defined by paired timber doors painted blue. Each bay defined by brick walls to the interior. Single concrete step leads to each set of doors. South, east and west elevations are blank. Building is of painted brickwork construction laid in a stretcher bond with flat, felt covered roof.	11a, 11b
Building 12	24/09/19	SO 78286 44691	First depicted on the 1967-73 Ordnance Survey plan. Likely former sub-station. Most recently identified as being ancillary to the operation of the laboratories. Small building of painted brickwork construction with flat roof, wide timber fascia board and painted timber boarded doors to the west and east elevations. North and south elevations blank. Positioned to the north of building 11, a larger sub-station and to the south of spur 1 of E Block.	12a, 12b

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
Building 13	24/09/19	SO 78297 44710	First depicted on the 1990 Site Plan. Two storey rendered brick and concrete blockwork building with a flat roof positioned between spurs 1 and 3 of E Block. Rectangular plan form aligned north to south with the spurs. No windows observed; south elevation is blank with louvered openings noted to the east and west elevations. Door access present in the west elevation. Noted to have used most recently as storage however the internal fixtures suggest it was used for research/testing.	13a, 13, b, 13c
Building 14	24/09/19	SO 78303 44740	This range is depicted on aerial photography from 1999 and was erected sometime between 1990 and 1999. The building is a single storey demountable type structure with timber plinth and stepped access to the west elevation. The building is aligned north to north and is positioned between spurs 2 and 4 of E Block however is detached from the main block with no internal or covered access connecting the two buildings directly. The arrangement of windows suggests it was well lit and likely comprised ancillary office accommodation in connection with research activities being undertaken in E Block.	14a, 14, b, 14c, 14d
Building 15	24/09/19	SO 78329 44679	Known as EX Block. First depicted on the 1990 Site Plan and erected under planning reference 85/02140/CRO in 1985 and later extended to the west in 1997 under planning reference 97/066/8/CRO. The building is located to the south of E Block,	15a, 15b, 15c, 15d

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			specifically to the south of spurs 3, 5 and 7 with internal access between the buildings via a single storey, solid, narrow link addition from spur 5. The building presents a simple architectural configuration and appearance and is aligned east to west, perpendicular to the spurs on E Block. It is two storeys in height with a flat roof. The external construction is concrete panels with a contrasting, narrow panelled band between ground and first floor level. Windows are flush to the external elevation and comprise narrow metal casements with tip opening top-lights.	
Building 16	24/09/19	SO 78409 44666	First depicted on the 1990 Site Plan. Small, roughly rectangular plan building located to the south east corner of spur 11 of E Block. Rendered blockwork construction with timber fascia and cast-iron guttering matching the sub-stations to the west of the Site (Buildings 11 and 12). Compact two storey building (as identified by an internal stair). Blank south, east and west elevation with timber boarded doors to the north elevation revealing plant equipment.	16a, 16b
Building 17	24/09/19	SO 78446 44680	Known as ET Block. This building is attached to E Block via a narrow link addition that extends east from the central corridor of E Block. The building is large scale, aligned north to south through the site and accessed from R.R.D.E Road to the north and bound by T.R.E Road to the South. The building has a clear industrial character	17a, 17b, 17c, 17d, 17e, 17f, 17g, 17h

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			created through its external appearance and construction materials which comprise corrugated metal cladding elevations set on a dark red brick plinth. The elevations are plain in appearance with large industrial roller doors to the north and east elevations with loading bays indicative of the former requirement for deliveries/export from this building. To the east elevation there is significant plant equipment and flues extending from the building further evidencing the former industrial activities that were undertaken within the building. The building is first depicted on the 1990 Site Plan however a review of the planning history for the Site reveals that the building was erected in the early 1980s under planning reference 83/02037/CRO as a silicon processing and evaluation laboratory (SPEL). The SPEL function had previously been undertaken within the central north projection of E Block (between spurs 8 and 10) before it's relocation to the purpose built facility.	
Building 18	24/09/19	SO 78508 44582	First depicted on the 1967-73 Ordnance Survey map. Occupies the Site of most easterly wing of D Block (Spurs 9 and 10) which appears to have been demolished to facilitate the erection of buildings 18 and 19 sometime between 1963 (date of Site Plan) and the time of the 1967-73 Ordnance Survey. The building is positioned to the immediate north of building 19 which comprises the main boiler house. Dark brown brick building with concrete vertical bands. Construction matches that of building 19 and they are likely contemporary built to provide suitable power	18a, 18b, 18c, 18d

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			infrastructure to the site. The building is single storey with a flat roof. There is an external storage compound to the east which is enclosed by matching dark brown brick to the south, east and west and metal security gates to the north. A single pedestrian door in the north elevation provides access to the main interior spaces which is subdivided by partition walls. To the right of the door are metal louvered vents. To the west elevation there are two further timber doors. To the south there are the remains of a block addition/compound which partially conceals/encloses the south elevation. The south elevation contains two sets of double timber doors with louvered vents.	
Building 19	24/09/19	SO 78511 44560	Known as the main boiler house. It is first depicted on the 1967-73 Ordnance Survey Map. The building occupies the site of the most easterly wing of D Block (Spurs 9 and 10) which appears to have been demolished to facilitate the erection of buildings 18 and 19 sometime between 1963 (date of Site Plan) and the time of the 1967-73 Ordnance Survey. The building comprises a two-storey range to the range with three, large external metal stacks to the north. A pipe extends from the south elevation connecting to Building 20. The building is of matching dark brown brick construction laid in an English bond with vertical concrete banding as Building 18 and the two are assumed contemporary in origin. To the east is a single storey addition. The west elevation has five square windows set below the eaves with a	19a, 19b, 19c, 19d

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			continuous window range and double doors to the east elevation. To the interior the building retains the large boilers connected to the external stacks.	
Building 20	24/09/19	SO 78506 44544	First depicted as a separate building on the 1990 Site Plan. This plan suggests the building was formerly attached to building 19 or forms part of later works when building 19 was altered. This building appears to house the main gas supply to the Site with a large yellow coated pipe, leading from building 19, entering the building through its east elevation. Small, rectangular single storey building of red brick construction and flat, felt covered roof. There are two louvered timber doors painted blue positioned within the north and south elevations. East and west elevation are blank. The building is positioned to the immediate south of building 19, identified as being the main boiler house and is therefore likely related to the operation of building 19.	20a, 20b, 20c, 20d
Building 21	13/09/19	SO 78594 44658	Known as Q Block. First depicted on the 1977 Site Plan which shows the construction traffic route through the Site to access this building. A large dark red/ brown brick building positioned within the eastern portion of the Site. It is located to the north of D Block and to the south west of H Building. The building extends to three storeys with a flat roof. The building comprises two distinct sections; the main range is of six bays, each bay having three pairs of recessed, two light casement windows with	21a, 21b, 21c, 21d, 21e, 21f, 21g

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			angled brick sills, those windows to the centre being spaced slightly further apart. The second section comprises the entrance block. This block extends to three storeys and is attached to the main range via a glazed stair link. The building has most recently been used as offices however it was originally constructed to undertake the computer operations associated with the activities being undertaken in H Building to modernise UK air defence which had outgrown H Building. The functional association between Q Block and H Building is not readily apparent however with only their relative close proximity indicative of some possible shared operation.	
Building 22	13/09/19	SO 78621 44735	First depicted on the 1963 Site Plan where it is shown to be immediately adjacent to the former Church of England Chapel building, shown to be extant in 1963. Small, single storey red brick building located to the north west of H Building, this position and matching red brick construction suggesting they are related in function and the building is assumed, due to its small scale to form part of the ancillary plant rooms serving H Building. Rectangular plan form with later red brick enclosed porch addition to the south elevation as identified by a change in brickwork. Blank east, west and north elevations however the west elevation presents evidence of bricked up window and door openings and the function and/or orientation of the building has likely been altered when the front addition added; the brickwork to the former	22a, 22b, 22c, 22d

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			opening match that used on the front addition.	
Building 23	13/09/19	SO 78645 44724	First depicted on the 1967-73 Ordnance Map. Former electricity sub-station building serving H Building. Light brown brickwork construction laid in a stretcher bond with a flat felt covered roof. Building is single storey, compact rectangular in plan form aligned east to west and positioned to the north of H Building. Building is located adjacent to the site of the former Church of England Chapel depicted on the original 1942 Site Plan and shown present on the 1963 Site Plan, it is therefore assumed that the sub-station is not contemporary with H Building which was erected in 1952 and was required to support technology research function of H Building at a later date. The building retains painted, boarded timber doors to the north and south elevations with three high-level square timber windows to the east elevation.	23a, 23b, 23c
Building 24	13/09/19	SO 78698 44711	First depicted on the 1963 Site Plan however it is believed to be of late 1950s origin being associated with the 'Linesman' programme which evolved from Rotor; Linesman being the name given to the military air control operations and 'Mediator' referring to the civil operations. The building is an irregular shaped, large building complex, known as BY Block, located to the north east of H Building within the north east corner of the Site. The	24a, 24b, 24c, 24d, 24e, 24f, 24g, 24h, 24i, 24j, 24k, 24l, 24m, 24n

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			building appears to have been subject to minor extension to the south and the north east. The building is of red brick construction extending to two storeys and set under a flat roof. Single storey elements extend to the south and east. The brickwork is sub-divided in parts of the west elevation by painted concrete banding, this likely for structural support rather than any aesthetic intention; this banding relating to the area of the building which supported a large, external radar satellite dish. Windows are renewed in UPVC with a mix of timber and UPVC doors. To the west is a two-storey projection which formerly accommodated a large external radar satellite dish; this is depicted on aerial photography held by MRATHS from 1985 and shown to be in situ on publicly available aerial photography from 1999, however it appears to have been removed from the building by the time of 2005 aerial imagery. The building has most recently been identified as being in office and laboratory use however it was constructed as a Type 85 prototype radar bunker, these were code-named Blue Yeoman from which the initials BY have been retained as the building's name. The building formed part of the research and development of radar technology to improve the early warning system for UK air defence and live radar feeds collected by the radar satellite were fed into H Building (MRATHS, 2017). H Building and BY Block have a functional association in that they were both developed as prototype buildings under ROTOR and Linesman with the aim of	

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			modernising UK air defence and air traffic control.	
Building 25	13/09/19	SO 78721 44698	Small L plan building of single storey scale positioned to the south east of Building BY (Building 24). Possibly depicted on the 1957 Site Plan although this building looks larger than that present and those shown on later Site Plans. It is depicted clearly on the 1967-73 Ordnance Plan. The building is rendered with a flat roof. Slightly lower and narrower addition to the north elevation which creates the L plan form. Windows and doors are painted timber. Most recently identified as being ancillary to B1 office and lab use. Likely housed plant/services to aid the operation of BY building and possibly B Block, formerly located to the south, prior to its removal in the late 2000s.	25a, 25b, 25c, 25d
Building 26	13/09/19	SO 78644 44568	First depicted on aerial photography from 1999. Two-storey office building, known as DX Block, located within the south east corner of the Site close to the former Poolbrook Way Gate entrance. Rectangular plan form aligned north to south and set parallel to the most eastly wing (Spurs 1 and 2) of D Block. Main entrance to the office building is located within the west facing elevation and is aligned with the east facing central entrance to D Block. The building is of modern appearance with red brickwork walls and buff and blue brickwork used to add variation to the elevation in the form of storey bands, false oculi windows and recessed panels. The	26a, 26b, 26c, 26d, 26e

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			roof is gabled and covered with clay tiles. The main entrance is defined by a small gablet and glazed, gabled porch projection aligned below. The building is of 27 window range to the west with the windows spaced evenly and regularly to this elevation. The north and south elevation each contain an external metal fire stair. The east facing elevation has similar brickwork detailing however the pattern of fenestration varies from the west elevation. The building is of matching materials and design as Building 27 which suggests they are of contemporary construction. The building was erected to provide office accommodation for the commercial arm of the Defence Research Agency in the early to mid-1990s.	
Building 27	13/09/19	SO 78667 44572	First depicted on aerial photography from 1999. Single storey building, known as BX Block, located within the south east corner of the Site. Aligned south east to north east, this alignment reflective of the building's position at the Poolbrook Way gate and its function as a reception area to visitors attending Site; these visitors likely being related to the growing commercial element of the DRA/DERA. Rectangular in plan form with a gabled tiled roof. Materially coherent with DX Block (Building 26) with buff brick walls, red brick plinth and blue brick used for banding this being indicative of their contemporaneous origins and related function. The main entrance is positioned to the south east elevation and is defined by an external glazed canopy. Windows and doors are UPVC with a disabled access ramp, partially	27a, 27b, 27c, 27d

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			concealed by vegetation along the north east elevation.	
Building 28	13/09/19	SO 78743 44696	First depicted on the 1957 Site Plan and labelled as 'Giraffe House (B)' on the 1963 Site Plan. Most recently identified as being used as a laboratory. The name giraffe house relates to the height of the building which is reputed to have been used a workshop for the assembly of equipment being research, developed and tested within the Site. The building is rectangular in plan and aligned roughly east to west. It is of red brick construction with a sheeted, flat roof covering which to the interior was observed to be supported on metal joists and beams. The north and south elevations are identical with a band of 13 square high-level windows set just below the eaves level of the building and five two light casement windows at ground floor level. The building is single storey however is open full height to its interior and retains full height opening to the west elevation; the opening to the east elevation appears to have reduced in scale with later brick infill to the upper section.	28a, 28b, 28c, 28d, 28e
Building 29	13/09/19	SO 78749 44715	First depicted on the 1967-73 Ordnance Survey map. Located to the north of the Building 28 (Giraffe House) and likely ancillary to its operation. The building was significantly obscured by vegetation, however it comprises a single storey roughly square plan building with sliding double door opening to the south elevation and a single window to the north elevation. Interior was observed to be plastered with	29a

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			tiled floor covering. Identified in 2004 as being used for storage.	
Building 30	13/09/19	SO 78782 44783	First depicted on the 1957 Site Plan. Positioned to the north of A Block and aligned north to south. Rectangular in plan form and constructed on shuttered concrete panels laid horizontally. Altered windows. The building formed part of the component recovery area.	30a, 30b
Building 31	13/09/19	SO 78783 44805	First depicted on the 1990 Site Plan. Single-storey, rendered concrete blockwork building with flat roof positioned to the north west of Building 30. The building is orientated south west with paired garage doors and window positioned within the south west facing elevation. The building is located within a group of small, pre-fab structures (buildings 30, 32, 33 and 34) which are identified on an earlier Site Plan as forming the component recovery area. Most recently (2004) used as a laboratory likely in conjunction with the activity of A Block which is positioned to the south west.	31a
Building 32	13/09/19	SO 78784 44819	Date of origin unknown however it was erected sometime after 1990 as the building is not shown on the 1990 Site Plan. Located to the north east corner of the Site and to the north east of A Block. Single storey concrete blockwork garage unit with vehicle access to the south west elevation. Orientated to overlook tarmac yard area.	32a, 32b

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			The building is located within a group of small, pre-fab structures (buildings 30, 31, 33 and 34) which are identified on an earlier Site Plan as forming the component recovery area. Most recently (2004) used as an ancillary storage likely in conjunction with the activity of A Block which is positioned to the south west.	
Building 33	13/09/19	SO 78772 44830	Date of origin unknown however it was erected sometime after 1990 as the building is not shown on the 1990 Site Plan. Located to the north east corner of the Site and to the north east of A Block. Single storey pre-fab garage unit with roller garage doors to the south east elevation. Orientated to overlook tarmac yard area. The building is located within a group of small, pre-fab structures (buildings 30, 31, 32 and 34) which are identified on an earlier Site Plan as forming the component recovery area. Most recently (2004) used as an ancillary store building likely in conjunction with the activity of A Block which is positioned to the south west.	33a
Building 34	13/09/19	SO 78765 44837	Date of origin unknown. Located to the north east corner of the Site and to the north east of A Block. A building is depicted on the footprint of this building up to the 1990 Site Plan. The extant building appears to form a replacement to this earlier building being aligned north west to south east as opposed to north east to south west as per the earlier building. The building was significantly obscured by vegetation, however comprised a single storey rectangular plan building of pebble	34a

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			dash render panel construction.	
Building 35	13/09/19	SO 78735 44833	First depicted on the 1967-73 Ordnance Survey Map. Annotated on the 1977 Site Plan as Dust Test Chamber. Located close to J Block (building 36) and A Block which comprised laboratories for the development and testing of complete systems and their components for use in military research/acquisition of information. Single storey building with rectangular plan form. Red brick construction laid in a stretcher bond. Flat roof with north west section being taller resulting in the south west and north elevations having an 'L' shape configuration. Windows and doors are timber. North west elevation blank, north east elevation obscured by vegetation. South west elevation has two windows, south east elevation has a matching window and timber door.	35a, 35b, 35c
Building 36	24/09/19	SO 78698 44820	Known at J Block. Drawings held by MRATHS give a date of construction as 1954/55 and attest to the pattern of large openings present today as being original. Originally built to house a stratosphere chamber for testing research equipment being developed on site. Most recently used as laboratories and offices. First depicted on 1957 Site Plan. J Block had been extended to the east by time of the 1963 Site Plan to house a centrifuge machine. Positioned to the north west of A Block and the west of building 35 (Dust test chamber).	36a, 36b, 36c, 36d, 36e, 36f, 36g, 36h, 36i, 36j, 36k, 36l

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			The building is of red brick construction laid in a stretcher bond with a mix of timber and UPVC windows; the main entrance to the south east having UPVC. The original building is larger in scale with a flat roof front portion and higher rear portion with gentle curved roof. This high portion is flanked by two storey flat roof wings. The plans for the building confirm that the stratosphere chamber was housed within the raised, north west portion of the building, the flat roof area to the east being used to house the plant equipment to operate and power the test machinery. Changes in brickwork observed to the south east and north west elevations of the later addition attest to alterations to openings. J Block along with building 35 and parts of A Block had functional associations whereby they were used to test complete systems whether that be radar, radio, laser imaging etc to ensure they could withstand physical and environmental conditions as part of their operation.	
Building 37	24/09/19	SO 78328 44615	Known as M Block. Large scale upside down 'L' plan form building located to the western half of the Site. The building is positioned to the east of KF and occupies the footprint of the central section (Spurs 7 -10) of F Block. The building was first depicted on the 1967-73 Ordnance Survey map at which time the eastern half of F Block (Spurs 1 – 6) were still present positioned to the east of M Block. The building has most recently been used for office and laboratory accommodation and is known	37a, 37b, 27c, 37d, 37e, 37f, 37g, 37h, 37i

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			to have been used for the development and growing of silicon crystals which led to development of MALMAG in the 1980s. MALMAG was a patented process to improve silicon chip production through improving crystal quality and uniformity by controlling adverse effects of forced convective flow by electromagnetism. The extant building extends to three storeys with a flat roof. The building is a mix of dark brown brick and concrete frame construction with a mix of UPVC and metal frame windows. The building can be described in two sections; the most western portion of the building is of brick construction with concrete panel infills to the west elevation and external concrete staircases to the north and south elevations which extend from ground floor to roof level. The lack of window openings and the presence of external plant and flues to this portion of the building suggest it may have been used for laboratory research rather than office accommodation. The eastern portion, which includes the east projection is of concrete framework construction, this being most visible to the north elevation where the exterior has incorporated concrete fins to add some interest to the elevation. Fins are also repeated on the east elevation of the eastern projection. The eastern portion and the projection are arranged around a former concrete pool area to the south west. The south facing elevation of the projection and the east facing elevation are dominated by window openings which form a continuous band to each floor level	

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			and which are separated by pebble dash rendered concrete panels. The configuration of the external appearance suggests that these sections of the building provided office accommodation.	
S Block	24/09/19	SO 78230 44713	S Block comprises a large, complex plan form building which formerly housed the Malvern Collage sanatorium and the building shares some detail continuity with buildings on the extant Malvern College site including the blue brick diaper banding and the rich red brick external walls which offer some evidence as to the building historic origins. The building is located to the north of T Block and has some architectural cohesion with this building some of the nearby residential buildings on St Andrew's Road. The building has its principal entrance frontage orientated to the west towards St Andrew's Road however a secondary entrance is present to the east elevation. The building comprises three connected ranges; the north range comprises a two-storey gabled wing which adjoins the central wing which has a symmetrical plan with hip red clay tile main roof and plainer detailed, projecting gabled wing to the east. The central wing is connected to the southern range by a two-storey link addition. The southern wing is the largest and comprises a distinct linear range with hip red clay roof that is symmetrically arranged to the east and west. The east and west are of two bays. Later two storey additions have been added to the north of the east	S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, S15, S16, S17, S18

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			elevation and the south of the west elevation which has interrupted the symmetrical intention of the elevations. The building is of red brick construction laid in a Flemish bond with blue brick diaper storey banding to the southern range and blue diaper brickwork dentil course to the central and north ranges. The south range has large window openings which comprise fixed multi-pane top-light set over six-over-six vertical sliding sash windows. This range has a classical deep curved cornice. To the west, the central range is connected to the south by a timber clad link addition, this likely being a later adaption to provide covered access between the two blocks of the sanatorium. This addition has black and white painted finish to the west. The central range is symmetrically planned with two windows flanking the central entrance which is housed within a gable porch. Details of note include gauged brickwork window heads and jambs to the entrance. The cornice detail is different to the south range comprising modillion blocks. The north range is architecturally similar to the central range with matching gauged brickwork, paired sash windows and diaper detail to the dentil course. Alteration comprising the removal of chimney stacks is visible to the east elevation of the north range.	
T Block	24/09/19	SO 78220 44703	T Block comprises a detached Ruabon red type brick building extending to two storeys with an attic and a detached single storey matching red brick garage positioned to the north. The roof covering has been renewed with an unknown	T1, T2, T3, T4, T5, T6, T7

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			material, possibly shingles, and likely comprised red clay tiles similar to nearby, contemporary properties. The main building is a former residential property converted and adapted for office use in connection with the Technology Centre with the detached single storey garage also adapted and extended for office use; a later gabled porch addition has been erected to its south elevation. The building is first depicted on Ordnance Survey mapping from 1926-27 and was constructed sometime between 1905 (date of previous Ordnance Survey map) and 1926 however the stretcher bond pattern of the brickwork suggests the building is of cavity wall construction and therefore was likely erected after 1919. The building has an asymmetrical plan with projecting gabled cross wing to the north. The main building is orientated to have its principal frontage facing west towards St Andrew's Road. This elevation retains a two-storey, stone bow window with timber casement windows with multi-pane top-lights and the main entrance which is housed within a gabled timber porch. Windows to the left of the entrance porch comprise two light casement windows with cyma reversa glazing bars to the top-lights. The windows are set under stone heads with shouldered drip moulds and a centre ogee inscription. Windows to the north, south and east elevations comprise vertical sliding sash windows. To the east, rear elevation there is a secondary entrance housed within a lean-to porch with tiled roof covering. To the left of the entrance at ground floor is a stone canted bay window with paired sash windows under a flat	

TABLE 1 – LEVEL 1 BUILDING RECORDING				
Building Reference (As shown on drawing ref BM11422-012)	**Date of Record**	**NGR**	**Building Description**	**Plate References (Appendix 1) (See drawing BM11422-016 for plate locations)**
			stone head aligned at first floor level. To the north there is a later extension comprising a single storey lean-to addition.	

4.3 Level 3 Building Recording: H Building (NGR Centred SO 78649 44687)

Date of Record

4.3.1 The photographic record was undertaken in 24th September 2019. The visit included access to the interior as well as external observations to inform the written record.

Location and Building Development

4.3.2 H Building is located within the eastern portion of the site and is enclosed by T.R.E Road as it loops round to the north to become R.R.D.E Road. The building has a loosely square footprint aligned north to south. To the immediate north of H Building is a former sub-station (building number 23) that is of matching brick construction. To the north east is building number 24, known as BY Block. This building, positioned to the north of R.R.D.E Road is present by 1960 being visible in an image of H Building held by MRATHS[10] and may have had a complimentary function to H Building being used for radar research. To the south the building overlooks a large carpark area. To the north west of H Building is the former Library Building and to the south west is a modern three-storey office building (building number 21) known as Q Block.

4.3.3 H Building appears to be a multi-phase building. It has most recently been used as research offices and laboratories however was originally constructed as a prototype R4 type bunker as part of the Rotor Early Warning Air Defence programme to improve UK air defence following WWII; the technology being tested and finalised at Malvern prior to being rolled out to operational military sites.

4.3.4 The building has been subject to alteration to adapt to new research priorities which, according to discussions with MRATHS, has included the development of UK Air Traffic Control in the 1960s and 1970s and research by the Joint Intelligence cell into optical an electrical security and the collation of satellite, photographic and electrical information in the early 1990s. It is recorded by former employees of the Radar Research Establishment and its subsequent namesake's that people working in H Building had the highest level of security clearance.

4.3.5 The building is unremarkable in appearance; this concealing the pioneering research and development activities being undertaken inside. The building is of red brick construction with renewed UPVC windows and doors throughout. The building occupies a loosely square footprint and varies in height from single storey to three

[10] https://mraths.org.uk/wp-content/uploads/2018/08/1954-TRE-Air-defence-research-v2_resize.jpg

storeys; the three-storey section houses the former R4 type bunker and is the most prominent section of the building being the tallest element and comprising solid brick walls with no external openings bar second-floor and first floor door openings to its north elevation and metal double doors to the centre of the west facing elevation.

4.3.6 Later additions were noted to all four elevations of the building resulting in a complex arrangement particularly to the north-west corner of the building.

4.3.7 H Building is first depicted on a Site Plan from 1957 (drawing BM11422-022) and is first depicted on Ordnance Survey mapping in 1967 – 1973 (see drawing BM11422-022). It continues to be depicted on later OS mapping observed online (not replicated here) however due to the nature of the operation of the Site generally and high security activities being undertaken within H Building it is possible Ordnance Survey mapping does not accurately reflect the phases of buildings development.

4.3.8 Documentary sources identify that the building was constructed in 1952 (See Appendix 9) and its original configuration as built is shown on image 4 below which is dated 1954.

4.3.9 The TRE, and later the RRE were the leaders in radar research for the UK military and the RRE was responsible for the design of both the replacement radars for the Chain Home radars and the command and control systems for UK National Air Defence (MRATHS, 2017). The first phase of this was Project Rotor which was based around the Type 80 radar and Type 13 height finder. The first prototype type 80 radar satellite was built at Malvern in 1953 and code-named Green Garlic. Live radar feeds against aircraft sorties were fed into H Building to carry out trials of new methods plotting and reporting air activity.

4.3.10 H Building was constructed as a prototype version of the Rotor project R4 Sector Operations Centre air defence bunkers; MRATHS note that a successful demonstration of air defence information systems in E Block to the west of H Building in 1951 led to the approval for a prototype research and development building to be constructed, this building being the first to be added to the Site since HMS Duke and would be known as H Building.

4.3.11 The original floor plans for the building display the classic configuration, as described by Cocroft, for a R4 SOC bunker consisting of three storey accommodation with offices and observation areas positioned to flank and overlook a central well known as operations command; this arrangement is show in image 9 below. The second floor

contained projectors from which the feed was projected down into the operations centre. The flanking rooms were ancillary to the central bunker with the single storey, gabled west ranges accommodating the radar control office and the track telling (See image 5); these two spaces being integral to the collection and collation of the radar feeds before it was projected into the operations command room. Image 2 shows the original open plan and open ceiling arrangement of the radar office.

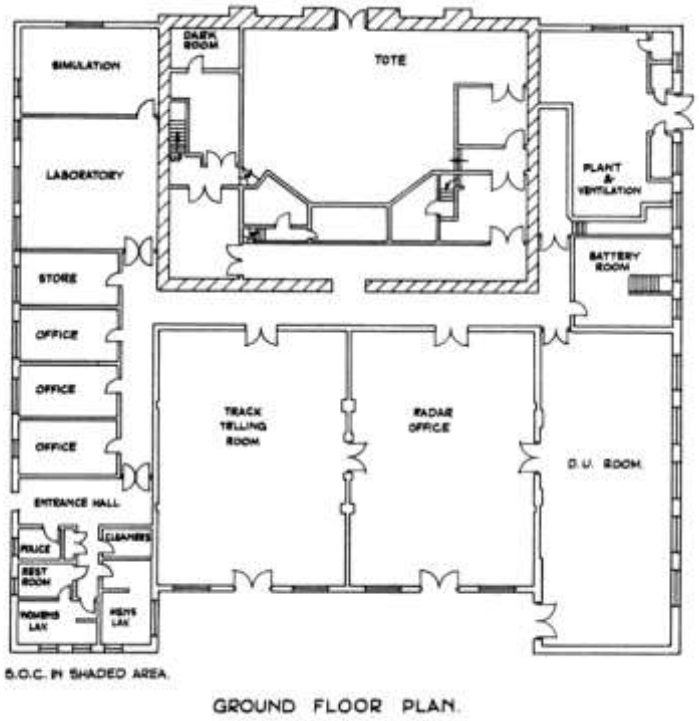

Image 4 - Ground floor plan of H Building 1954 (Image reproduced with permission of MRATHS)

4.3.12 The purpose of the building was to work out how to modernise the UK air defence in light of the threat of soviet attack who were developing jet planes and missiles.

4.3.13 The building appears to have been altered relatively quickly with the first-floor addition to the southern range and the south stair well added in 1958 (MRATHS). Further internal alterations comprising the reconfiguration of internal spaces was also undertaken, most notably within the bunker through the insertion of a first-floor construction through the operation control room which created a separate ground floor space known as the 'Data Handling' room (Ibid). Images 6 to 8 below show how the building exterior was adapted in quick succession.

4.3.14 An image held by MRATHS [11] dated 1960 and included as Image 7 below, displays the west facing elevation of H Building and identifies and that the single storey brick projections extant to this elevation are not original to the building's construction. The single storey structures to the west elevation are depicted on the 1967-73 Ordnance Survey map which infers they were added to the building sometime between 1960 and 1973.

4.3.15 The image also shows the presence of satellite and antenna features mounted to the roof of the building indicative of its use for research and collation of data function.

4.3.16 The pattern of openings to the west elevation of the south range shown in the 1960 image identify that this elevation has been subject to change as part of the building's development with additional openings and an external staircase added.

4.3.17 The northern range, which was originally constructed at a larger scale than the south range, was altered in 1966 with the creation of first floor accommodation and a north addition housing a new battery room and stair well.

4.3.18 The building was within continued occupation throughout the 1960s and 1970s; project 'Linesman' was name given to the radar upgrade for military purpose and was known as 'Mediator' in relation to civil air activity (MRATHS, 2017). The Linesman project was based around Type 84 / 85 primary radar satellites and the HF200 height finder (Ibid). A prototype type 85 radar (Blue Yeoman) was built adjacent to H Building in 1959 and is known as BY Block and is identified as Building 24 on drawing BM11422-012. Live radar returns from BY Block were fed into H Building.

4.3.19 A subsequent operation to combine the military and civil radar networks was proposed with H Building supporting both the civil and military research and development, civil development being undertaken in the now demolished B Block which was located to the south east of H Building.

4.3.20 In the 1970s, H Building was involved in developing a more integrated and flexible system known as UKADGE (United Kingdom Air Defence Ground Environment) (MRATHS, 2017). In the late 1970s the computer operations associated with UKADGE were relocated to Q Block (Building 21) which has been purpose built for this function.

4.3.21 Floor plans for H Building dated 1983 and included within the appendices, depict that the former bunker area was at this time being used predominantly for storage

[11] https://mraths.org.uk/wp-content/uploads/2018/08/1954-TRE-Air-defence-research-v2_resize.jpg

suggesting it had become functionally redundant for radar development. The adjoining rooms were being used as offices mainly at this time.

4.3.22 Between 1991 and 1993, plans were developed to reuse the former bunker area of H Building as a secure computing facility for use by the Joint Intelligence cell. The interventions implemented are those which are extant within the bunker today and required significant reconfiguration of the R4 Bunker plan and arrangement; a faraday cage was constructed at ground floor level protecting the computer equipment and electrical feed in the former bunker and the first floor and second floor spaces had the original internal dividing walls removed and the space opened up for use as open offices with two smaller internal pods constructed directly against the original east blast wall sound proofed for additional security.

4.3.23 The mezzanine to the second floor and its balcony arrangement to overlook the first floor is the only indication of the original R4 type bunker arrangement.

Image 5 - Image of the radar office within H Building (image reproduced with permission of MRATHS)

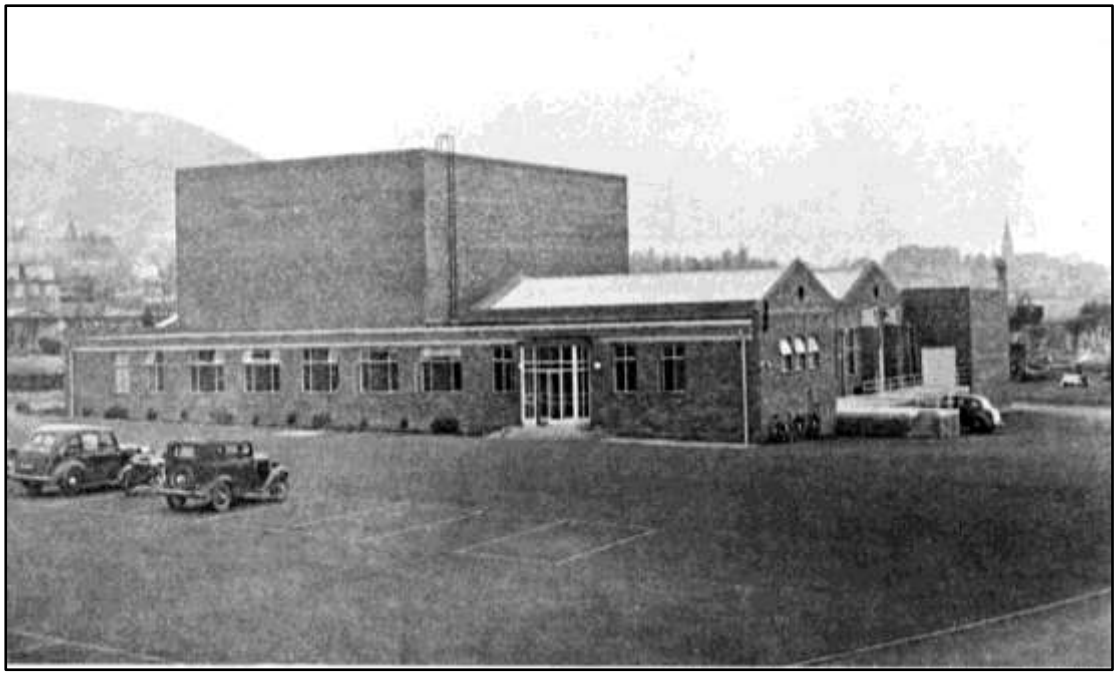

Image 6 - H Building shortly after its construction in 1952, image taken from the south east showing the south and part east elevations (Reproduced with permission of MRATHS)

Image 7 - View towards the west elevation of H Building from the roof of B Block (now demolished). Image is undated however BY Block is visible to the right of the image so its likely early 1960s; note the large external radar satellite projecting from BY Block (Image reproduced with permission of MRATHS)

Image 8 - H Building viewed from the west in 1960 (Image reproduced with permission of MRATHS)

Image 9 - Interior view of the R4 Bunker of H Building looking towards the south east corner from the north west corner (Image reproduced with permission of MRATHS)

Exterior Description (Plates H1 to H26)

4.3.24 *South Elevation* - The main entrance frontage faces south overlooking a large car park accessed from T.R.E Road; the building footprint and the car park historically having used as parade ground when the Site was used as a WWII naval training base. Access

into the building is through a small, projecting, flat roof single storey UPVC porch which has ramped access from the left and 3-stepped access from the right (Plate H1). This elevation is two-storeys in height, a change in brickwork observed to the north elevation evidencing the first floor was added at a later date (Plates H17 and H18); research by MRATHS provides a date of 1958 for the first extension and the adjoining two-storey stair wing which, due to a change in brickwork appears later rather than contemporary.

4.3.25 This elevation forms a rectangular wing that abuts the taller bunker element to the north west. The ground floor of this elevation has ten window openings of varying size, all renewed in UPVC. The first floor is distinguished by a horizontal render band. Glazing to the first floor extends the full width and comprises renewed UPVC casements with UPVC fascia board above.

4.3.26 *East Elevation* - The east elevation is of red brick construction; the central single storey double gabled arrangement is contemporary with the main bunker element being of the same brick construction laid in an English bond (Plate H14) and depicted on the original plans. This elevation has a loose symmetrical arrangement with the central single storey projections flanked to the north and south by two, two-storey, flat roof wings. The central range extends eastwards from a flat roof section that directly abuts the rear of the bunker. Access to the roof of the bunker is provided via two sets of metal ladders fixed to the east facing bunker elevation (Plate H8, H20 and H24). The roof covering to the dual pitches was observed from the external stairs to the roof and comprises cementitious type sheeting with a central valley gutter dividing the two gables, copings to the west gables had been covered with a metal flashing whilst those to the east were uncovered with the original solider course detailing visible (Plates H22 and H23).

4.3.27 The ground level surrounding the building declines towards the east and access to the single storey central range is via seven concrete steps that lead from a car park area up to a small external landing area constructed from red brick and enclosed behind painted metal rails. Each gable end is symmetrically arranged with central double renewed UPVC doors enclosed between two square piers and flanked by renewed 6 light UPVC windows. The piers to the left gable have painted louvered vents, those to the right have been removed. External plant and air conditioning units were noted to the central range and the north facing return of the south wing. A single window is present to the east facing elevation of the north wing.

4.3.28 First floor windows to the north facing elevation of the south wing and south facing elevation of the north wing were observed as being renewed and of varying sizes, but typically of two lights. A door into the ground floor of the south elevation of the north wing also provides access the raised landing area to the front of the central single storeys range (Plates H22 and H23).

4.3.29 *North Elevation* - The north elevation has been subject to a two-storey extension that projects centrally from the northern wing beyond the line of the original north elevation; a clear change in brickwork attests to its later date as do the 1952 floor plans for the building (See appendices) and the 1954 floor plan replicated in Image 3 above. The left section of the north wing contains four, large nine-light windows to ground floor level. A concrete band with rendered panel sits below the first-floor windows which match those to the first floor of the south facing elevation (Plates H11 and H12).

4.3.30 The projecting central addition contains a fully glazed stairwell to its left side with five high-level windows to the first floor just below eaves level. The lower ground floor has five corresponding high-level windows with two, six-light windows to the ground floor. All windows are renewed in UPVC.

4.3.31 Adjoining the central addition to the right is a single-storey range that extends beyond the plane of the main west elevation of the former bunker. The north elevation of this range contains louvered vents, three at ground floor and a double door opening at lower ground floor level, to a plant room (Plates H9 to H12). External metal stairs lead to the flat roofs of the single storey range which offer access to a ground floor plant room via an external door in the west elevation of the two-storey addition to the north. To the north elevation of the main bunker access is provided to the first floor via a covered external door (Plate H19). A further two-flight metal stair case leads to an external door at second floor level; both this door and the first-floor door aligned below are covered behind a Perspex type addition and are the only external openings evident to the former bunker section of the building. Adjacent to this covering is a large, painted metal conduit that extends up the north elevation of the former bunker.

4.3.32 The north-west corner of the building is a complex arrangement of flat roof additions housing redundant plant equipment; concrete slabs with plant connections and casing were noted in close proximity to this elevation which may have been the location of external equipment associated with the research being undertaken within the main building (Plates H8 and H9).

4.3.33 *West Elevation* - The west elevation faces towards a tarmac track leading from R.R.D.E Road to the car park in front of the south elevation of H Building. Three single storey additions project from the main west elevation of the former bunker with a change in brick work suggesting a different date of construction (Plates H3, H5, H6 and H7); this is further evidenced by the 1954 ground floor plan which does depict any of these additions, although the central addition is shown to be present in an image of H Building from 1960 held by MRATHS which questions of the accuracy of early floor plans to show the full extent of the building. The largest addition to the west elevation houses metal pipework, now disconnected (Plate H7). This room retains a red tile floor. Extending to the south side of this extension is the smallest of the three additions which has painted timber external doors.

4.3.34 The main bunker elevation is of red brick construction laid in an English bond. It has four rectangular brick piers extending to second floor level (Plates H2 and H3). Double metal doors are enclosed between the two central piers at ground floor level. Three vents are present to the right corresponding to the first and second floor internal levels. The flat roof to the bunker is concealed behind a parapet with the rainwater hopper indicating the finished roof level (Plates H25 and H26).

4.3.35 There is an external, galvanised metal escape stair leading from a first-floor door in the west facing elevation of the southern wing. To the ground floor, a ramp with metal handrails leads to a door with a sign fixed adjacent advertising the 'Occupational Health Department'. An early window, six-light metal casement is adjacent (Plate H4). The photograph from 1960 identifies this window is original however the doors at ground and first floor are later additions.

4.3.36 In general, there is a proliferation of external pipework, cables and plant work to the external elevations. Rainwater goods were noted to be painted cast iron to the bunker and seemingly contemporary sections of the building although the downpipes were missing in sections to the east elevation. Windows and doors, where renewed have a standard white finish. External joinery and metal has either a blue or green painted finish.

