Historic England

Rapid Coastal Zone Assessment Survey Yorkshire and Lincolnshire: Phase 3

Field Survey and Historical Assessment

Selected First and Second World War Monuments
North Yorkshire, East Riding of Yorkshire, Lincolshire

T. Brigham, J. Buglass and D. Jobling, Humber Archaeology

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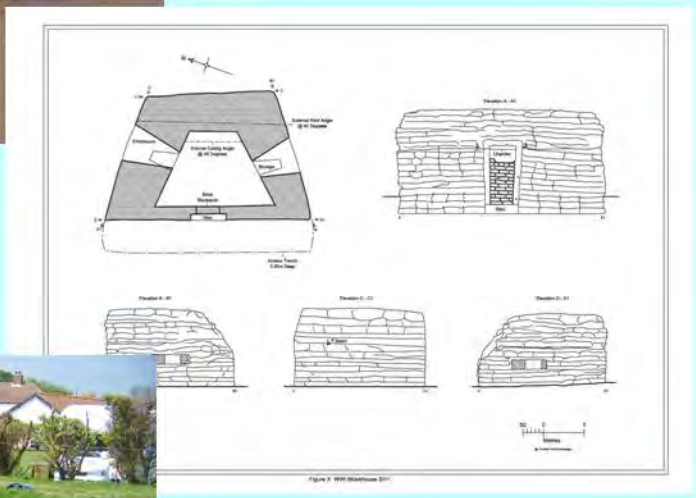

ENGLISH HERITAGE

Humber Field Archaeology

Archaeological Consultants and Contractors

RAPID COASTAL ZONE ASSESSMENT

YORKSHIRE AND LINCOLNSHIRE

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Selected First and Second World War Monuments

North Yorkshire, East Riding of Yorkshire, Lincolnshire

PHASE 3

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1 SUMMARY

This field survey of First World War 1 and selected Second World War 2 monuments was undertaken by Humber Field Archaeology in May and June 2012 on behalf of English Heritage as part of Phase 3 of the Rapid Coastal Zone Assessment (RCZA) of Yorkshire and Lincolnshire (Project 3729).

The assessment takes into account the results of previous walkover surveys of the area undertaken for Phases 1 and 2 (Brigham et al 2008; Buglass & Brigham 2008a, 2008b; Brigham & Jobling 2011a, 2011b, Buglass & Brigham 2011), but includes more detailed field recording, and a re-evaluation of documentary and cartographic sources. This has allowed an appraisal to be made of the potential importance of surviving structural remains in the study area. With the advice of Roger J Thomas, English Heritage, a number of possible First World War small square pillboxes were identified as a result of Phases 1 and 2 in the East Riding of Yorkshire; these were considered to be of national importance in view of their rarity. The new survey confirmed the First World War origins of the pillboxes and a larger blockhouse of identical construction located in the Barmston and Skipsea areas. Several demolished pillboxes of First World War origin were added to the list, while other probable candidates can no longer verified on the ground, including examples in the Barmston–Skipsea areas and at Roos. Additional structures were identified which may represent a class of semi-sunken command or communications shelter, one on the beach at Withow Gap, Skipsea, and two larger structures inland near Atwick and East Garton. A similar structure, now lost, may have been present at Old Hive, Easington. A further semi-sunken command/communications post located in Atwick was visited as it was considered to be of possible First World War date, but proved to be of Second World War construction; it was, however, recorded as being of unique design. Two square structures sunk in the beach at Cayton and Filey Bay in North Yorkshire may also be of First World War date, as they closely resemble the standard East Yorkshire type in construction and dimensions.

In northern Lincolnshire, a pillbox of trapezoidal plan was also identified in Phases 1 and 2 as being of potential First World War date. This was re-examined and recorded as part of the Phase 3 survey, confirming the interpretation; three further intact examples and fragments of two demolished pillboxes were also re-evaluated and found to be of similar design and date, bringing the recognised total to six.

In addition to these, two rare types of Second World War section post identified during Phases 1 and 2 in the Robin Hood's Bay and Cayton Bay areas of North Yorkshire were examined in more detail; the condition and exposed location of these had made it imperative that they were recorded as soon as possible. A possible command/communications post at Osgodby (Cayton Bay) was also recorded, as it was considered to be at risk.

