

NORTH HILL, MINEHEAD, SOMERSET

(NGR SS 95391 47712)

Results of historic building recording

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On behalf of:
The Exmoor National Park Authority

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AC archaeology

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Summary

An historic building record of a Second World War Radar Station on North Hill, Minehead, Somerset (SS 95391 47712) was prepared by AC archaeology in July 2013. The survey was commissioned by the Exmoor National Park Authority who are carrying out conservation works and repairs to the surviving building, the transmitter/receiver block.

The station housed an army Coast Defence/Chain Home Low radar. Its operational history is sparse but it was probably constructed in 1942 and may have been decommissioned in 1944, having been transferred for a period to the Royal Air Force. The building was constructed of mass concrete to a standard design. Surviving fittings include the doors, window shutters and some of the internal electrics. Limited evidence for the location of equipment was recorded; however, by comparison with other sites, a conjectural layout has been put forward.

1. INTRODUCTION (Fig. 1)

1.1 This report presents the results of historic building recording carried out on 3 July 2013 by AC archaeology during conservation works to a Second World War radar station at North Hill, Minehead, Somerset (SS 95391 47712; Fig. 1). The building is currently used by the Exmoor National Park Authority (ENPA) as a volunteer store and workshop. The archaeological recording was commissioned by the ENPA during conservation repairs works to the building. These works include the re-laying of the asphalt roof, and repairs and replacement to the doors and window shutters, as well as the clearance of trees from around the building.

1.2 North Hill is situated to the northwest of Minehead and forms the western end of a coastal ridge between Bossington in the west and Minehead in the east. The radar station is situated just off the crest of the ridge on its north side, at a height of approximately 210m aOD, and overlooks the Bristol Channel. The underlying geology is Devonian sandstone of the Hangman Sandstone Formation.

2. HISTORICAL BACKGROUND

2.1 The radar station at North Hill was a Second World War Coastal Defence/Chain Home Low (CD/CHL) establishment. CD and CHL radars were low-looking and army CD radars were 'surface watching'; that is, they were positioned to locate surface shipping. In contrast, the Royal Air Force (RAF) CHL radars were sited to detect low-flying aircraft, but could also identify surface shipping. The CD radar had a maximum range of 25 miles (40km), although in good visibility their range would be reduced to 20,000 yards (18.3km) (Dawson *et al.* 2011, 68). The information from the CD radars would have been passed to an army plotting room, which collated information and passed it to the army, navy and RAF. In the army context information would then have been passed to Coastal Defence gun batteries protecting vulnerable areas of the British coast; in this instance the Bristol Channel. In 1940 it was recommended that the army CD/CHL radars should be passed to the RAF and incorporated into their expanding air-defence radar network, but with stations manned by all three services. This seems to have occurred between the end of 1941 and the late summer of 1943, although it is not clear whether all army and navy stations were actually taken over.

- 2.2** North Hill/Minehead was designated M116, the M prefix referring to a 1.5m wavelength CD/CHL station (Dobinson 2000, 144; *ibid.* 2010, 624). It was in operation by spring 1942; however, there is some discrepancy over the actual date. The English Heritage Pastscape entry (reference 1454868) and Dobinson (2000, 116) give a date of February 1942 and reports that it was manned by 78 COD, whereas Dawson *et al.* (2011, 68) state it was established in May 1942 and was taken over by 558 Regiment Coast Artillery. A chart of 11 December 1942 records that its primary role was anti-shipping (*ibid.* 69). Despite this, it seems to have been taken over by the RAF, although none of the published sources confirms this arrangement. However, it was made redundant sometime between January 1943 and January 1944 when it was transferred to the GHQ Home Forces for Coast Artillery use (Dobinson 2000, 144). This would certainly imply that the station had previously been under RAF control. The station would have worked in conjunction with CD/CHL radars in Swansea and Oxwich in South Wales. These would have overlapped providing full coverage of the entrance to the Bristol Channel (Dawson *et al.* 2011, fig. 5.12). Associated Coastal Defence gun batteries were situated along the Bristol Channel, for example, at Ilfracombe, Minehead, Brean Down, as well as Flat Holm and Steep Holm within the channel itself.
- 2.3** During the Second World War, North Hill was also used as a tank-training area and extensive remains survive to the south and west of the radar station. These include tracks, firing ranges and building foundations (ENPA Historic Environment Record reference MM0627).