Interior Description (Plates H27 to H59)

4.3.37 The description of the interior focuses primarily on the former bunker area which is of greater interest than the north, south and east portions of the building which were observed to be unremarkable in their plan form, detailing and fixtures and which seemingly had been reordered and adapted to meet changing uses, most recently

recorded as offices; a Certificate of Lawful Use application submitted to the Malvern Hills District Council in 2004 (Reference 04/01774/CLE) depicts that 90 per cent of the building was used as B1a offices and 10 per cent used for B1a laboratories.

4.3.38 The south entrance leads to a small entrance hall with a small reception/office to the right. The hall leads onto the main corridor system which provides circulation around the ground floor of the building in a 'H' plan formation on an east to west axis (Plates H39 and H40). This plan form exists in part on the 1952 plan however reconfiguration of the ground floor rooms to the east and west of the south and north wings respectively has required the extension of the corridor routes. The corridor running north to south and connecting the north and south wing encloses the former bunker to the west and remains as original. A blocked doorway observed in the corridor through the south range relates to a doorway into the former bunker area shown on the 1983 plan; this opening created after 1952 as it is not shown on the 1952 plans (see Appendix 9).

4.3.39 A thick, metal secure door is located centrally in the west side internal elevation of the corridor that provides the only ground floor interior access into the former bunker (Plates H40 and H41); the original plans attest to this being its original position. In the opposite east wall of the corridor there are two doors leading into two large offices housed within the single storey gabled projections observed from the east elevation. The 1954 ground floor plan (Image 4 above) record these rooms as the 'Track Telling Room' and the 'Radar office' and are later referred to as the 'Plotting Room'; these names attesting to close association with the activities of the bunker. The earlier floor plans evidence that the room to the north has been subject to subdivision with partition walls inserted to form a small hall area before doors lead into the main office space (Plate H27). The two large rooms are connected internally with a double size opening in the dividing wall which is depicted on the 1954 plan. No obvious features relating to the original use were evident in the room and when compared to Image 5 above which shows the interior of the radar office, it is apparent the ceiling has been altered and the walls plastered.

4.3.40 The north and south wings are subdivided regularly into various sized rectangular rooms, those within the south wing are more uniform and more clearly relate to the early ground floor plans than the existing plan form to the north wing which is shown to have originally comprised large space known as the D.U room. The variation in ground level is more apparent to the north block with the stairwell contained within

the two-storey north addition leading to both the lower ground and first floor levels (Plates H29 and H32). Additionally, the plant room/air conditioning unit contained within the north west section of the building has a metal stair leading down to the lower ground level which corresponds with the ground level of the interior of former bunker area and which corresponds to the vented openings observed to the exterior of the north elevation (Plate H37).

4.3.41 Access to the first floor is available from both the north and south wings via metal staircases included within later additions. Access is also possible through the former bunker with a secondary internal entrance through a thick, metal security door into the south wing. The 1983 floor plan for the building identifies that the original first-floor access into the bunker from the south range was in the south west corner at the summit of the bunker staircase. It relocation to its extant position to the east attributed to the refurbishment works undertaken as part of 1991-93 works.

4.3.42 No internal connective routes between the first floors of the north and south wings are available. The plan form to the first floors was unexceptional with the spaces arranged into small office areas accessed from corridors (Plates H1 and H32). To the south wing, the first floor had an open plan arrangement (Plate H28), this being a later modification to this later first floor addition.

4.3.43 The former bunker comprises a large rectangular structure around which the supporting and ancillary rooms have been located, this form is comparable to the standard R4 design depicted in Cocroft and Thomas. The perimeter wall of the bunker is of brick construction and is roughly c45cm wide. Entry at ground floor level is through an outward opening thick, metal security door which resembles a blast door within the west side wall of the north sough aligned connective corridor. A blocked opening or alteration to the south of the blast door is visible within the brickwork suggesting access may have been altered previously (Plate H59). The depth and construction of the perimeter wall is observable moving through the opening (Plates H41 and H48). The door leads into a small internal porch with a small landing off of which access to two sets of concrete steps is offered through metal, security doors to the north and south. The steps extend north and south respectively from the landing area providing access into the narrow corridor that runs around the perimeter between the external bunker wall and a later faraday cage at lower ground level (Plates H41 and H42). The faraday cage has been inserted at lower ground level as part of the 1993 alterations and sits below the main ceiling height of this lower ground

floor area. The exterior of the faraday cage is of metal construction with vertical joists placed roughly at 1m intervals supporting the metal sheets. Two smaller horizontal joists connect the vertical joists (Plates H42 to H44).

4.3.44 The faraday cage within the design offers some understanding of the later activities within this part of H Building with the cage protecting the electrical equipment and supply which extends into H Building from the north; significant amounts of plant and mechanisms remain visible within the north east area of the perimeter corridor of the bunker, adjacent to the plant room within the northern wing of the main building.

4.3.45 To the south, the corridor leads to a staircase comprising two flights with metal rails and enclosed within a breeze block stairwell leading up to the first floor. Access into the faraday cage is through an RF Air lock system comprising two heavy metal doors on its south facing elevation (Plates H49 and H51). A second access is provided in the north west corner with a matching heavy metal door. The internal arrangement of the lower ground floor deviates from the 1952 ground floor plan and the standard R4 bunker designs detailed within Cocroft and Thomas' 2003 book, although the faraday cage appears to correspond to the position of an internal blast wall within the main bunker structure that enclosed the 'Operations Room'.

4.3.46 Within the faraday cage there are nine columns located centrally in two aligned rows of four and five (Plate H46). These do not appear to correspond to the upper levels and their purpose is unlikely to be purely structural with the columns possibly concealing services.

4.3.47 Within the cage to the north there are two small rooms of similar proportions accessed via metal security doors. The rooms inserted as part of the 1993 works have a single high-level window overlooking the central space within the cage (Plate H47). These are protected within the faraday cage which dog legs around the north end of these at the north west corner. The room to the right was the computer server room whilst the room to the left was a research space.

4.3.48 The secondary access door to the north west of the cage leads back into the periphery corridor of the main structure. A raised concrete platform accessed via steps leads to an internal lift system enclosed within a blockwork structure. The lift is accessed via a door and retains the sliding metal gate and rises through the former bunker to the second-floor level. From the platform a matching metal security door within the main west facing wall of the bunker leads into the smallest single storey brick addition observed to the west elevation (Plate H48).

4.3.49 Along the north corridor the former ventilation and plant tracts are encased within the same metal sheeting as the main Faraday cage structure (Plates H43 and H45). The corridor to the west is accessed via concrete steps that lead down from the raised platform. This corridor returns to the south where the staircase to the upper floors is accessed (Plate H44).

4.3.50 At first floor level the stairs lead onto a small landing area that is enclosed by the internal blast wall along the north and the breeze block wall that houses the stairs leading to the second floor. Direct access into the main space is provided via a metal security door within the south wall. A further entry point is provided via a former security system in an inserted west wall which comprises a glass security circular pod which is housed within a small room with blast door access from both the landing area and the main first floor room (Plate H52). This space retains the glass pod and the security swipe card system and clearly relates to a later function of the space and identifies the secure nature of the research and development activities being undertaken within this space as part of its later use; this is attested by the 1956 photograph of the interior held by MRATHS which shows the early arrangement of the space which is open to the landing area and stair, visible through the glazed screens overlooking the operations room.

4.3.51 The main room is open to the second floor allowing views of the mezzanine structure above (Plates H55 and H56). The mezzanine wraps around the north, east and part south elevations of the former bunker to a form ‘u’ shape that is splayed to the outer corners along the east elevation (Plate H57). This distinctive plan form is noted on the 1954 ground floor and within the typical R4 designs however it is now only evident at second floor level within H Building.

4.3.52 Analysis of the original and later floor plans for the bunker against the extant configuration identify the main bunker space has been substantially adapted from original R4 Bunker designs with the insertion of a first-floor which is sitting above the ceiling of the faraday cage directly below and through the removal of the original internal, individual rooms which were accessed via a perimeter corridor which circulated the south, east and north elevations. Within an operational R4 bunker, the main space would have been open from the lower ground level up to the underside of the roof with each floor overlooking the ‘Operations Room’ from behind glazed screens that enclosed it on three sides; the mezzanine to the second floor provides the only indication of this original design. The insertion of the ceiling likely forming

part of the prototype arrangement or comprising part of a later phase of alteration.

4.3.53 The internal configuration of the main space has also been altered with the provision of two small, internal rooms along the west wall (Plates H53 and H54). Comparable to the rooms provided at lower ground floor level, the first-floor rooms/pods are contained within sound-proof construction inserted within the open plan space against the east internal wall and accessed by large, metal security doors and have a long, horizontal glazed opening for observation of the main space. It is noted by MRATHS, that these individual rooms were used for secure conferencing and office accommodation associated with the use of the space for secure computer operations. Further alterations include the provision of Male and Female toilets within the south west corner of the main space beneath the second-floor mezzanine.

4.3.54 In the far north west corner, the lift opens out directly into the main space. A small internal porch is located directly adjacent and is accessed via a blast door. The porch corresponds to the first-floor door opening observed on the north facing external elevation.

4.3.55 Access to the first floor of the southern wing via a blast door within the south facing wall of the periphery blast wall of the former bunker.

4.3.56 Access to the second floor is provided via a single flight of metal stairs that leads onto a small internal landing area, corresponding with the landing at first floor level. A blast door provides access into the main former operations area through the internal blast wall. This space retains the evidence of the original R4 bunker designs in the form of the U shape mezzanine which is enclosed behind a 1.5m high solid balustrade. The original control cabins and offices that would have overlooked the main well (above the 'Operations Room') have been removed and the space is now open. The dimensions of the main blast walls which enclose the former bunker area were visible at this level with the bunker extending to c20metre in width and c14metres in depth enclosed around its entire perimeter by thick brick walls measuring c0.45m in depth.

4.3.57 In the north west corner, there is a similar arrangement to the first floor with the lift and internal porch providing access to the north elevation provided (Plate H58). The blast door within the small interior porch was noted as having a brass tag with a date of '1993' depicted; similar brass tags were noted on several other blast doors within the former bunker complex and provide further evidence of alteration and upgrading to meet the function requirements at the time.

4.3.58 The interior of the former bunker includes large metal joists which had been treated with an intumescent coating and painted white. Internal finishes to the walls were light in colour to maximise light reflection from the artificial lighting (Plate H57).

4.4 Level 3 Building Recording: KF Block (NGR centred on SO 78288 44724)

Date of Record

4.4.1 The photographic record was undertaken in 24th September 2019. The visit included access to the interior as well as external observations to inform the written record.

Location and Building Development

4.4.2 KF Block is located within the west half of the former technology centre site between T.R.E Road and Poolbrook Way. It is a single storey rectangular block aligned roughly north to south through the site and is positioned close to the original main gate entrance from St Andrew's Road to the west.

4.4.3 The building comprises spurs 11 and 12 of a formerly extant larger connective H plan building known as F Block and represents the only above ground remains of this original WWII building, the original central and eastern extent having been replaced by a large four storey building known as M Block (building number 37) of 1960s origins and architectural appearance.

4.4.4 KF Block had most recently been used as office and laboratories however an article prepared by MRATHS[12] notes that spur 12, the southern half of the extant block, housed the Telecommunications Research Establishment Automated Computer (TREAC) from 1950 until the early 1960s when it was switched off due to the unreliability of the hardware. TREAC was the result of research in 1947 to explore circuits for binary arithmetic, this research building upon the work of Group 28 of the TRE, into digital computing during WWII who had designed equipment for Bletchley Park (MRATHS, 2016).

4.4.5 The building is first depicted on Ordnance Survey mapping from 1967-73. It is shown as a rectangular block with small central projection to its rear, east facing elevation; this projection identifying where the building formerly connected to the central corridor of the larger F Block building.

4.4.6 The original extent of F Block is depicted on drawings BM11422-018 – 020 and can

[12] https://mraths.org.uk/?page_id=633

also be discerned from Image 1 included on Page 13. The early site plans and image show F Block to form a large single storey building comprising the characteristic connective 'H' plan form depicted by A and D Blocks. The block was symmetrically arranged with 6 spurs extending east and west of the central entrance which was orientated north to face onto the main circulatory access road. KF Block comprises the projections known as spurs 11 and 12.

4.4.7 By the time of the 1967-73 Ordnance Survey the central part of the original F Block had been demolished with Block M erected; the most easterly extent of F Block comprising spurs 1 to 6 is shown to be retained as a smaller Block.

4.4.8 The 1973-77 and the 1977-91 Ordnance Survey maps viewed online (not reproduced here) and the 1990 Site Plan (drawing BM11422-024) continue to depict the extant configuration of KF Block and infers no further works of alteration or extension have been undertaken to building exterior.

4.4.9 This mapping also depicts the detached remains of F Block were still present. The first publicly available aerial image from 1999 confirms the remains of F Block had been removed by this time. The exact timescale for the removal of the remains of F Block is difficult to understand given the nature of the activities being undertaken within the Site and it is possible Ordnance Survey mapping was not updated to accurately reflect exact building arrangements and configurations.

Exterior Description

4.4.10 The building is of rendered brickwork construction under a felted flat roof. Similar to Blocks E, D and A, the roof overhangs by approximately 30cm and is supported on painted metal brackets. The east, part west and south elevations were obscured by vegetation which has restricted the visual observations and the photographic recording.

4.4.11 *East Elevation (Plate KF1)* – Part of the east elevation was observed from the north east corner. The elevation comprises rendered brickwork. A small, flat roof painted brick addition projects a short distance from around the third bay. There is a timber canopy porch supported on gallows brackets adjacent to the most northerly window opening. The window comprises a four-light renewed UPVC casement with the lager right panes being tip-opening.

4.4.12 At least four galvanised flues and vents extend from the east elevation and the east roof. The presence of the vents and their scale and number offer some understanding

as to the function of the internal spaces of the building.

4.4.13 *North Elevation (Plates KF2, KF3)* – The north elevation comprises rendered brickwork; a brick plinth is visible around the base of the wall. The north elevation has a two-bay arrangement. There is a centrally positioned door opening which retains a painted timber panelled door with fixed panels to the left. The door and side panels are set under a UPVC solid panel. External pipework exits the building through this panel travelling west where it wraps around the north west corner.

4.4.14 To the left of the door is an asymmetrically arranged four-pane UPVC window which matches that described on the east elevation.

4.4.15 To the right, at the north west corner of the elevation is a small lean-to addition with painted render and corrugated cementitious sheet roof. The addition projects beyond the plane of the north west corner of the building and connects to a flat roof addition projecting from the west elevation. To the north elevation of the addition is a centrally positioned painted timber boarded door.

4.4.16 *West Elevation (Plates KF4 – KF7)* – The west elevation is of 15 bays; seven bays flank the main entrance into the building which is positioned centrally within the elevation.

4.4.17 The entrance (Plate KF6) is framed by a small external porch which is enclosed by painted brick piers which extend from ground level to below the projecting eaves of the flat roof. The entrance contains two renewed timber doors with a dark stain finish.

4.4.18 The entrance is flanked to the north and south by 14 bays, each bay is defined by a renewed UPVC window. The windows are symmetrically planned with six panes; the larger central, tip-opening lights flanked by smaller, fixed side lights. Some alterations to the windows was observed consisting of the replacement of the central panes with fixed UPVC panels.

4.4.19 *South Elevation* - The south elevation was partially obscured however it presents the same rendered brickwork finish as the west, north and east elevations. The elevation replicates the same two-bay arrangement as the north elevation with matching smaller, asymmetrical four-pane UPVC windows. A single flat roof addition of a lower scale is present. This addition is not depicted on early site plans however it is present on the floor plan held by MRATHS and showing how the TREAC system was accommodated within the spur.

Interior Description (See Plates KF 8 – KF20)

4.4.20 The building is single storey with all internal accommodation accessed from the same level.

4.4.21 A central corridor extends the near entire length of the building connecting from the external door in the north elevation through to the 12-bay range to the right of main entrance (Plates KF8 and KF9). The corridor is 1.52m wide and c3.12m high. The walls comprise painted brick tiles which form part of the original 1940 construction and which evidence that this corridor has not been altered (Plate KF20). The floor covering is renewed in carpet however red lino tiles were present close to the north entrance door (Plate KF13); this floor covering being observed in E Block also and may represent the original floor finish.

4.4.22 The corridor contains round brick piers spaced at regular 3.33m intervals which project forward of the internal east wall. These piers define each bay and are representative of the modular type construction used within the original building (Plates KF9 to KF11).

4.4.23 The corridor is flanked by rooms to the east and west; those rooms to the east being wider at c5.55m in width and those to the east being narrower at c3.6m in width. Several of the rooms to the southern half retain a painted brickwork finish to the internal north and south walls and the external east and west walls; this area likely being constructed as an air raid shelter originally and therefore requiring more robust construction than that offered by the standard brick tile (Plate KF20).

4.4.24 There are seven individual rooms contained within the western half of the building to the north of the central entrance. These rooms are all the same size with regularity defined the brick piers of the original modular construction. To the eastern half the bays have been altered with some rooms being larger consisting of two bays.

4.4.25 To the south of the entrance, the arrangement of the rooms appears to have been altered however their width still follows the same regular division using the original brick piers of the internal bays to inform their size. To the west side of the building the two end bays of the seven have been altered with the remaining five being of a consistent size and reflecting the regular plan form presented to the northern bays.

4.4.26 Research by MRATHS confirms that this section of the building, known as spur 12 was used to house the Telecommunications Research Establishment Automated Computer (TREAC). A plan, replicated below, showing the configuration of this spur for accommodating TREAC in 1952 identifies that the most southerly bays and the

arrangement between the south addition remains unaltered. The plan also identifies that the larger bays to the west side have been subdivided since to create five smaller rooms. The plan also depicts the internal dividing walls to the two most southern bays are thicker, which similar to those depicted within D Block are indicative of former air raid shelters constructed as part of the original HMS Duke complex; it is possible that these thicker walls benefitted the operation and/or security if TREAC and made this location preferable to others.

4.4.27 To the east side of the building the rooms vary in size however they are typically either one or two bays in width and use the brick piers as a means of subdivision.

4.4.28 Within the centre of the building, the corridor opens out opposite the main entrance (Plate KF14). This area would have originally formed part of the central connective corridor that would have extended the width of the original F Block and which would have provided internal access to the adjacent 10 spurs that made up the original extent of the Block. The floor level here, slopes down in an eastly direction and the lobby space is terminated by a painted block wall beyond which are female and male WC facilities contained within a modern block addition to the east elevation.

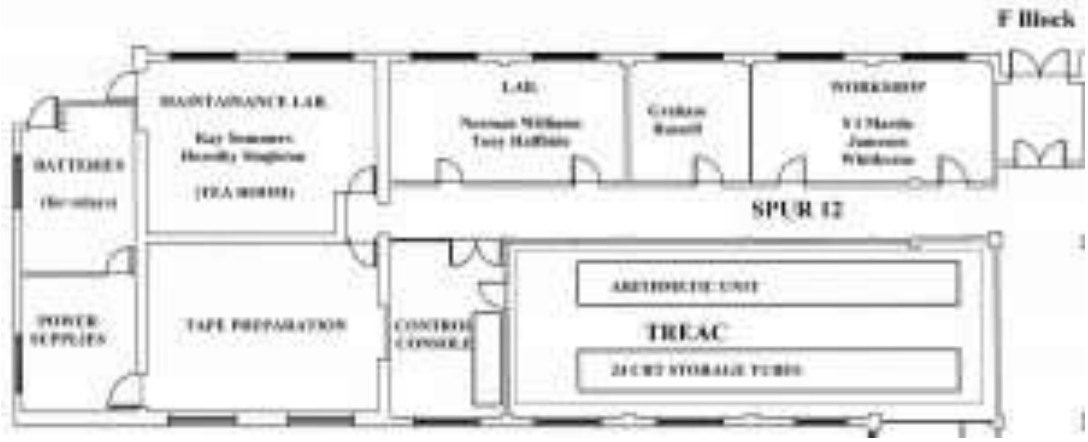

Image 10 – Copy of a plan showing the arrangement of Spur 12 with KF Block for the accommodation and operation of TREAC in 1952 (Reproduced with permission of MRATHS)

4.4.29 Other features of interest that remain to the interior of the building, other than the presence of the rounded brick piers and painted brick tiles walls within the corridor and the flanking rooms, the early floor plan for the end bays of spur 12 that relate to TREAC and the proportions of the interior, are several original timber boarded doors of 1940/50s character. These doors comprise a mix of single solid panel or glazed light to the upper third of the door with three fielded panels to the two bottom thirds

(Plates KF15 to KF18). This style is typical of the 1940s and the doors are likely to relate to the original phase or construction or near contemporary to this phase.

4.5 **Level 3 Building Recording: E Block (NGR centred on SO 78367 44709)**

Date of Record

4.5.1 The photographic record was undertaken in 24th September 2019. The visit included access to the interior as well as external observations to inform the written record.

Location and Building Development

4.5.2 E Block comprises a single storey building located to the north west corner of the Site. The building is bound by R.R.D.E Road to its north and T.R.E Road to its south.

4.5.3 The building comprises a series of 14 spurs or wings which project in a north south alignment from a main, central corridor which connects each spur and which extends the entire width of the building on a roughly east to west alignment. The resulting plan form is distinctive comprising a series of connective 'H' plan sections.

4.5.4 The building is of the same construction as KF Block, D Block and A Block comprising rendered brickwork with a flat, felt roof covering. The roof is slightly projecting and is supported on regularly spaced metal brackets which are painted blue. Rainwater goods are painted cast iron. Windows are renewed in UPVC with a mixture of renewed UPVC and painted timber doors.

4.5.5 The building has been subject to modification throughout its occupation; at its eastern extent where a small link extension connects E Block to the large light industrial/workshop block known as ET (Building number 17).

4.5.6 Single storey extensions to the north of spurs 4 and 12 are present however that to spur 12 has been recently destroyed by fire although its extent is still discernible on site and on mapping.

4.5.7 A small link extension from spur 5 connects the E Block to EX Block (Building number 15) providing internal access at ground floor.

4.5.8 E Block comprises an original WWII building and is depicted on the 1942 site Plan and on aerial imagery from 1949 in its original configuration. An original floor plan for the block dated to 1940 (See Appendix 10) identifies that the block was not symmetrically arranged with only six spurs to the eastern half of the building as opposed to the eight to the western half. The plan shows that the spurs of the block were originally open plan with only the last two bays of each spur closest to the central corridor range being

enclosed. This suggests that Block E was likely used for shared dormitory accommodation for the trainee recruits.

4.5.9 The original floor plan clearly depicts the structural brick columns to the spurs and piers to the corridor and attest to these forming part of the construction. The plan also confirms that the rear, north projection aligned with the main central entrance is a boiler house; this arrangement being repeated across each of the original WWII buildings.

4.5.10 An aerial image from 1949 (See Image 1 above) identifies that spurs 10, 13 and 14 had first floor accommodation comprising detached gabled huts; these are later additions to the original building being constructed shortly after the occupation of the Site by the T.R.E in 1946 and were used house radar equipment (MRATHS).

4.5.11 It is noted by MRATHS that a demonstration of Air Defence Information Systems undertaken within E Block in 1951 led to the approval of a prototype Sector Operations Centre (SOC) being constructed on the Site which would become known as H Building.

4.5.12 It is apparent from both the floorplan and the Site plans that the building has been subject to alteration during its occupation; a Site Plan form 1977 confirms that extension in the form of single storey additions to the north form spurs 4 and 12 are present by this time and similarly proportioned addition is depicted to the south of the block connected to spur 9, a small rear projection observed on site identifies the former location of the link between the main spur and the addition. These additions are first depicted on the 1967-73 Ordnance Survey plan and therefore were erected sometime between the time of the 1963 Site Plan and the publishing of the OS map.

4.5.13 The building is recorded by MRATHS that E Block was used for the research and development of integrated circuit after this area of work was relocated from A Block on the 1970s.

4.5.14 The 1977 map identifies that ET Block (Building Number 17) to the east and EX Block to the south (Building Number 15) had not yet been built. Blocks ET and EX adjoining E Block are not depicted on Ordnance Survey mapping available for the Site. As above, this likely to the nature of the activities undertaken on the site. They are however depicted on a Site Plan dated 1990 (drawing BM11422-021).

4.5.15 The space between spurs 6 and 8 has been infilled with a later extension of matching rendered construction. This infilling is not depicted on Ordnance Survey mapping or a

Site Plan until 1990. Review of the planning history for the site reveals that this spur was infilled in the late 1970s under planning reference 78/02095/CRO for the provision of office accommodation.

4.5.16 A search of the online planning applications identifies that ET Block was erected sometime after 1983 under planning reference 83/02037/CRO and is identified as silicon processing and evaluation laboratories or SPEL; MRATHS confirm that SPEL was previously housed within the former boiler room which were adapted by the RRE for research purposes following their permanent relocation to the site. This space was later used for research and development of liquid crystal technology which led to the development of LCD screens.

4.5.17 EX Block is recorded as being erected after 1985 under planning reference 85/02140/CRO and later extended in 1997 under planning reference 97/066/18/CRO. The accuracy of the descriptions provided on the planning references also requires careful consideration; as a MOD site on Crown land, the site would have benefitted from crown exemption within the Planning Act and the actual intended function of the buildings is unlikely to be detailed within publicly accessible information.

4.5.18 Aerial images of the site available from 1999 identify that the extension to the south of spur 9 is still present however it has been removed by 2009 possibly following the abandonment of the site in 2008.

Exterior Description (Plates E1 to E27)

4.5.19 The building presents a regular, highly repetitive external arrangement of rectangular spurs which project northwards and southwards in pairs from a central a continuous corridor wing.

4.5.20 The building has 14 projecting spurs in total with eight to the west of the main entrance and six to the east. The spurs are of a consistent proportion with each extending to three bays wide. In terms of length each spur within its original configuration extends to seven bays from the central corridor; each bay is c3.6m in length giving a rough total spur length of c25m.

4.5.21 Each pair of spurs is spaced from the adjacent pair by a three-bay interval bar the spurs which flank the main entrance where they are slightly further apart, the connective corridor being five bays wide at this point.

4.5.22 Bays are defined to the exterior by windows and doors with each bay typically containing either a large symmetrically arranged six-pane UPVC casement window or

a smaller, asymmetric four-pane UPVC window. Windows to E Block are consistent in design, size and material as used presented in A, D and KF Blocks.

4.5.23 The roof construction matches that to A, D and KF Blocks with matching cast iron rainwater goods.

4.5.24 *East Elevation (Plates E2, E6, E11, E15 and E19)* – The main east elevation was obscured from close visual inspection and photographic recording by vegetation and by the present of ET Block which is connected between the two blocks. This link is of matching corrugated metal sheeting construction to Building 17. Windows were observed to comprise UPVC windows as presented on each spur.

4.5.25 The east elevations of each individual spur are consistent in appearance extending to seven bays and having either large six pane or small four pane UPVC windows. Evidence of blocked or altered windows was observed to some of the spurs.

4.5.26 *South Elevation (Plates E4 and E5)* - The south elevation comprises of spurs 1, 3, 5, 7, 9, 11 and 13 which project regularly southwards from the central corridor. The spurs were observed to be similar in appearance with UPVC windows to each elevation. The south elevations of each spur are three bays in width with a typical arrangement comprising a central pedestrian door flanked by a window either side. Some variations on this arrangement were observed where a window had been altered to provide a door and where the opening has been infilled.

4.5.27 The main entrance into the block is from the south and is set between spurs 9 and 7. The entrance is located within an advanced bay which projects south from the main corridor frontage; a small extension has been added to the left (west) side of the entrance bay. The entrance comprises two, fully glazed doors with timber rails which are set under a single rectangular fanlight. The doors are enclosed by two brick piers which extend from ground level to eaves level; this design matching that observed to the west elevation of KF Block.

4.5.28 *West Elevation (Plates E, E3, E8 and E9)* – The main west elevation is of 15 bays; seven bays flank a secondary western entrance into the building which is positioned centrally within the elevation. The north spur has a lower roof level, this change in design taking account of a change in topography.

4.5.29 The entrance matches that to the south elevation bar the projecting entrance bay. It is framed by a small external porch which is enclosed by painted brick piers which extend from ground level to below the projecting eaves of the flat roof.

4.5.30 Each of the 14 flanking bays is defined by a renewed UPVC window. The windows are symmetrically planned with six panes; the larger central, tip-opening lights flanked by smaller, fixed side lights. Some alterations to the windows was observed consisting of the replacement of the central panes with fixed UPVC panels.

4.5.31 Similarly to the east elevation of each individual spur, the west elevations are generally consistent in appearance extending to seven bays and having either large six pane or small four pane UPVC windows. Evidence of blocked or altered windows was observed to some of the spurs. The west elevation of spur 8 has been obscured by a later addition that has infilled the space between this spur and spur and 6 (Plate E22).

4.5.32 *North Elevation (Plates E13 to E25)* - The north elevation comprises of spurs 2, 4, 6, 8, 10, 12 and 14 which project regularly northwards from the central corridor. The spurs were observed to be similar in their external appearance with UPVC windows to each elevation.

4.5.33 As with the south elevations of each spur, the north elevations are three bays in width with a typical arrangement comprising a central pedestrian door flanked by a window either side. Variations on this arrangement are present, notably to spurs 2, 4, 8 and 12 where a window had been altered to provide a door and where the opening has been infilled. In relation to spurs 4 and 12 the variation on opening pattern relates to former additions.

4.5.34 Small scale and piece-meal modification and alteration has been more substantial to the northern spurs with a later, large flat roof addition infilling of the space between spurs 6 and 8 and the erection of detached units within the space between the spurs and the installation of various plant equipment, pipework and flues obscuring and disrupting the simplicity of the standardised construction pattern (Plates E14, E15, E16, E22 and E25).

4.5.35 The extension noted to spur 12 and first depicted on the 1967-73 Ordnance Survey map has been substantially damaged by a recent fire however its extent is discernible as it the internal connection into spur 12.

Interior Description (Plates E28 to E54)

4.5.36 The building is single storey with all internal accommodation accessed from the same level however changes in gradient between the central primary corridor and the secondary corridors to each spur have been accommodated with ramps.

4.5.37 The interior of the building comprises a central primary corridor which provides access

to each of the 14 spurs with each spur containing a series of offices and laboratories accessed from a secondary central corridor; this arrangement is different to spur 8 where the secondary corridor has been truncated as part of the reconfiguration of this space and spur 6 as part of the later infill extension.

4.5.38 The primary corridor runs east to west through the building with a noticeable incline in gradient from east west reflective of the changes in ground level. The corridor extends along the southern side of the central link with offices, labs, storage areas and toilets to the north. The central corridor, within its original configuration is c2.63 metres in width, the overall width of the central link inclusive of the corridor and office space is c6.25m (Plates E29 to E31).

4.5.39 Based on the 1940 floor plan the interior of Block E has been subject to more significant alteration with the spurs sub-divided into smaller rooms using the brick columns to standardise the width (Plates E13, E33, E34, E40, E42 and E43).

4.5.40 In addition modern ceilings and stud walls have been inserted along a significant part of the central corridor; these insertions obscuring the rounded ends of the regularly spaced structural brick columns which define each internal bay and the original ceiling from view and altering the original proportions of the space (Plates E41 and E48).

4.5.41 Towards the eastern end of the corridor the early construction pattern is visible with brick tiled internal dividing walls and the rounded ends of the brick columns exposed. Within this area (Plates E34 and E40), between spurs 12 and 14, an original a pair of timber double doors with three fielded panels to each door is present (Plate E28).

4.5.42 Each Spur, bar spur 8, is accessed from the central corridor either through timber doors or through a simple opening. The spurs, in their original configurations, comprises a secondary corridor, aligned north to south through spur, and positioned off centre. These corridors match that observed and discussed in relation to KF Block and are 1.52m wide and c3.12m high. Rooms enclose the corridor to the east and west with wider rooms (c5.55m in width) to one side and narrow rooms (c3.6m in width) to the opposing, there being no general pattern to which side has the wider rooms.

4.5.43 The walls of the secondary corridors and flanking offices and labs, where exposed, comprise painted brick tiles which form part of the original 1940 construction as well as the late 1940 alterations made initially the TRE and which evidence that the corridor has not been altered since the late 1940s this is most obvious in spurs 1, 2, 4, 5, 7, 9, 11, 13 and 14. These rooms also retain corners of the rounded brick columns to their

external corners (Plates E34, E38, E40, E52, E54).

4.5.44 These spurs typically contain round brick piers spaced at regular 3.33m intervals which project forward of the internal dividing wall enclosing the wider rooms. These piers viewed in the corridor and within the flanking rooms define each bay and are representative of the modular type construction used within the original building. Spur 9 appears to retain the early internal subdivision to the west side with seven rooms, one per modular bay present

4.5.45 As with the other original WWII buildings, the general arrangement of the rooms within the spurs appears to have been altered however, typically, their width still follows the same regular division using the original brick piers of the internal bays.

4.5.46 Several of the spurs present more substantial rearrangement where the original modular plan form and regular internal subdivision has been lost or substantially obscured. Spurs 6 and 8 present a more complex arrangement of spaces with many retaining fixtures, finishes and signage relating to the later laboratory use and it can therefore be assumed that extension and adaptation of the original fabric was necessary to enable these research works to undertaken (Plates E43, E44, E45, E47 and E49); this infill may coincide with the relocation of the integrated circuits sector.

4.5.47 Spur 3 retains part open space which is more reflective of the original floor plan however it is likely that the open space design is a reversion of earlier alterations which sub-divided the space (Plate E47).

4.5.48 Signage observed within the building identifies that part of Spur 11 was used for optonic research.

4.6 Level 3 Building Recording: D Block (NGR centred on SO 78570 44562)

Date of Record

4.6.1 The photographic record was undertaken in 13th September 2019. The visit included access to the interior as well as external observations to inform the written record.

Location and Building Development

4.6.2 D Block comprises a single storey building located towards the south east corner of the Site. The building is bound by T.R.E Road to its north and Poolbrook Way to its south. To its west are the main boiler house and sub-stations and to the east is DX Block (Building 26).

4.6.3 The building comprises a series of eight spurs or wings which project in a north south

alignment from a main, central link which connects each spur, and which extends the entire width of the building on an east to west alignment. The resulting plan form is symmetrical and distinctive comprising a two connective 'H' plan sections.

4.6.4 The building is of the same construction as KF Block, E Block and A Block comprising rendered brickwork with a flat, felt roof covering. The roof is slightly projecting and is supported on regularly spaced metal brackets which are painted blue. Rainwater goods are painted cast iron. Windows are renewed in UPVC with a mixture of renewed UPVC and painted timber doors.

4.6.5 The building forms part of the original WWII complex known as HMS Duke and is depicted on a Site Plan dated 1942 and shown on aerial photography from 1949. These depict the building as comprising 10 spurs with an additional wing adjoining spurs 7 and 8 to the west and confirm that the building originally was asymmetrically planned. The 1942 plan identifies that the northern portion of spur 9 was the 'Ships PO'.

4.6.6 The building is noted by MRATHS as being the original administration block for HMS and would have housed civilian staff as well military staff; the north projection between spurs 5 and 7 is reputed have originally been the site morgue and it is likely that medical facilities were also contained within this block, later site plans attest that part of Spur 4 was used as the surgery however no evidence of this use was observed during the visual inspection with this part of the spur having been altered to create a single large, open plan space within the end three bays.

4.6.7 An early floor plan for the building (see image 11 below), which although undated refers to the RRE within the drawing title indicating it was likely produced sometime in the mid to late 1950s after the TRE and the ADRE were merged to become the Radar Research Establishment and later the Royal Research Establishment, depicts the southern end bays of spurs 2 and 6 to have thicker solid walls than depicted elsewhere within the block indicating the location of former air raid shelters; these were observed to remain in situ within spur 6 which was later adapted to become a secure storage area for secret documents; evidence of the secure area is presented within a large, metal safe door which encloses a small cupboard (see internal description below).

4.6.8 The footprint of the block has been reduced with spurs 9 and 10 removed sometime between 1963 and 1967 to accommodate the boiler house buildings (Buildings 18, 19 and 20) which are first depicted on Ordnance Survey mapping dated 1967-73.

4.6.9 Verbal discussions with members of MRATHS identified that part of the building had a crypto room for cryptographic research; internal observations of space suggest that this may have been housed within spur 6 within the western half of the Block where the end bays have altered to provide an enlarged space which retains a solid, thick safe door to small storage area.

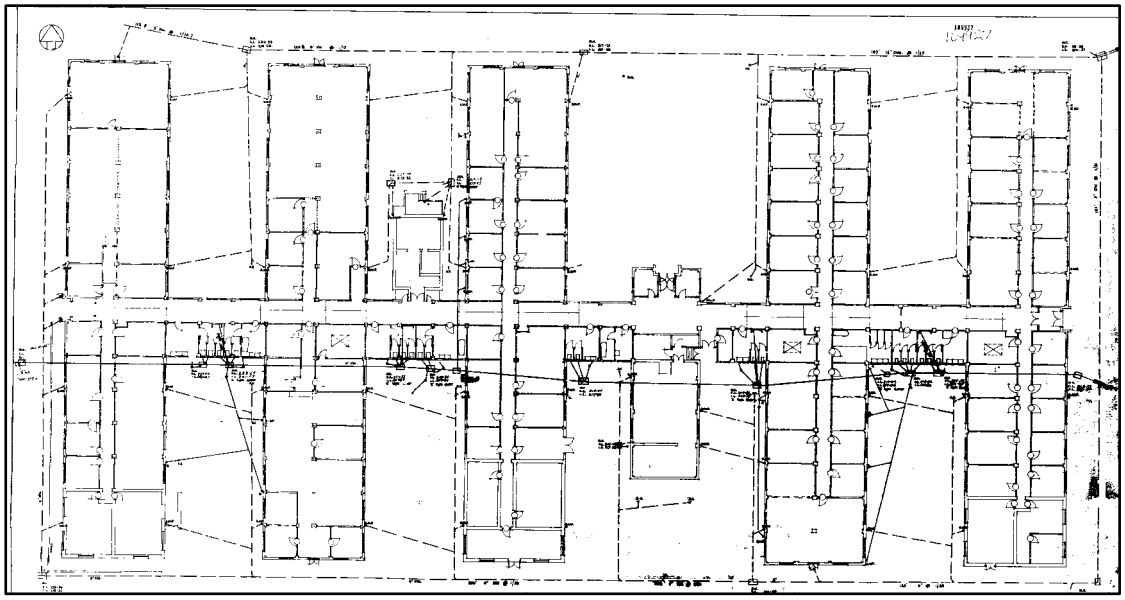

Image 11 - Copy of digital image of a floor plan dated mid to late 1950s showing internal arrangement of D Block; not the mix of open plan and small, individual enclosure which may relate to the original administrative function of the building (Image sourced from MRATHS digital archives)

Exterior Description (Plates D1 to D30)

4.6.10 D Blocks presents a regular, highly repetitive external arrangement of rectangular spurs which project northwards and southwards in pairs from a central a continuous corridor wing.

4.6.11 The building has eight projecting spurs in total with four to the west of the main central entrance and four to the east. The spurs are of a consistent proportion with each extending to three bays in width. The length of each of the eight spurs matches that presented to E Block, A Block and EF Block extending to seven bays from the central corridor elevation end; each bay is c3.6 metres in length giving a rough total spur length of c25 metres.

4.6.12 Each pair of spurs is spaced from the adjacent pair by a three-bay interval bar the spurs which flank the main entrance where they are slightly further apart, the connective central link being five bays wide at this point as opposed to three.

4.6.13 As with Blocks A, E and KF, bays are defined to the exterior by windows and doors with

each bay typically containing either a large symmetrically arranged six-pane UPVC casement window or a smaller, asymmetric four-pane UPVC window. Windows to D Block are consistent in design, size and material as used presented in A, E and KF Blocks.

4.6.14 The roof construction matches that to A, E and KF Blocks with matching cast iron rainwater goods and a slightly projecting eaves supported on cast iron brackets.

4.6.15 *West Elevation (Plate D31)* – The main west elevation comprises the spurs 7 and 8. This elevation was significant obscured by vegetation however it was observed to be of the same rendered brickwork construction with UPVC windows. Based on the uniformity of the design of these WWII building it is anticipated that the west elevation matches that presented to E Block (Plate E1) being of 15 bays in width with seven bays flanking a secondary western entrance into the building which is positioned centrally within the elevation. This secondary was not observed however given that this wing originally extended to a further wing it is unlikely to be of matching design to the original secondary entrances as presented to the east elevation.

4.6.16 The west elevation of each individual spur is consistent in appearance extending to seven bays and having either large six pane or small four pane UPVC windows (Plates D8, D11, D22, D27).