Typical examples of the three most common Second World War pillbox types between North Yorkshire and Lincolnshire were recorded, comprising a 'lozenge' type infantry pillbox, 'eared' machine-gun post, and a Lincolnshire-variant Type 23 anti-aircraft pillbox.

A further appraisal was made of a rare Second World War turret training range at Theddlethorpe All Saints, Lincolnshire. This comprised earthworks and small structures representing the remains of the target range itself, the hardstanding for the turrets and other features, including a building used in the maintenance of the turrets. In the event, the site was too overgrown for detailed recording and topographic survey, although it is recommended that this should be done.

An updated photographic record was also made of Ringbrough and Godwin Batteries which are being actively eroded along the coast of Holderness; these had been visited on several previous occasions and have exhibited rapid changes in condition. No beach access was possible to Ringbrough owing to further collapses, although some photographs were taken of surviving structures at the landward side of Ringbrough Farm.

2 INTRODUCTION

2.1 Background

The Phase 3 Field Survey was intended to assess and record First World War and selected Second World War military assets in North Yorkshire, the East Riding of Yorkshire, and Lincolnshire, which were identified in Phases 1 and 2 of the Rapid Coastal Zone Assessment of Yorkshire and Lincolnshire (EH Project 3729) as being of particular significance. Monument numbers used in the text of this report are those assigned in the Phase 1 and 2 reports.

2.2 Definition of the study area

The study area is defined as the selected monuments themselves; their locations are shown on Figure 1. Most of these monuments were defined in the Updated Project Design (Brigham 2012), although the list below has been amended in the light of fieldwork and further examination of the records:

Task B: recording of First World War and selected Second World War monuments

Fylingdales Parish

- Field recording of rare Second World War section posts FD60 and FD80.

Cayton Parish

- Field recording of at-risk Second World War section post CY11 and examination (if safe) of remains of section post CY9 and possible section post CY19.

Barmston Parish

- Field recording of First World War pillboxes BA4, 10, 19, 22, 30(x2), 74, 94, 118, 190, assessment of site of possible First World War pillbox(es) BA36;
- Field recording of typical Second World War 'lozenge' pillbox BA104.

Carnaby Parish

- Field recording of typical 'eared' machine-gun pillbox CA24.

Skipsea Parish

- Field recording of First World War pillboxes SK50, 63, possible forward observation or command/communications post SK49, and possible pillbox SK11.

Atwick Parish

- Field recording of First World War possible command/communications post AT24 and Second World War command/communications post AT58.

Aldbrough Parish

- Updated photographic record of Second World War Ringbrough Battery (AL52) and related monuments.

East Garton parish

- Visit to possible First World War command/communications post EG27.

Roos parish

- Check on any surviving remains of possible First World War pillbox RO29.

Easington Parish

- Check on any surviving remains of possible First World War command/communications post on beach at Old Hive (EA5);
- Check on site of presumed post-war ROC post in cliff edge, Dimlington (EA43);
- Updated photographic record of First/Second World War Godwin Battery area (EA182).

North and South Somercotes Parish

- Field recording of demolished First World War pillbox NS74;
- Field recording of typical Second World War Lincolnshire-variant Type 23 pillbox NS59.

Skidbrooke with Saltfleet Haven Parish

- Field recording of First World War pillboxes SH1, 4, 8.

Saltfleetby

- Field recording of First World War pillbox SA11.

Theddlethorpe All Saints Parish

- Further investigation of RAF Theddlethorpe air weapons range (TS27) and the related turret firing range (TS9).

The individual monuments are described in Section 4, summarised in the gazetteer (Appendix 1), and discussed in Section 5.

2.3 Statutory Status

None of the monuments currently has any statutory designation.

2.4 Objectives

The general aim of this report is to collate information relating to First World War and selected Second World War monuments, including their character, date, integrity, state of preservation and relative quality in order to make an assessment of their worth. They are considered both individually and as groups.

The report contributes towards the overall aim, which is to provide sufficient information to enable the formulation of a strategy to ensure the recording, preservation or management of any significant built cultural heritage feature, including consideration of structures for statutory designation to secure their future.