3. AIMS

- 3.1** The aims of the work were twofold. Firstly, to prepare a record of the building in its current state, and, as necessary, provide information from the survey to inform the conservation works. Secondly, to use the survey, and if appropriate additional documentary research, to aid interpretation of the building.

4. METHODOLOGY

- 4.1** All works were undertaken in accordance with the Institute for Archaeologists (IfA) *Standard and Guidance for the archaeological investigation and recording of standing buildings or structures* (revised 2008), and with reference to English Heritage's 2006 document *Understanding Historic Buildings: A guide to good recording practice*.
- 4.2** The building was recorded in accordance with AC archaeology's *General Site Recording Manual, Version 2*. A full written description was prepared, as was a 1:50 ground-floor plan that also included its immediate environment. A photographic record was also prepared, and included general views as well as wider views showing the context of the building. It comprised colour digital format only and where appropriate, included a photographic scale. Details of photographs taken were made on *pro forma* record sheets.
- 4.3** No new documentary research has been undertaken. Historical and technical information has been gathered from published sources and online data, as well as from the archive of Mike Passmore of Exeter, collated during his and the author's research into RAF air-defence radar in Devon. It should be noted that the development and use of radar during the war was top secret, and few official photographs were taken. Private photography was strictly forbidden. No contemporary photographs of the interior of an Army CD/CHL station have been

located, and reference is therefore made to the few published photographs of RAF CHL stations. Site visits were made to CD/CHL stations at Swansea (Margam), and Oxwich Bay and Rhossili Bay on the Gower Peninsula in South Wales, and these stations are discussed as comparable sites where necessary. Reference has also been made to an English Heritage survey report of the CD/CHL station at Craster, Northumberland (Hunt and Ainsworth 2006).

5. BUILDING SURVEY

5.1 Site context

The station is located just off the crest of the hill on a north-facing site overlooking the Bristol Channel. Part of the site is situated on unenclosed moorland, whilst some is within former enclosed farmland to the east. The whole area is naturally reverting back to woodland.

The only standing building is the transmitter/receiver block (TxRx); all other buildings were reportedly removed by the 1950s (English Heritage Pastscape reference 1454868). The only other identified former building is a standby-set house – containing a generator for use when electricity from the National Grid was not available. This was situated to the south of the TxRx block, and a building platform, with steps down from a terrace walkway, can be identified within woodland (ENPA HER MM0632). Its footprint cannot be identified due to vegetation but at other CH/CHL sites the receiver blocks are of a standard design, constructed of mass concrete (as per the TxRx block – see below), with a T-shaped plan comprising an engine room and porched entrances leading into a lobby.

The site may also have included some domestic accommodation. It is not recorded whether technical personnel, as well as those guarding the station, lived on site or elsewhere (such as in Minehead); on RAF radar stations both arrangements are recorded. Of the three sites visited in Wales, only one, Rhossili Bay, was provided with on-site accommodation. As a minimum some form of basic accommodation including ablutions and cooking facilities is likely to have been provided. To the east of the standby-set house, within the enclosed land, there is a further terrace with some building debris and a number of metal grills, which may represent the site of a further building.

The site would have been defended and enclosed by a barbed-wire fence. A number of slit trenches are recorded on the ENPA HER (references MSO12601, MSO7606, MSO12488-12492), although at the time of the survey most were obscured by vegetation. A small number of 'pigs tail' barbed wire fence posts have been recovered from the site by the ENPA and members of the public. Interestingly, these are short (at around 430mm long), and must have been used for secondary defence, rather than in the primary perimeter fence.

5.2 The exterior and construction technique

The building is constructed within a terrace dug up to 2m into the hillside (Plate 1). There is a flight of concrete-lined bricks set into the terrace on its southern side. The block is built of mass concrete that was poured within wooden shuttering, laid onto a concrete raft that extends beyond its elevations filling the terrace and creating a walkway. Within the raft is a shallow open drain that empties into gullies situated at the southwest, northeast and northwest corners. The walls incorporate eight integral buttresses – two each on the interior and exterior faces of both the north and south elevations. These supported the aerial array above the roof.