4.6.17 *North Elevation (Plates D1 to D12)* – The north elevation consists of spurs 1, 3, 5 and 7. The north end elevation of each spur has either a three or two bay arrangement; spurs 3 and 7 present a three bay arrangement where a central UPVC pedestrian door is flanked by single six pane UPVC windows whilst spur 5 presents a two bay arrangement defined by two six-pane UPVC windows only; it being possible that the central pedestrian door has been removed. The north end elevation of spur 1 was not observed due to vegetation cover.

4.6.18 The main entrance into the block is from the north and is set between spurs 3 and 5 and overlooks a large tarmac area formerly used for parking. The entrance is located within a central advanced bay which projects north from the main central link. The advanced bay is flanked by two six-pane UPVC windows to either side. Access into the block is through two, 4-panel timber doors which appear to original from their architectural character although second from top panel has been replaced with a glazed panel. The doors are enclosed by two brick piers which extend from ground level to eaves level; this design matching that observed to entrance to the east elevations and the primary and secondary entrances to KF Block, E Block and A Block.

4.6.19 *East Elevation (Plates D5, D11, D13, D14, D15, D16, D19, D25, D28)* – The main east elevation of D Block fronts Aquila Way which is a narrow roadway between D Block and DX Block (Building 26). The elevation comprises a 15-bay arrangement with seven window bays flanking the centrally positioned entrance. The entrance to D Block is aligned with the main entrance DX Block which suggests a former functional relationship between the two buildings.

4.6.20 The eastern entrance matches that to the north elevation bar the projecting entrance bay. It is framed by a small external porch which is enclosed by painted brick piers which extend from ground level to below the projecting eaves of the flat roof. Doors are modern timber replacements. The brickwork surrounding doors retains its original brickwork finish. (Plate D17).

4.6.21 The east elevation of each individual spur is consistent in appearance extending to seven bays and having either large six pane or small four pane UPVC windows. A small flat roof addition has been added to the east elevation of spur 8 at its south west corner (Plate 28).

4.6.22 *South Elevation (Plates D18, D19, D21, D22, D23, D26, D27, D28 and D30)* – The south elevation comprises of spurs 2, 4, 6, and 8 which project regularly southwards from the central link corridor. The spurs were observed to be consistent in their external appearance with UPVC windows spaced regularly to each bay.

4.6.23 The south elevation of spurs 2 and 4 are of a matching, typical three bay arrangement with six-pane UPVC windows flanking a centrally positioned UPVC pedestrian door. On the assumption that the original configuration comprises a three-bay arrangement, Spurs 6 and 8 have been subject to greater modification with window openings blocked (Plate D26) and/or enlarged to form double door openings (Plate D28).

4.6.24 To the south of the central bay of the link corridor, between spurs 4 and 6, is a shorter, narrower spur projection which is aligned with the central entrance to the north. This projection, repeated in plan form on Blocks E and A, although extended on Block E, is part of the original WWII configuration being present of the 1942 Site Plan. The projection is two bays in width and 5 bays in depth (Plate D23).

4.6.25 A secondary entrance is provided to the east (right) of this projection. The entrance is recessed behind the south elevation with concrete stepped access up to the small external porch area. Access into the interior of the building is via two painted timber doors with glazed top panels. The doors which are likely original or early additions to

the building, are set under a single fanlight with a single vertical and horizontal slim glazing bar (Plate D30).

Interior Description (Plates D32 to D54)

4.6.26 The building is single storey with all internal accommodation accessed from the central primary corridor which forms the main circulation space through the building. This central corridor positioned within the northern half of the central link extends the entire width of the building. The corridor provides access to each of the eight spurs with each spur containing a series of offices and laboratories accessed from a secondary central corridor.

4.6.27 The primary corridor follows the regimented east to west alignment through the building with a noticeable incline in gradient from east to west reflective of the changes in ground level. Offices, labs, storage areas and toilets are located within the southern portion of the central link with direct door access from the primary corridor. The primary corridor, within its original configuration is c2.63 metres in width, the overall width of the central link inclusive of the corridor and office space is c6.25 metres.

4.6.28 The main north entrance and the corresponding entrance from the south lead into the central primary corridor with two sets of opposing double doors and stud walls aligned with the position of the modular brick columns creates a small internal lobby area from which the central corridor leads to spurs 1 to 4 and 5 to 8 in an east and west direction respectively.

4.6.29 Within the corridor, as with Blocks A and E, the rounded structural brick columns project out slightly in regular c3.3 metre intervals, each pair of columns defining the extent of a bay (Plates D32 to D35).

4.6.30 Moving east along the corridor leads to spurs 1 to 4. These spurs have, in consideration of the floor plan included in image 9 above, experienced alteration comprising the removal of brick tile partition walls either in part or in whole to create large open spaces (Plates D41, D52, D53 and D54). In these rooms the structural brick columns which form the basis of the modular construction plan of the building are exposed; these columns have rounded edges and stop chamfers at the junction with the ceiling however this detail was obscured in part in spurs 1 and 3 by modern ceilings inserted below the original, higher ceiling level.

4.6.31 It is noted on documents held by MRATHS that the director for RSRE and his secretary

were accommodated within the most northern bays of spur 1.

4.6.32 The level of alteration is slightly less in spur 4 where the arrangement of spaces within the northern half of the spur, closest to the corridor, has a regular, consistent plan form based upon the pattern of structural brick columns with each of the first four bays forming separate office spaces. The individual rooms display the rounded corners of the brick columns within the outside corners of each room (Plate D37).

4.6.33 The shorter, central projection, originally the boiler room, has lower floor level than the rest of the main building with stepped access leading down into a larger open room with high ceiling (Plate D46). A door opening in the south internal wall leads to a further small room which has small external porch to the south east corner, as visible in Plate D23.

4.6.34 Moving westwards through the connective corridor, the floor level gently inclines (Plate D32); this change within internal floor level is most apparent in spurs 7 and 8 where the secondary corridor into the spur is ramped (Plate D36).

4.6.35 The secondary corridors serving spurs 6 and 8 have brick tile internal walls, the joints and bond pattern visible beneath the painted finish; these spaces presenting the best examples within the building. These secondary corridors to the spurs are narrower in width than the primary corridor measuring c1.52 metres and have part of the structural brick columns projecting into the corridor (Plates D36, D40 and D48).

4.6.36 In spur 6 the corridor terminates at bay six with the most southerly bays (bay seven) altered to form a single space room that extends across the entire width of the spur. This room contains a secure storage room to the east of the space with a metal, safe door identifying that the space was used to secure important items/information; this space is believed have been the secure room used for cryptographic research in deciphering encrypted messages and codes (Plates D49 and D50).

4.6.37 To the north, between bays 5 and 7 is a short projection originally built as the morgue for HMS Duke. The projection houses office accommodation (Plate D51) with no evidence of this original function visible within the much-altered interior.

4.6.38 Spurs 7 and 8 are positioned at the most westerly end of the Block with both being accessed by inclining ramps from the primary corridor. Spur 7 has been subject to greater modification with the internal dividing walls between the flanking rooms removed to create a more open plan space (Plate D52).

4.6.39 Spur 8 extends to the south and retains a more intact modular plan form with offices

flanking the secondary corridor following the regular, consistent division offered by the structural brick columns; the rooms to west being wider and having the internal walls removed to create a larger space (Plates D2, D44 and D45).

4.6.40 The block retains some evidence of earlier configurations with a blocked doorway visible within the internal brick tile partition wall between the smaller rooms with spur 5 (Plate D39).

4.7 Level 3 Building Recording: Library Building (NGR centred on SO 78591 44720)

Date of Record

4.7.1 The photographic record was undertaken in 13th September 2019. The visit included access to the interior as well as external observations to inform the written record.

Location and Building Development

4.7.2 The Library building is positioned within the eastern half of the Site and to the south of R.R.D.E Road. It comprises a 'H' plan building with two parallel rectangular wings aligned roughly north west to south east connected by a central corridor. The south west range is longer projecting further south east than the north east range. The building occupies a sloping site with stepped access to its north east entrance. The south west range occupies a slightly high ground level with the change in levels accommodated for internally via internal steps within the connecting corridor.

4.7.3 The building is constructed of a mix of red and orange brickwork with renewed UPVC windows and doors throughout. Windows vary between four-light and six-light casements however all have concrete lintels and those to the north east range also have concrete sills. The roofs of both ranges are shallow pitched gables covered with corrugated metal sheeting.

4.7.4 The north east range of the building is depicted on the 1942 Site Plan as 'Lecture Rooms'. This original building comprises a rectangular plan building which gabled roof as shown on the 1949 aerial image of the site (Image 1 above). This image also identifies that the small entrance porch, which stepped access from the north and south, did not form part of the original configuration; this was likely added at the same time and the south west range.

4.7.5 The south west range is first depicted on the 1963 Site Plan with a later extension to the south of this range show on the 1967-73 Ordnance Survey plan. A foundation plan of the extension held within the MRATHS digital archives dates the first extension at

1956.

4.7.6 There are variations in the brickwork to the external elevation elevations which attest to the south west range being a later addition, this wing having an orange/red brindle type brickwork.

4.7.7 The building is first depicted as a library on the 1977 Site Plan, although construction plans dated from the 1950s indicate the building was in use as such well before 1977. The building is most recently depicted as being used as offices.

Exterior Description (Plates L1 to L16)

4.7.8 Sections of the building were significantly obscured by vegetation which restricted access and visual observation; notably the central connecting corridor was obscured from the exterior as was the south west and south east elevations of the north east range and the north east elevations of the south west range. Glimpses through the vegetation confirmed these elevations to comprise the same red and orange brick construction with renewed UPVC windows.

4.7.9 *North east Elevation (Plates L1, L2, L14 and L15)* – The north east elevation of the north east range is of red and orange brick construction in a stretcher bond with a darker red brick plinth laid in an English Garden Wall bond; the change in brick colour and bond may indicate that the library building has been rebuilt, possibly as part of the later works of extension.

4.7.10 The elevation is of five bays, each bay defined brick piers. The outer bays have larger four-light UPVC casement windows, the inner bays have two smaller four-light UPVC casement windows. The central bay is wider containing the main entrance. The entrance is provided within a flat roof porch addition with stepped access provided at either end of the porch. A large six-light symmetrical UPVC window which matches the large windows to A, E, D and KF Blocks is positioned within the north east elevation of the porch addition. The base of the porch extension is rendered.

4.7.11 The north east elevation of the south west range was of a lighter, orange coloured brick construction. This range is longer comprising eight bays. Windows were observed to comprise renewed UPVC symmetrical six light casements that match that to the north east porch and those A, E, D and KF Blocks.

4.7.12 *North west Elevation (Plates L3, L4, L7 and L8)* – The north west elevations comprise the gables ends of each range; the north east elevation of the corridor which links the two ranges was not visible due to significant vegetation cover however it appears to

comprise a simple flat roof brick addition with large glazed windows (as observed for the interior) to the north east. The brickwork to the gable end of the north west range is more uniformly orange/red in colour, the change between the ranges, indicative of different construction dates.

4.7.13 The north west gable ends of both ranges comprise a three-window arrangement. The windows to the north east range are smaller being four-light UPVC casements matching those in proportion and design to the north east elevation. The central window is set within brick piers.

4.7.14 The windows to the north west gable end of the south west range are larger comprising six-pane UPVC casements.

4.7.15 *South West Elevation (Plates L5, L9 and L10)* – The south west elevation of the north east range was significantly obscured by vegetation however observations made from the north west end identified a matching construction and window detailing to that presented on the gable end and the north east frontage.

4.7.16 The south west elevation of the south west range extends to eight bays. An entrance porch addition matching that in scale and arrangement to the north east elevation, bar the stepped access, is present in the third bay and is aligned with the central corridor and the entrance porch provided to the north east range.

4.7.17 To the left of the entrance are two six-light UPVC casement windows whilst to the right are five six-light UPVC casement windows; this range being longer following subsequent extension between 1963 and 1967.

4.7.18 *South East Elevation (Plates L11, L12 and L13)* – The south east elevation forms the opposing gable elevations to the north west. Similarly to the north west elevation the exterior of the link corridor was not visible due to vegetation. It is anticipated this elevation will also be of orange brindle brick construction. Observations from the interior indicate that windows are likely to be fewer and smaller than the north east elevation of the corridor due to the most recent use of this space WC facilities.

4.7.19 The south east elevation of the north east range was also significantly obscured. A matching four light window was observed through the vegetation and it is anticipated that the elevation presents a similar three-light arrangement.

4.7.20 The south east elevation of the south west range is symmetrically arranged with two three-light high-level casement windows flanking a centrally positioned solid timber door aligned under a two-light UPVC high-level window. The arrangement and type of

the windows suggests that the corresponding interior space did not require the same level of natural illumination as elsewhere within the window and it is possible this space comprised storage as part of the earlier library use.

Interior Description (Plates L17 to L29)

4.7.21 The interior of the building has been subject to significant alteration. No evidence as to the former library use was observed to the interior with fixtures and fittings indicative of such removed and the most recent use as an office clearly reflected in the internal configuration.

4.7.22 The north east range is accessed via the entrance porch addition to the north east elevation. This porch leads into a small vestibule area before opening up into the main interior space.

4.7.23 This space consists on modern office cubicles with glazed upper sections positioned around the perimeter of the range with those to the north west forming a shape around a large open space. The offices to the southern bays are larger.

4.7.24 Double doors within the south west elevation open outwards and provide access to the link corridors. The link corridor contains two short flights of steps that take account of the change in levels between the ranges. The corridor is finished with painted brickwork. A fire door is positioned to the centre of the north west elevation.

4.7.25 To the south east, the corridor provides access to WC facilities.

4.7.26 The second flight of steps leads up to another set of timber double doors. These doors lead into a large reception area of the south west range. The doors are aligned with the entrance porch to the south west elevation. This range comprises four main spaces; the space to the north west comprises a single large open area enclosed from a central reception by modern office partition walls matching those to the north east range.

4.7.27 The southern extent of the range comprises two further large spaces, open the width of the range and accessed via double doors in the south east internal of the reception area. The partition walls are painted brickwork and appear to be original. A further pair of timber double-doors, aligned with those from the reception area lead into the most southerly space which comprises a large room of three bays length; this room likely comprising the extent of the later addition added between 1963 and 1967.

4.8 Level 3 Building Recording: A Block (NGR SO 78745 44784)

Date of Record

4.8.1 The photographic record was undertaken on 13th September 2019. The visit included access to the interior as well as external observations to inform the written record.

Location and Building Development

4.8.2 A Block is located to the north east of the Site outside of the application Site boundary however it is proposed for demolition as part of the approved planning application.

4.8.3 A Block comprises a single storey building or rendered brickwork construction with a flat, felt roof covering. It is aligned roughly north west to south east and has the same repetitive plan form and is of the same standardised construction as E, D and KF Blocks with a pair of aligned spurs projecting north east and south west from the central connective link.

4.8.4 The original plan form of the building, as depicted on the 1942 Site Plan, is symmetrical with four spurs projecting regularly either side of the main, central entrance bay.

4.8.5 To the north west of the A Block is building 36, known as J Block and formerly housed the stratosphere and centrifuge chambers. To the rear, north east of the building are a series of single storey sheds and pre-fab storage units which the 1977 Site Plan (BM11422-019) depicts as the component recovery section.

4.8.6 It is known that spur 4 was used to test systems in relation to vibration and sections of floor plans relating to alterations to the block om the 1977 continue to depict this as being a vibration test laboratory.

4.8.7 The concentration of the component testing functions to A Block and its immediate environs consisting of J Block (building 36), dust test chamber (building 35), component recovery section (buildings 30 – 34) and the Giraffe building (building28) suggest this area of the wider Site specialised in this type of physical and practical testing of equipment.

4.8.8 The building has been subject to modification which has affected the legibility of the original plan form; this is most evident to western half of the Block where the space between spurs 2 and 4 to the north have been filled in and squared off and the space between spurs 1 and 3 to the south has been partially infilled with a later addition and connected to the enclosing spurs via a glazed link addition. This infill addition is noted on plans held by MRATHS as comprising a component test laboratory and added in

1960.

4.8.9 The infill extension between spurs 2 and 4 (see image 12 below) is first indicated on the 1963 Site Plan and replaced an earlier, smaller projection which appears to have formed part of the original WWII configuration being present on the 1942 Site Plan; this projection matching a projection between spurs 6 and 8. Later works of alteration to this space comprise the creation of a climatic laboratory and the relocation of a power house annexe recorded under planning reference 76/02492/CRO to the infill extension between spurs 2 and 4. The space is noted as being used for solar radiation research; fixtures and signage extant within the building suggesting that this use is more recent.

4.8.10 It is known from MRATHS that part of the infill extension was used to rigorously test equipment developed at Malvern with a laboratory for replicating physical, unpredictable and unstable conditions that the technologies and their important components would be required to survive[13]. This space is identifiable within the extant configuration of spur 3 through the remains of significant hoisting gear and a roller garage door where vehicles would load and unload the equipment onto a raised platform before being moved to be testing.

4.8.11 It is also recorded that A Block was involved in the physical and climatic testing of the complete radar, radio, fuse and electronic systems used within operation red beard, a UK developed atom bomb, although the testing did not include the nuclear core.

4.8.12 The building contains a complex arrangement of laboratories with remaining fixtures including fume chambers, x ray areas and laser warning signage providing evidence as to the research technologies being developed most recently and tested as part of the building later uses.

[13] https://mraths.org.uk/?page_id=495

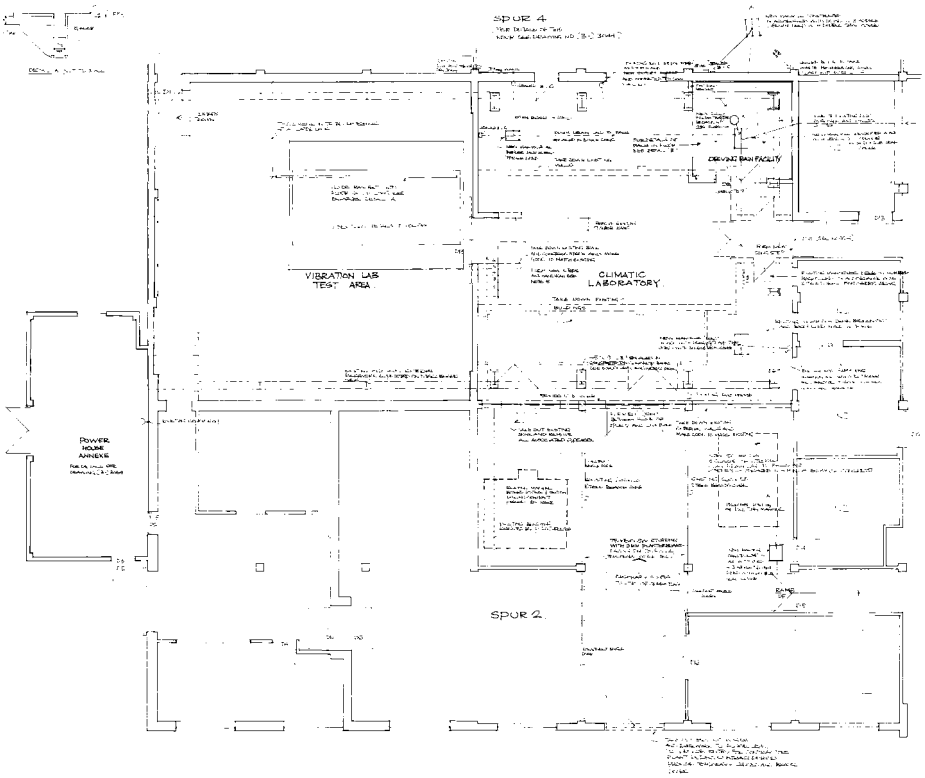

Image 12 - Proposed floor relating to consolidation works to the infill extension between spur 2 (to the base on the image) and spur 4 (Image sourced from MRATHS digital archives)

Exterior Description (Plates A1 to A27)

4.8.13 The building presents a regular, highly repetitive external arrangement of rectangular spurs which project roughly north eastwards and south westwards in pairs from a central a continuous corridor wing which is aligned north west to south east.

4.8.14 The building has eight projecting spurs which were originally arranged symmetrically around the central entrance; the block retains the symmetrical appearance to the south west frontage where the spurs have been subject to less external alteration. to the west of the main entrance and six to the east.

4.8.15 The spurs, where intact, are of a consistent proportion and match those extant to Blocks D and E with each spur extending to three bays in width. In terms of length each spur within its original configuration extends to seven bays from the central corridor; each bay is c3.6 metres in length giving a rough total spur length of c25 metres.

4.8.16 Each spur to the south west and the spurs to the north east (6 and 8) is spaced from the adjacent spur by a three-bay interval bar the spurs which flank the main entrance where they are slightly further apart, the connective corridor being five bays wide at this point.

4.8.17 Bays are defined to the exterior by windows and doors with each bay typically containing either a large symmetrically arranged six-pane UPVC casement window or a smaller, asymmetric four-pane UPVC window. Windows to A Block are consistent in design, size and material as presented in D, E and KF Blocks.

4.8.18 The roof construction matches that to D, E and KF Blocks with matching cast iron rainwater goods.

4.8.19 *North West Elevation (Plates A22 to A24)* – The north west elevation comprises the west end of Spurs 1 and 2. It was partially concealed from observation due to significant vegetation cover which is more dense to the exterior of spur 2 however in general the elevation comprised the same configuration observed to the north east elevation and the main end elevations of Blocks D and E consisting of a 15 bay arrangement with seven window bays flanking a centrally positioned entranceway with the roof height of spur 2 stepping down below the roof height of spur 1. The entranceway was of the standard design for the former WWII building comprising double entrance doors (renewed in timber) set within a small external porch defined by brick piers.

4.8.20 The north west facing elevations of each spur were also observed to follow the same consistent and standard design approach albeit some variation to the design and size of windows and blocking up of openings as a result of alteration was observed however the general rhythm of the built form remains discernible (Plates A4, A9, A18 and A26).

4.8.21 Features of note to the north west elevations comprise the painted board applied to the south extent of spur 5 (covering the end bay) which is a test panel for laser photography (Plate A5).

4.8.22 A small first floor addition has been added above the first bay of spur 1 (closest to the entrance) however access to this space was not observed to the interior.

4.8.23 Also observed is an external veranda/porch area to spur 3 which appears to connect to altered and enlarged addition erected between spurs 1 and 3 (Plate A26).

4.8.24 *North East Elevation (Plates A15 to A21)* – The north east elevation consists of spurs 2, 4, 6 and 8 which project north eastwards from the central link. This elevation faces out towards a tarmac area and former road network which is enclosed by buildings 30 to 34 and which was formerly used as the component recovery area and it is possible that the arrangement of these smaller ancillary buildings to interact with the north

east elevation of A Block is representative of a connected former function between the buildings.

4.8.25 To the centre of the block is centrally positioned painted brick addition which is positioned between spurs 4 and 6. The addition has double solid, timber doors to its centre and it appears to have been subject to rebuilding with an area of brickwork above the door matching the orange/red brindle brick used on the Library Building (Plate A15).

4.8.26 Much of the north east elevation was obscured from observation by dense vegetation cover however the end elevations of each spur were observed to be consistent with the design of the end elevations to the opposing spurs having a three-bay width with renewed UPVC windows and doors arranged symmetrically.

4.8.27 The north east elevation of the infill addition between spurs 2 and 4 has concealed the original spur configuration and resulted in the loss of distinctive pattern of openings to the end elevations; this making it harder to read the original design within the later works. The addition appears to be two storey projecting as a square box above the original flat roof however observations to the interior identify that the space is not two storeys instead comprising a large, open space which extends to two storeys in height and which is lit by the high level windows with openings to the ground floor restricted due to the presence of the original spurs.

4.8.28 *South East Elevation (Plates A1, A8, A11, A12, A13, A14, A16, A20 and A21)* – The south east comprises the end elevations of spurs 7 and 8. It is of the same configuration as the north west elevation consisting of a 15 bay range with seven renewed UPVC windows flanking a centrally positioned entrance. As with north west elevation, the roof level of spur 8 steps down below the level of spur 7 which is reflected in the gently declining floor level of the interior spaces to the spur.

4.8.29 The entrance comprises two renewed timber doors with stained finish set within a shallow, recessed external porch defined by brick columns which is this instance have their natural brick finish exposed to their out edge.

4.8.30 The south east elevations of spurs 6 and 4 were significantly obscured by vegetation however in general appeared to comprise the same pattern of window openings (Plate A16). Spurs 2 and 4 have experienced greater alteration with projecting addition to the south east elevation at its most northern extent and to the north east end. The projection to the south east (from spur 4) contains large timber doors on a sliding

mechanism, these doors providing access into a test laboratory for recreating extreme physical conditions that the technology and equipment produced on Site may have to incur.

4.8.31 *South West Elevation (Plates A2, A3, A6, A7, A8, A9, A10, A25, A26, A27)* – The south west elevation consists of spurs 1, 3, 5 and 7 which extend the same distance south westwards away from the central link. The spurs were observed to be consistent in their external appearance with UPVC windows spaced regularly to each bay although the addition to the link between spurs 1 and 3 has obscured the pattern of opening from view,

4.8.32 The south west end elevations of each spur are of generally of a matching three bay arrangement with six-pane UPVC windows to the outer bays. The central bay of spurs 1, 5 and 7 having been altered with the central doorways removed; a blocked-up doorway is clearly visible to the end elevation of spur 5 (Plates A7, A10, A25 and A27).

4.8.33 The main entrance into the block is from the south west and is set between spurs 3 and 5 and overlooks a large tarmac area formerly used for parking. The entrance is located within a central advanced bay which projects north from the main central link. The advanced bay is flanked by two six-pane UPVC windows to either side. Access into the block is through two, renewed timber doors. The doors are enclosed by two brick piers which project forward of the entrance and which extend from ground level to eaves level; this design matching that observed to entrance to the east elevations and the primary and secondary entrances to KF Block, E Block and D Blocks.

4.8.34 Evidence of alteration is presented by the addition between spurs 1 and 3 which, from previous site plans, occupies an earlier building at its core which has been extended south westwards and which has been linked by glazed corridor addition to spur 3.

Interior Description (Plates A28 to A55)

4.8.35 The building is single storey with all internal accommodation accessed from the central primary corridor which forms the main circulation space through the building. This central corridor positioned within the southern half of the central link extends the entire width of the building. The corridor provides access to each of the eight original spurs with each spur containing a series of offices and laboratories which flank a secondary corridor which extends roughly centrally through the spur; although the length of the corridor varies depending on the arrangement of the offices and labs

with some extending the width of the spur and therefore terminating the corridor prematurely.

4.8.36 The primary corridor follows the regimented east to west alignment through the building with a subtle incline in gradient from east to west reflective of the changes in ground level (Plates A28 to A30). Offices, labs, storage areas and toilets are located within the northern portion of the central link with direct door access from the primary corridor. The primary corridor, within its original configuration is c2.63 metres in width, the overall width of the central link inclusive of the corridor and office space is c6.25 metres.

4.8.37 The main south west entrance leads into the central primary corridor with two sets of opposing double doors and stud walls aligned with the position of the modular brick columns creates a small internal lobby area from which the central corridor leads to spurs 1 to 4 and 5 to 8 in an west and east direction respectively.

4.8.38 Within the corridor, as with Blocks D and E, the rounded structural brick columns project out slightly in regular c3.3 metre intervals, each pair of columns defining the extent of a bay (Plates A30 and A31).

4.8.39 To the north of the central corridor is an original shorter projection which on plan is aligned with the central entrance, this comprising the original boiler rooms within the WWII configuration. Original timber doors comprising two panels doors with solid bottom panels lead to stone steps which lead down to the space, most recently used as a laboratory within the main space of the projection (Plate A53).

4.8.40 Moving east along the corridor leads to spurs 5 to 8. These spurs appear to retain more of their earlier configuration and the distinct modular arrangement whereby the internal spaces are defined by the structural brick columns is clearly legible (Plates A32 and A35); it likely that these infills are slightly in later in origin with some of the spurs originally being open plan, as depicted on the original floor plan for Block E, and used for communal dormitory accommodation. Some later alteration is visible however with the most southerly and northerly bays typically reconfigured in plan form with internal walls altered or removed to create larger spaces (Plates A37 and A38).

4.8.41 The end bays of spur 6 are shown in image 13 below and are thicker in width than the standard brick tile internal partition walls and it is assumed that this area was constructed as an air raid shelter, similar to those constructed in Blocks D and KF within the original configuration; these walls being of imperial brickwork construction

rather than brick tile.

4.8.42 Within many of the individual rooms, used for both offices and laboratories, the structural brick columns are exposed to the external walls with the rounded edges and stop chamfers present at the junction with the ceiling visible (Plates A33, A38 and A46). This detail was also present in rooms that comprised more than one bay in width demonstrating that the modular plan form has continued to be used to inform the layout of the internal spaces within later uses.

4.8.43 The four spurs to the north west of the block retain a significant number of fixtures, fitting and signage relating to laboratory use and there appears to be a greater concentration of practical research and development within this half of the Block. That said, spurs 3 and 4 still display the consistent and regular plan form with seven individual rooms contained within each of the seven bays, these rooms have brick tile internal partition walls with the round corners of the brick columns exposed in the corners of each room.

4.8.44 With spur 4 there is evidence of alteration, as viewed to the exterior, where the spur has been extended to its north east corner. Within this space, the original external wall of the spur is clearly visible with sections removed to create large openings into the extension. It is understood that this area was used in the 1960s for the rigorous physical testing of equipment. The space retains large doors to the external elevation which suggest that equipment was loaded and offloaded by vehicle (Plates A48 and A49). An external timber boarded door remains within the north east end elevation of the spur (Plate A51).

4.8.45 Access into the infill addition between spurs 2 and 4 is possible via a laboratory within the north western half of spur 4 and from spur 2; spur 2 having experienced a greater degree of alteration with the removal of internal partition walls to create larger laboratory areas (Plates A42 and A47). Fixtures remaining within these labs evidence that both x ray and laser research activities were undertaken.

4.8.46 The infill extension houses an internal research lab to its centre with glazed screens enclosing it from a circulation space (Plates A43 and A44). The space is naturally lit by high level around the perimeter of the addition which are observed as first floor windows from the exterior; this area is identified on earlier mapping as a climatic laboratory.

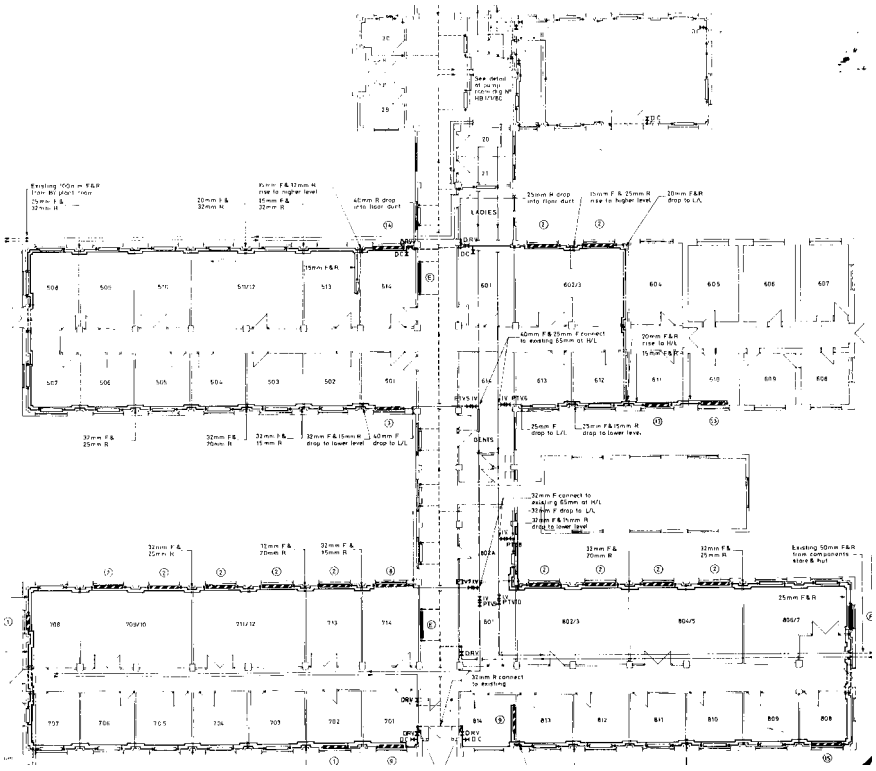

Image 13 – Copy of a digital image of a partial floor plan of A Block dated 1974 showing spurs 5 -8 (5 and 7 to the left and 6 and 8 to the right) with the thicker walls to the outer three bays of spur 6 clearly depicted as being wider (Image sourced from MRATHS digital archive)

4.8.47 To the south west, spurs 3 and 1 are connected via the primary central corridor and by a later link addition which extends from the third bay of spur 3 and leads into an adapted earlier addition before exiting into spur 1. The link addition is UPVC framed. Several of the southern bays of spur 1 have been opened up to create a larger space with the walls painted black and is noted by MRATHS as being used for thermal imaging research (Plate A50).

4.8.48 The block retains evidence of earlier configurations with a blocked doorway visible within the internal brick tile partition wall between the smaller rooms with spur 8 (Plate A34).

5 DISCUSSION AND SUMMARY

5.1.1 The Site represents a complex and varied assortment of buildings adapted and constructed to meet the research and development requirements of the scientific research wing of the Ministry of Defence. Whilst research aims originally principally focussed upon radar development, the scope and type of the research being undertaken at the Site expanded and the buildings reflect the variety of technologies that were developed at Malvern.

5.1.2 Whilst the Site derived as WWII Naval Training Base, these origins are difficult to discern within the context of the research and development use and this phase only represents a very short phase of the Site's occupational and operational history.

5.1.3 The Level 3 recording has focussed upon the remaining WWII buildings which were derived from analysis of historic mapping. These buildings, known as A, D, E and KF Blocks and the Library Building all present a standardised and uniform construction pattern which makes their contemporary origins easy to interpret, although correlation to WWII operations is not explicitly expressed within their architectural appearance as a result of the more recent adaptations and additions they have experienced including near wholesale renewal of original crittel type windows and timber doors with modern timber alternatives and UPVC replacements.

5.1.4 These WWII buildings are basic in the appearance presenting a simple and repetitive modular plan that enabled easy and likely rapid construction which would have been important as part of their wartime construction. This simple plan form has also made the building easy to adapt where comparison of original floor plans against later floor plans reveals the sub-division of original, large open plan spaces based using the modular structural brick columns to inform the proportions of the internal spaces. Whilst it is likely that not all of the blocks would have comprised large open spaces originally, the sub-division of the smaller original rooms that flank the central connective corridor range follow this modular and consistent form of internal division. construction and easy adaptation. This was enabled by the grid-iron, modular brick column framework which allows simple, subdivision or opening up of spaces dependent on the internal requirement.

5.1.5 A, D and E Blocks all present a distinctive plan form consisting of a series of eight to 14 spurs arranged in aligned pairs that project equal distance from a central connective corridor range and which are spaced apart at equal distance and on plan appear as a series of connective H plans. KF Block represents the end aligned spurs of an original

WWII Block known as K Block which has since been removed from the Site.

5.1.6 The blocks are architecturally and materialistically matching; they are all of rendered brickwork construction with flat roof with slightly over-sailing eaves supported on metal brackets. They are all accessed via a centrally positioned entrance which is set with a simple porch with brick piers; the main entrances being announced by being set in within slightly projecting entrance bays. Analysis of aerial photographs and early plans identify that all the blocks had central projecting, short ranges which housed the boiler rooms which would have served each of the original blocks and all have projecting, brick rendered roof projections which would have housed the water tanks.

5.1.7 Their homogeneity extends to the interior where the main central entrance and secondary side entrances from the outer elevations of the end spurs all lead to a single corridor which extends the entire width of each block. This primary corridor offers the main means of circulation through the building with each of the projecting spurs accessed directly from the primary corridor. Each spur is typically served by a secondary, off centre aligned corridor which is flanked by individual rooms of varying proportions to either side. The pattern and extent of sub-division varies however there remains a general consistent approach to each of the Blocks.

5.1.8 Based on the early plans it is likely that internal sub-division of most of the spurs on a wholesale basis was undertaken relatively early on the Site's development and is attributed to the operation of the Site under the TRE from 1946 however, as above, some level of sub-division would have already existed and it is highly likely the new alterations followed this pattern; internal dividing walls are consistently constructed of brick tiles where their coursing pattern is clearly discernible through the painted finish. Other internal walls are of brickwork construction and these areas appear to relate to end sections of the spurs which were constructed to have thicker internal walls and which would have likely been to provide air raid shelter accommodation.

5.1.9 Each of the blocks retain elements of the original construction exposed to the interior. This is most noticeable to the primary central corridor where the rounded edges of the structural brick columns which support the roof construction project out into the space at regular intervals and which define the internal bays. These brick columns are also exposed within the secondary corridors of several of the spurs and also within several of the individual rooms where the dividing partition walls abut the structural columns leaving the rounded edges which have chamfered jambs exposed. These features, along with the original high ceiling and visibility of the brick tile or imperial

brickwork walls gives these areas a greater degree of historic integrity. The retention of the pattern of circulation to the blocks attest to their configuration remaining useful to the later requirements of the TRE, RRE, DRE, DRA, DERA and Qinetiq.

5.1.10 The Level 3 recording extends to H Building. This building whilst of a post WWII origin dating from 1952, is of particular interest as a purpose-built research building specifically designed to accommodate a prototype R4 Bunker. The building has strong associations to the military response to improving air defence, specifically the early warning systems through the use of radar technology.

5.1.11 The remains of the former bunker area of the building are of most value evidentially. The building originated as a prototype of the R4 standard building design used for Service Operations Centres (SOC) constructed as part of the Rotor programme. The existence of a prototype of this specific design suggests that the SOC were highly important to the successful operation of the upgraded air defence system; this is made more pertinent given the high cost associated with the construction of such bunkers. Furthermore, the existence of the bunker within the Malvern site provides some evidence as to the importance and the value of the research being undertaken by the TRE at this time.

5.1.12 The remains of the former bunker provide physical evidence of the fear and perceived threat of attack experienced during the Cold War. The architecture employed in its original core construction provides evidence of the technology available at the time to offer protection to the operations undertaken internally within the bunker, which as discussed above, were integral to the operation of an effective air defence system.

5.1.13 The mainly above ground construction of the former bunker area provides an indication of the level of engineering and excavation works that would have been necessary to construct similar structures below ground as part of the original Rotor programme.

5.1.14 However, the building has been subject to quite significant adaptation and the remaining features that most obviously directly correlate to the original R4 standard design are limited to the thick perimeter walls and the open arrangement of the second-floor mezzanine that overlooks what would have been the main operations room.

5.1.15 Other features of some value include the suspended ground floor to the corridor to the east of the bunker beneath which cabling and services would have been carried,

and the remains of a large and complex air conditioning system, visible to the lower ground floor of the former bunker, which would have removed heat generated by the electronic valves used in the early control consoles and later, the computer systems.

5.1.16 The building presents an interior which relates to 1993 phase of alteration which has amended the internal configuration to suit the requirement to create a secure computer facility for joint intelligence operations; these adaptations include the insertion of sound proof pods, the insertion of a security chamber designed to detect explosive materials and the insertion of a Faraday cage at lower ground level which is illustrative of the need to project electrical and computer equipment.

5.1.17 In considering the extent of survival of the original R4 bunker it is evident that both the configuration of the bunker and the surrounding ancillary offices have undergone change and adaptation which has lessened their functional integrity and the ancillary, supportive purpose of the spaces surrounding the bunker are no longer apparent with both the bunker and the surrounding spaces presenting a similar office-use function. Furthermore, the internal arrangement of the former bunker has been altered substantially with the insertion of a new floor at first floor level and the removal of the cabins and offices surrounding the main well. This has altered the original design of the main operations room to a point where it differs significantly from the description provided by Cocroft and Thomas following their research.

5.1.18 The simplicity of the external appearance of all the buildings subject to the programme of recording is concealing of the complexity of the works being undertaken and performed within the buildings. This is possibly deliberate with the work being undertaken highly sensitive and secretive as well as functional.

5.1.19 The later use of the buildings at the Malvern site as part of progressive and often secretive military and scientific research and development along with the wider, general association of the Site with noted scientists, mathematicians, products and events adds to the historic interest of the site generally.

6 CONCLUSION

6.1.2 The building recording has satisfied the aims set out in Section 2. Detailed observations of all available elevations and an overview of the complex interior spaces of the extant buildings subject to the Level 3 recording and the external appearance of the 39 buildings subject to the Level 1 recording have been discussed and photographed to allow, where possible, an appreciation of the historic development of the Site and the function of the buildings.

6.1.3 The Site was not established until c1940 when it was developed as WWII Navel Training Base known as HMS Duke. The original complex comprised seven matching, single storey, distinctive multi H plan blocks with ancillary structures including a chapel, gymnasium, chapel, canteen, civilian mess and lecture room also erected.

6.1.4 This initial operation was short lived terminating at the end of the war subsequent to which the Site was occupied by the Telecommunications Research Establishment, who had been relocated temporarily to Malvern in 1942.

6.1.5 The Site became the established base for the TRE and its later abbreviations, and the site was developed and expanded with a series of purpose-built research, laboratory and office buildings as well as ancillary service buildings, of varied design, scale and individual function.