3 METHODOLOGY

3.1 Introduction

The sources of information consulted are noted below and the data derived from them are presented in the gazetteer of archaeological remains in tabulated format in Appendix 1 of this study. Additional published and unpublished sources are quoted in the report text and their details are noted in the bibliography.

Standard GPS survey methods were used to accurately locate features and/or the extent of structures, for transfer onto a modern OS mapbase.

Scale plan and elevation drawings of selected structures were made using standard HFA methodologies. Where possible elevations were completed of all the visible sides and internal elevations (where possible) along with a plan of the structure as a whole. Unique and shared characteristics were recorded, including dimensions, differences in construction, locations of doors, weapons slits and ventilation shafts. To assist in illustrating this, the plan was supplemented by dashed lines to show internal details such as fire support shelves and the plan of the reveals of the embrasures. A digital photographic record was also made of the exterior and interior of each accessible structure from as many angles as possible, along with photographs of any structural details, incorporating appropriate scales. Finally a detailed written record was produced on a pre-printed pro forma.

Attention was given to the setting of each asset within the surrounding landscape, with a view to understanding the reason for selection of individual sites, in terms of factors such as visibility, potential fields of fire, and relationship to other assets nearby. This was intended to assist in determining the local defensive strategy for each group of monuments, although the conclusions were necessarily limited by the likelihood that significant elements were absent, particularly where features may have been lost to the sea, including both 'hard' and 'soft' defences, such as pillboxes and trench/weapons pits. In addition, the study has attempted to determine whether First World War features were incorporated into the more extensive defences constructed in the early part of the Second World War. This was obviously the case where First and Second World War structures were paired, modified, or can be identified as active from Second World War aerial photographs.

The First World War pillboxes identified on the Holderness coast in Barmston (Auburn) and Skipsea belong to the simplest class of structure noted by Osborne (Osborne 2008, 53), which he assumed were confined to Kent. Variants of this basic square small arms pillbox have been identified, including a probable machine-gun pillbox (BA10) and a large rectangular blockhouse (BA19), while one (BA94) appears to be a heavier version of the standard pillbox type. In addition to the pillboxes, however, further types of First World War structure have been identified, and these are just as significant in terms of understanding the early system of coastal defence. These include small possible forward observation or command/communications posts (SK49; possibly EA5) and two larger inland command/communications posts of what may well have been a standard design (AT24, EG27). The majority of these structures are not immediately at risk, although they do lie on a fast eroding section of the coast. However, SK49 already stands on the beach, having become inverted within the last few years, and EA5 and other probable examples have already been destroyed. South of Barmston, the degree of coastal erosion becomes increasingly severe. And it is quite possible that many First World War front line structures have been lost.

South of the Humber, an extant trapezoidal pillbox in Skidbrooke with Saltfleetby, Lincolnshire (SH1), was illustrated by Osborne, and considered to be of First World War date; the existence of several others were mentioned in the text, but their whereabouts not given (ibid, 55–6); nor had they been identified as a class by the Defence of Britain project. SH1 had been recorded in plan by Osborne (ibid, fig 43), although on re-examination, the drawing proved to be schematic and the interior dimensions and detailing have been corrected by the present survey. The structure has now been confirmed to be comparable with two demolished examples in North Somercotes (NS65, NS74), and three more examples, previously supposed to be Second World War, but almost certainly those referred to by Osborne, have been identified and recorded during the Phase 3 survey in Skidbrooke (SH4, 8) and Saltfleetby (SA11). These structures lie on a relatively stable section of coast, often at the point where tracks met the seabank, with a wide swathe of vegetated saltmarsh to the front, which at the time of construction may have been more open mudflats; the fate of NS65 and NS74, however, does demonstrate the need for some form of protection.

The Second World War section posts in Fylingdales (FD60, FD80) and Cayton (CY9, C11) are also very rare. A further possible post, CY19, is probably the remains of a different type of structure, but due to complete burial by sand, it was decided to record the remains of a possible Second World War forward command/observation post at the northern end of the bay (OS10) as an alternative. The section posts were located in commanding locations on the cliff edge, and were set at an angle to provide enfilading and intersecting fire, potentially from whole infantry sections. Their location means that all are either at risk from erosion or have already collapsed. Recording of these monuments will provide a permanent record of their form and location: following recording, FD60 was identified by the Local Planning Authority in March 2013 as being in a sufficiently dangerous state to require urgent demolition to safeguard public safety.