The roof itself is a slab of mass concrete covered with bitumen that has recently been replaced. The aerial array has been removed and only the bolts for supporting its lower structure survive, protruding from the roof (Plate 2). At Swansea, the static lower frame partially survives *in situ* (Plate 3). It is constructed of thin L-shaped steel pieces bolted together forming a truncated pyramid shape. At Rhossili Bay the TxRx block has been deliberately demolished, but a circular metal structure that appears to have been fixed to the lower frame (rather than being part of the upper turning array) survives (Plate 4). Access to the roof would have been via a ladder attached to the west elevation, now removed. The base of the ladder was attached to a three-step mounting block located away from the building. Attachment points for the ladder were observed on the mounting block and the side of the building.

The building is divided into three rooms (from west to east, transmitter room, receiver room and telephone room), and there are double-width doorways in the south elevation into the transmitter room and in the east elevation into the telephone room. These both have steel outward-opening doors; one of each has been replaced as part of the present conservation programme. Above the doors are fittings for small canopies or hoods; this is clearer over the door in the east elevation where there is a scar and four protruding steel rods (Plate 5). These seem to represent attachments for a separate canopy, whereas at Oxwich Bay and Swansea shallow integral hoods were provided to deflect water away from the doors (Plate 6). As part of the post-war use of the building by the ENPA the openings have been narrowed using concrete blocks to accommodate standard-sized doors.

Natural light is provided by a series of high level windows; two in the south elevation lighting the receiver and telephone rooms, one in the east elevation lighting the telephone room, four in the north elevation lighting all three rooms, and one in the west elevation lighting the transmitter room. The present windows are post-war replacements comprising five metal security bars set into a wooden frame with leaded glass attached to the inner side of the frames. There is no evidence for the original fittings. However, at Oxwich Bay, some primary fittings survive and consist of metal frames holding a pair of top-opening two-over-two pane windows (Plate 7). Internally, the window opening incorporated pairs of steel security shutters, although at the time of the survey some had been removed for refurbishment and replacement. Each pair could be fixed in the closed position using vertical bolts on one shutter that slid into the window sill and a rotating latch on the other shutter. They could be secured in the open position using hooks attached to the wall; only one of the latter survives (Plate 8), although several brackets remain.

At other CD stations there is a viewing step situated below one of the windows; the position varies depending on the topography and orientation towards the coast. None is present at North Hill, which may indicate that equipment was situated against the walls where the windows overlook the coast.

Incorporated into the north, east and west elevations below the ceiling are open vents. Curiously, these are Y-shaped, rather than providing a direct flow through the wall. This must have been designed to restrict the flow of wind-blown particles into the building. On their exterior, the vents retain the frames of a grill.

5.3 The interior

The three rooms are connected by doorways adjacent to the south elevation; they display scars of removed door frames. There are also wooden fittings above the

eastern door. These may have been for a sliding curtain or a sliding door as at Swansea where there are metal brackets for the latter.

The floor is mass concrete and incorporates rows of wooden battens (not shown on Fig. 2) for the attachment of wooden floorboards and a linoleum floor (cf Hunt and Ainsworth 2006, 21-22). The floor also incorporates two groups of cable ducts, of different widths, now infilled with concrete (Plate 9). These conform to a standard layout as recorded at Craster (*ibid.*, 21, Fig. 9) and visible at Swansea.

Electrical power entered the building from the northeast corner of the telephone room where there are the remains of five cable ducts (Plate 10). Some of these are, however, likely to be for phone cables. Cable ducts are incorporated into all the walls and where necessary into the ceiling, and terminate in metal plug socket boxes. A single possible light fitting survives in the telephone room.

There is limited evidence for the original finish. The lower two-thirds of the walls seem to have been painted green over a red undercoat, and later whitewashed. At Oxwich, the interior has an orange-cream undercoat with a lower band of dark green paint, the remainder being a lighter green colour.

The centre of the aerial array was located over the dividing wall between the transmitter and receiver rooms. Here the wall has a hole for the turning mechanism above which is a circular opening in the ceiling. Transmitting and receiving cables to/from the aerial pass through crude cut-out channels in the dividing wall, and ducts partially survive below the ceiling. Fittings associated with the running gear are attached to the ceiling and comprise two rows of three nuts and bolts as well as two nuts and bolts and a C-shaped bracket in the transmitter room (Plate 11) and two rows of two nuts and bolts as well as two nuts and bolts and a C-shaped bracket in the receiver room (Plate 12).