6.1.6 All of the extant buildings on the Site including those outside of the red line boundary are to be demolished as part of the approved development, though the majority of the buildings are of little architectural merit. The buildings subject to the Level 3 recording are considered to have a greater degree of architectural and historic merit forming part of the original phases of the Site's development as well as having a greater degree of historic interest, notably H Building which provides physical evidence of the combined built and technological response to modernising UK air defence following WWII.

6.1.7 All the buildings which comprise the former Malvern Technology Centre site will be permanently preserved in this record as a result of the programme of historic building recording undertaken in line with Historic England Guidance and condition 6 of the associated planning approval (Application Ref: 18/01088/FUL).

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APPENDICES

APPENDIX 1

Plate Index Table

APPENDIX 1 PLATE INDEX TABLE

BUILDINGS SUBJECT TO LEVEL 1 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
1a	Building 1, north elevation	N
1b	Building 1, part west elevation	W
1c	Building 1, part south and west elevations	WSW
1d	Building 1, part south elevation	S
1e	Building 1, part east elevation	SE
1f	Building 1, part east elevation	E
2a	Building 2, part west and north elevation	NW
3a	Building 3, part east elevation	E
3b	Building 3, part south elevation of main range and part east elevation of south addition	SE
3c	Building 3, east elevation of south addition	E
3d	Building 3, south elevation of south addition	SW
3e	Building 3, south elevation of main range	SW
3f	Building 3, later porch addition to west elevation of main range	SW
3g	Building 3, north elevation	WSW
4a	Building 4, south elevation	SE
4b	Building 4, east elevation	S
4c	Building 4, part north and west elevations	WNW
4d	Building 4, west elevation	W
4e	Building 4, west elevation	N
5a	Building 5, part west and south elevations	SW
6a	Building 6, north elevation of lower section	N
6b	Building 6, north elevation of main range	N
6c	Building 6, west elevation	W
7a	Building 7, north elevation and part west elevation	NW
7b	Building 7, part eats elevation of main range and east elevation of garage/store	E
7c	Building 7, part north and east elevation of main L shape range; garage/store to right of image	ENE
7d	Building 7, south elevation	SE
7e	Building 7, part west elevation	E
7f	Building 7, part west elevation	NE
8a	Building 8, east elevation of north range	NE
8b	Building 8, link extension connecting the north and south ranges (viewed from the east)	E
8c	Building 8, east elevation of south range	NE

BUILDINGS SUBJECT TO LEVEL 1 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
8d	Building 8, part east elevation of south range	SE
8e	Building 8, upper storeys of the eats elevation of the south range	SE
8f	Building 8, part south elevation of the south range	SE
8g	Building 8, part south elevation of the south range	E
8h	Building 8, part south elevation of the south; not later alteration to create vehicle access	SE
8i	Building 8, oculi window to the south elevation of the south range	S
8j	Building 8, west elevation of the south range	SW
8k	Building 8, west elevation of the south range	W
8l	Building 8, link extension between the south and north ranges viewed from the west	WNW
8m	Building 8, west elevation of the north range	SW
8n	Building 8, part north elevation of the north range	N
8o	Building 8, north elevation of the north range	NW
9a	Building 9, first floor link corridor to the east connecting to the west of building 10	S
9b	Building 9, part east elevation	SE
9c	Building 9, recessed entrance at the south east corner	SE
9d	Building 9, part south elevation	ESE
9e	Building 9, part south elevation	ESE
9f	Building 9, west elevation (original phase) with later UPVC porch addition	SW
9g	Building 9, part west and north elevations	NW
9h	Building 9, north elevation	WNW
9i	Building 9, part north and east elevations	NE
9j	Building 9, first floor link extension viewed from the north	NE
10a	Building 10, east elevation	SE
10b	Building 10, part south and east elevations	SE
10c	Building 10, part west elevation with first floor link corridor to building 9	S
10d	Building 10, concrete pillars supporting first floor element (viewed from the south west)	SW
10e	Building 10, north elevation	N
11a	Building 11, north elevation	W
11b	Building 11, typical door detail (observed to south elevation)	E
12a	Building 12, east and north elevations	NE
12b	Building 12, west elevation	W

BUILDINGS SUBJECT TO LEVEL 1 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
13a	Building 13, part west elevation	SW
13b	Building 13, south elevation	S
13c	Building 13, part south and east elevations	SE
14a	Building 14, north and part west elevations	NW
14b	Building 14, part north and east elevations	NW
14c	Building 14, part west and north elevations	S
14d	Building 14, roof and east elevation viewed from roof of E Block	SE
15a	Building 15, East and part south elevations	SE
15b	Building 15, part south elevation with main entrance	SE
15c	Building 15, west elevation showing change in external ground level	W
15d	Building 15, part west and north elevations with link to E Block to centre	NW
16a	Building 16, part south and west elevations	W
16b	Building 16, north elevation	N
17a	Building 17, north elevation	N
17b	Building 17, part east and north elevation of projection	N
17c	Building 17, part east elevation	NEN
17d	Building 17, part east elevation	NE
17e	Building 17, east elevation of main range and south elevation of projections	SE
17f	Building 17, south elevation	ESE
17g	Building 17, part west elevation of main range and stepped south elevation of additions	SW
17h	Building 17, part west elevation of main range and south elevation of single storey link to E Block	S
18a	Building 18, north elevation	NE
18b	Building 18, south elevation	SE
18c	Building 18, west elevation	W
18d	Building 18, west elevation of blockwork enclosure	NW
19a	Building 19, south elevation, note gas pipe extending towards building 20	SW
19b	Building 19, north elevation	W
19c	Building 19, external flues to the main boilers (north elevation)	NW
19d	Building 19, former boilers to the interior	WNW
20a	Building 20, east elevation	NE
20b	Building 20, part west and south elevations	SW
20c	Building 20, part west elevation	W

BUILDINGS SUBJECT TO LEVEL 1 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
20d	Building 20, north elevation and part east elevation with gas pipe entering the north elevation	N
21a	Building 21, north elevation (obscured by vegetation) and part west elevation	NW
21b	Building 21, part east elevation (northern portion)	ESE
21c	Building 21, eats elevation central part	E
21d	Building 21, east elevation of entrance range	E
21e	Building 21, west elevation of entrance range	W
21f	Building 21, part west elevation (central portion)	SE
21g	Building 21, west elevation (north and central portions)	WSW
22a	Building 22, south elevation; porch addition is later	S
22b	Building 22, west elevation; note blocked former openings	NW
22c	Building 22, part west and north elevations west elevation; note blocked former openings	N
22d	Building 22, east elevation	E
23a	Building 23, east elevation	SE
23b	Building 23, south elevation	SE
23c	Building 23, south elevation (viewed from the west)	NE
24a	Building 24, part north elevation showing former radar satellite platform	N
24b	Building 24, part north elevation	N
24c	Building 24, part east elevation (two storey section)	NE
24d	Building 24, east elevation; note H Building to the centre and left of image	E
24e	Building 24, part east elevation (single storey section)	E
24f	Building 24, part west elevation of single storey range to east	SW
24g	Building 24, part west and south elevations	W
24h	Building 24, south elevation of main two storey range	SW
24i	Building 24, part south and west elevations of main two storey range	W
24j	Building 24, south elevation of former radar satellite platform	S
24k	Building 24, west elevation of former radar satellite platform	W
24l	Building 24, part north and east elevations	NW
24m	Building 24, part west and north elevations	N
24n	Building 24, part west elevation of main two storey range	WNW
25a	Building 25, west elevation	NW
25b	Building 25, part east and north elevations	E
25c	Building 25, east elevation	SE
25d	Building 25, south elevation	SW

BUILDINGS SUBJECT TO LEVEL 1 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
26a	Building 26, West elevation	NW
26b	Building 26, north elevation	NE
26c	Building 26, part east elevation	SE
26d	Building 26, south elevation	SE
26e	Building 26, west elevation	SW
27a	Building 27, south east elevation with entrance	SE
27b	Building 27, part north east elevation	NE
27c	Building 27, north west elevation	W
27d	Building 27, part south west elevation	SW
28a	Building 28, north east elevation	NW
28b	Building 28, north west elevation	NW
28c	Building 28, south west elevation	SW
28d	Building 28, south east elevation	S
28e	Building 28, interior view	NW
29a	Building 29, entrance doors to the south west elevation	SW
30a	Building 30, part north west elevation	W
30b	Building 30, part north west elevation	SW
31a	Building 31, north west elevation	NW
32a	Building 32, north west elevation and north east elevation of building 32	NW
32b	Building 32, south east elevation	SW
33a	Building 33, part south east and south west elevation	S
34a	Building 34, part north east elevation, A block to the rear	E
35a	Building 35, south west and south east elevations	S
35b	Building 35, south east elevation	SW
35c	Building 35, north west elevation	NW
36a	Building 36, south elevation	S
36b	Building 36, part west elevation	SW
36c	Building 36, east elevation, note taller element which housed the stratosphere chamber	W
36d	Building 36, part north elevation with entrance to the stratosphere chamber	WNW
36e	Building 36, entrance doors to the stratosphere chamber	NWW
36f	Building 36, east elevation of stratosphere chamber	NE
36g	Building 36, part north elevation of single storey wing	NE
36h	Building 36, north east elevation of single storey range	NE
36i	Building 36, part north east elevation of single storey wing	E
36j	Building 36, part south east elevation of single storey wing which formerly housed the centrifuge machine	E

BUILDINGS SUBJECT TO LEVEL 1 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
36k	Building 36, part south east elevation of single storey wing which formerly housed the centrifuge machine	S
36l	Building 36, main entrance to the south east elevation	S
37a	Building 37, west elevation	NW
37b	Building 37, external concrete staircase to the north elevation	N
37c	Building 37, part west and north elevation	W
37d	Building 37, part north elevation with decorative concrete work panels	NW
37e	Building 37, Part east elevation concrete fins	NE
37f	Building 37, part south and east elevations	SE
37g	Building 37, part east and south elevations	S
37h	Building 37, south elevation with external concrete stair that matches north elevation	SE
37i	Building 37, west elevation with KF block to the foreground (partially concealed by vegetation	ESE
S1	Block S, east elevation	NE
S2	Block S, advanced gable upper storeys to east elevation	E
S3	Block S, rear entrance between the central and south ranges	E
S4	Block S, east elevation of the southern range; note later two storey extension to the right of the main range	ENE
S5	Block S, detailing to the east elevation of the southern range	SE
S6	Block S, south elevation of the south range	SE
S7	Block S, west elevation of the south range; note extension to the right of the elevation	SW
S8	Block S, west elevation of the south range	NW
S9	Block S, north elevation of the south range	NW
S10	Block S, west elevation of the timber link addition between the central and southern ranges	W
S11	Block S, central range which displays a strong domestic arrangement	W
S12	Block S, north elevation of southern range and part west elevation of the north range	NW
S13	Block S, west and south elevation of the northern range	W
S14	Block S, main entrance door into the central range; note gauged brickwork jambs and decorative fanlight	W
S15	Block S, typical window detail to the southern range	N
S16	Block S, external metal stair to the south elevation of the southern range	E

BUILDINGS SUBJECT TO LEVEL 1 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
S17	Remains of signage to the west of the Block S facing St Andrew's Road	W
T1	T Block, part south and east elevations of the detached former garage range	SE
T2	T Block, east and north elevation of main building and east elevation of later glazed porch addition to former garage block	E
T3	T Block, part north elevation with later lean-to addition	NE
T4	T Block, east elevation of main range with canted bay window to the left at ground floor and later glazed porch addition to the right	E
T5	T Block, south elevation	S
T6	T Block, two storey bow window to the west frontage	W
T7	T Block, west elevation with main entrance positioned off centre within advanced gable; note ogee shaped inscription to the stone lintels	W

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
H Building		
H1	H Building, South Elevation	S
H2	H Building, part west and south elevations	SW
H3	H Building, west elevation of former bunker	SW
H4	H Building, altered west elevation of south range	W
H5	H Building, later addition to west elevation of former bunker	SW
H6	H Building, original opening to west elevation of the former bunker	W
H7	H Building, later addition to the west elevation of the former bunker	W
H8	H Building, plant room additions to the north west corner	W
H9	H Building, part west elevation and part north elevation of former bunker	NW
H10	H Building, west elevation of plant room and former bunker	N
H11	H Building, part west elevation	N
H12	H Building, part west elevation	NE
H13	H Building, part east elevation; change in brickwork denotes first floor extension	NE
H14	H Building, part east elevation showing the gabled roof form of the original radar room and track telling room	E
H15	H Building, part inner north elevation of south range and east elevation; change in brickwork to the first floor and the stair block relates to early phase of external alteration	NE
H16	H Building, east elevation	SE
H17	H Building, part east elevation and south elevation	SE
H18	H Building, west elevation of the first extension to the north	W
H19	H Building, enclosed first and second floor exits and metal external stair to the north elevation of the former bunker	NW
H20	H Building, external metal stair leading to the second-floor area of the former bunker	E
H21	H Building, external opening in north elevation into internal porch of second floor area of the former bunker	E
H22	H Building, corrugated cementitious type sheet roof to the gable east rooms and the north elevation of the first-floor addition to the south range	W
H23	H Building, south elevation of the first floor addition to the north range	S
H24	H Building, external metal staircase to roof of former bunker on the east elevation	SW

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
H25	H Building, north west area of the roof of the former bunker	SE
H26	H Building, south west area of the roof of the former bunker	NW
H27	H Building, ground floor office (former radar room)	W
H28	H Building, first floor open plan office within the south range	E
H29	H Building, lower ground floor level of battery room extension to the north	W
H30	H Building, ground floor office with north range; stairs previously accessed a storage space within the roof, altered when the first floor was created	NW
H31	H Building, typical appearance of the first-floor office to north range	NE
H32	H Building, stairs within the two-storey extension to the north	
H33	H Building, ground floor corridor aligned east to west through the north range (former radar room to right)	W
H34	H Building, tiled sill and painted brickwork interior to the first offices of the north range	N
H35	H Building, ground floor of the north range; steps lead up to battery room extension	S
H36	H Building, former battery room within the north extension	E
H37	H Building, plant room within the north west corner	S
H38	H Building, ground floor corridor within the south range which retains its original proportions in part	W
H39	H Building, ground floor corridor link north and south ranges; former bunker to right of image	N
H40	H Building, ground floor corridor linking north and south ranges; former bunker and main entrance to right. Internal walls display painted brickwork finish	S
H41	H Building, main entrance into the former bunker area with dense, wide metal security door	E
H42	H Building, perimeter corridor within former bunker area; faraday cage to left of image	S
H43	H Building, perimeter corridor within former bunker area	W
H44	H Building, view of the ground floor perimeter corridor of former bunker from the elevated lift platform in the north west corner; west external wall to right of image	N
H45	H Building, north east corner of the ground floor showing the extent of electrical equipment and its projection within metal faraday caging	SW

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
H46	H Building, ground floor of former bunker. View of interior space within the faraday cage with 5 columns across centre, likely encasing service and duct work rather than being structural	SE
H47	H Building, ground floor of former bunker. Two small 'pods' built into the northern wall of the faraday cage with thick, metal security doors. Room to the right is the former computer server room and room to the left served as a secure research area	S
H48	H Building, depth of external blast walls to the former bunker area	SE
H49	H Building, ground floor. RF lock entry into the central faraday cage	W
H50	H Building, ground floor of former bunker looking towards the small 'pods'	SW
H51	H Building, ground floor. Enclosed stairwell to first floor, inserted sometime after 1952 and before 1983, likely inserted when the first was created in the late 1950s	E
H52	H Building, first-floor level. Security pod to access the first-floor space; opening to right leads to a small lobby area where opening in the south wall of bunker leads to the first floor of the south range	N
H53	H Building, first-floor. Sound-proof conference pod to the east wall of the former bunker	NE
H54	H Building, first-floor. Sound-proof office and conference pods to eats wall with wide, secure, metal doors	NW
H55	H Building, Second floor. View of the first-floor open plan area from the second-floor mezzanine level	SW
H56	H Building, Second floor. View of the first-floor open plan area from the second-floor mezzanine level	W
H57	H Building, Second floor. View across the second-floor mezzanine level. This configuration is the only obvious remains of the original R4 bunker configuration. Metal joists have been coated with an intumescent covering to metal structural steels. Original floors of the R4 bunker were hung from these joists	NE
H58	H Building, Second floor. Secondary, exit to the north elevation via a secure, enclosed porch with thick metal, security doors to the inner and outer walls. Doors display date of '1993' on construction label	W
H59	H Building, Ground floor. Block door opening within the south wall of the former bunker, viewed from the south corridor	S

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
KF Block		
KF1	Part north and east elevation	N
KF2	North elevation	NW
KF3	Part north elevation and west projections	N
KF4	Part west elevation	SW
KF5	Part west elevation with M Block (Building 37) to the rear	WSW
KF6	West elevation, main entrance	W
KF7	Part west elevation (south side)	NW
KF8	Central corridor (northern half), brick tile internal dividing walls and rounded edge of brick columns visible	N
KF9	Central corridor (looking into southern half), brick tile internal dividing walls and rounded edge of brick columns visible	N
KF10	Example of rounded edge of brick column visible to the corridors and internal rooms	SE
KF11	Example of corner edge of round brick column with chamfered stops to upper section	SE
KF12	North west room showing more recent intervention with modern fixtures and fittings	SW
KF13	Possible original lino tile floor covering observed within the most northern tip of the central corridor	N
KF14	Brick infill work to modern extension where KF block was previously adjoined to F Block	W
KF15	Early/Original door within northern half of block	E
KF16	Early/original door within southern half of block	E
KF17	Early/original door within southern half of block	SW
KF18	Early/original door within southern half of block	E
KF19	Typical brick tile internal dividing wall	N
KF20	Door leading into the area which formerly housed TREAC; note the brickwork construction to the right (north) internal wall which depicts the use as a former air raid shelter	E
E Block		
E1	E Block, west elevation of spurs 1 and 2	S
E2	E Block, east elevation of spur 1	S
E3	E Block, west elevation of spur 3	SW
E4	E Block, south elevation of spur 3, representative of typical arrangement of the end elevations of the spurs projecting to the south (odd numbers)	SW

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
E5	E Block, main entrance into Block positioned between spurs 7 and 9	S
E6	E Block, east elevation of spur 7 with ET Block (building 15) in the background	N
E7	E Block, typical window arrangement to the spurs and central corridor range	SW
E8	E Block, southern three bays of west elevation of spur 9	NW
E9	E Block, west elevation of spur 11	S
E10	E Block, part west elevation of spur 11 and part corridor range	SW
E11	E Block, part east elevation of spur 9	SE
E12	E Block, east elevation of spur 13 where link extension connects to building 17	SE
E13	E Block, north end elevation of spur 12 where previously addition has bene destroyed by recent fire	N
E14	E Block, north end elevation of spur 10 and part west elevation o spur 12	N
E15	E Block, part north end elevation of spur 10 and north end and part east elevation of spur 8	NE
E16	E Block, north end elevation of spurs 6 and 8 and part west elevation of central projection between spurs 8 and 10	NW
E17	E Block, part west elevation of spur 4	N
E18	E Block, part north elevation of central corridor range between spurs 2 and 4 with building 14 to centre and left	N
E19	E Block, view south towards the central corridor range between spurs 6 and 8 with eats elevation of spur 6 to right and extension to spur 8 to left	N
E20	E Block, north facing elevation of central corridor range between spurs 2 and 4	NW
E21	E Block, north end elevations of spurs 6, 4 and 2	NE
E22	E Block, part north end elevation of spur 8 and flat roof extension to the west side	NW
E23	E Block, north elevation of central corridor range between spurs 6 and 8	N
E24	E Block, part north end and west facing elevations of spur 14	N
E25	E Block, north end elevation of spur 2 (right) looking east	W
E26	E Block, view east across roofscape from spur 4	W
E27	E Block, view south towards building 15 between spurs 1 and 3	N
E28	E Block, early/original double doors within internal north dividing wall in central corridor range between spurs 12 and 14	S

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
E29	E Block, hole in partition wall exposing brick tile construction typical to the internal walls within the original WWII blocks	N
E30	E Block, view west along central corridor from east end	E
E31	E Block, view west along central corridor range from outside spurs 13 and 14	E
E32	E Block, view north along secondary corridor into spur 4	S
E33	E Block, view south along secondary corridor into 10	S
E34	E Block, secondary corridor to 9 with rounded edge of brick columns and brick tile internal dividing walls typical of each original block	SW
E35	E Block, evidence of alteration with blockwork walls and creation of secondary access to the west facing elevation of spur 11	N
E36	E Block, typical internal arrangement (observed in spur 11)	N
E37	E Block, modern alterations to the interior, typical of the north projecting spurs which have experienced a greater degree of reconfiguration	SW
E38	E Block, remains of original construction to the interior	SW
E39	E Block, view north along spur 12 which has been damaged by recent fire	S
E40	E Block, brick tile internal dividing construction typical of the interior of the block	SE
E41	E Block, view west along central corridor from main entrance; section of corridor has been subject to alteration to stud partition walls and new ceiling altering the original the original proportions	E
E42	E Block, secondary corridor of spur 7	N
E43	E Block, internal alterations to secondary corridor in spur 14	S
E44	E Block, interior of infill block between spurs 6 and 8	SE
E45	E Block, interior of infill block between spurs 6 and 8	W
E46	E Block, interior of infill block between spurs 6 and 8	S
E47	E Block, open plan interior to spur 2	NW
E48	E Block, altered secondary corridor to spur 5	S
E49	E Block, spur 6, fixtures and fitting relating to most recent laboratory and research use	SW
E50	E Block, spur 6, rounded edge of structural brick column exposed within later alterations to the interior	

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
E51	E Block, spur 8, fixtures and fitting relating to most recent laboratory and research use, the film to the window indicating importance of controlling the type of light into the space	SE
E52	E Block, evidence of blocked opening observed in spur 14	S
E53	E Block, spur 8 evidence of alteration and reconfiguration original layout	S
E54	E Block, remains of structural brick column with chamfered stops to top end. Common feature throughout the block where the early configuration remains (observed in small room to spur 4	SW
D Block		
D1	D Block, part north elevation of spurs 6 and 8	NW
D2	D Block, part west elevation of spur 6	NW
D3	D Block, north elevation of central corridor range between spurs 6 and 8	N
D4	D Block, north elevation of spur	N
D5	D Block, east elevation of spur 6 (typical configuration of every spur)	NE
D6	D Block, north elevation with main centrally positioned entrance (flanked by spur 6, right, and spur 4, left)	N
D7	D Block, external steps to north east corner of spur 6	E
D8	D Block, west elevation of spur 4	NW
D9	D Block, timber doors to main entrance from the north	N
D10	D Block, north elevation of spur 4	N
D11	D Block, typical arrangement of the spurs and central corridor range (spur 4, right, and spur 2, left	N
D12	D Block, obscured north elevation of spur 2	NE
D13	D Block, east elevation of spur 2	NE
D14	D Block, east elevation of spur 2 (typical window arrangement presented)	SE
D15	D Block, west elevation of spur 5 with altered pattern of openings	SW
D16	D Block, east elevation of spur 1	NE
D17	D Block, secondary entrance into the block from the east. Entrance marks the central corridor location which separate spurs 1, left, and spur 2, right	E
D18	D Block, south end elevation of spur 1	SW

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
D19	D Block, south elevation of central corridor between spur 1, right and spur 3, left	S
D20	D Block, east elevation of spur 3	SE
D21	D Block, south end elevation of spur 3	SW
D22	D Block, south entrance to corridor range and west elevation of spur 3	S
D23	D Block, south elevation of original boiler house range between spurs 3 and 5	S
D24	D Block, east elevation of spur 5	SE
D25	D Block, south end elevation of spur 5	S
D26	D Block, central corridor range between spurs 5 and 7 and west elevation of spur 5; nota altered pattern of windows to corridor range	S
D27	D Block, part west elevation of spur 5 with altered window openings	W
D28	D Block, south end elevation of spur 7	SE
D29	D Block, timber entrance doors to south entrance between spurs 3 and 5	S
D30	D Block, obscured west elevation of spur 7	SW
D31	D Block, central corridor looking east from central lobby area. Note inserted ceiling to conceal ducts and services and rounded edges of brick columns and brick tile internal walls to the right	W
D32	D Block, central corridor looking east (from between spurs 7 and 8). Note inserted ceiling to conceal ducts and services and rounded edges of brick columns and brick tile internal walls to the right	W
D33	D Block, central corridor looking west from between spurs 5 and 6. Note inserted ceiling to conceal ducts and services and rounded edges of brick columns and brick tile internal walls to the left	E
D34	D Block, arrangement of openings and brick column where the corridor leads into the north projection between spurs 8 and 6 which was originally the morgue	SW
D35	D Block, looking north into spur 8 from the corridor, not brick structural columns within main space beyond the doors and the brick tile internal walls	S
D36	D Block, spur 5, rounded edge of brick column typical within the individual rooms of each spur	SW

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
D37	D Block, typical detail of rounded brick columns as exposed to the main central corridor and the secondary spur corridors	W
D38	D Block, blocked opening in spur 5. Brickwork internal walls indicate area of original air raid shelter, this function requirement more solid walls as opposed to the typical brick tile internal walls	S
D39	D Block, spur 3 looking south	N
D40	D Block, spur 6. Open plan arrangement with structural brick columns of the original construction method to centre of the room	SE
D41	D Block, Spur 5. Typical arrangement of larger rooms flanking the secondary spur corridor	S
D42	D Block, spur 3. Typical internal arrangement of flanking rooms with rounded edge of brick column and brick tile internal walls	SW
D43	D Block, spur 5. Most southern bay with original brickwork internal dividing wall to the right	E
D44	D Block spur 5, typical secondary corridor arrangement	SW
D45	D Block, former boiler house within the south projection between spurs 3 and 5	S
D46	D Block, spur 1. Evidence of alteration	N
D47	D Block, spur 7 corridor	S
D48	D Block, secure document store roof to the most southern bay of spur 5	NW
D49	D Block, safe door to secure document storeroom	SW
D50	D Block, view north into original morgue area, now reconfigured as offices	S
D51	D Block, interior of part of spur 8	S
D52	D Block, interior of spur 4	SE
D53	D Block, interior of spur 2	SE
Library Building		
L1	Library building, part north east elevation of north east range (original section)	NE
L2	Library building, part north east elevation of north east range (original section)	NE
L3	Library building, part north west end elevation of north east (original) range	NE
L4	Library building, part north west end elevation of north east (original) range	SW

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
L5	Library building, part south west elevation of original range, now enclosed by the later south west range where its north east elevation opposes	W
L6	Library building, north east elevation of the later south west range, opposing elevation to the inner facing south west elevation of the north east range	NW
L7	Library building, north west end elevation of the later south west range	N
L8	Library building, north west end elevation of the later south west range	W
L9	Library building, part south west elevation of later south west range with central, projecting flat roof entrance porch	S
L10	Library building, part south west elevation of the later south west range	W
L11	Library building, south east end elevation of the later south west range	SE
L12	Library building, north east elevation of the later south west range	E
L13	Library building, part south east and north east elevations of the original range	E
L14	Library building, south east facing entrance into later flat, roof porch to the north east elevation	SE
L15	Library building, north west entrance into later flat roof porch addition to the north east elevation of the original range	NW
L16	Library building, north east elevation of the original range. Change in brickwork and coursing indicative of alteration or rebuilding, possibly contemporary with the later addition of the south west range	NE
L17	Library building, internal arrangement of the south east half of the original range. All partitions and fixtures are modern	NE
L18	Library building, internal arrangement of the south east half of the original range. All partitions and fixtures are modern	NW
L19	Library building, internal partitions to the original range	E
L20	Library building, lobby entrance area from the north east porch	W
L21	Library building, doors leading into the link corridor connecting original range to the later south west range	NE
L22	Library building, link corridor with painted brickwork wall and steps to address changes in level between the two ranges (facing south west)	NE

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
L23	Library building, link corridor with painted brickwork wall and steps to address changes in level between the two ranges (facing north east)	SW
L24	Library building, later south west range interior with modern partition walls	NE
L25	Library building, south west range. Open plan space within the north west half of the range	W
L26	Library building, south west range. Lobby area looking into the south east half of the range	W
L27	Library building, south west range. Open plan space to the south east half of the range	E
L28	Library building, south west range. Doors lead into a later addition added to the south east end of the south west range	NW
L29	Library building, south eastern extent of the south west range which was added later	N
A Block		
A1	A Block, part south east elevation of spur 3	SW
A2	A Block, min central entrance facing south west positioned between spurs 3 and 5	S
A3	A Block, part central corridor range and north west elevation of spur 5	W
A4	A Block, part north west elevation of spur 5	WNW
A5	A Block, laser camera test panel to end bays of spur 5 (north west elevation	NW
A6	A Block, timber doors to main south west entrance	SW
A7	A Block, south west end elevation of spur 5	SW
A8	A Block, south east elevation of spur 5 and part south west end elevation of spur 7	SW
A9	A Block, view towards central corridor between spurs 5 (left) and 7 (right)	SW
A10	A Block, south west end elevation of spur 7	W
A11	A Block, south east elevation of spur 7	SW
A12	A Block, secondary entrance at central junction between spurs 7 (left) and 8 (right)	SE
A13	A Block, south east elevation of spur 8	SE
A14	A Block, south east elevation of spur 8 with later external staircase addition	E

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
A15	A Block, north east end elevation of shorter projection between spurs 8 (left) and 6 (right)	NE
A16	A Block, part south east elevation of spur 6	SE
A17	A Block, north east elevation	NE
A18	A Block, part north west elevation of spur 6	N
A19	A Block, north west elevation of spur 1 with secondary west entrance and small first floor addition	NW
A20	A Block, part south east elevation of later addition to spur 4 (centre) and part south east elevation of former boiler house (left) positioned to oppose the central entrance	SE
A21	A Block, enlarged entrance to south east elevation of original boiler house range	E
A22	A Block, north west elevation of spur 2	W
A23	A Block, secondary entrance to the central corridor range at the junction between spurs 1 (right) and 2 (left)	NW
A24	A Block, part north west elevation of spur 1 with altered opening	NE
A25	A Block, south west end elevation of spur 1	SW
A26	A Block, part north west elevation of spur 3 with infill addition connecting spur 3 to spur 1	SW
A27	A Block, south west end elevation of spur 3	SW
A28	A Block, interior of central corridor range looking north west	SW
A29	A Block, interior of central corridor range looking south east	NW
A30	A Block, interior of central corridor range from the south east	NW
A31	A Block, rounded edge of structural brick column with stop chamfers, typical feature of the corridors	N
A32	A Block, secondary corridor to spur 7	NE
A33	A Block, corner of the structural brick column typical of interior rooms to the spurs	NE
A34	A Block, evidence of a blocked doorway observed in spur 8	NE
A35	A Block, secondary corridor to spur 8	SW
A36	A Block, evidence of new work and new opening observed in spur 5	NE
A37	A Block, south western extent of spur 5 with altered configuration of rooms	NE
A38	A Block, evidence of internal alteration to spur 6 with floor level raised	NE
A39	A Block, evidence of most recent research and laboratory use of the internal spaces (spur 6)	SW

BUILDINGS SUBJECT TO LEVEL 3 RECORDING		
Plate Reference	**Description**	**Direction Taken from**
A40	A Block, evidence of most recent research and laboratory use of the internal spaces (spur 6), note the original rounded edge of the brick columns and the brick tile internal walls retained	NW
A41	A Block, fixtures associated with laboratory use observed in spur 4	NE
A42	A Block, modern fixtures associated with laboratory use observed in spur 2	SW
A43	A Block, infill extension between spurs 2 and 4 originally used for climatic testing of complete systems. Remaining features indicate research use continued within the space	NW
A44	A Block, infill extension between spurs 2 and 4 originally used for climatic testing of complete systems. Remaining features indicate research use continued within the extension	SE
A45	Internal recess space, identified as being an original feature on the 1940 plan (see appendix 10), to main corridor range	SW
A46	A Block, interior of original boiler room space, subsequently adapted and used for research	W
A47	A Block, internal laboratory space within block 2	W
A48	A Block, interior of later addition to the south east elevation of spur 4. Space was historically used to test physical durability complete systems used in radar development	NE
A49	A Block, interior of later addition to the south east elevation of spur 4, extent of original external wall of spur 4 inline with the brick piers	SE
A50	A Block, Remains of fixture and fittings to laboratory space in spur 1	NW
A51	A Block, early boarded and braced door within the north east elevation of later addition to spur 4	W
A52	A Block, steps down into the original boiler house area accessed from the central corridor opposite the main central entrance	NW
A53	A Block, modern interventions observed within spur 3	NE
A54	A Block, brick tile internal wall and rounded corner of brick column evident of early method of subdivision observed within spur 1	NE

APPENDIX 2

Plates - Buildings 1-37 Block S and T

Plate 1a – Building 1 north elevation

Plate 1b – Building 1, Part west elevation

Plate 1c – Building 1 part south and west elevations

Plate 1d – Building 1, part south elevation

Plate 1e – Building 1, part east elevation

Plate 1f – Building 1, part east elevation

Plate 2a – Building 2, part west and north elevations (green building within the foreground)

Plate 3a – Building 3, part east elevation

Plate 3b – Building 3, part south elevation of main range and part east elevation of south addition

Plate 3c – Building 3, east elevation of south addition

Plate 3d – Building 3, south elevation of south addition

Plate 3e – Building 3, south elevation of main range

Plate 3f – Building 3, later porch addition to west elevation of main range

Plate 3g – Building 3, north elevation

Plate 4a – Building 4, south elevation

Plate 4b – Building 4, east elevation

Plate 4c – Building 4, part north and west elevations

Plate 4d – Building 4, west elevation

Plate 4e – Building 4, west elevation

Plate 5a – Building 5, part west and south elevations

Plate 6a – Building 6, north elevation of lower section

Plate 6b – Building 6, north elevation of main range

Plate 6c – Building 6, west elevation

Plate 7a – Building 7, north elevation and part west elevation

Plate 7b – Building 7, part eats elevation of main range and east elevation of garage/store

Plate 7c – Building 7, part north and east elevation of main L shape range; garage/store to right of image

Plate 7d– Building 7, south elevation

Plate 7e – Building 7, part west elevation

Plate 7f – Building 7, part west elevation

Plate 8a – Building 8, east elevation of north range

Plate 8b – Building 8, link extension connecting the north and south ranges (viewed from the east)

Plate 8c – Building 8, east elevation of south range

Plate 8d – Building 8, part east elevation of south range

Plate 8e – Building 8, upper storeys of the eats elevation of the south range

Plate 8f – Building 8, part south elevation of the south range

Plate 8g – Building 8, part south elevation of the south range

Plate 8h – Building 8, part south elevation of the south; not later alteration to create vehicle access

Plate 8i – Building 8, oculi window to the south elevation of the south range

Plate 8j – Building 8, west elevation of the south range

Plate 8k – Building 8, west elevation of the south range

Plate 8l – Building 8, link extension between the south and north ranges viewed from the west

Plate 8m – Building 8, west elevation of the north range

Plate 8n – Building 8, part north elevation of the north range

Plate 8o – Building 8, north elevation of the north range

Plate 9a– Building 9, first floor link corridor to the east connecting to the west of building 10

Plate 9b – Building 9, part east elevation

Plate 9c – Building 9, recessed entrance at the south east corner

Plate 9d – Building 9, part south elevation

Plate 9e – Building 9, part south elevation

Plate 9f – Building 9, west elevation (original phase) with later UPVC porch addition

Plate 9g – Building 9, part west and north elevations

Plate 9h – Building 9, north elevation

Plate 9i – Building 9, part north and east elevations

Plate 9j – Building 9, first floor link extension viewed from the north

Plate 10a – Building 10, east elevation

Plate 10b – Building 10, part south and east elevations

Plate 10c – Building 10, part west elevation with first floor link corridor to building 9

Plate 10d – Building 10, concrete pillars supporting first floor element (viewed from the south west)

Plate 10e – Building 10, north elevation

Plate 11a – Building 11, north elevation

Plate 11b – Building 11, typical door detail (observed to south elevation)

Plate 12a – Building 12, east and north elevations

Plate 12b – Building 12, west elevation

Plate 13a – Building 13, part west elevation

Plate 13b – Building 13, south elevation

Plate 13c – Building 13, part south and east elevations

Plate 14a – Building 14, north and part west elevations

Plate 14b – Building 14, part north and east elevations

Plate 14c – Building 14, part west and north elevations

Plate 14d – Building 14, roof and east elevation viewed from roof of E Block

Plate 15a – Building 15, East and part south elevations

Plate 15b – Building 15, part south elevation with main entrance

Plate 15c – Building 15, west elevation showing change in external ground level

Plate 15d – Building 15, part west and north elevations with link to E Block to centre

Plate 16a – Building 16, part south and west elevations

Plate 16b – Building 16, north elevation

Plate 17a – Building 17, north elevation

Plate 17b – Building 17, part east and north elevation of projection

Plate 17c – Building 17, part east elevation

Plate 17d – Building 17, part east elevation

Plate 17e – Building 17, east elevation of main range and south elevation of projections

Plate 17f – Building 17, south elevation

Plate 17g – Building 17, part west elevation of main range and stepped south elevation of additions

Plate 17h – Building 17, part west elevation of main range and south elevation of single storey link to E Block

Plate 18a – Building 18, north elevation

Plate 18b – Building 18, south elevation

Plate 18c – Building 18, west elevation

Plate 18d– Building 18, west elevation of blockwork enclosure

Plate 19a – Building 19, south elevation, note gas pipe extending towards building 20

Plate 19b – Building 19, north elevation

Plate 19c – Building 19, external flues to the main boilers (north elevation)

Plate 19d – Building 19, former boilers to the interior

Plate 20a – Building 20, east elevation

Plate 20b – Building 20, part west and south elevations

Plate 20c – Building 20, part west elevation

Plate 20d – Building 20, north elevation and part east elevation with gas pipe entering the north elevation

Plate 21a – Building 21, north elevation (obscured by vegetation) and part west elevation

Plate 21b – Building 21, part east elevation (northern portion)

Plate 21c – Building 21, eats elevation central part

Plate 21d – Building 21, east elevation of entrance range

Plate 21e – Building 21, west elevation of entrance range

Plate 21f – Building 21, part west elevation (central portion)

Plate 21g – Building 21, west elevation (north and central portions)

Plate 22a – Building 22, south elevation; porch addition is later

Plate 22b– Building 22, west elevation; note blocked former openings

Plate 22c – Building 22, part west and north elevations west elevation; note blocked former openings

Plate 22d – Building 22, east elevation

Plate 23a – Building 23, east elevation

Plate 23b – Building 23, south elevation

Plate 23c – Building 23, south elevation (viewed from the west)

Plate 24a – Building 24, part north elevation showing former radar satellite platform

Plate 24b – Building 24, part north elevation

Plate 24c – Building 24, part east elevation (two storey section)

Plate 24d – Building 24, east elevation; note H Building to the centre and left of image

Plate 24e – Building 24, part east elevation (single storey section)

Plate 24f – Building 24, part west elevation of single storey range to east

Plate 24g – Building 24, part west and south elevations

Plate 24h – Building 24, south elevation of main two storey range

Plate 24i – Building 24, part south and west elevations of main two storey range

Plate 24j – Building 24, south elevation of former radar satellite platform

Plate 24k – Building 24, west elevation of former radar satellite platform

Plate 24l – Building 24, part north and east elevations

Plate 24m – Building 24, part west and north elevations

Plate 24n – Building 24, part west elevation of main two storey range

Plate 25a – Building 25, west elevation

Plate 25b – Building 25, part east and north elevations

Plate 25c – Building 25, east elevation

Plate 25d – Building 25, south elevation

Plate 26a – Building 26, West elevation

Plate 26b – Building 26, north elevation

Plate 26c – Building 26, part east elevation

Plate 26d – Building 26, south elevation

Plate 26e – Building 26, west elevation

Plate 27a – Building 27, south east elevation with entrance

Plate 27b – Building 27, part north east elevation

Plate 27c – Building 27, north west elevation

Plate 27d – Building 27, part south west elevation

Plate 28a – Building 28, north east elevation

Plate 28b – Building 28, north west elevation

Plate 28c – Building 28, south west elevation

Plate 28d – Building 28, south east elevation

Plate 28e – Building 28, interior view

Plate 29a – Building 29, entrance doors to the south west elevation

Plate 30a – Building 30, part north west elevation

Plate 30b – Building 30, part north west elevation

Plate 31a – Building 31, north west elevation

Plate 32a – Building 32, north west elevation and north east elevation of building 32

Plate 32b – Building 32, south east elevation

Plate 33a – Building 33, part south east and south west elevation

Plate 34a – Building 34, part north east elevation, A block to the rear

Plate 35a – Building 35, south west and south east elevations

Plate 35b– Building 35, south east elevation

Plate 35c – Building 35, north west elevation

Plate 36a – Building 36, south elevation

Plate 36b – Building 36, part west elevation

Plate 36c – Building 36, east elevation, note taller element which housed the stratosphere chamber