The field record was accompanied by a documentary and cartographic survey for relevant data relating to construction. Where relevant, reference has also been made to existing work referring to the area (e.g Osborne 2008; Foot 2006).

A number of other sub-tasks were identified, including photographic condition survey updates of Ringbrough and Godwin Batteries, and a survey of the remains of the rare turret range at Theddlethorpe All Saints. Both Ringbrough and Godwin Batteries have continued to deteriorate rapidly due to their position on the most rapidly receding section of the fastest eroding coast in Europe, while recent demolition work at the former RAF Theddlethorpe shows how vulnerable sites can be to clearance for agriculture or development.

A survey of the World War 1 & 2 remains on Spurn Point should be considered for the future, but this would require considerable resources, with access restricted to the winter months when vegetation is less of an obstacle.

3.2 Sources

Various cultural heritage research and other sources were consulted during Phases 1–3 of this assessment, which included:

- Humber Sites and Monuments Record
- North Yorkshire County Record Office
- Lincolnshire Archives

- English Heritage Archive events and monuments databases
- English Heritage Archive aerial photographic collections
- National Archives, Kew

Cultural heritage information from the principal sources is summarised in Appendix 1, with details amended in the light of field surveys undertaken by Humber Field Archaeology. The results of the surveys are summarised in Section 4 of this report. A selection of photographs taken as part of the survey have been included in the report.

4 FIELD SURVEY

4.1 First World War monuments

Background

The project has singled out a number of pillboxes and other structures, most of which were recorded in Phases 1 and 2 of the RCZAS, whilst others have been identified subsequently (BA10, 19, 21, 22, 30(x2), 36, 74, 94, 118, 190, SK11, 49, 50, 63, AT24, RO29, EG27, EA5 in the East Riding, NS65, 74, SH1, 4, 8, SA11 in Lincolnshire), which are considered to be of potential First World War date and therefore of national significance in view of their rarity. The location of the East Riding and Lincolnshire samples suggest the identification of areas either side of the Humber which were considered to be particularly vulnerable to a German invasion, or to raids on accessible strategic sites and facilities. A number of these pillboxes were not identified from Phase 1 aerial photographic analysis, which suggested that they had blended in or become hidden by vegetation; other examples were visible because they had been incorporated into Second World War defences; full identification has had to await an appraisal of Phases 1 and 2 and further fieldwork.

Until the first decade of the 20th century, the prospect of a French invasion still seemed more likely than from any other source, and the south-eastern and southern coasts remained the most heavily defended areas. By the time Britain and France signed the 'Entente Cordiale' in 1904, the ambitions of Imperial Germany were becoming increasingly obvious (Oldham 2011, 115), and the 'Triple Alliance' countries (Germany, Austro-Hungary and Italy) were now therefore regarded as the most likely threat. The Royal Navy was still envisaged as providing the first line of defence, but the War Office produced a series of papers (WO33) detailing the national response to a potential invasion. In summary, this envisaged dividing forces based in the United Kingdom into garrisons, based in existing barracks, ports and other defended areas, and mobile forces, which would have consisted of local forces within the existing Home Commands, backed by a central force made up of Territorial units which could be switched to support invaded areas; with a pressing need for more troops on the Western Front, the central force was disbanded at the end of 1915. Territorial forces included infantry, cyclist battalions and mounted yeomanry. The likely scale of an invasion was expected to be of the order of 70,000 troops, with smaller diversionary raids considered to be a probability, particularly targeting ports, naval facilities, munitions factories and defensive sites.

In the later 19th and 20th centuries, Yorkshire and Lincolnshire formed part of Northern Command, one of several Home Commands set up for the defence of the country in time of war or civil disturbance in 1838 and reconstituted in 1905 with a base in York (Dunlop 1938). By 1914, each command contained a number of garrisons, comprising army bases, airfields and coastal defences. At the outbreak of the war, additional army camps were constructed to cope with the greatly enlarged army, and new airfields, anti-aircraft/anti-zeppelin and coastal batteries were created. Towards the end of 1915, General Headquarters (GHQ) Home Forces was created to co-ordinate the work of the various Home Commands.