The transmitter room

In addition to the fittings described above there are a few other features in this room. In the east elevation a pipe (?cable duct) passes through the wall at ground level. In the northeast corner is a small concrete plinth with four protruding holding-down bolts for a piece of equipment.

The receiver room

There are fittings for a shelf attached to the south wall between the buttress and the doorway into the transmitter room (Plate 13). Below this is a cable duct that may be associated with the former equipment on the shelf.

The telephone room

In the floor adjacent to both doorways are slight recesses finished in smooth concrete; one contains two iron fixings. Their function is unknown. There are fixtures for a shelf in the southeast corner.

6. COMMENTS (Fig. 3)

- 6.1** The recorded TxRx block at North Hill, Minehead forms part of an army CD/CHL radar station associated with the defence of the Bristol Channel during the early years of the Second World War. The layout of the block conforms to the standard pattern. In researching these buildings the author has noted very few differences in layout, the only major feature being the provision of a viewing step under one of the

windows. The position of this step depends on the topographic location of the block. Unusually, no such stepping block is present (or survives) at North Hill.

6.2 The block would have formed part of a larger complex of structures, although these are known to vary from site to site, and in layout depending on the topography. At North Hill, the only additional positively identified building is the standby-set house, which was located to the south of the TxRx block. Possible 'domestic' buildings or structures may however have been provided to the east of this building. The distribution of the associated defensive slit trenches (as recorded on the HER) would appear to indicate that the site did not contain many further buildings, and that the main sleeping accommodation was further away (either in the tank-training area or in Minehead itself).

6.3 Internal layout (Fig. 3)

Other than having three rooms – the transmitter room, the receiver room and the telephone room – there is little evidence for the internal layout of furniture and equipment. The following is an attempt to recreate the layout based on the evidence at various stations (including positions of scars and of former electrical ducts and sockets). Given the positions of the viewing steps vary from site to site, it is clear that some pieces of equipment could be located in various parts of the relevant room as required. The change from army to RAF control may also have involved an increase in the number of reporting positions and associated personnel. However, most of the electrical fittings at Minehead have been observed in the same positions at other stations. It is clear that much of the larger equipment was self-contained and may have been bolted to the now-removed floor, whilst smaller electrical and communication fittings were attached to racking or the walls.

Transmitter room

This room would have housed the transmitting equipment as well as the motor for turning the aerial array. The latter is likely to have been located on the plinth in the northeast corner of the room and connected (?via a belt drive) to an axle and gears attached to the ceiling.

A photograph of an RAF CHL transmitter room (TNA AIR 10/4152) shows three main pieces of equipment including the transmitter. All three would fit into the CD/CHL transmitter room but in different positions to those in the photograph.

Receiver room

The only positively-identified location for equipment was on a shelf attached to the south wall. A photograph (TNA AIR 10/4152; Bragg 2002, Plate XXV) of a twin watch CHL transmitter room at an RAF station (rather than a former army CD/CHL station) shows receiving equipment comprising plan position indicator and range consoles, a freestanding air-plotting board (the corresponding naval board is out of shot), and a desk with WRAF and WRNS wireless operators. Electrical and communications equipment along with a fold-up desk are attached to the walls. Further photographs reproduced on the *A History of RAF Saxavord* blog show a plotting board positioned behind the plan position indicator and range consoles. In the background there is further equipment, some freestanding boxes, others attached to frames or shelves.

At Oxwich, there are fixtures for small electrical boxes attached to the partition walls. There is a further scar on one partition wall, although what this represents is unclear. It is angled at a shallow pitch, but seems too large to represent a "fixed" plotting board of the type seen as freestanding in historic photographs.

At Minehead, the plan position indicator and range consoles were probably positioned adjacent to the west wall close to where cables came into the building from the aerial above. The shelf attached to the south wall may have supported communication equipment. Further devices are likely to have been attached to the north wall.