Plate 36d – Building 36, part north elevation with entrance to the stratosphere chamber

Plate 36e – Building 36, entrance doors to the stratosphere chamber

Plate 36f – Building 36, east elevation of stratosphere chamber

Plate 36g – Building 36, part north elevation of single storey wing

Plate 36h – Building 36, north east elevation of single storey range

Plate 36i – Building 36, part north east elevation of single storey wing

Plate 36j – Building 36, part south east elevation of single storey wing which formerly housed the centrifuge machine

Plate 36k – Building 36, part south east elevation of single storey wing which formerly housed the centrifuge machine

Plate 36l – Building 36, main entrance to the south east elevation

Plate 37a – Building 37, west elevation

Plate 37b – Building 37, external concrete staircase to the north elevation

Plate 37c – Building 37, part west and north elevation

Plate 37d – Building 37, part north elevation with decorative concrete work panels

Plate 37e– Building 37, Part east elevation concrete fins

Plate 37f – Building 37, part south and east elevations

Plate 37g – Building 37, part east and south elevations

Plate 37h – Building 37, south elevation with external concrete stair that matches north elevation

Plate 37i – Building 37, west elevation with KF block to the foreground (partially concealed by vegetation

Plate S1 – Block S, east elevation

Plate S2 – Block S, advanced gable upper storeys to east elevation

Plate S3 – Block S, rear entrance between the central and south ranges

Plate S4 – Block S, east elevation of the southern range; note later two storey extension to the right of the main range

Plate S5 – Block S, detailing to the east elevation of the southern range

Plate S6 – Block S, south elevation of the south range

Plate S7 – Block S, west elevation of the south range; note extension to the right of the elevation

Plate S8 – Block S, west elevation of the south range

Plate S9 – Block S, north elevation of the south range

Plate S10 – Block S, west elevation of the timber link addition between the central and southern ranges

Plate S11 – Block S, central range which displays a strong domestic arrangement

Plate S12 – Block S, north elevation of southern range and part west elevation of the north range

Plate S13 – Block S, west and south elevation of the northern range

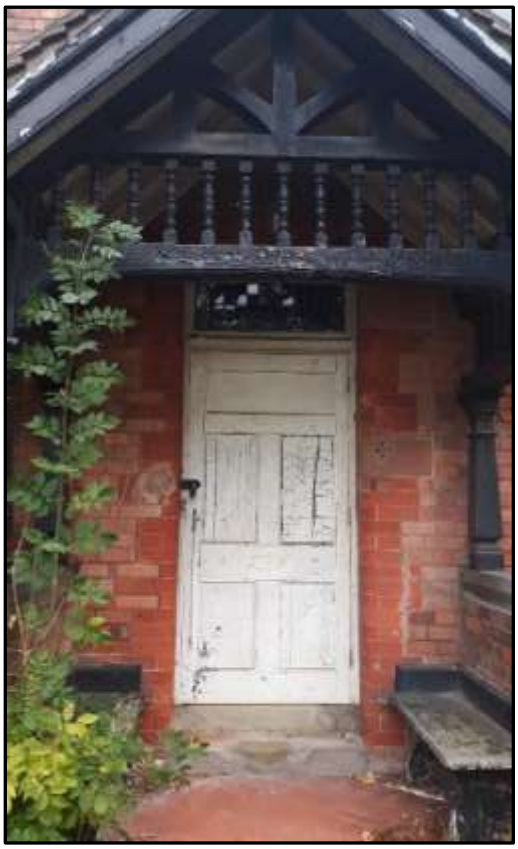

Plate S14 – Block S, main entrance door into the central range; note gauged brickwork jambs and decorative fanlight

Plate S15 – Block S, typical window detail to the southern range

Plate S16 – Block S, external metal stair to the south elevation of the southern range

Plate S17 – Remains of signage to the west of the Block S facing St Andrew's Road

Plate T1 – T Block, part south and east elevations of the detached former garage range

Plate T2 – T Block, east and north elevation of main building and east elevation of later glazed porch addition to former garage block

Plate T3 – T Block, part north elevation with later lean-to addition

Plate T4 – T Block, east elevation of main range with canted bay window to the left at ground floor and later glazed porch addition to the right

Plate T5 – T Block, south elevation

Plate T6 – T Block, two storey bow window to the west frontage

Plate T7 – T Block, west elevation with main entrance positioned off centre within advanced gable; note ogee shaped inscription to the stone lintels

APPENDIX 3

Plates - H Building

Plate H1 – H Building, South Elevation

Plate H2 – H Building, part west and south elevations

Plate H3– H Building, west elevation of former bunker

Plate H4 – H Building, altered west elevation of south range

Plate H5 – H Building, later addition to west elevation of former bunker

Plate H6 – H Building, original opening to west elevation of the former bunker

Plate H7 – H Building, later addition to the west elevation of the former bunker

Plate H8 – H Building, plant room additions to the north west corner

Plate H9 – H Building, part west elevation and part north elevation of former bunker

Plate H10 – H Building, west elevation of plant room and former bunker

Plate H11 – H Building, part west elevation

Plate H12 – H Building, part west elevation

Plate H13 – H Building, part east elevation; change in brickwork denotes first floor extension

Plate H14 – H Building, part east elevation showing the gabled roof form of the original radar room and track telling room

Plate H15 – H Building, part inner north elevation of south range and east elevation; change in brickwork to the first floor and the stair block relates to early phase of external alteration

Plate H16 – H Building, east elevation

Plate H17 – H Building, part east elevation and south elevation

Plate H18 – H Building, west elevation of the first extension to the north

Plate H19 – H Building, enclosed first and second floor exits and metal external stair to the north elevation of the former bunker

Plate H20 –H Building, external metal stair leading to the second-floor area of the former bunker

Plate H21 – H Building, external opening in north elevation into internal porch of second floor area of the former bunker

Plate H22 – H Building, corrugated cementitious type sheet roof to the gable east rooms and the north elevation of the first-floor addition to the south range

Plate H23 – H Building, south elevation of the first floor addition to the north range

Plate H24 – H Building, external metal staircase to roof of former bunker on the east elevation

Plate H25 – H Building, north west area of the roof of the former bunker

Plate H26 – H Building, south west area of the roof of the former bunker

Plate H27 – H Building, ground floor office (former radar room)

Plate H28– H Building, first floor open plan office within the south range

Plate H29 – H Building, lower ground floor level of battery room extension to the north

Plate H30 – H Building, ground floor office with north range; stairs previously accessed a storage space within the roof, altered when the first floor was created

Plate H31 – H Building, typical appearance of the first floor office to north range

Plate H32 – H Building, stairs within the two storey extension to the north

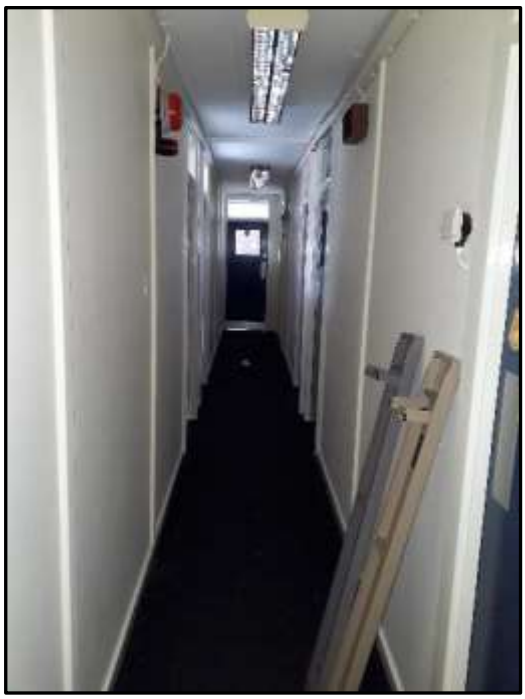

Plate H33 – H Building, ground floor corridor aligned east to west through the north range (former radar room to right)

Plate H34 – H Building, tiled sill and painted brickwork interior to the first offices of the north range

Plate H35 – H Building, ground floor of the north range; steps lead up to battery room extension

Plate H36 – H Building, former battery room within the north extension

Plate H37 – H Building, plant room within the north west corner

Plate H38 – H Building, ground floor corridor within the south range which retains its original proportions in part

Plate H39 – H Building, ground floor corridor link north and south ranges; former bunker to right of image

Plate H40 – H Building, ground floor corridor linking north and south ranges; former bunker and main entrance to right. Internal walls display painted brickwork finish

Plate H41 – H Building, main entrance into the former bunker area with dense, wide metal security door

Plate H42 – H Building, perimeter corridor within former bunker area; faraday cage to left of image

Plate H43 – H Building, perimeter corridor within former bunker area

Plate H44 – H Building, view of the ground floor perimeter corridor of former bunker from the elevated lift platform in the north west corner; west external wall to right of image

Plate H45 – H Building, north east corner of the ground floor showing the extent of electrical equipment and its projection within metal faraday caging

Plate H46– H Building, ground floor of former bunker. View of interior space within the faraday cage with 5 columns across centre, likely encasing service and duct work rather than being structural

Plate H47 – H Building, ground floor of former bunker. Two small 'pods' built into the northern wall of the faraday cage with thick, metal security doors. Room to the right is the former computer server room and room to the left served as a secure research area

Plate H48 – H Building, depth of external blast walls to the former bunker area

Plate H49 – H Building, ground floor. RF lock entry into the central faraday cage

Plate H50 – H Building, ground floor of former bunker looking towards the small 'pods'

Plate H51 – H Building, ground floor. Enclosed stairwell to first floor, inserted sometime after 1952 and before 1983, likely inserted when the first was created in the late 1950s

Plate H52 – H Building, first-floor level. Security pod to access the first-floor space; opening to right leads to a small lobby area where opening in the south wall of bunker leads to the first floor of the south range

Plate H53 – H Building, first-floor. Sound proof conference pod to the east wall of the former bunker

Plate H54 – H Building, first-floor. Sound proof office and conference pods to eats wall with wide, secure, metal doors

Plate H55 – H Building, Second floor. View of the first-floor open plan area from the second-floor mezzanine level

Plate H56 – H Building, Second floor. View of the first-floor open plan area from the second-floor mezzanine level

Plate H57 – H Building, second floor. View across the second floor mezzanine level. This configuration is the only obvious remains of the original R4 bunker configuration. Metal joists have been coated with an intumescent covering to metal structural steels. Original floors of the R4 bunker were hung from these joists

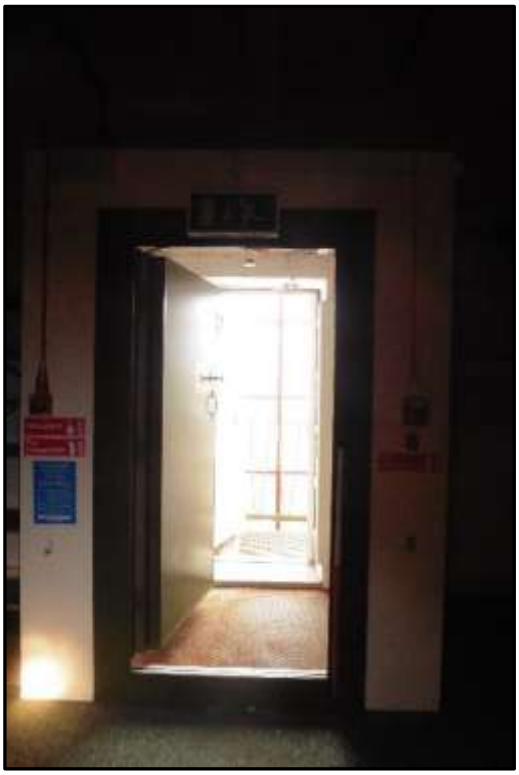

Plate H58 – H Building, second floor. Secondary, exit to the north elevation via a secure, enclosed porch with thick metal, security doors to the inner and outer walls. Doors display date of '1993' on construction label

Plate H59 – H Building, ground floor. Block door opening within the south wall of the former bunker, viewed from the south corridor

APPENDIX 4

Plates – KF Block

Plate KF1 – Part north and east elevation

Plate KF2 – North elevation

Plate KF3– Part north elevation and west projections

Plate KF4 – Part west elevation

Plate KF5 – Part west elevation with M Block (Building 37) to the rear

Plate KF6 – West elevation, main entrance

Plate KF7 – Part west elevation (south side)

Plate KF8 – Central corridor (northern half), brick tile internal dividing walls and rounded edge of brick columns visible

Plate KF9 – Central corridor (looking into southern half), brick tile internal dividing walls and rounded edge of brick columns visible

Plate KF10 – Example of rounded edge of brick column visible to the corridors and internal rooms

Plate KF11 – Example of corner edge of round brick column with chamfered stops to upper section

Plate KF12 – North west room showing more recent intervention with modern fixtures and fittings

Plate KF13 – Possible original lino tile floor covering observed within the most northern tip of the central corridor

Plate KF14 – Brick infill work to modern extension where KF block was previously adjoined to F Block

Plate KF15 – Early/Original door within northern half of block

Plate KF16 – Early/original door within southern half of block

Plate KF17 – Early/original door within southern half of block

Plate KF18 – Early/original door within southern half of block

Plate KF19 – Typical brick tile internal dividing wall

Plate KF20 – Door leading into the area which formerly housed TREAC; note the brickwork construction to the right (north) internal wall which depicts the use as a former air raid shelter

APPENDIX 5

Plates – E Block

Plate E1 – E Block, west elevation of spurs 1 and 2

Plate E2 – E Block, east elevation of spur 1

Plate E3– E Block, west elevation of spur 3

Plate E4 – E Block, south elevation of spur 3, representative of typical arrangement of the end elevations of the spurs projecting to the south (odd numbers)

Plate E5 – E Block, main entrance into Block positioned between spurs 7 and 9

Plate E6 – E Block, east elevation of spur 7 with ET Block (building 15) in the background

Plate E7 – E Block, typical window arrangement to the spurs and central corridor range

Plate E8 – E Block, southern three bays of west elevation of spur 9

Plate E9 – E Block, west elevation of spur 11

Plate E10 – E Block, part west elevation of spur 11 and part corridor range

Plate E11 – E Bock, part east elevation of spur 9

Plate E12 – E Block, east elevation of spur 13 where link extension connects to building 17

Plate E13 – E Block, north end elevation of spur 12 where previously addition has bene destroyed by recent fire

Plate E14 – E Block, north end elevation of spur 10 and part west elevation o spur 12

Plate E15 – E Block, part north end elevation of spur 10 and north end and part east elevation of spur 8

Plate E16 – E Block, north end elevation of spurs 6 and 8 and part west elevation of central projection between spurs 8 and 10

Plate E17 – E Block, part west elevation of spur 4

Plate E18 – E Block, part north elevation of central corridor range between spurs 2 and 4 with building 14 to centre and left

Plate E19 – E Block, view south towards the central corridor range between spurs 6 and 8 with eats elevation of spur 6 to right and extension to spur 8 to left

Plate E20 – E Block, north facing elevation of central corridor range between spurs 2 and 4

Plate E21 – E Block, north end elevations of spurs 6, 4 and 2

Plate E22 – E Block, part north end elevation of spur 8 and flat roof extension to the west side

Plate E23 – E Block, north elevation of central corridor range between spurs 6 and 8

Plate E24 – E Block, part north end and west facing elevations of spur 14

Plate E25 – E Block, north end elevation of spur 2 (right) looking east

Plate E26 – E Block, view east across roofscape from spur 4

Plate E27 – E Block, view south towards building 15 between spurs 1 and 3

Plate E28– E Block, early/original double doors within internal north dividing wall in central corridor range between spurs 12 and 14

Plate E29 – E Block, hole in partition wall exposing brick tile construction typical to the internal walls within the original WWII blocks

Plate E30 – E Block, view west along central corridor from east end

Plate E31 – E Block, view west along central corridor range from outside spurs13 and 14

Plate E32 – E Block, view north along secondary corridor into spur 4

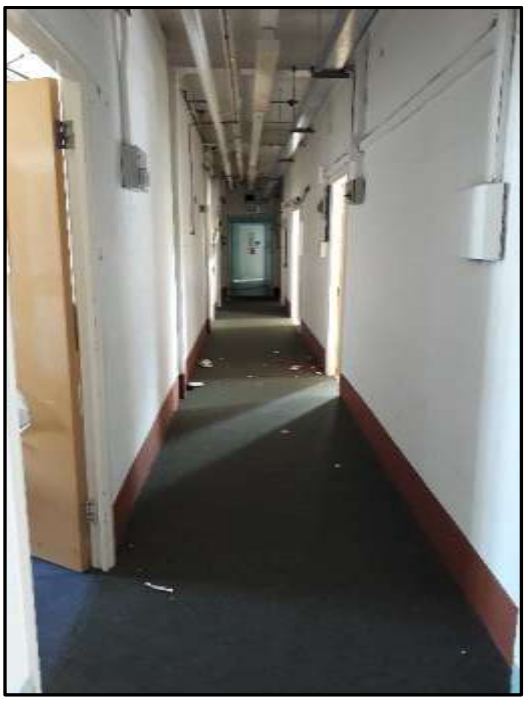

Plate E33 – E Block, view south along secondary corridor into 10

Plate E34 – E Block, secondary corridor to 9 with rounded edge of brick columns and brick tile internal dividing walls typical of each original block

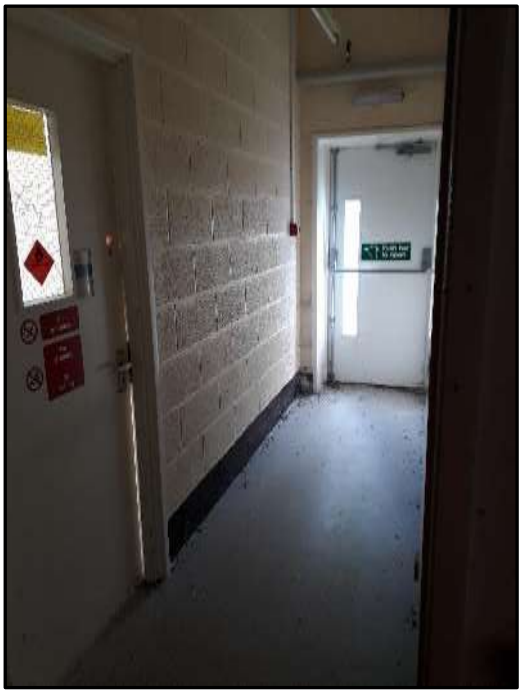

Plate E35 – E Block, evidence of alteration with blockwork walls and creation of secondary access to the west facing elevation of spur 11

Plate E36 – E Block, typical internal arrangement (observed in spur 11)

Plate E37 – E Block, modern alterations to the interior, typical of the north projecting spurs which have experienced a greater degree of reconfiguration

Plate E38 – E Block, remains of original construction to the interior

Plate E39 – E Block, view north along spur 12 which has been damaged by recent fire

Plate E40 – E Block, brick tile internal dividing construction typical of the interior of the block

Plate E41 – E Block, view west along central corridor from main entrance; section of corridor has been subject to alteration to stud partition walls and new ceiling altering the original the original proportions

Plate E42 – E Block, secondary corridor of spur 7

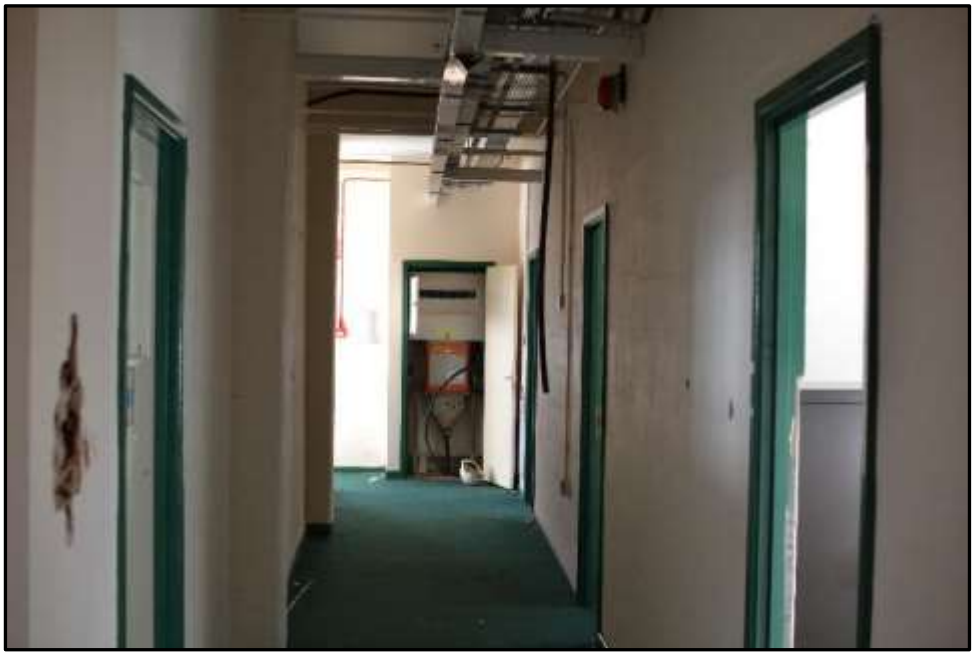

Plate E43 – E Block, internal alterations to secondary corridor in spur 14

Plate E44 – E Block, interior of infill block between spurs 6 and 8

Plate E45 – E Block, interior of infill block between spurs 6 and 8

Plate E46– E Block, interior of infill block between spurs 6 and 8

Plate E47 – E Block, open plan interior to spur 2

Plate E48 – E Block, altered secondary corridor to spur 5

Plate E49 – E Block, spur 6, fixtures and fitting relating to most recent laboratory and research use

Plate E50 – E Block, spur 6, rounded edge of structural brick column exposed within later alterations to the interior

Plate E51 – E Block, spur 8, fixtures and fitting relating to most recent laboratory and research use, the film to the window indicating importance of controlling the type of light into the space

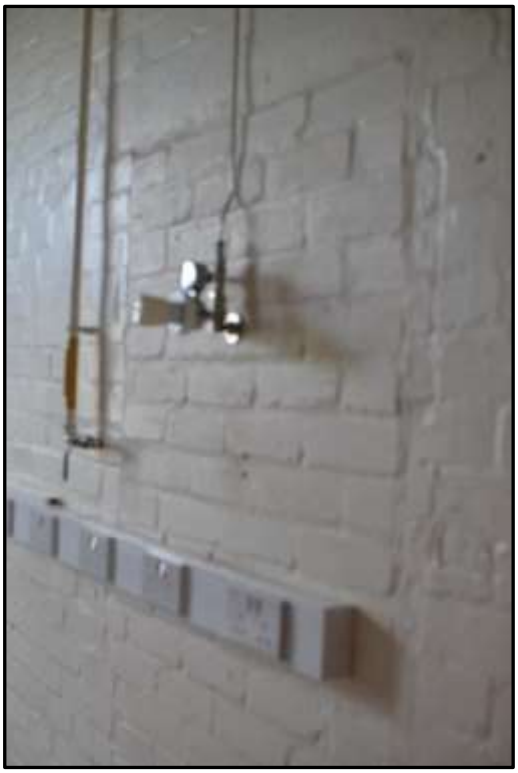

Plate E52 – E Block, evidence of blocked opening observed in spur 12

Plate E53 – E Block, spur 8 evidence of alteration and reconfiguration original layout

Plate E54 – E Block, remains of structural brick column with chamfered stops to top end. Common feature throughout the block where the early configuration remains (observed in small room to spur 4

APPENDIX 6

Plates – D Block

Plate D1 – D Block, part north elevation of spurs 6 and 8

Plate D2 – D Block, part west elevation of spur 6

Plate D3– D Block, north elevation of central corridor range between spurs 6 and 8

Plate D4 – D Block, north elevation of spur

Plate D5 – D Block, east elevation of spur 6 (typical configuration of every spur)

Plate D6 – D Block, north elevation with main centrally positioned entrance (flanked by spur 6, right, and spur 4, left)

Plate D7 – D Block, external steps to north east corner of spur 6

Plate D8 – D Block, west elevation of spur 4

Plate D9 – D Block, timber doors to main entrance from the north

Plate D10 – D Block, north elevation of spur 4

Plate D11 – D Block, typical arrangement of the spurs and central corridor range (spur 4, right, and spur 2, left)

Plate D12 – D Block, obscured north elevation of spur 2

Plate D13 – D Block, east elevation of spur 2

Plate D14 – D Block, east elevation of spur 2 (typical window arrangement presented)

Plate D15 – D Block, west elevation of spur 5 with altered pattern of openings

Plate D16 – D Block, east elevation of spur 1

Plate D17 – D Block, secondary entrance into the block from the east. Entrance marks the central corridor location which separate spurs 1, left, and spur 2, right

Plate D18 – D Block, south end elevation of spur 1

Plate D19 – D Block, south elevation of central corridor between spur 1, right and spur 3, left

Plate D20 – D Block, east elevation of spur 3

Plate D21 – D Block, south end elevation of spur 3

Plate D22 – D Block, south entrance to corridor range and west elevation of spur 3

Plate D23 – D Block, south elevation of original boiler house range between spurs 3 and 5

Plate D24 – D Block, east elevation of spur 5

Plate D25 – D Block, south end elevation of spur 5

Plate D26 – D Block, central corridor range between spurs 5 and 7 and west elevation of spur 5; nota altered pattern of windows to corridor range

Plate D27 – D Block, part west elevation of spur 5 with altered window openings

Plate D28– D Block, south end elevation of spur 7

Plate D29 – D Block, timber entrance doors to south entrance between spurs 3 and 5

Plate D30 – D Block, obscured west elevation of spur 7

Plate D31 – D Block, central corridor looking east from central lobby area. Note inserted ceiling to conceal ducts and services and rounded edges of brick columns and brick tile internal walls to the right

Plate D32 – D Block, central corridor looking east (from between spurs 7 and 8). Note inserted ceiling to conceal ducts and services and rounded edges of brick columns and brick tile internal walls to the right

Plate D33 –D Block, central corridor looking west from between spurs 5 and 6. Note inserted ceiling to conceal ducts and services and rounded edges of brick columns and brick tile internal walls to the left

Plate D34 – D Block, arrangement of openings and brick column where the corridor leads into the north projection between spurs 8 and 6 which was originally the morgue

Plate D35 – D Block, looking north into spur 8 from the corridor, not brick structural columns within main space beyond the doors and the brick tile internal walls

Plate D36 – D Block, spur 5, rounded edge of brick column typical within the individual rooms of each spur

Plate D37 – D Block, typical detail of rounded brick columns as exposed to the main central corridor and the secondary spur corridors

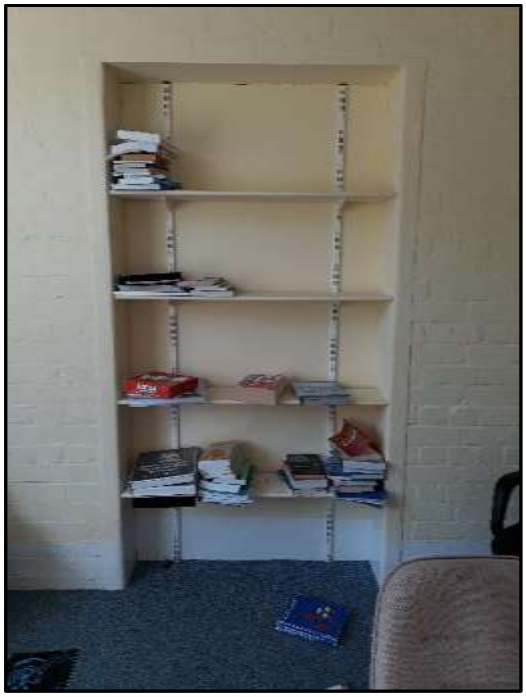

Plate D38 – D Block, blocked opening in spur 5. Brickwork internal walls indicate area of original air raid shelter, this function requirement more solid walls as opposed to the typical brick tile internal walls

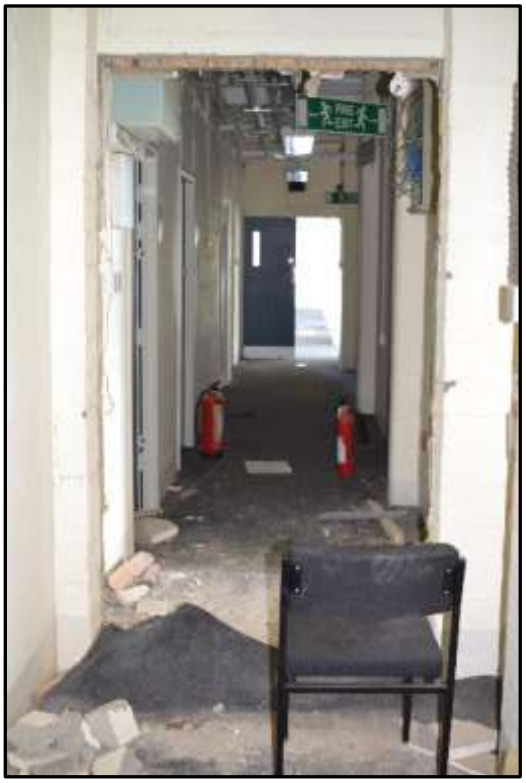

Plate D39 – D Block, spur 3 looking south

Plate D40 – D Block, spur 6. Open plan arrangement with structural brick columns of the original construction method to centre of the room

Plate D41 – D Block, Spur 3. Typical arrangement of larger rooms flanking the secondary spur corridor

Plate D42 – D Block, spur 3. Typical internal arrangement of flanking rooms with rounded edge of brick column and brick tile internal walls

Plate D43 – D Block, spur 5. Most southern bay with original brickwork internal dividing wall to the right

Plate D44 – D Block spur 5, typical secondary corridor arrangement

Plate D45– D Block, former boiler house within the south projection between spurs 3 and 5

Plate D46 – D Block, spur 1. Evidence of alteration

Plate D47 – D Block, spur 7 corridor

Plate D48 – D Block, secure document store roof to the most southern bay of spur 5

Plate D49 – D Block, safe door to secure document storeroom

Plate D50 – D Block, view north into original morgue area, now reconfigured as offices

Plate D51 – D Block, interior of part of spur 8

Plate D52 – D Block, interior of spur 4

Plate D53 – D Block, interior of spur 2

APPENDIX 7

Plates – Library Building

Plate L1 – Library building, part north east elevation of north east range (original section)

Plate L2 – Library building, part north east elevation of north east range (original section)

Plate L3– Library building, part north west end elevation of north east (original) range

Plate L4 – Library building, part north west end elevation of north east (original) range

Plate L5 – Library building, part south west elevation of original range, now enclosed by the later south west range where its north east elevation opposes

Plate L6 – Library building, north east elevation of the later south west range, opposing elevation to the inner facing south west elevation of the north east range

Plate L7 – Library building, north west end elevation of the later south west range

Plate L8 – Library building, north west end elevation of the later south west range

Plate L9 – Library building, part south west elevation of later south west range with central, projecting flat roof entrance porch

Plate L10 – Library building, part south west elevation of the later south west range

Plate L11 – Library building, south east end elevation of the later south west range

Plate L12 – Library building, north east elevation of the later south west range

Plate L13 – Library building, part south east and north east elevations of the original range

Plate L14 – Library building, south east facing entrance into later flat, roof porch to the north east elevation

Plate L15 – Library building, north west entrance into later flat roof porch addition to the north east elevation of the original range

Plate L16 – Library building, north east elevation of the original range. Change in brickwork and coursing indicative of alteration or rebuilding, possibly contemporary with the later addition of the south west range

Plate L17 – Library building, internal arrangement of the south east half of the original range. All partitions and fixtures are modern

Plate L18 – Library building, internal arrangement of the south east half of the original range. All partitions and fixtures are modern

Plate L19 – Library building, internal partitions to the original range

Plate L20 – Library building, lobby entrance area from the north east porch

Plate L21 – Library building, doors leading into the link corridor connecting original range to the later south west range

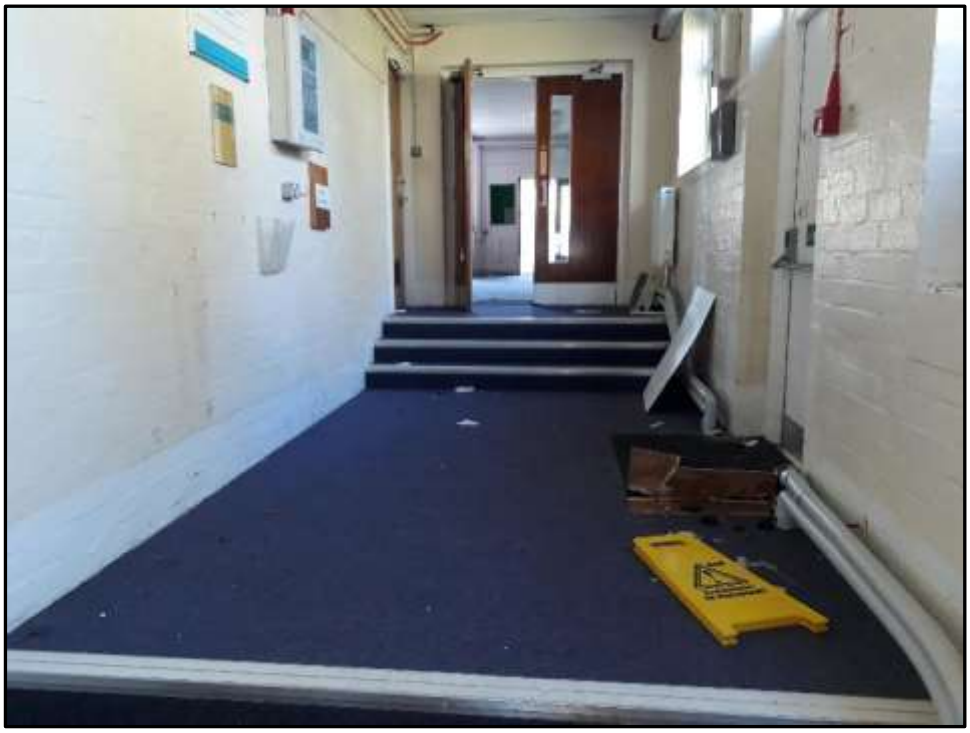

Plate L22 – Library building, link corridor with painted brickwork wall and steps to address changes in level between the two ranges (facing south west)

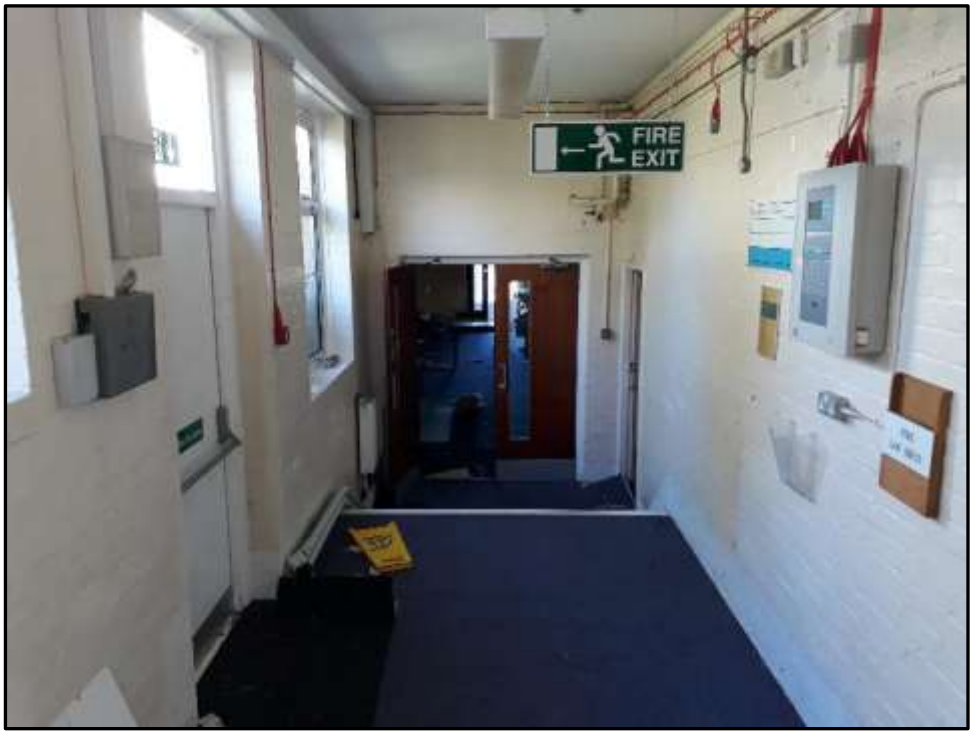

Plate L23 – Library building, link corridor with painted brickwork wall and steps to address changes in level between the two ranges (facing north east)

Plate L24 – Library building, later south west range interior with modern partition walls

Plate L25 – Library building, south west range. Open plan space within the north west half of the range

Plate L26 – Library building, south west range. Lobby area looking into the south east half of the range

Plate L27 – Library building, south west range. Open plan space to the south east half of the range

Plate L28– Library building, south west range. Doors lead into a later addition added to the south east end of the south west range

Plate L29 – Library building, south eastern extent of the south west range which was added later

APPENDIX 8

Plates – A Block

Plate A1 – A Block, part south east elevation of spur 3

Plate A2 – A Block, min central entrance facing south west positioned between spurs 3 and 5

Plate A3– A Block, part central corridor range and north west elevation of spur 5

Plate A4 – A Block, part north west elevation of spur 5

Plate A5 – A Block, laser camera test panel to end bays of spur 5 (north west elevation)

Plate A6 – A Block, timber doors to main south west entrance

Plate A7 – A Block, south west end elevation of spur 5

Plate A8 – A Block, south east elevation of spur 5 and part south west end elevation of spur 7

Plate A9 – A Block, view towards central corridor between spurs 5 (left) and 7 (right)

Plate A10 – A Block, south west end elevation of spur 7

Plate A11 – A Block, south east elevation of spur 7

Plate A12 – A Block, secondary entrance at central junction between spurs 7 (left) and 8 (right)

Plate A13 – A Block, south east elevation of spur 8

Plate A14 – A Block, south east elevation of spur 8 with later external staircase addition

Plate A15 – A Block, north east end elevation of shorter projection between spurs 8 (left) and 6 (right)

Plate A16 – A Block, part south east elevation of spur 6

Plate A17 – A Block, north east elevation

Plate A18 – A Block, part north west elevation of spur 6

Plate A19 – A Block, north west elevation of spur 1 with secondary west entrance and small first floor addition

Plate A20 – A Block, part south east elevation of later addition to spur 4 (centre) and part south east elevation of former boiler house (left) positioned to oppose the central entrance

Plate A21 – A Block, enlarged entrance to south east elevation of original boiler house range

Plate A22 – A Block, north west elevation of spur 2

Plate A23 – A Block, secondary entrance to the central corridor range at the junction between spurs 1 (right) and 2 (left)

Plate A24 – A Block, part north west elevation of spur 1 with altered opening

Plate A25 – A Block, south west end elevation of spur 1

Plate A26 – A Block, part north west elevation of spur 3 with infill addition connecting spur 3 to spur 1

Plate A27 – A Block, south west end elevation of spur 3

Plate A28– A Block, interior of central corridor range looking north west

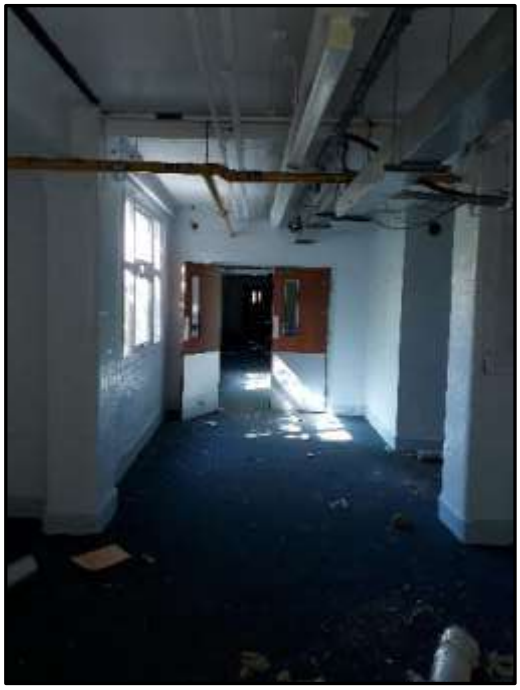

Plate A29 – A Block, interior of central corridor range looking south east

Plate A30 – A Block, interior of central corridor range from the south east

Plate A31 – A Block, rounded edge of structural brick column with stop chamfers, typical feature of the corridors

Plate A32 – A Block, secondary corridor to spur 7

Plate A33 – A Block, corner of the structural brick column typical of interior rooms to the spurs

Plate A34 – A Block, evidence of a blocked doorway observed in spur 8

Plate A35 – A Block, secondary corridor to spur 8

Plate A36 – A Block, evidence of new work and new opening observed in spur 5

Plate A37 – A Block, south western extent of spur 5 with altered configuration of rooms

Plate A38 – A Block, evidence of internal alteration to spur 6 with floor level raised

Plate A39 – A Block, evidence of most recent research and laboratory use of the internal spaces (spur 6)