Outside the south-east, most of the country was defended largely by a mixture of forts ranging in date from the medieval and Tudor periods to the late Victorian era, including sites like Paull Point Battery ('Fort Paull'), which had been the site of batteries in the 16th, 17th and early 19th centuries before the final artillery fort was constructed in the mid 19th century. Few of these sites were suited to early 20th-century warfare without considerable modification and many were in locations which

were no longer suitable in an era when the range of heavy guns and the thickness of naval armour plating had increased significantly.

Although the outbreak of the First World War led to the understandable concern that invasion was a possibility, the biggest immediate threat was that of naval bombardment, particularly of the major North Sea ports, whether to degrade the country's military capacity or to attempt to impose a blockade in advance of an invasion. With the lack of Second World War innovations such as purpose-built landing craft, and the absence of later inventions such as tanks and self-propelled guns, seizure of a harbour or port would have been necessary to secure a bridgehead which could be expanded. The Germans' failure to take northern France with its ports meant that the south coast was an unlikely target, as long as the Royal Navy controlled the submarine threat in the Channel; the Humber and eastern seaports were all therefore potential targets for an invasion *via* the long North Sea route. At the start of the war there was immediate strengthening of existing coastal defences and the construction of new sites, some of which were in the planning stage by 1914 as a future conflict already seemed likely. These were particularly concentrated on the approaches to major estuaries and ports with military functions, trading and industrial facilities rather than relatively minor centres such as Bridlington, Scarborough and Whitby. Significant numbers of industrial facilities were located near the coast, particularly in the areas of Tyneside and Wearside, where several existing late Victorian/early Edwardian batteries were upgraded.

The threat to the coast was ostensibly confirmed by the apparent ease with which capital units of the German High Seas Fleet were able to bombard the ports of Hartlepool, Whitby and Scarborough on 16th December 1914 without interference from the British Grand Fleet. This was part of an exercise to test coastal defences rather than the precursor to a planned invasion, but the information collected was no doubt of use to German strategic planners. Further damage was caused by Zeppelin raids on coastal towns in 1915–16, followed in 1917 by attacks on the south-east by heavy Gotha G.V and Zeppelin-Staaken R.VI and R.XIV bombers. Sabotage raids from parties dropped by submarine were considered a possibility, although agents or fifth columnists were a more likely threat. In the event, the arrest of all known spies at the outset of hostilities coupled with diligent watches kept on the most critical areas of infrastructure and transport facilities prevented any major documented incidents.

In fact, by early 1915, although the German army had invested heavily in the Western Front, the premature invasion of Russia required significant transfer of resources to the East; this took place too early in the war to allow sufficient reserves to be held back for any planned assault on Great Britain. Despite this, Great Yarmouth and Lowestoft were shelled by the German Navy as late as April 1916, although a planned raid on Sunderland shortly afterwards to lure the Grand Fleet into a combined fleet and submarine trap was called off after the detection of Admiral Scheer's flotilla by a British submarine and intelligence reports on U-boat movements. In fact the comparable strengths of the British and German surface and submarine fleets at this stage of the war and the lack of suitable transports would have made a German invasion unlikely, even if the will and opportunity were there. British agents also kept a close watch on the principal German ports, reporting shipping movements.

As it transpired, the Battle of Jutland on 31st May 1916 effectively ended the immediate surface threat, with the Germans concentrating on submarine attacks and minelaying thereafter; unrestricted submarine attacks on unarmed merchantmen and passenger vessels eventually helping to bring America into the war.

In East Yorkshire, considerable effort was made to deny the enemy surface fleet access to the Humber. Substantial coastal batteries with ancillary barracks, blockhouses and engine houses were completed soon after the war started at Kilnsea (Godwin Battery) and Spurn (Light Permanent, Light Temporary and Green Batteries). Haile Sands and Bull Sands Forts were also built in the Humber channel, although these were not completed until hostilities were over. A pair of second-line batteries was completed in 1915 further up the estuary at Sunk Island on the north bank and Stallingborough on the Lincolnshire side, replacing the mid-Victorian Paull Point Battery. The structures at Kilnsea and Spurn were well-built, with massive reinforced concrete gun emplacements, magazines and searchlight installations, but also many ancillary buildings such as stores and barracks. These were constructed using precast concrete blocks, giving the sites an appearance of permanency. A considerable number of buildings remain in use at both sites, having seen further use between the wars and during the Second World War, while others are disused but have survived, a testament to the quality of their construction.