Telephone room

In this room at Minehead there is evidence for a shelf in the southern corner. At Craster and Oxwich there are fittings on the walls in front and to the right of the external door (Minehead's north and west walls). It is not clear how this room operated. At Craster, the surveyors described the room as being where plots would have been telephoned to the sector control. However, the photograph of the RAF CHL station appears to show this process taking place within the receiver room. As a minimum the room may have contained the telephone equipment and perhaps an operator, as well as any electrical equipment (such as fuses boxes) associated with the incoming electrical supply. The room may also have been used for general admin and storage.

7. ARCHIVE AND OASIS ENTRY

7.1 The site archive is currently held at AC archaeology's offices 4 Halthaies workshops, Bradninch, Exeter EX5 4LQ, and will be deposited under an accession number at the Somerset Heritage Centre within one year of completion of the entire project.

7.2 An entry onto the OASIS (Online AccesS to the Index of Archaeological investigationS) database has been created using the identifier 159778.

8. ACKNOWLEDGEMENTS

8.1 This report was commissioned by the ENPA, and was managed for them by Rob Wilson-North. The project was managed for AC archaeology by Andrew Passmore. The recording was carried out by Andrew Passmore and Stella de-Villiers. The report was written by Andrew Passmore with the illustrations prepared by Elisabeth Patkai. Thanks are due to Rob Wilson-North and Patrick Watts-Mabbott for facilitating access and providing details on the recent use of the building and the current conservation programme. Documentary material was kindly provided from the archive of Mike Passmore.

9. SOURCES CONSULTED

The National Archives, Kew

AIR 10/4152 Air Publication No SD 0458 *Photographic Record of Radar Stations (Ground)*, Air Ministry 1943

Bragg, M., 2002, *RDF1: The location of aircraft by radio methods 1935 – 1945* (Hawkhead Publishing).

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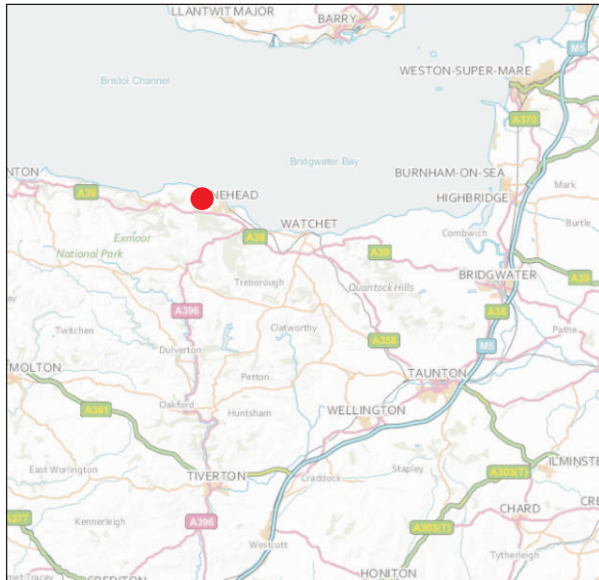
Hunt, A., and Ainsworth, S., 2006, *Craster, Northumberland: An archaeological investigation of a World War II radar station complex*, English Heritage Research Department Report Series No. **43/2006**.