Plate A40 – A Block, evidence of most recent research and laboratory use of the internal spaces (spur 6), note the original rounded edge of the brick columns and the brick tile internal walls retained

Plate A41 – A Block, fixtures associated with laboratory use observed in spur 4

Plate A42 – A Block, modern fixtures associated with laboratory use observed in spur 2

Plate A43 – A Block, infill extension between spurs 2 and 4 originally used for climatic testing of complete systems. Remaining features indicate research use continued within the space

Plate A44 – A Block, infill extension between spurs 2 and 4 originally used for climatic testing of complete systems. Remaining features indicate research use continued within the extension

Plate A45 – Internal recess space, identified as being an original feature on the 1940 plan (see appendix 10), to main corridor range

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Plate A46 – A Block, interior of original boiler room space, subsequently adapted and used for research

Plate A47 – A Block, internal laboratory space within block 2

Plate A48 – A Block, interior of later addition to the south east elevation of spur 4. Space was historically used to test physical durability complete systems used in radar development

Plate A49 – A Block, interior of later addition to the south east elevation of spur 4, extent of original external wall of spur 4 inline with the brick piers

Plate A50 – A Block, Remains of fixture and fittings to laboratory space in spur 1

Plate A51 – A Block, early boarded and braced door within the north east elevation of later addition to spur 4

Plate A52 – A Block, steps down into the original boiler house area accessed from the central corridor opposite the main central entrance

Plate A53 – A Block, modern interventions observed within spur 3

Plate A54 – A Block, brick tile internal wall and rounded corner of brick column evident of early method of subdivision observed within spur 1

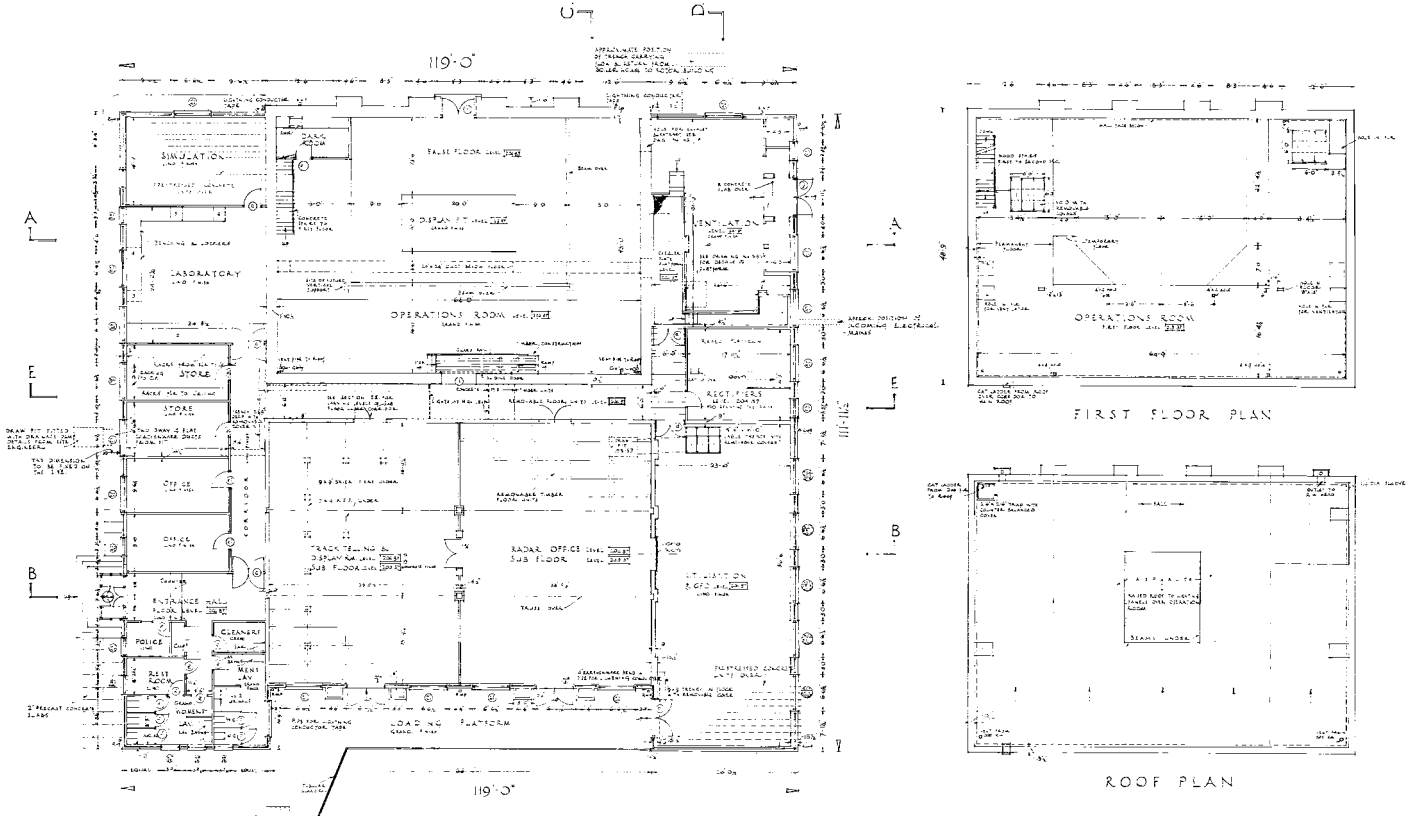
APPENDIX 9

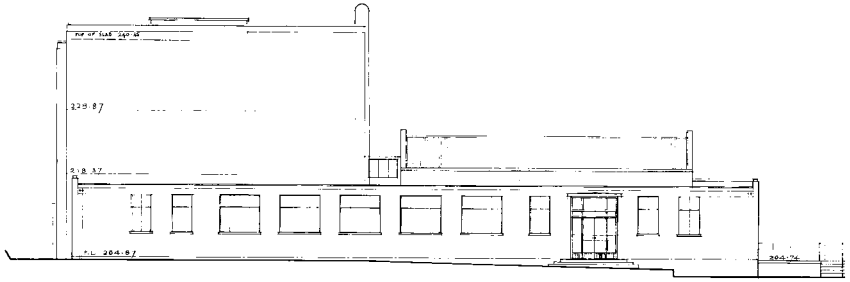
H Building 1952 and 1983 Plans

APPENDIX 9 – H Building 1952 and 1983 Plans

Digital copies of original floor plan, elevation and section plans for H Building from 1952 which show its original construction configuration. Later floor plan from 1983 depicts the internal arrangement prior to a refurbishment in 1991-1993 and shows how the internal spaces were reordered between 1952 and the early 1990s (Plans sourced from a digital archive collection held by MRATHS).

1952





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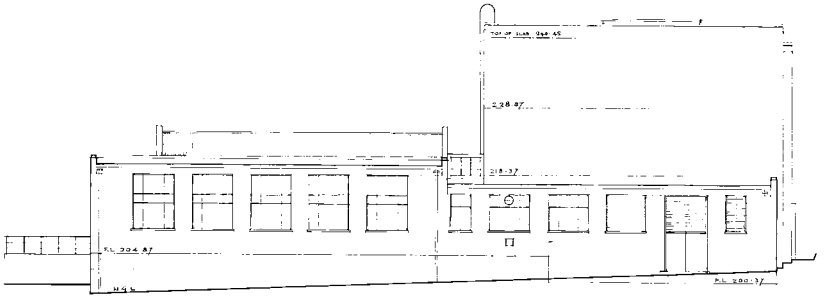

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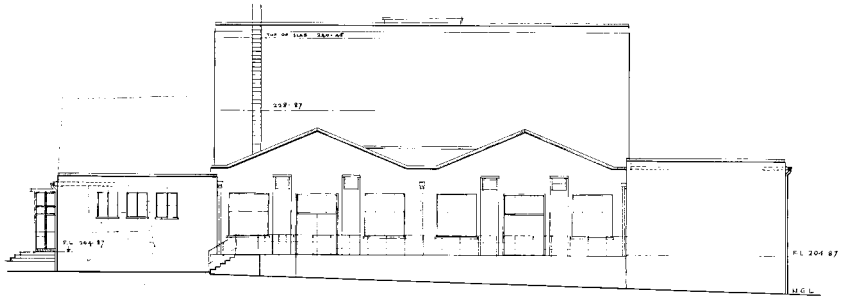

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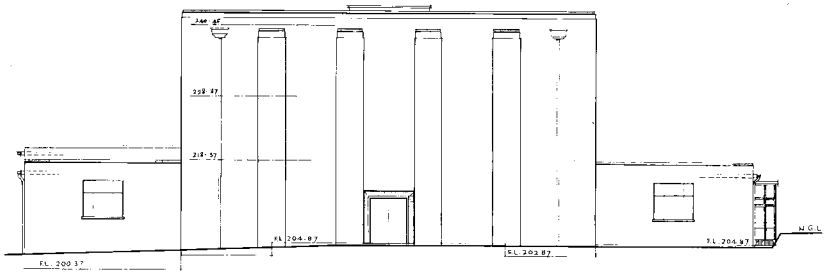

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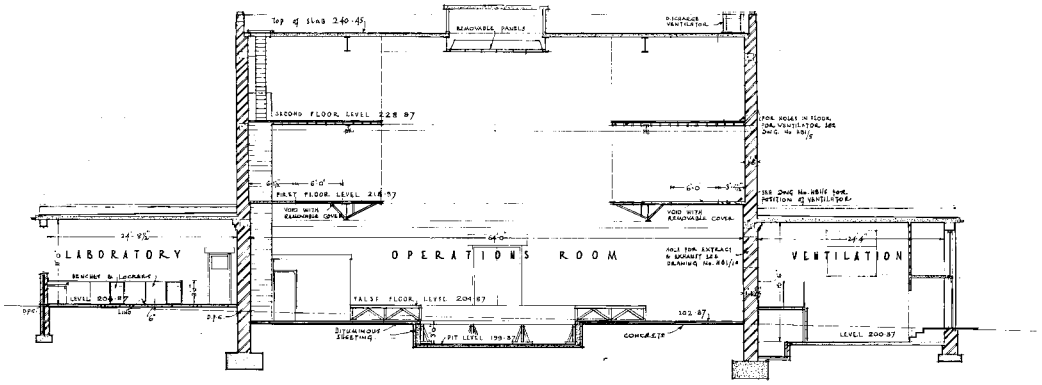

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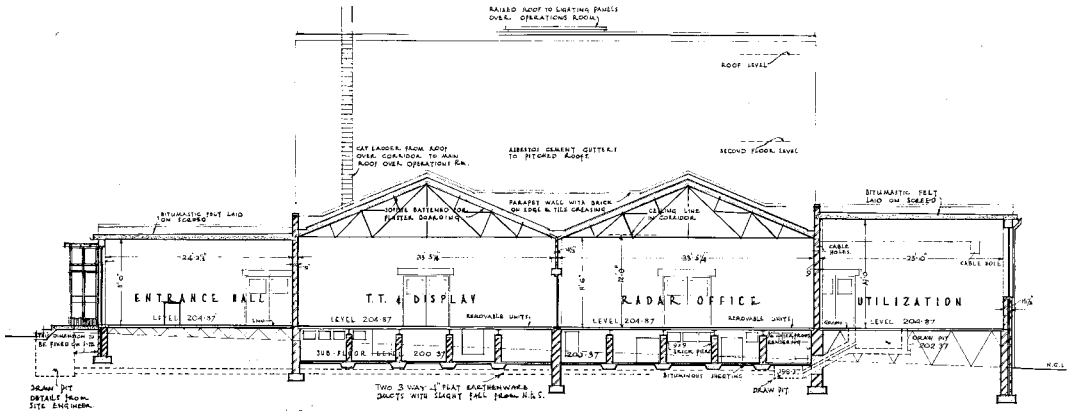

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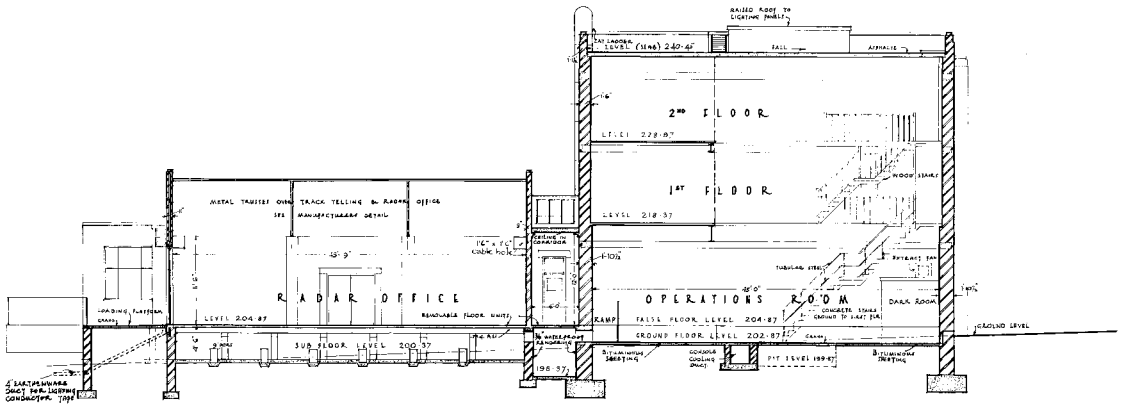

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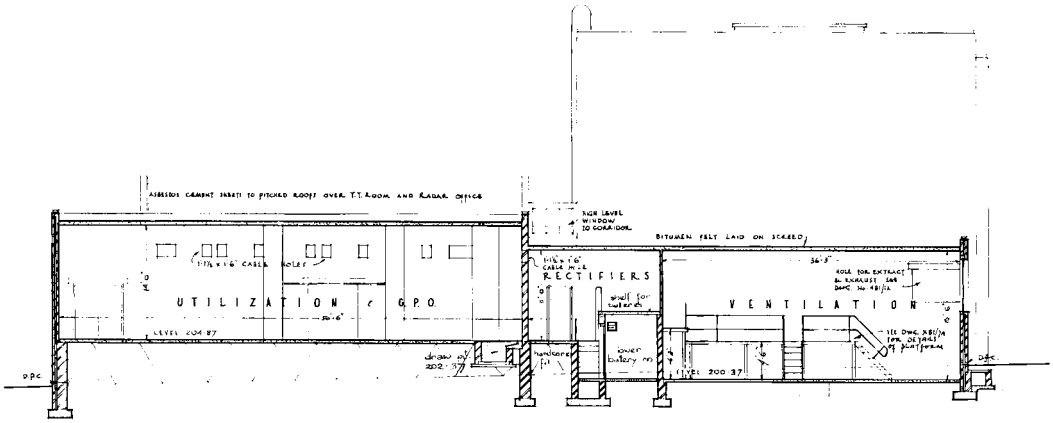

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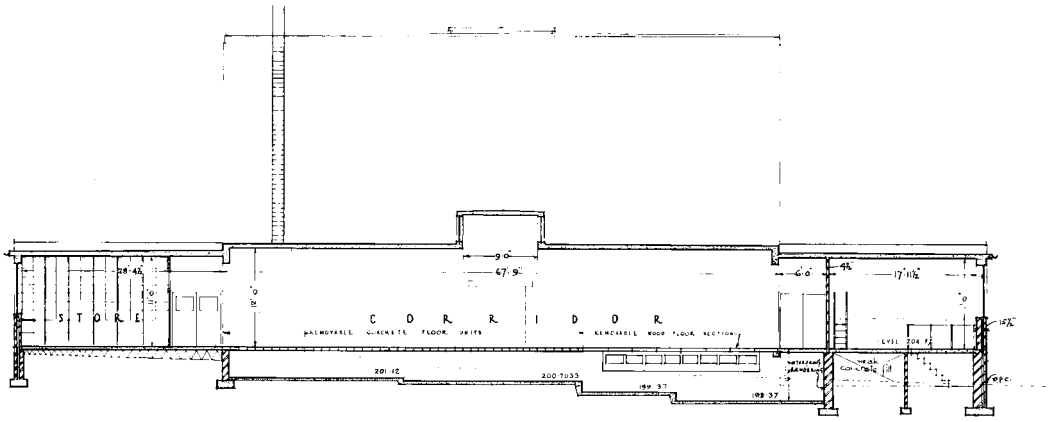

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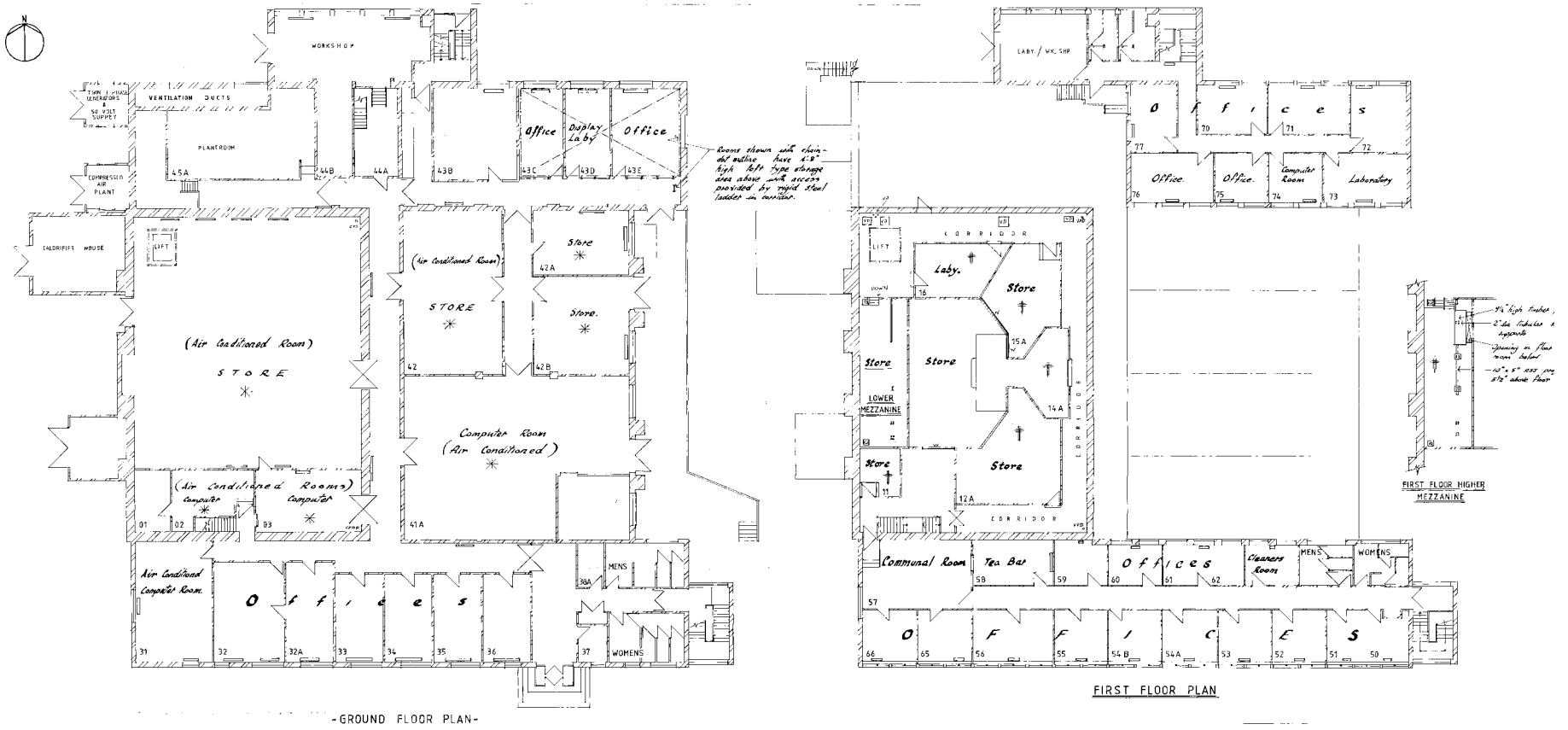
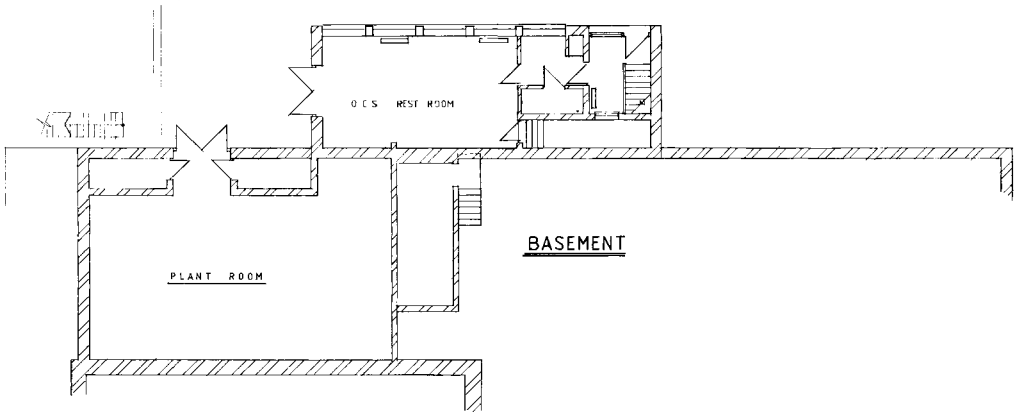

WORKSHOP
VENTILATION DUCTS
PLANTROOM
COMPRESSED AIR PLANT
CALORIFIER HOUSE
LIFT
Office
Display Laby
Office
Rooms shown with chain-dot outline have 4'-8" high loft type storage area above with access provided by rapid steel ladder in corridor.
(Air Conditioned Room)
STORE
Store
Store.
Computer Room (Air Conditioned)
(Air Conditioned Rooms)
Computer
Computer
Air Conditioned Computer Room.
Offices
MENS
WOMENS
-GROUND FLOOR PLAN-
LABY / WK. SHP
Offices
Office.
Office.
Computer Room
Laboratory
CORRIDOR
Laby.
Store
Store
Store
LOWER MEZZANINE
Store
Store
Communal Room
Tea Bar
Offices
Cleaners Room
MENS
WOMENS
OFFICES
FIRST FLOOR PLAN
FIRST FLOOR HIGHER MEZZANINE



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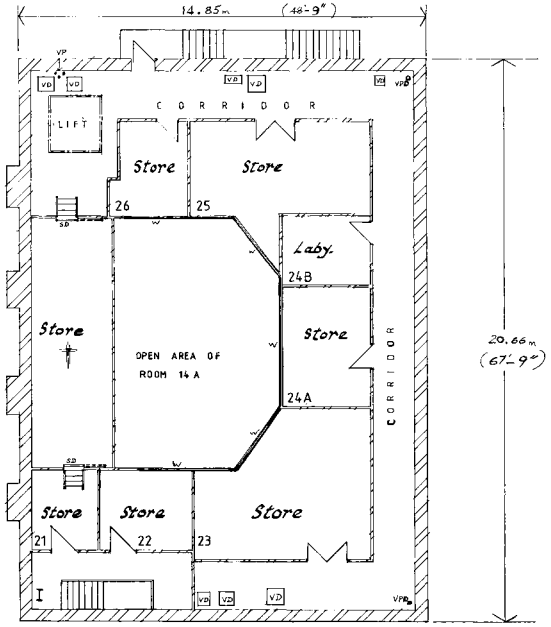


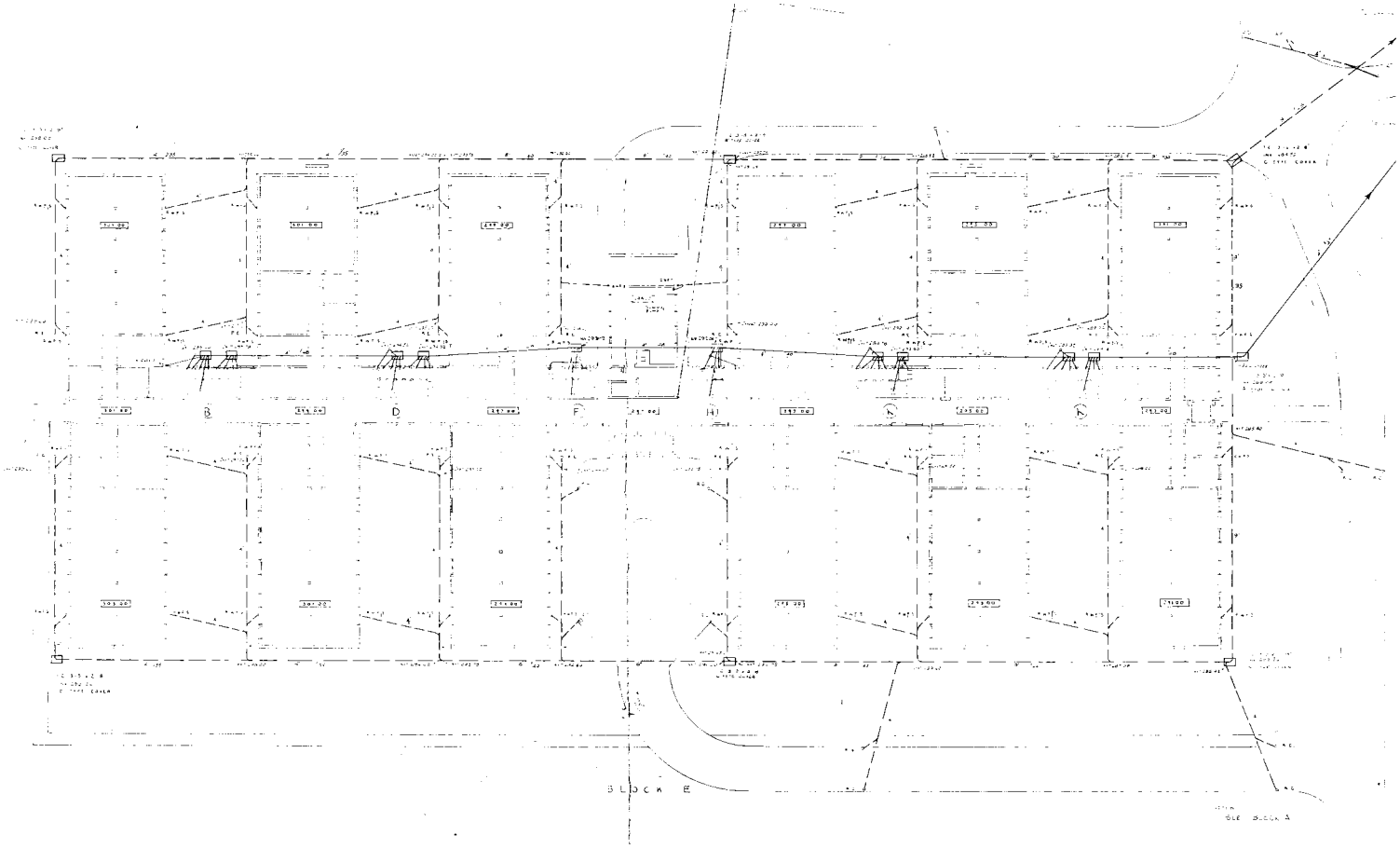
-SECOND FLOOR PLAN-

APPENDIX 10

Typical Original Floor Plan of WWII Blocks

APPENDIX 10

Digital copies of original floor plan for E Block dated 1940. This plans shows the original arrangement of this block and it can be assumed, based on the visual observations made of KF, A and D Blocks that this plan arrangement would have been typical to each of the original blocks and therefore provides a good base as to how each of the blocks would have appeared (Plans sourced from a digital archive collection held by MRATHS).



APPENDIX 11

Written Scheme of Investigation: Historic Building Recording

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ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT

PERSIMMON HOMES SOUTH MIDLANDS

MALVERN TECHNOLOGY CENTRE

BUILDING RECORDING WRITTEN SCHEME OF INVESTIGATION

AUGUST 2019

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DATE ISSUED: **AUGUST 2019**

JOB NUMBER: **BM11422**

REPORT NUMBER: **HBWSI-001b**

PERSIMMON HOMES SOUTH MIDLANDS

MALVERN TECHNOLOGY CENTRE

BUILDING RECORDING WRITTEN SCHEME OF INVESTIGATION

PREPARED BY:

C Dawson Associate Director (Archaeology & Heritage)

APPROVED BY:

C Mellor Technical Director

CONTENTS

FIGURES

1 INTRODUCTION

1.1.1 Wardell Armstrong has been commissioned by Persimmon Homes South Midlands (hereafter referred to as 'the client') to prepare a Written Scheme of Investigation (WSI) for the preparation of a historic building record of the extant WWII buildings at the Malvern Technology Park (Centred on NGR: SO 78576 44681), see Figure 1.

1.1.2 The historic building recording is required in order to document the WWII buildings in the written record, prior to the proposed redevelopment at the Site, for which a planning decision is pending (18/01088/FUL).

1.1.3 The buildings to be recorded include those within the planning application area for dwellings and those within the wider centre for which demolition is also proposed.

1.1.4 Advice received from Aidan Smyth the MHDC Archaeology and Planning Advisor has confirmed that any consent would be subject to a condition stipulating a Building Recording of the structures currently extant on the Site.

1.1.5 In respect to WWII structures, the Building Recording required would be Level 3 as set out in Historic England's 'Understanding Historic Buildings: A Guide to Good Recording Practice' (2016).

1.1.6 A Level 1 recording would be required of other buildings present.

1.1.7 This WSI provides a methodology for a historic building recording in accordance with Historic England guidance and conforms to the guidelines and standards laid down in the following documents:

- *Standard and guidance for the archaeological investigation and recording of standing buildings or structures,* Chartered Institute for Archaeologists: Reading (CIFA 2014a).

2 BACKGROUND

2.1 Location

2.1.1 The former centre is located off St Andrews Road in the south-eastern suburbs of Great Malvern, Worcestershire (NGR SO 78576 44681). It comprises an irregular shaped parcel of land which was predominantly developed from the 1940s onwards, initially for military use. Extant buildings within the Site include former military buildings of 1940s and 1950s date and other non-military buildings of various date.

2.2 Brief Historical Background

2.2.1 The land based Royal Navy training establishment (HMS Duke) was commissioned on land within the Site in May 1941. It provided land based training in seamanship and naval discipline (HER references WSM25017 & WSM42821).

2.2.2 Although it was disbanded in 1946 some of the original buildings still stand today. These are highlighted on Figure 2. The original blocks of buildings were given the names of historic naval personalities and accommodated various uses including: general training, lecture rooms, administration, school, gymnasium, cinema, staff quarters and WREN's quarters. A block was given over to the Surgeon-Captain as a sick bay.

2.2.3 After WWII, the former naval training establishment was adapted for use by the Telecommunication Research Unit who relocated permanently to the Site in 1953. The Malvern site formed part of the 'Rotor' programme, an ambitious military engineering project to urgently modernise the UK's radar defence system initiated in the late 1940s.

2.2.4 The largest structures built as part of the 'Rotor' programme were the operations blocks or bunkers which were designed to be bomb-proof against armour piercing bombs. These bunkers were predominantly built underground or partially submerged. Research by Malvern Radar and Technology History Society suggests that the building within the Site known as H building (HER reference WSM69538), was built in 1952 and has a prototype version of the Rotor R4 standard radar station building type for Sector Operations Centre (SOC) at its core.

2.2.5 The Site later became known as DRE (Defence Research Establishment) Malvern, followed by DERA (Defence and Evaluation Research Agency) Malvern.

2.2.6 In 2000, it was privatised and used by Dstl (The Defence Science and Technology Laboratory) and abandoned late 2008.

2.2.7 Today, the Site is disused and comprises a complex of WWII and later buildings, the 'H building' being of particular interest.

3 AIMS AND OBJECTIVES

3.1.1 The general aim of the building recording is to document the buildings, or parts of the buildings, which are to be demolished.

3.1.2 The WWII buildings and the 'H building' are of particular interest and will be subject to a higher level of recording (Level 3).

3.1.3 The other buildings within the Site will be subject to the lowest level of recording (Level 1).

3.1.4 The buildings to be recorded include those within the planning application area for dwellings and those within the wider centre for which demolition is also proposed.

3.1.5 The level of recording is indicated on Figure 2.

3.1.6 The Level 1 buildings will be subject to a basic visual record. This will comprise a photographic record and a written record. It will record the building's location, age and type. It will be restricted to the exterior of the buildings only, although any notable features present internally will also be photographed.

3.1.7 The Level 3 buildings will be subject to an analytical record. This will comprise a photographic record, a written record and (potentially) a drawn record. It will provide an account of the building's origins, development and use.

3.1.8 A copy of the report will be deposited with the Worcestershire Historic Environment Record.

4 METHOD STATEMENT

4.1.1 The historic building recording will comprise a Level 1 or 3 survey as described in '*Understanding Historic Buildings – A Guide to Good Recording Practice'* (Historic England 2016). The necessary components are summarised below.

4.1.2 The building record will be undertaken prior to the demolition of the buildings. Demolition will be permitted on the approval of the record by Aidan Smyth, the MHDC Archaeology and Planning Advisor.

4.2 Level 1 Record

4.2.1 The buildings shown in pink on Figure 2 will be subject to a Level 1 record.

4.2.2 The photographic record would comprise a digital record only. All photographs should be taken at the highest resolution on a DSLR camera (at a minimum of 10 Mega Pixels).

4.2.3 All photographs must in focus and taken with due regard to natural lighting and the use of artificial lighting as appropriate.

4.2.4 Hard copy prints within the report and the archive will be printed on Fujicolour Crystal Archive paper (or similar) for the purposes of clarity and longevity. All printing would be done to a minimum of 300dpi.

4.2.5 The photographic record for each building will comprise:

- A photograph of the building in its wider context;
- A series of oblique views of all external elevations to provide an impression of size and shape; and
- Photographs of any complex features at right angles.

4.2.6 The written record for each building will comprise:

- The date of the record, the name(s) of the recorder and the location of any archive;
- A National Grid Reference for each building;
- A note of any designated status – in this case, none; and
- A summary of the building's type/function historically and at present, materials and date as far as is apparent from this inspection.

4.3 Level 3 Record

4.3.1 The buildings shown in green on Figure 2 will be subject to a Level 3 record.

4.3.2 The photographic record would comprise a digital record only. All photographs should be taken at the highest resolution on a DSLR camera (at a minimum of 10 Mega Pixels).

4.3.3 All photographs must in focus and taken with due regard to natural lighting and the use of artificial lighting as appropriate.

4.3.4 Hard copy prints within the report and the archive will be printed on Fujicolour Crystal Archive paper (or similar) for the purposes of clarity and longevity. All printing would be done to a minimum of 300dpi.

4.3.5 The photographic record for each building will comprise:

- A photograph of the building in its wider context;
- A series of oblique views of all external elevations to provide an impression of size and shape;
- Photographs of any complex features at right angles;
- Photographs illustrative of original design intentions (known from documentary or inferred on Site;
- Internal photography to illustrate principal rooms and circulation areas (to demonstrate shape and size);
- External and internal details (structural or decorative) illustrative of the building's design, development and use (with scale where appropriate);
- Any machinery, plant or building contents which attest to its ts former use; and
- Any dates or inscriptions, signage or graffiti which contribute towards and understanding of the building (a transcription should be referenced where necessary); and
- Any copies of maps, drawings, views or photographs present within the building which attest to it of the Site's historic development.

4.3.6 The written record for each building will comprise:

- The date of the record, the name(s) of the recorder and the location of any archive;
- A National Grid Reference for each building;
- A note of any designated status – in this case, none;
- A summary statement to summarise the building's form, function, date and sequence of development. Names of architects, builders, patrons and owners

specified if known;

- A contents list;
- An introduction setting out the circumstances of the project, its objectives, method, scope and limitations. This WSI should be referenced;
- Acknowledgements to those who have contributed to the record and any who have provided permission for the reproduction of material;
- A main report including:
  - A discussion of published sources relating to the building and the Site referencing any cited account of the building;
  - A written account of a map regression for each building;
  - An account of the buildings past and present use and the use of its parts (all interpretations being evidenced);
  - Analysis of any circulation pattern;
  - Analysis of any decorative scheme;
  - An account of fixtures, fittings, plant and machinery;
  - Any evidence of the former existence of removed plant associated with the building; and
- Selected copies of historic maps, views or historic photographs deemed appropriate to provide an understanding of the building; and
- A full bibliography.

4.3.7 Photography is generally appropriate to present information on the appearance and historic development of a building. The extent of the drawn record will be established in consultation with Aidan Smyth the MHDC Archaeology and Planning Advisor after the undertaking of the photographic record. A review of the photographic record should establish which drawings will make the most useful contribution to the record. It is anticipated that the repetitive nature of the buildings will negate the necessity for measured plans of all elevations and floor plans.

4.4 Timetable

4.4.1 The Level 1 and Level 3 photographic record would be undertaken over the course of one week, during which time the recorder would undertake external photography of all of the buildings and internal photography of the building highlighted for a Level 3 survey.

4.4.2 A review of the photography of the buildings subject to the Level 3 survey will take place within two weeks of the completion of the photographic record such that discussions can be undertaken with Aidan Smyth, the MHDC Archaeology and Planning Advisor, on the necessary requirements of the drawn record. The requirements and timetable for any drawn record would be provided as an addendum to this WSI.

4.4.3 Demolition of the buildings would be permitted on the approval of the finished record (as stipulated within this WSI and potential addendum regarding the drawn record) by Aidan Smyth, the MHDC Archaeology and Planning Advisor.

4.5 Archive Preparation and Deposition

4.5.1 Wardell Armstrong support the Online Access to the Index of Archaeological Investigations (OASIS) project. This project aims to provide an online index and access to the extensive and expanding body of grey literature created as a result of developer-funded archaeological fieldwork. As a result, details of the results of this study will be made available by Wardell Armstrong as a part of this national project.

4.6 Monitoring

4.6.1 Monitoring will be undertaken internally to ensure compliance with the WSI.

4.7 Dissemination

4.7.1 The project will be registered with the Online AccesS to the Index of archaeological investigationS (OASIS), where a digital copy of the report will be made available.

4.7.2 Two copies of the report, one hard copy and one digital copy, will be deposited with the Worcestershire Historic Environment Record via the Historic Environment Record Officer.

4.8 Health and Safety

4.8.1 Wardell Armstrong will conduct the work in compliance with the Health and Safety at Work Act 1974.

4.8.2 Wardell Armstrong maintains a Health and Safety Policy and has available appropriate

expertise in Health and Safety advice. Site staff will have an appropriate level of training to enable them to carry out fieldwork safely.

4.8.3 Wardell Armstrong will abide by the client's health and safety methodology as well as producing their own internal risk assessment document. All Wardell Armstrong staff will assist the client in maintaining the Site in a safe condition. Hazards will be appropriately identified and managed.

4.8.4 In addition to the risk assessment which will be undertaken prior to commencement of fieldwork, where appropriate a COSHH assessment will also be undertaken. Once on Site, these documents will be assessed and any variations will be documented and added to the appropriate document. These will be re-evaluated as necessary periodically during the course of the evaluation to make sure that they remain consistent to the Site specific risks. All members of Wardell Armstrong and visitors will be required to be inducted and sign these documents on first arrival to Site to show that they have read and understood the contents and any variations to the documents will be communicated as required.

4.8.5 During the fieldwork appropriate safety clothing will be worn by Wardell Armstrong staff at all times. The client will be requested to provide details of their own risk assessment before fieldwork commences. If there is conflict between the client's risk assessment and that of Wardell Armstrong then the client's will take priority, unless it is perceived to be placing the field team at greater risk.

4.9 Staffing

4.9.1 Wardell Armstrong is a Registered Archaeological Organisation of the Institute for Archaeologists. The standards and codes of conduct of the Chartered Institute for Archaeologists would be adhered to at all times.

4.9.2 The work would be managed by either Charlotte Dawson (Associate Director for Archaeology & Heritage) or Lorna Goring, Principal Heritage Consultant.