A History of RAF Saxavord blog

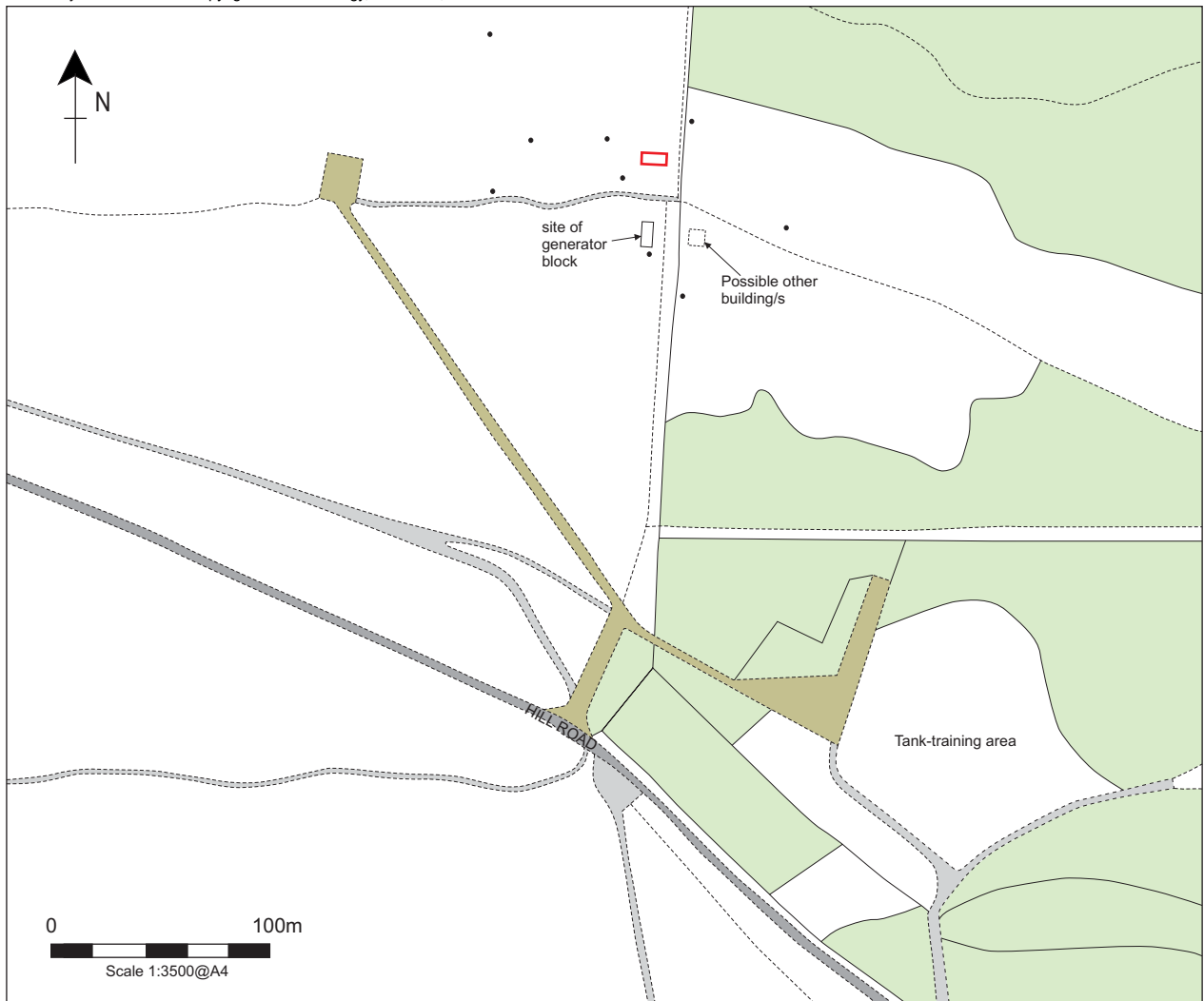
http://ahistoryofrafsaxavord.blogspot.co.uk/2012_07_02_archive.html



English Heritage Pastscape website

www.pastscape.org.uk



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-  Transmitter/receiver block
-  Slit trenches
(group locations from HER entries)

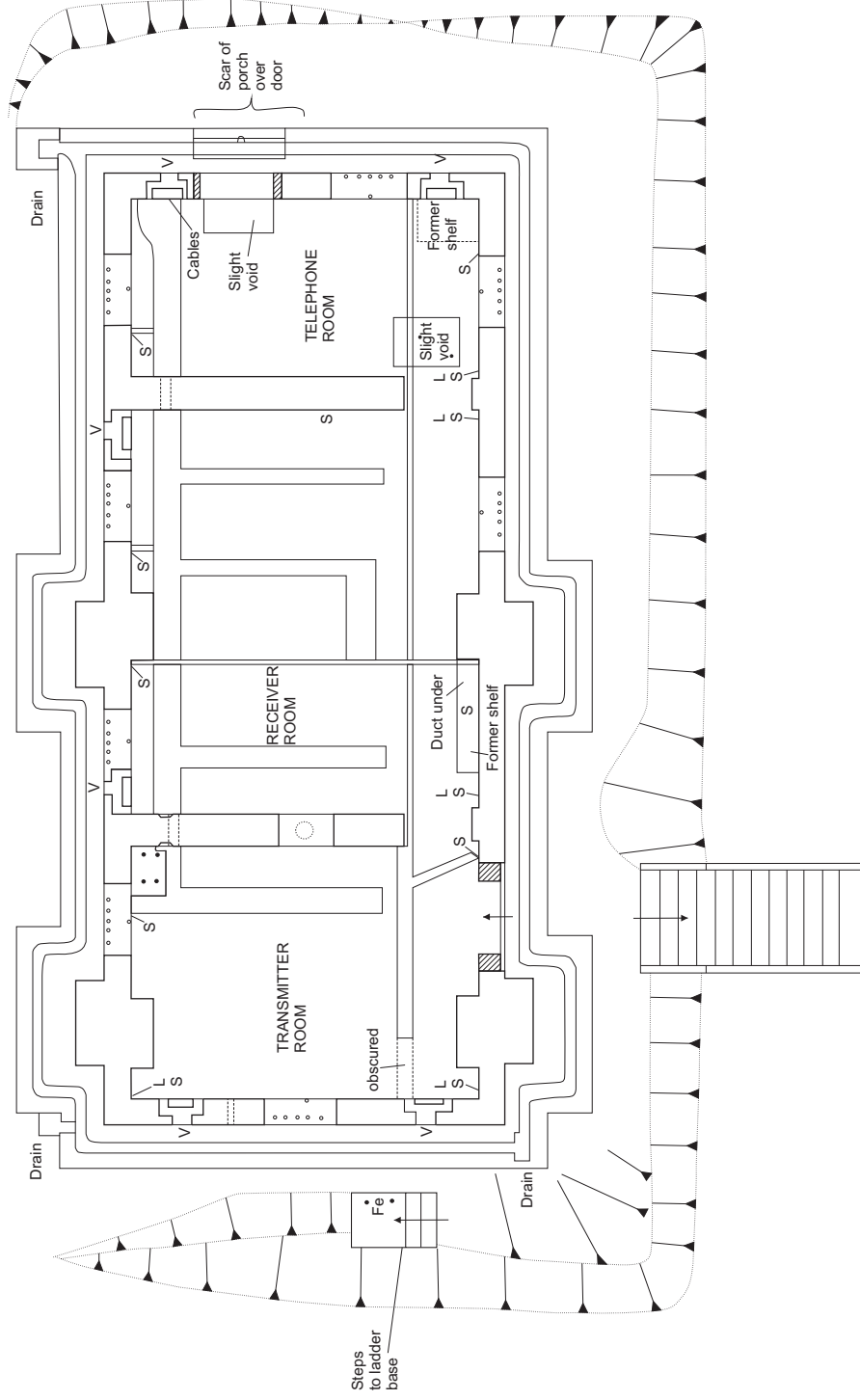
PROJECT

North Hill, Minehead, Somerset

TITLE

Fig. 1: Location of site

- WWII building
- ▨ Modern alterations
- ◻ Infilled cable duct
- V Vent
- L Light switch socket
- S Socket