4.9.3 Wardell Armstrong will keep the client informed on the progress of work.

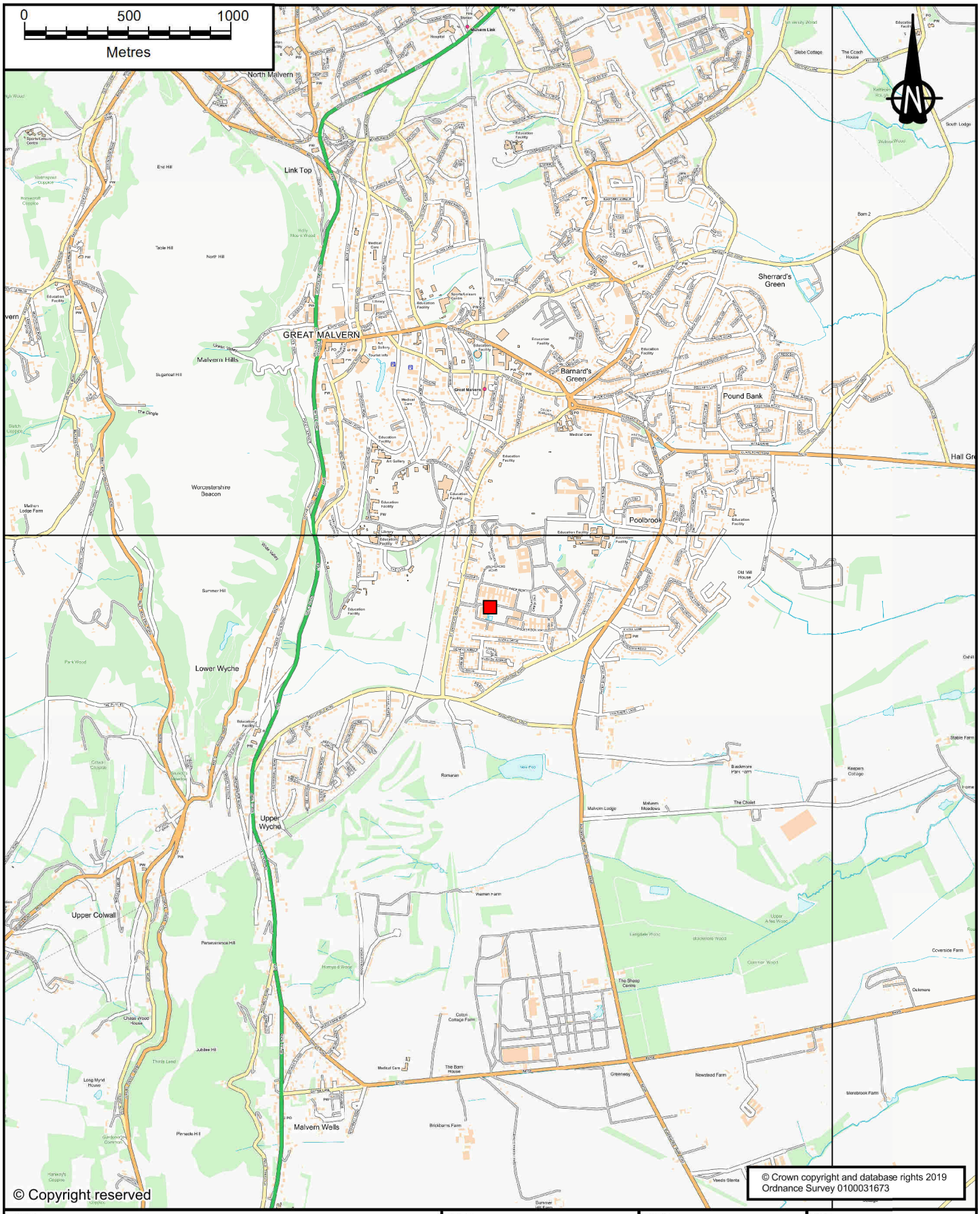
5 REFERENCES

CIfA. (2014) *Standard and guidance for the archaeological investigation and recording of standing buildings or structures, Chartered Institute for Archaeologists, Reading*

Historic England (2016) *Understanding Historic Buildings: A Guide to Good Recording Practice*

Historic England (2015) *Management of Research Projects in the Historic Environment*, Historic England, London

FIGURES



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PROJECT	**DRAWN BY**	**CHECKED BY**	**APPROVED BY**
Malvern Technology Centre	CLD	CM	CM

DRAWING TITLE

Figure 1
Site Location

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Site Boundary

Level 3 Survey

Level 1 Survey

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre

DRAWING TITLE

Figure 2
Recording Levels

DRG No.	REV
BM11422-010	C

DRG SIZE	SCALE	DATE
A3	1:2,250 @ A3	August 2019

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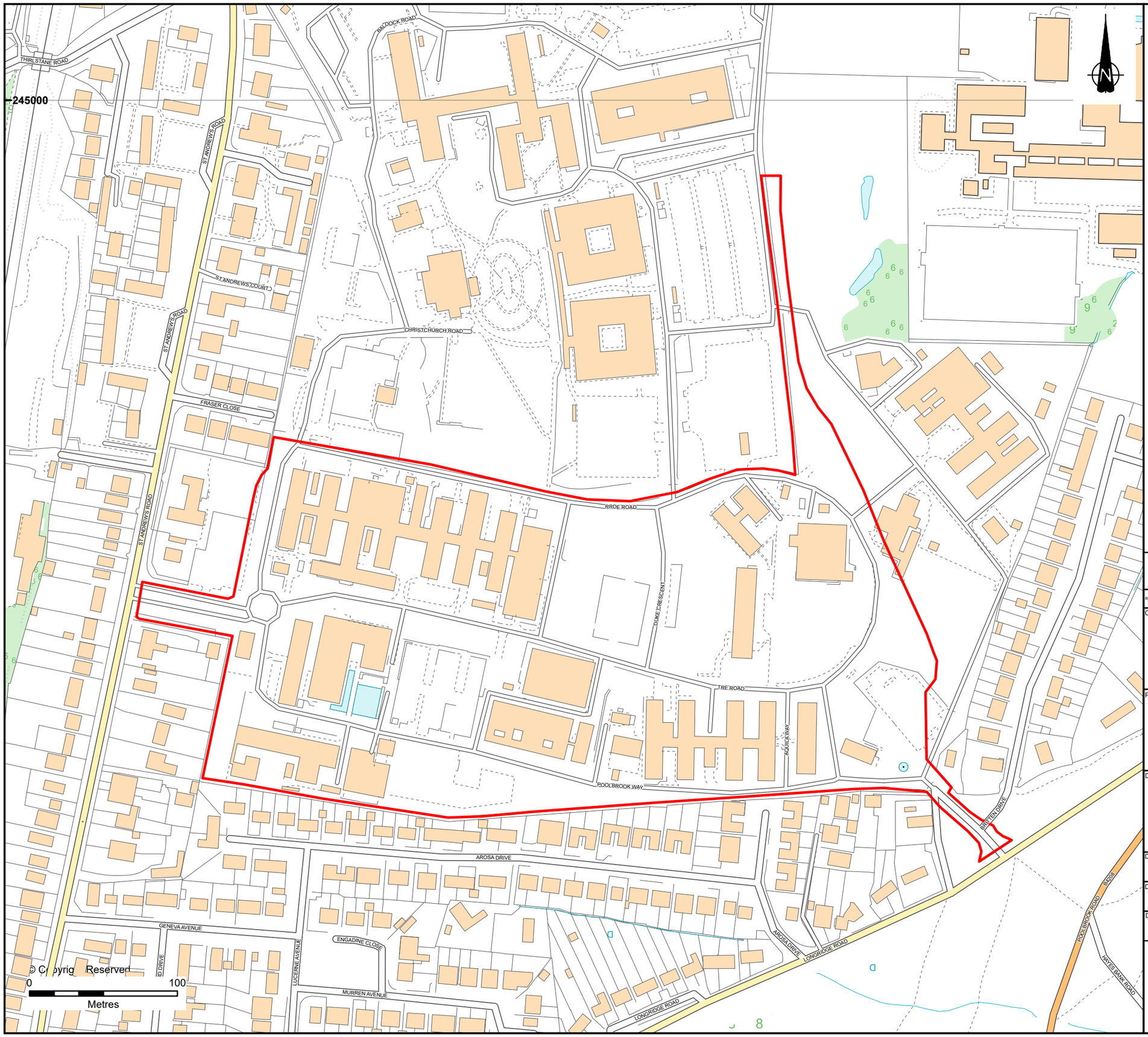

KEY

Site Boundary

Notes:
Coordinates to British National Grid.

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
.	.	.	.	.	.

CLIENT

PERSIMMON HOMES

PROJECT

MALVERN TECHNOLOGY CENTRE
HISTORIC BUILDING RECORDING

DRAWING TITLE

LOCATION PLAN

DRG No.		REV
BM11422-001		P0
DRG SIZE	SCALE	DATE
A3	1:2,500	15/10/2019
DRAWN BY	CHECKED BY	APPROVED BY
JG	LG	CM

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DO NOT SCALE FROM THIS DRAWING

Site Boundary

Level 3 Survey (H Building, Library, Blocks A, D, E & KF

Level 1 Survey (Blocks S & T & Buildings 1-37)

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Building Recording Levels

DRG No.	REV
BM11422-012	B

DRG SIZE	SCALE	DATE
A3	1:2,250@A3	Oct 2019

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N:\WM\BM11422 - MALVERN TECHNOLOGY CENTRE\03 - DESIGN\AUTOCAD\BM11422-012 RECORDING LEVELS.DWG

DO NOT SCALE FROM THIS DRAWING

- Site Boundary
- Pre-WWII buildings
- Buildings erected as part of the HMS Duke Naval Base (1940)
- Buildings present by 1957
- Buildings present by 1963
- Buildings present by the 1967-1973 Ordnance Survey map
- Buildings added between 1974 & 1990
- Buildings added after 1990 (based on planning history)
- Date of origin unknown

NB - This map is based upon available Ordnance Survey mapping and the planning history held by the LPA. Due to the nature of the operation of the site, mapping information and planning history is unlikely to be accurate and some dates of development may therefore be different to those depicted.

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Site Development Plan
(Buildings Extant Sept 2019)

DRG No.	REV
BM11422-013	B

DRG SIZE	SCALE	DATE
A3	1:2,250@A3	Oct 2019

DRAWN BY	CHECKED BY	APPROVED BY
ACH	LG	CM

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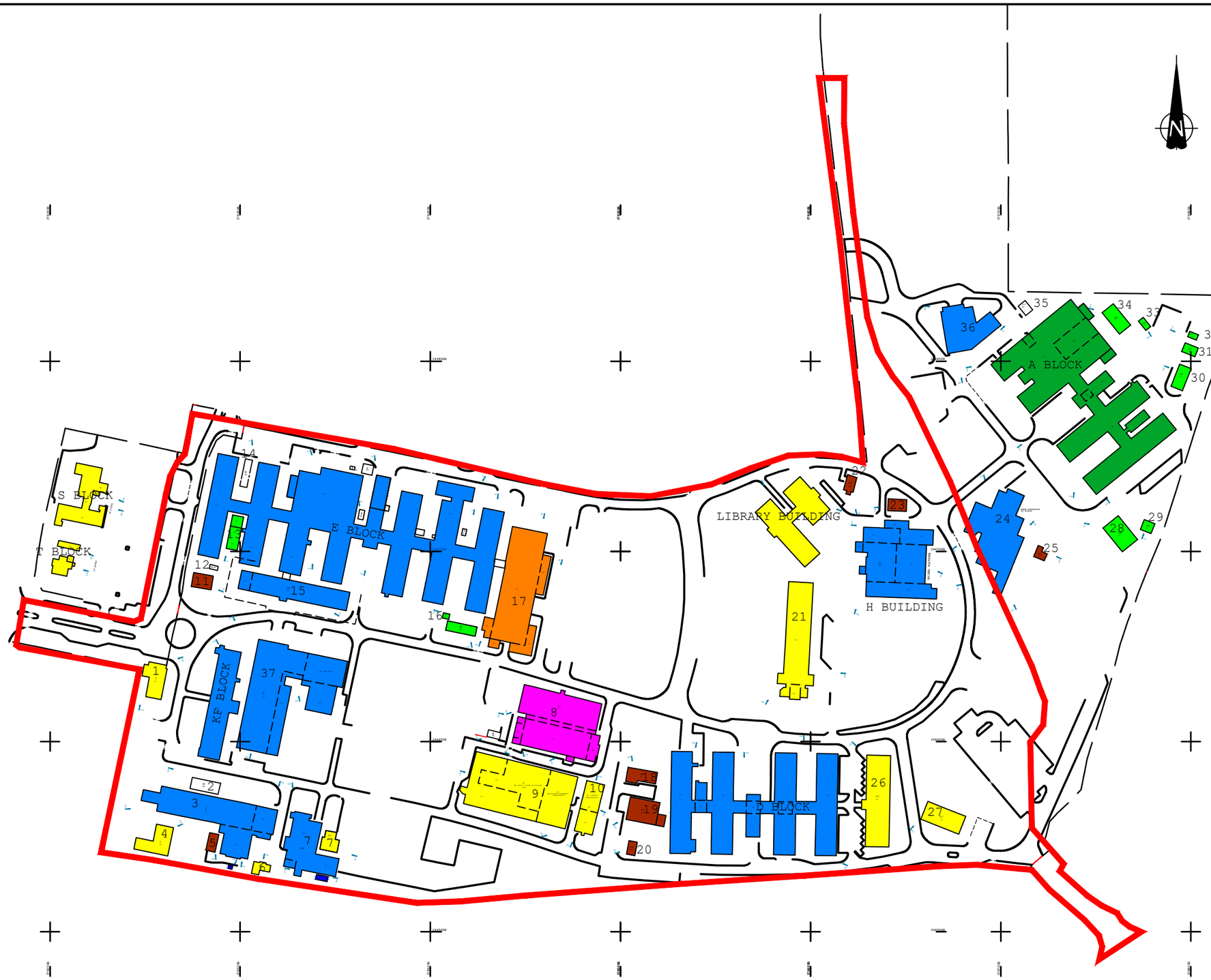
N:\WM\BM11422 - MALVERN TECHNOLOGY CENTRE\03 - DESIGN\AUTOCAD\BM11422-013 SITE DEVELOPMENT PLAN.DWG



DO NOT SCALE FROM THIS DRAWING

- Site Boundary
- Labs & Offices
- Labs
- Labs, Offices & Workshops
- Offices
- Labs & Workshops
- Conferencing
- Ancillary Buildings

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Building Use (As of 2004)

DRG No.	REV
BM11422-014	B

DRG SIZE	SCALE	DATE
A3	1:2,250@A3	Oct 2019

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N:\WM\BM11422 - MALVERN TECHNOLOGY CENTRE\03 - DESIGN\AUTOCAD\BM11422-014 BUILDING USE (AS OF 2004).DWG

DO NOT SCALE FROM THIS DRAWING

- Site Boundary
- Level 1 Survey (Blocks S & T & Buildings 1-37)
- (1) Plate Number
- Photo Direction

S BLOCK
T BLOCK
E BLOCK
KF BLOCK
244600N

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Plate Location Plan
Buildings Subject to Level 1 Recording
Sheet 1

DRG No.	REV
BM11422-016	A

DRG SIZE	SCALE	DATE
A3	1:2,250@A3	Oct 2019

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N:\WM\BM11422 - MALVERN TECHNOLOGY CENTRE\03 - DESIGN\AUTOCAD\BM11422-016 PLATE LOCATION - LEVEL 1.DWG

DO NOT SCALE FROM THIS DRAWING

Site Boundary

Level 1 Survey (Blocks S & T & Buildings 1-37)

1 Plate Number

Photo Direction

LIBRARY BUILDING

H BUILDING

D BLOCK

RAISED PLATFORM

244700N

244600N

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Plate Location Plan
Buildings Subject to Level 1 Recording
Sheet 2

DRG No.	REV
BM11422-016	A

DRG SIZE	SCALE	DATE
A3	1:2,250@A3	Oct 2019

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N:\WM\BM11422 - MALVERN TECHNOLOGY CENTRE\03 - DESIGN\AUTOCAD\BM11422-016 PLATE LOCATION - LEVEL 1.DWG

DO NOT SCALE FROM THIS DRAWING

- Site Boundary
- Level 1 Survey (Blocks S & T & Buildings 1-37)
- (1) Plate Number
- Photo Direction

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Plate Location Plan
Buildings Subject to Level 1 Recording
Sheet 3

DRG No.		REV
BM11422-016		A
DRG SIZE	SCALE	DATE
A3	1:2,250@A3	Oct 2019
DRAWN BY	CHECKED BY	APPROVED BY
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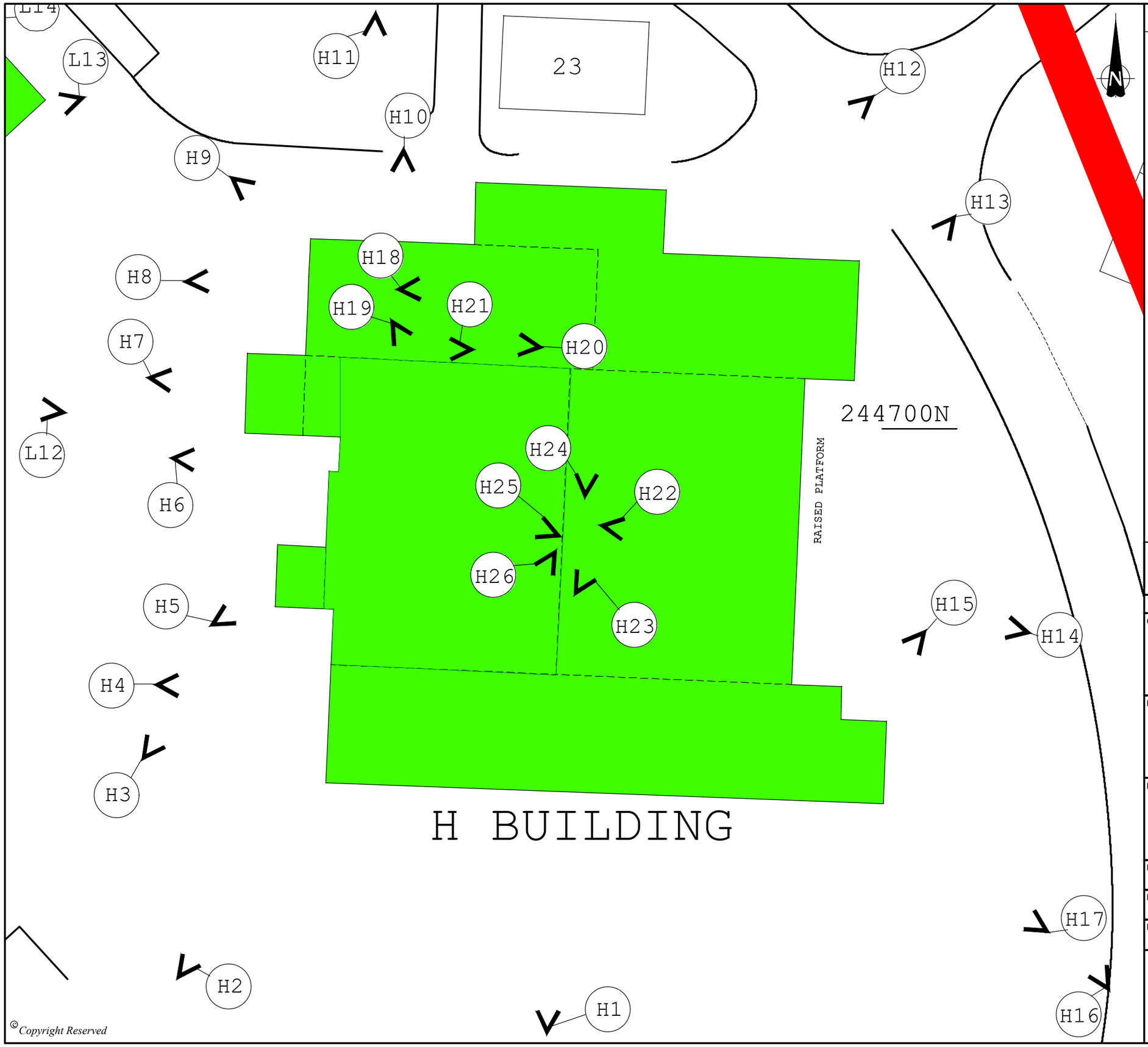

DO NOT SCALE FROM THIS DRAWING

- Site Boundary
- Level 3 Survey
- (1) Plate Number
- Photo Direction

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording:

DRAWING TITLE

Plate Location Plan
Buildings Subject to Level 3 Recording:
H Building

DRG No.	REV
BM11422-017 SH1	A

DRG SIZE	SCALE	DATE
A3	1:250@A3	Oct 2019

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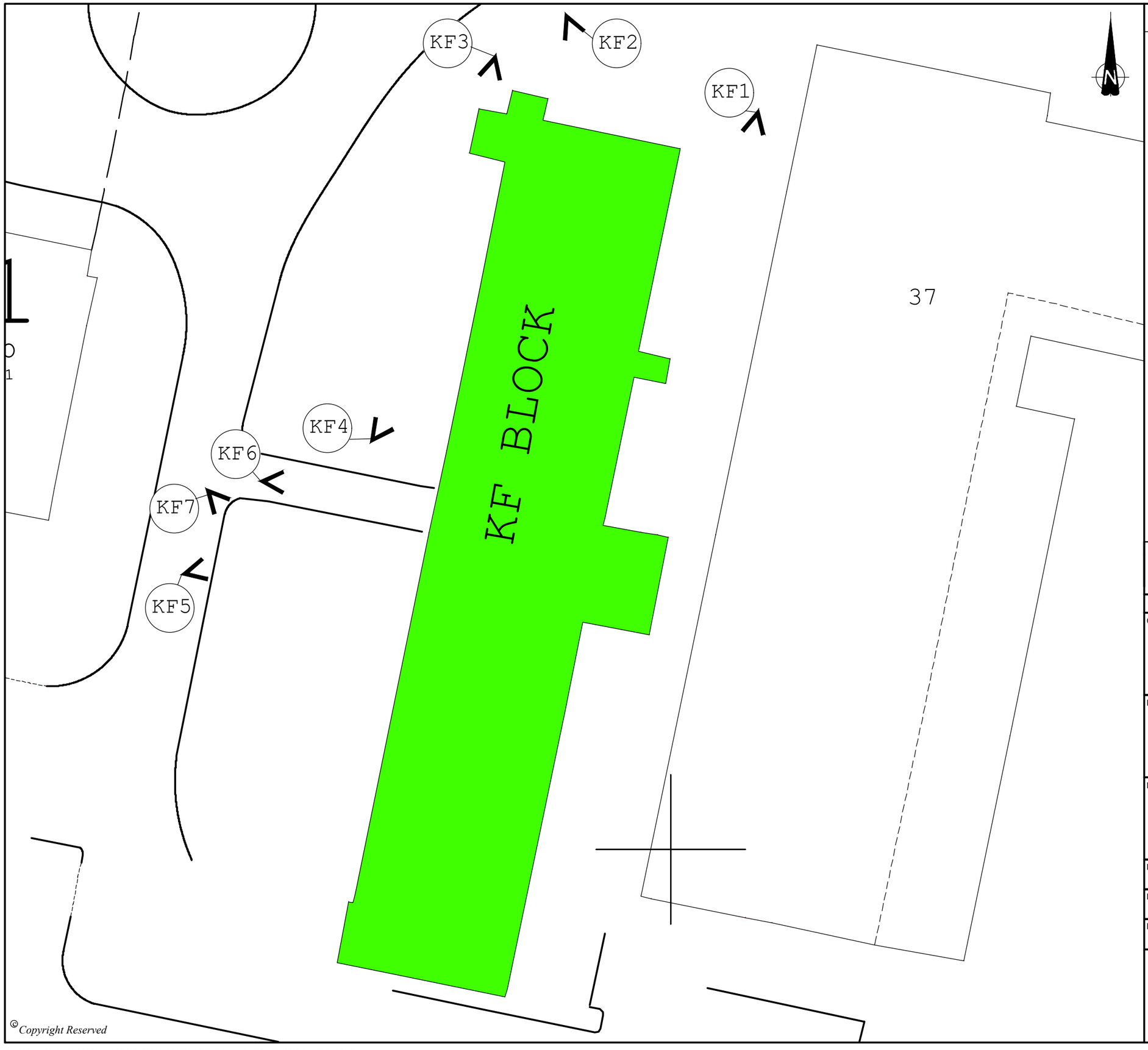

DO NOT SCALE FROM THIS DRAWING

Site Boundary

Level 3 Survey

1 Plate Number

Photo Direction

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Plate Location Plan
Buildings Subject to Level 3 Recording:
KF Block

DRG No.	REV
BM11422-017 SH2	A

DRG SIZE	SCALE	DATE
A3	1:250@A3	Oct 2019

DRAWN BY	CHECKED BY	APPROVED BY
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DO NOT SCALE FROM THIS DRAWING

Site Boundary

Level 3 Survey

1 Plate Number

Photo Direction

E BLOCK

244700N

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16 E17 E18 E19 E20 E21 E22 E23 E24 E25 E26 E27 KF1 KF2 KF3

11 12 13 14 15 16 37 S4 (NH TBC)

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

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PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Plate Location Plan
Buildings Subject to Level 3 Recording:
E Block

DRG No.		REV
BM11422-017 SH3		A
DRG SIZE	SCALE	DATE
A3	1:500@A3	Oct 2019
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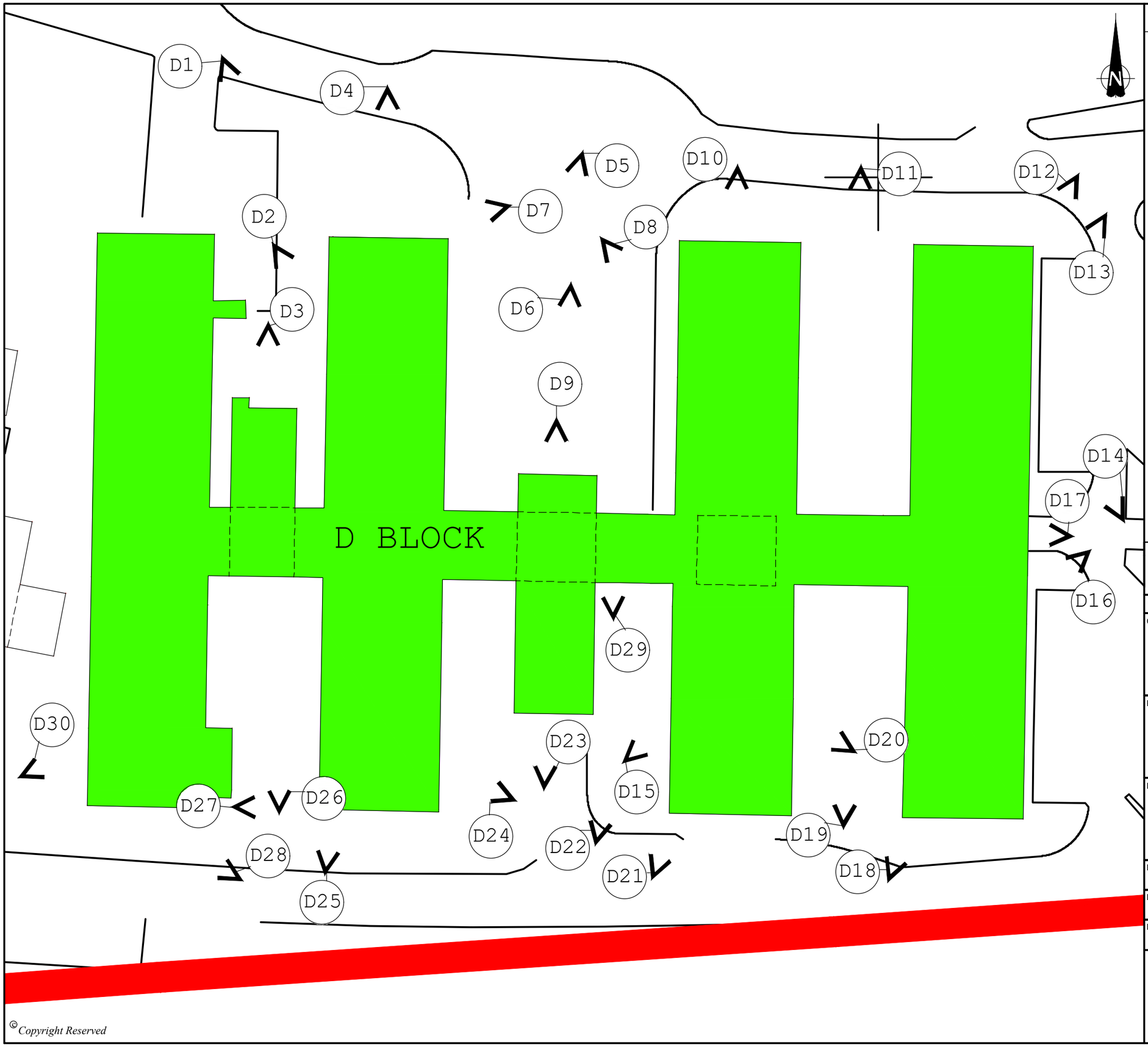

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Site Boundary

Level 3 Survey

1 Plate Number

Photo Direction

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Plate Location Plan
Buildings Subject to Level 3 Recording:
D Block

DRG No.	REV
BM11422-017 SH4	A

DRG SIZE	SCALE	DATE
A3	1:350@A3	Oct 2019

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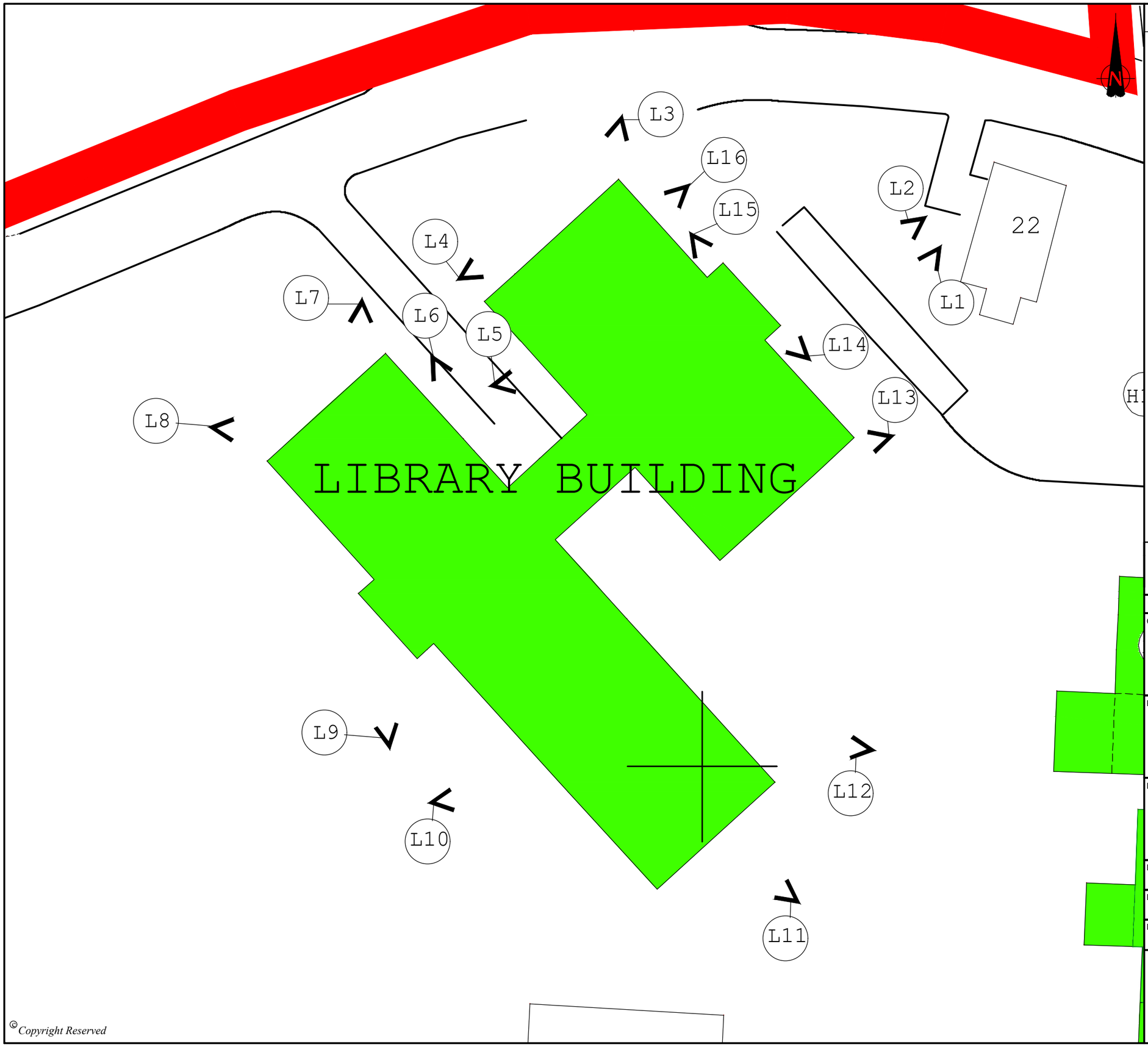

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Site Boundary

Level 3 Survey

1 Plate Number

Photo Direction

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Plate Location Plan
Buildings Subject to Level 3 Recording:
Library Building

DRG No.		REV
BM11422-017 SH5		A
DRG SIZE	SCALE	DATE
A3	1:250@A3	Oct 2019
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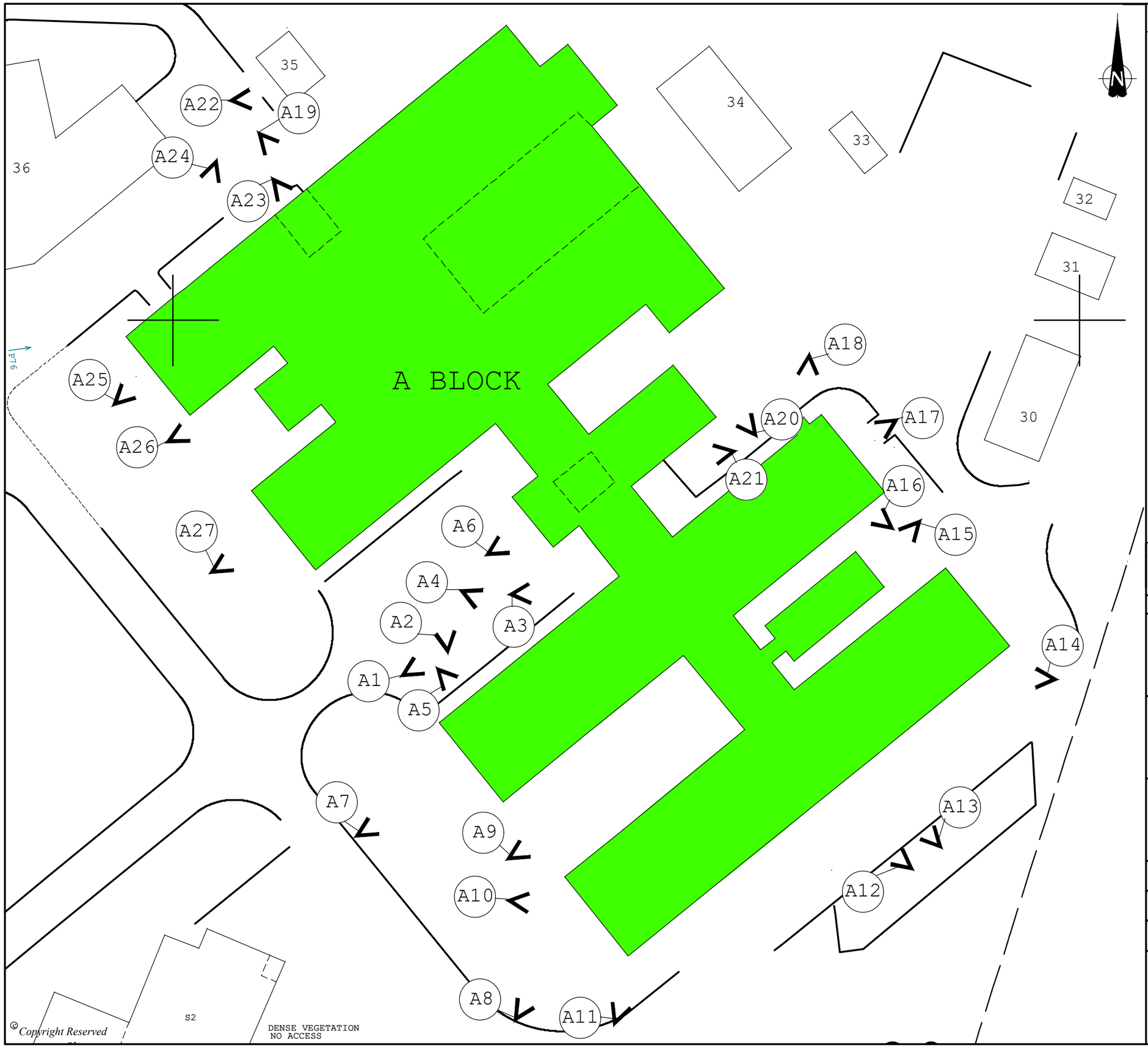

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- Site Boundary
- Level 3 Survey
- (1) Plate Number
- Photo Direction

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

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PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Plate Location Plan
Buildings Subject to Level 3 Recording:
A Block

DRG No.	REV
BM11422-017 SH6	A

DRG SIZE	SCALE	DATE
A3	1:400@A3	Oct 2019

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Site Boundary

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REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Site Plan 1942

DRG No.	REV
BM11422-018	A

DRG SIZE	SCALE	DATE
A3	Not to Scale	Oct 2019

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Site Boundary

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REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

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PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Site Plan 1948

DRG No.	REV
BM11422-019	A

DRG SIZE	SCALE	DATE
A3	Not to Scale	Oct 2019

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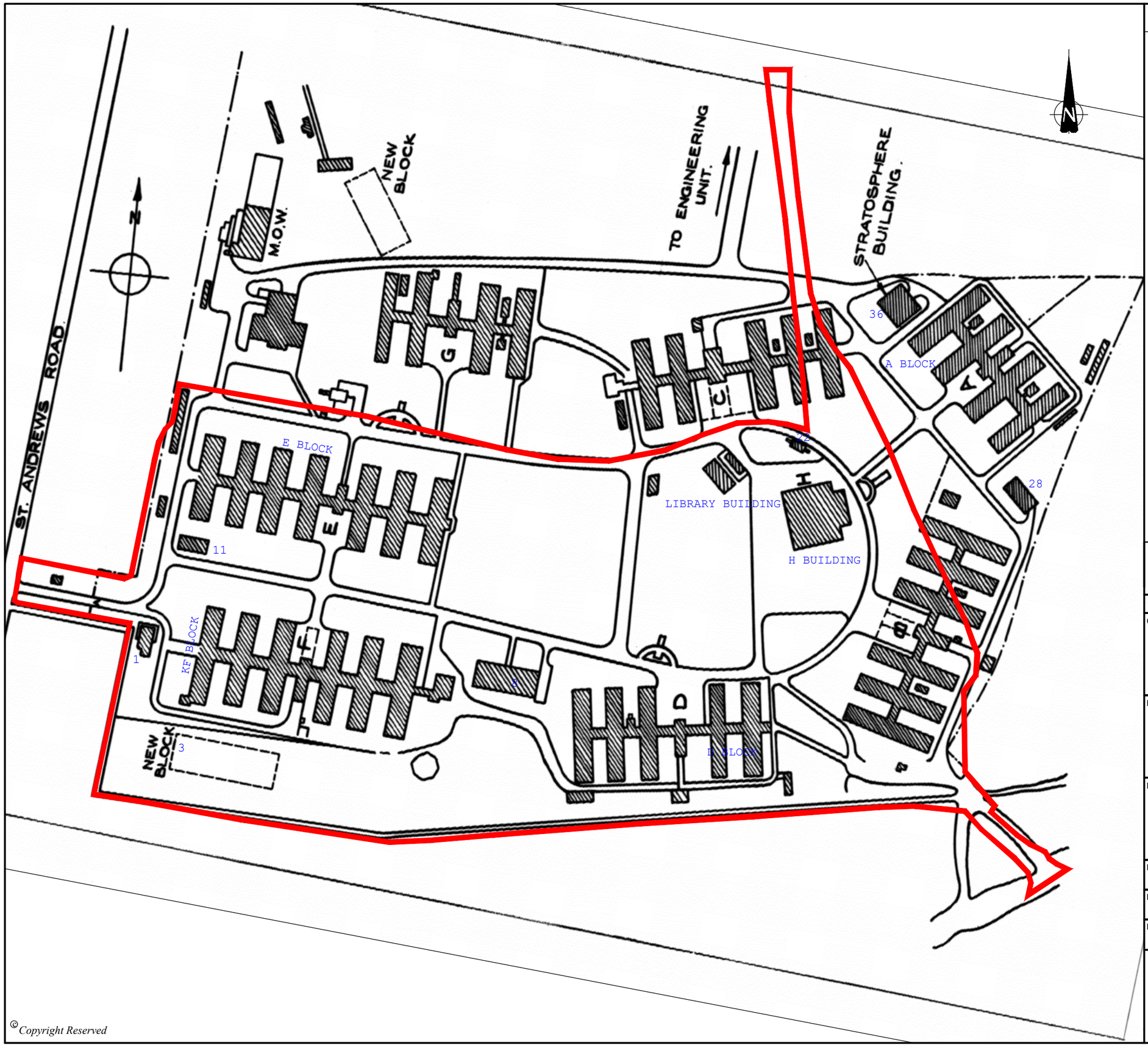

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Site Boundary

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Site Plan 1957

DRG No.	REV
BM11422-020	A

DRG SIZE	SCALE	DATE
A3	Not to Scale	Oct 2019

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Site Boundary

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REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Site Plan 1963

DRG No.	REV
BM11422-021	A

DRG SIZE	SCALE	DATE
A3	Not to Scale	Oct 2019

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Site Boundary

Playing Field

S BLOCK

T BLOCK

E BLOCK

KF BLOCK

LIBRARY BUILDING

Royal Radar Establishment
(ministry of technology)