0 5m

Scale 1:100@A4

PROJECT

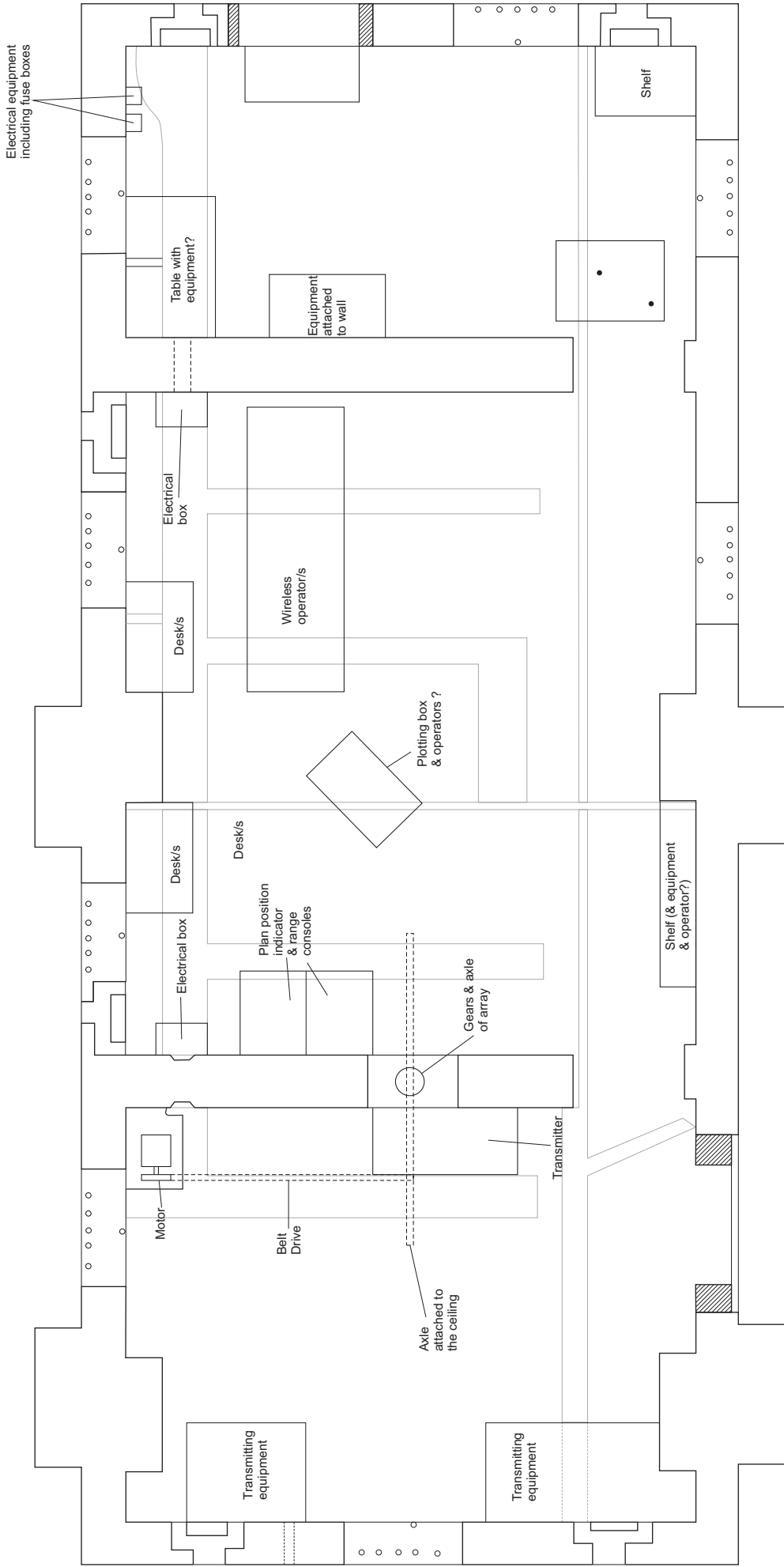
North Hill, Minehead,
Somerset

TITLE

Fig. 2: Plan of the
transmitter/receiver block



ACI archaeology



PROJECT
**North Hill, Minehead,
 Somerset**

TITLE
**Fig. 3: Conjectural
 layout the transmitter/
 receiver block**



Scale 1:50@A4



Plate 1: View of the TxRx block from the southwest, showing the building terrace with steps leading to the main entrance. 1m scale.



Plate 2: The roof showing the bolts for the aerial array's lower frame, viewed from the southwest.



Plate 3: The aerial array at Swansea, viewed from the northwest.
Photo: Andrew Passmore.



Plate 4: Part of the aerial array frame at Rhossili Bay, viewed from the south. Photo: Andrew Passmore



Plate 5: The doors in the eastern elevation showing the evidence for the hood above, viewed from the east. 1m scale.



Plate 6: A doorway at Oxwich Bay showing the concrete hood, viewed from the southeast. Photo: Andrew Passmore.



Plate 7: An original window frame at Oxwich Bay, viewed from the southeast. Photo: Andrew Passmore



Plate 8: A securing hook for a window shutter, viewed from the south.



Plate 9: The floor of the receiver room showing the battens for the floor joists and infilled cable ducts, viewed from the east. 1m scale.



Plate 10: The ducts in the telephone room, viewed from the southwest.



Plate 11: The fixings on the ceiling of the transmitter room for the aerial array turning gear, viewed from the southwest.



Plate 12: The fixings on the ceiling of the receiver room for the aerial array turning gear, viewed from the southeast.



Plate 13: Evidence for the shelf on the south wall of the receiver room, viewed from the north. 1m scale.



Plate 14: Evidence for the shelf on the east wall of the telephone room, viewed from the west. 1m scale.

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