H BUILDING

D BLOCK

A BLOCK

ARDEA DRIVE

GENEVA AVENUE

LONGRIDGE ROAD

1 3 7 8 9 11 12 18 19 22 23 24 25 28 29 30 35 36 37

8254
0.89ha
22

OS Plan 1:2,500 1967-1973

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Site Plan 1967-1973

DRG No.	REV
BM11422-022	A

DRG SIZE	SCALE	DATE
A3	Not to Scale	Oct 2019

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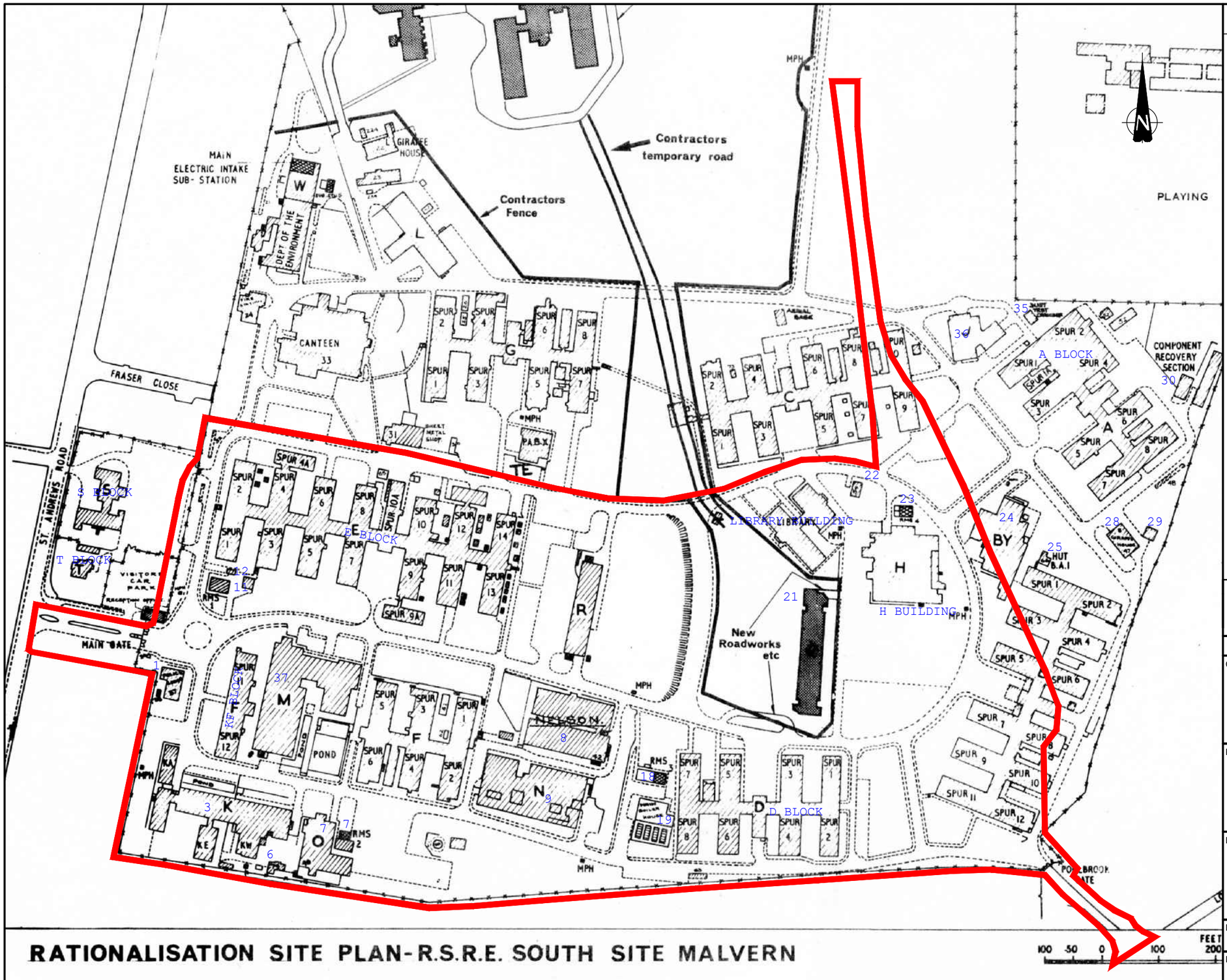

RATIONALISATION SITE PLAN- R.S.R.E. SOUTH SITE MALVERN

DO NOT SCALE FROM THIS DRAWING

Site Boundary

Produced with permission from MRATHS

REVISION	DETAILS	DATE	DRN	CHK'D	APP'D

CLIENT

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PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Site Plan 1977

DRG No.	REV
BM11422-023	A

DRG SIZE	SCALE	DATE
A3	Not to Scale	Oct 2019

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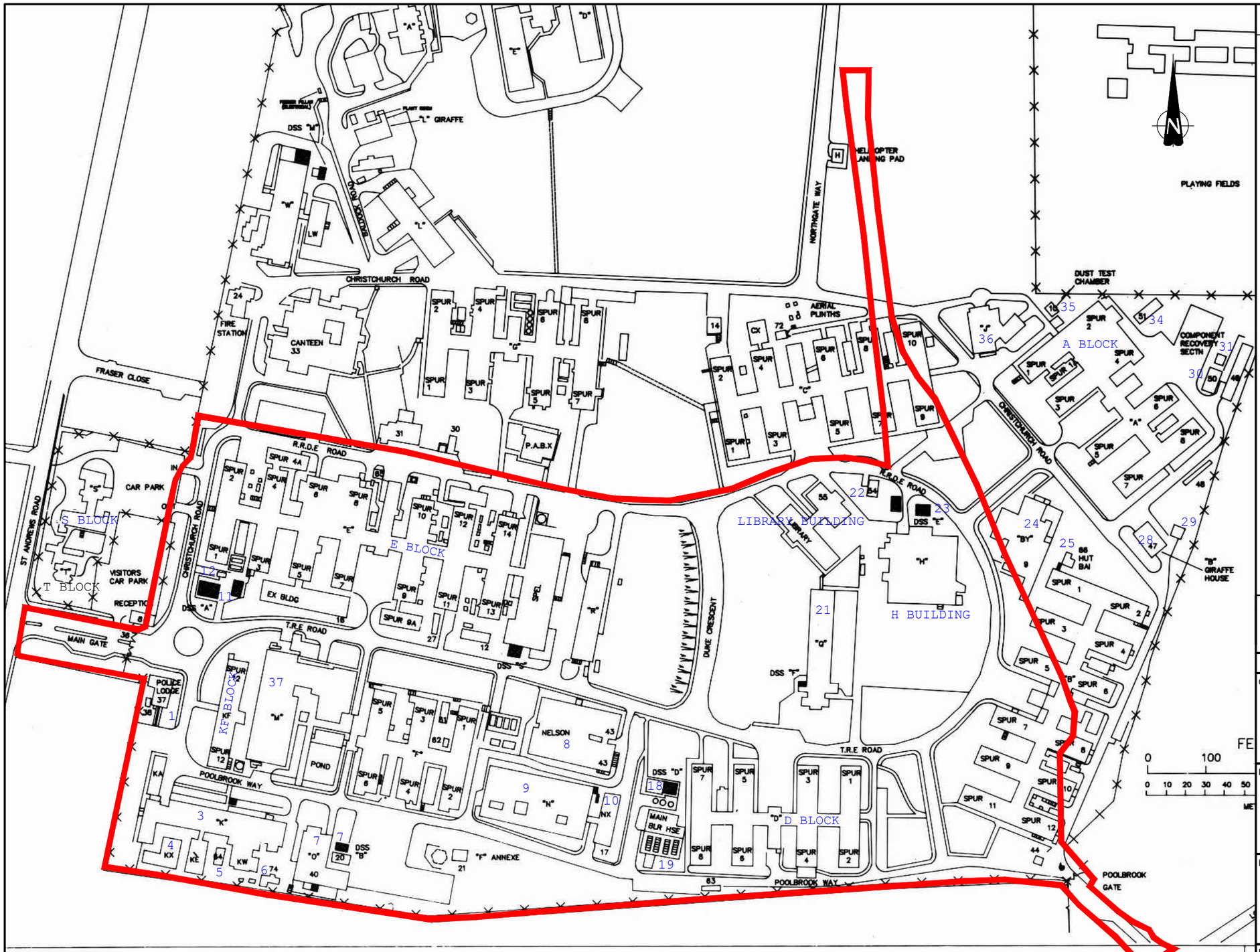

BUILDING LOCATION PLAN SOUTH SITE

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Site Boundary

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REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

Site Plan 1990

DRG No.	REV
BM11422-024	A

DRG SIZE	SCALE	DATE
A3	Not to Scale	Oct 2019

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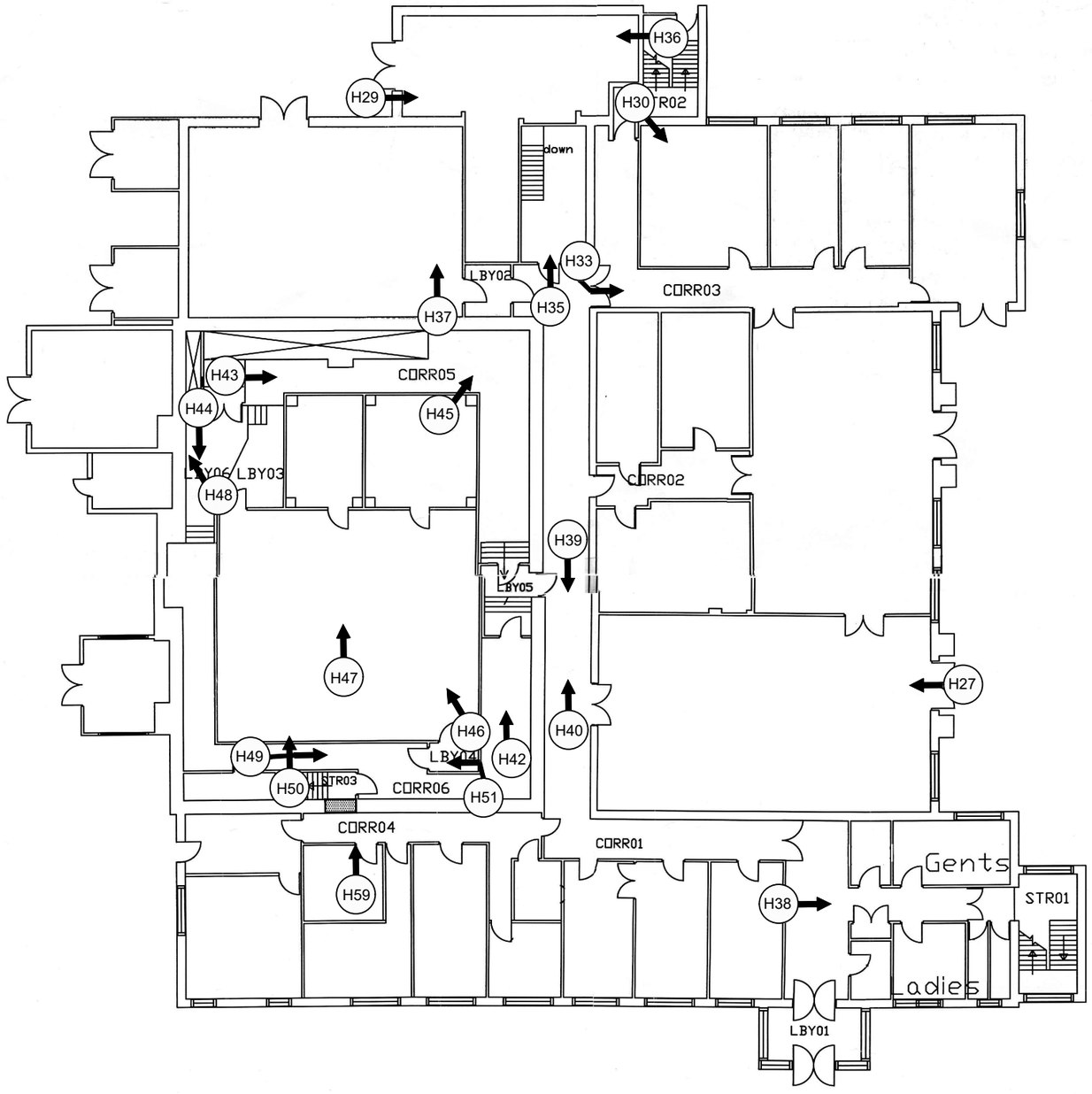

DO NOT SCALE FROM THIS DRAWING

KEY

D42 PLATE NUMBER

PLATE DIRECTION

BLOCKED DOOR

NOTE: Plan based on early 2000s floor plan held within MRATHS archives & site observations (September 2019)

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
A	FIRST ISSUE	23.12.19	JC	LG	CM

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

H Building Ground Floor Plan
Sheet 1 of 3

DRG No.	REV
BM11422-025	A

DRG SIZE	SCALE	DATE
A3	NTS	05/11/19

DRAWN BY	CHECKED BY	APPROVED BY
JC	LG	CM

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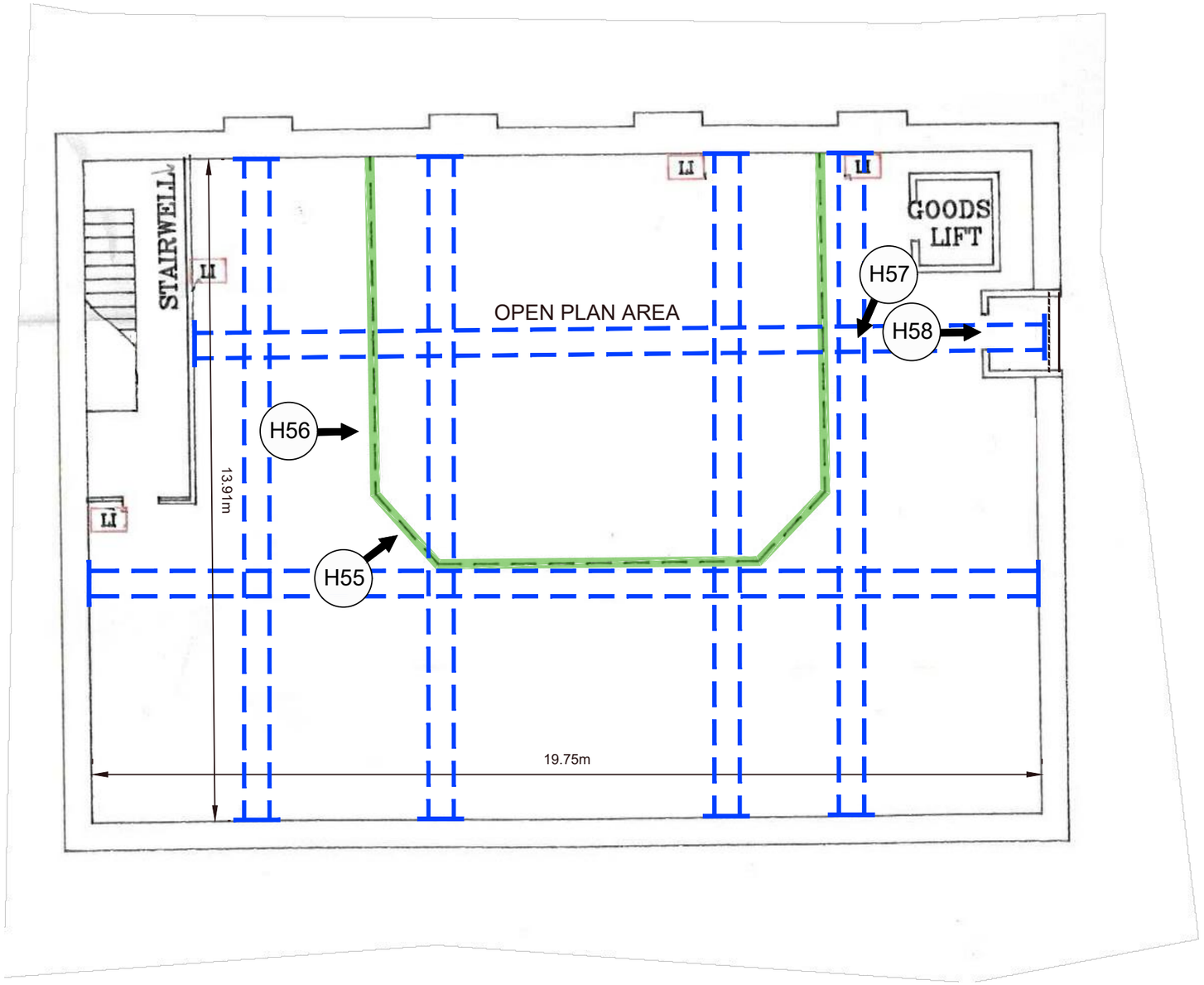

DO NOT SCALE FROM THIS DRAWING

KEY

D42 PLATE NUMBER

PLATE DIRECTION

EXTENT OF MEZZANINE BALCONY

BEAM (METAL) OVER

NOTE: Plan based on early 1990s floor plan found on site & site observations (September 2019)

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Persimmon Homes

PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

H Building - Second Floor & Mezzanine
Plan of Former Bunker Area
Sheet 3 of 3

DRG No.	REV
BM11422-025	A

DRG SIZE	SCALE	DATE
A3	APPROX 10:1	07/11/19

DRAWN BY	CHECKED BY	APPROVED BY
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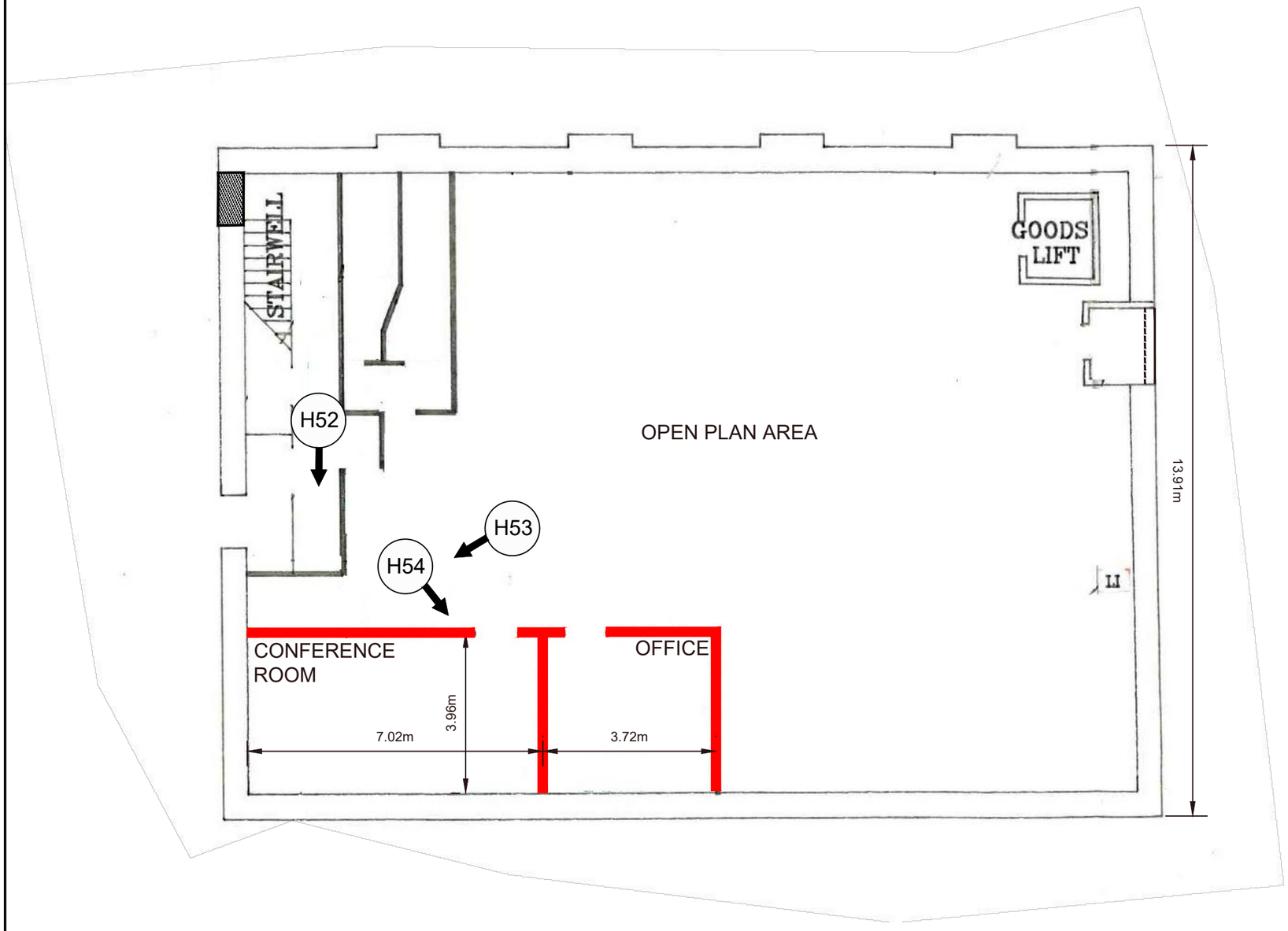

DO NOT SCALE FROM THIS DRAWING

KEY

D42 PLATE NUMBER

PLATE DIRECTION

BLOCKED DOOR

SOUND PROOF WALLS

NOTE: Plan based on early 1990s floor plan found on site & site observations (September 2019)

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
A	FIRST ISSUE	23.12.19	JC	LG	CM

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PROJECT

Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

H Building First Floor Plan of Former Bunker Area
Sheet 2 of 3

DRG No.	REV
BM11422-025	A

DRG SIZE	SCALE	DATE
A3	APPROX 10:1	05/11/19

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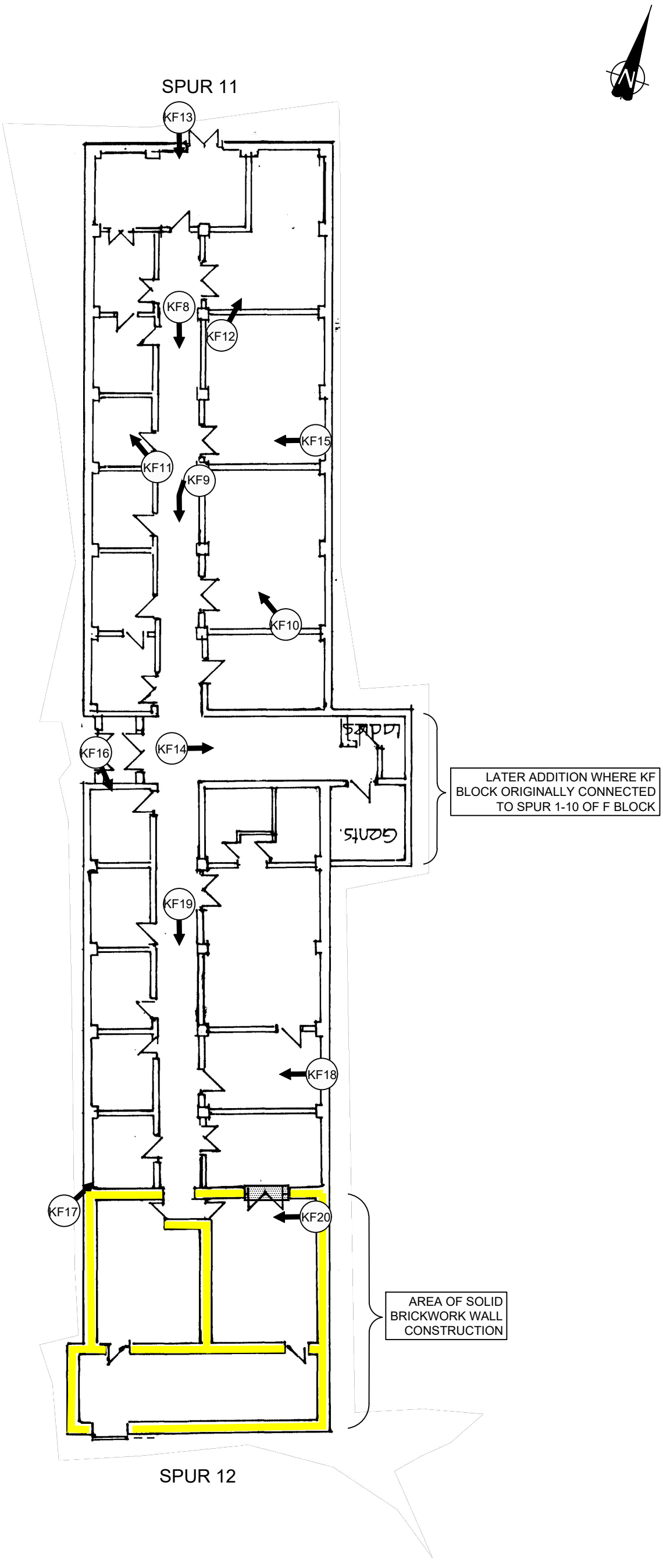
KEY

D42 PLATE NUMBER

PLATE DIRECTION

BLOCKED DOOR

AREA OF SOLID BRICKWORK WALL CONSTRUCTION



NOTE: Plan based on digital copy of 1985 floor plan held within MRATHS archives & site observations (September 2019)

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PROJECT

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Historic Building Recording

DRAWING TITLE

KF Block Floor Plan

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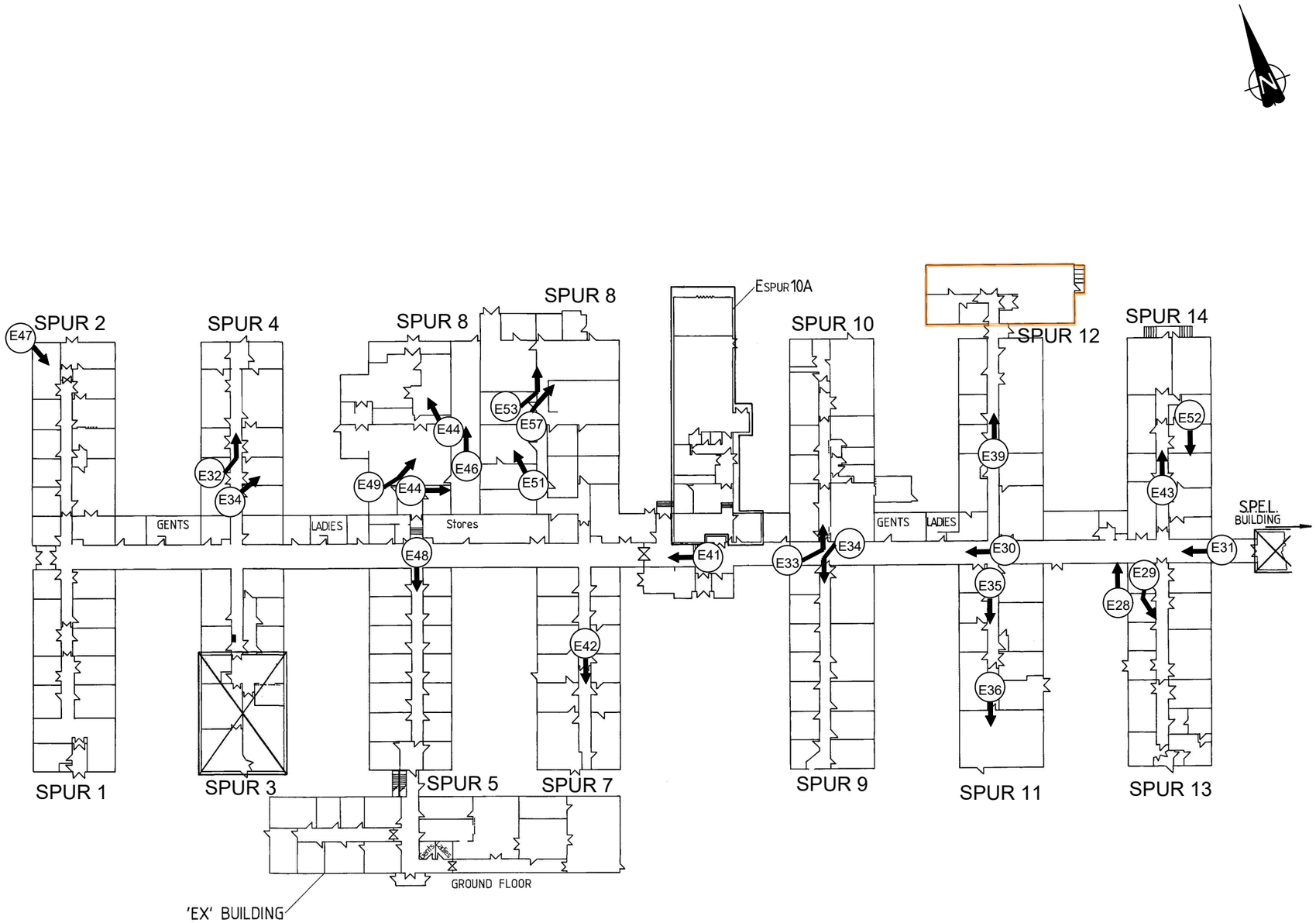

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KEY

(D42) PLATE NUMBER

PLATE DIRECTION

AREA SUBSTANTIALLY DESTROYED BY FIRE

NOTE: Plan based on digital copy of 1991 floor plan held within MRATHS archives & site observations (September 2019)

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Historic Building Recording

DRAWING TITLE

E Block Indicative Floor Plan

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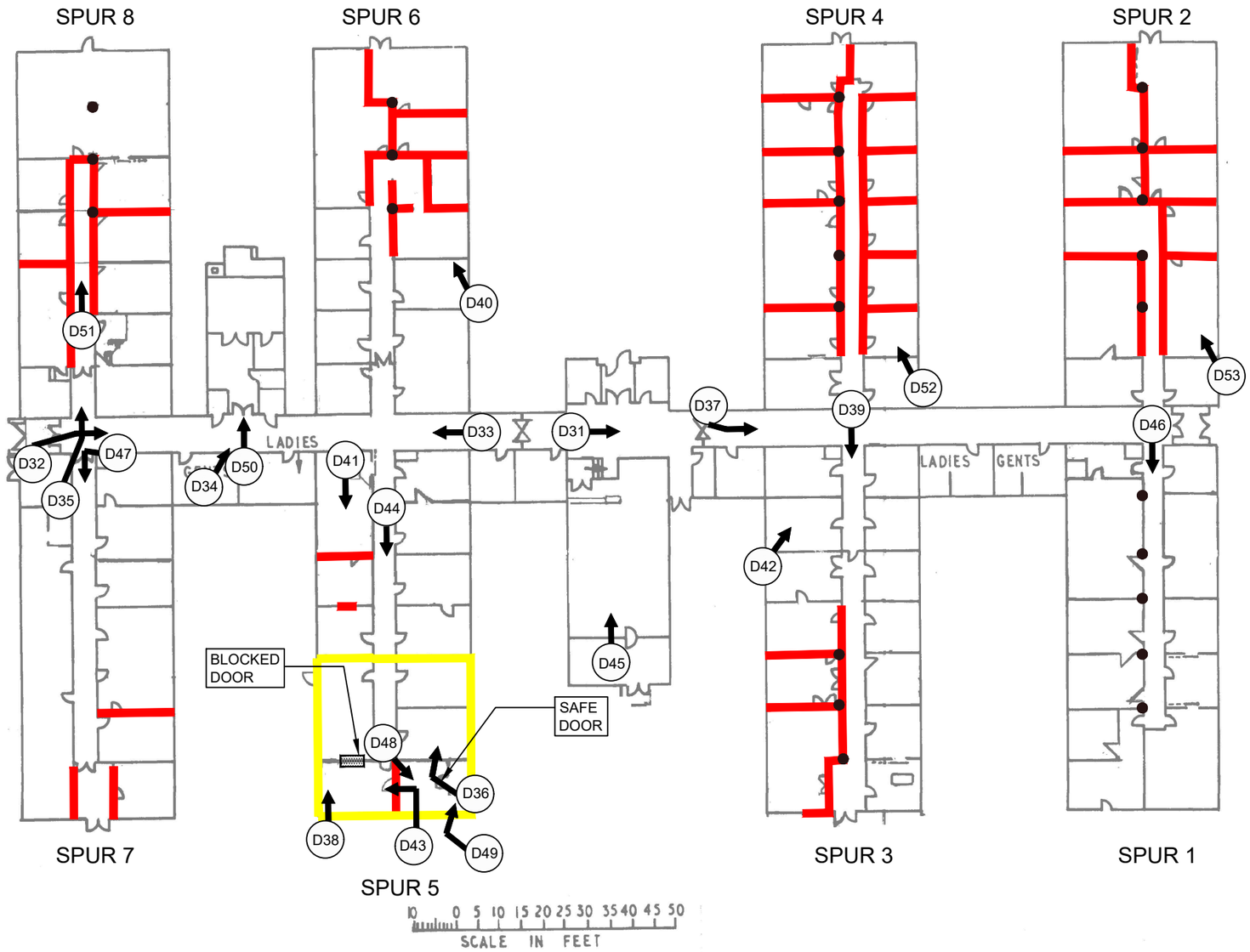

KEY

- REMOVED WALLS
- AREA OF SOLID BRICKWORK WALL CONSTRUCTION
- (D42) PLATE NUMBER
- PLATE DIRECTION
- BRICKWORK COLUMN
- BLOCKED DOOR

NOTE: Plan based on digital copy of 1986 floor plan held within MRATHS archives & site observations (September 2019)

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Malvern Technology Centre
Historic Building Recording

DRAWING TITLE

D Block Indicative Floor Plan

DRG No.	REV
BM11422-028	A

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A3	NTS	05/11/19

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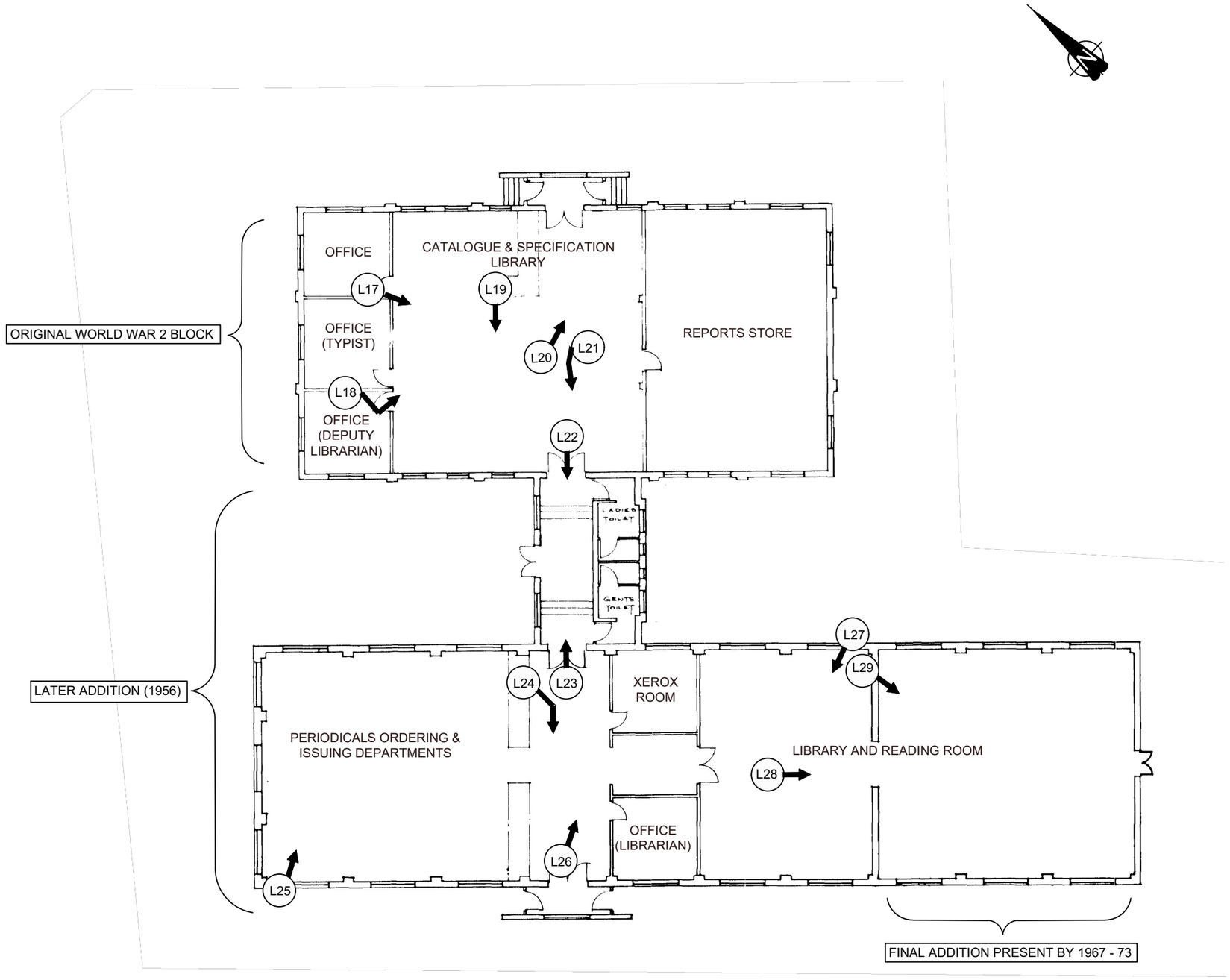
\\WA.LOCAL\PROJECTS\WM\BM11422 - MALVERN TECHNOLOGY CENTRE\03 - DESIGN\AUTOCAD\BM11422-028 D BLOCK INDICATIVE FLOOR PLAN.DWG



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KEY

D42 PLATE NUMBER

PLATE DIRECTION

NOTE: Plan based on digital copy of 1986 floor plan held within MRATHS archives

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Historic Building Recording

DRAWING TITLE

Library Building Indicative Floor Plan

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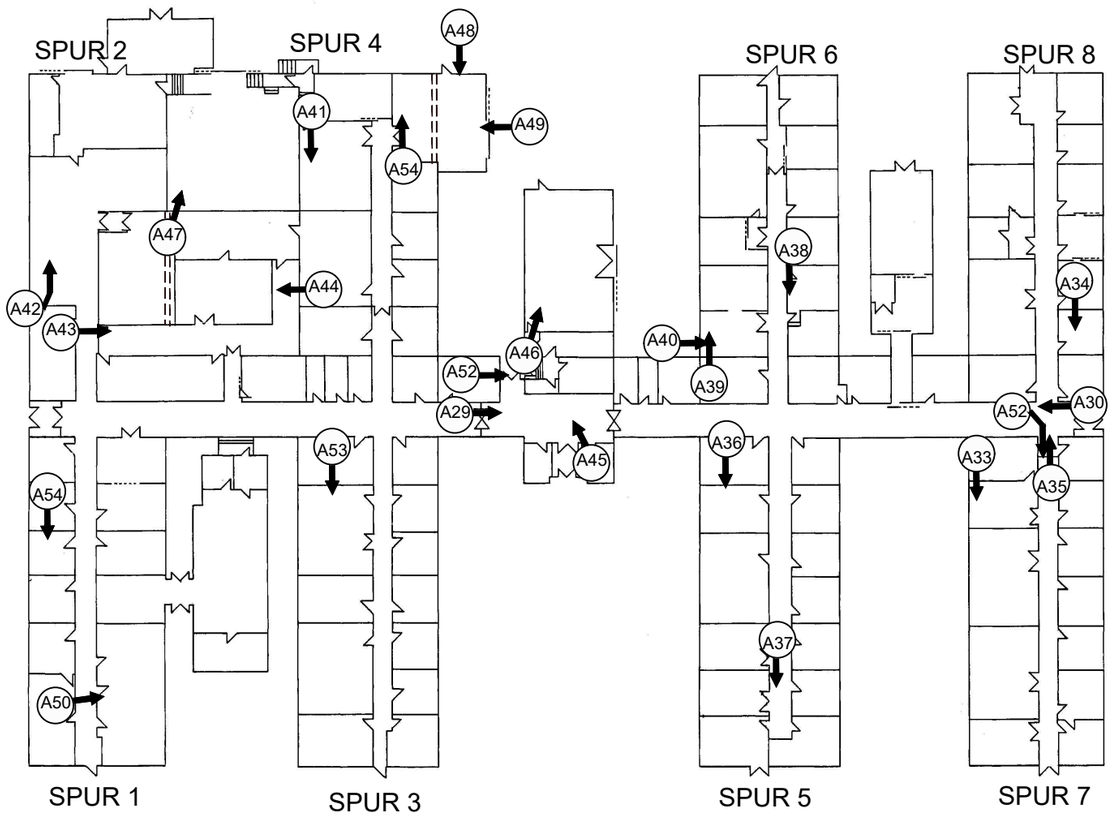

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KEY

D42 PLATE NUMBER

PLATE DIRECTION

FORMER WALL

NOTE: Plan based on digital copy of 1991 floor plan held within MRATHS archives & site observations (September 2019)

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

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Historic Building Recording

DRAWING TITLE

A Block Indicative Floorplan

DRG No.	REV
BM11422-030	A

DRG SIZE	SCALE	DATE
A3	NTS	07/11/19

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