Other significant coastal defence sites in East Yorkshire were a Royal Naval Air Service (RNAS) seaplane base at Hornsea Mere and an RNAS/RAF airfield at Atwick, occupied in 1915 by 504, 505, 506, 510 (Special Duties) Flights, RNAS, commanded from Hornsea Mere, becoming 251 Squadron on the formation of the RAF in 1918; part of their early duties were anti-zeppelin patrols, but these would theoretically have played a part in observing and attacking any invasion fleet. Other possible First World War sites have been identified at Flamborough and Mappleton, while more undoubtedly existed, but were either shortlived, undocumented or confused with Second World War installations. A concrete acoustic mirror at Kilnsea Grange, used to detect oncoming aircraft, may date from the First World War or the period immediately afterwards.

Between the major sites, the coast was garrisoned from the start of the war. In the first year, the coastal garrison mostly consisted of a mixture of territorial and yeomanry battalions (including many cyclist units), with the regular infantry 1st Battalions mainly held back from the coast to act as a mobile reserve while training for overseas duties. The garrison was mainly based at the sector headquarters towns, Bridlington and Hornsea, with intervening outposts lightly manned by cavalry and cyclists. With the disbanding of the central force concept in 1915, and 1st Battalions and new Service Battalions being drafted to active service in France, Gallipoli, Egypt and elsewhere, their place was taken by second and third line and reserve battalions which had been formed to provide replacements; from 1916 these now took coastal duties rather than being held back as the concept of defending the high water line came into being, replacing the earlier garrison/outpost system. The strategy now was to hold the enemy on the beaches for as long as possible until the Royal Navy could cut off the line of retreat and reserves could be brought up, or failing that, to retreat to second-line positions and hold the enemy as near the coast as possible; the Navy estimated in 1916 that they would be in a position to deploy vessels within 24–28 hours of enemy transports being sited, revised in 1917 to 32–34 hours. Forward defence schemes would therefore have had to be designed with that period in mind.

The new strategy required a more extensive system of defences, with additional camps constructed in new forward locations outside the main pre-existing garrisons, supplemented by billeting troops in coastal settlements. Labour (or ‘Pioneer’) companies had already been created to construct defences and undertake a wide variety of other support roles at home and abroad, usually under the supervision of Royal Engineer officers and artificers. This system was haphazard until the existing companies were replaced by the Labour Corps in 1917, including soldiers transferred

as unfit for front line service, as well as reserve battalions not required at the time for the trenches. The British coast was split into eight Theatres of Operations, those in the sub-region being C – North Humber and D – South Humber, with inland Concentration Areas for training and billeting reinforcements at five locations within the Northern Command area.

Although a number of excellent books have been produced recently dealing with the Home Front (e.g Beckett 2006; Bilton 2003), there is little mention of the nation's coastal defences, the few exceptions tend to deal with defences built later in the war (e.g. Bird 1999; Osborne 2008). Many of the early coastal defences would have been simple slit trenches and other earthworks, including strategically placed heavy gun emplacements with searchlights and machine-gun posts similar to those constructed in Flanders. Although photographs of the time show troops occupying trenches, in the absence of aerial photographic coverage to compare with that of the Second World War, there has been little evidence for their extent, or for the deployment of more complex beach landing obstacles and other elements commonly used in the subsequent conflict. Barbed wire was certainly used, but may well have been confined to beach access points, and sections were probably rolled back during the day to allow continued access for the local population.

In effect, the dependence on heavy batteries to protect ports and estuaries, with the coast patrolled by mobile territorial and reserve units, was little different in military thinking to that of previous generations, including the French Revolutionary and Napoleonic Wars of the late 18th/early 19th centuries, and perceived later French invasion threats. However, a new approach was adopted, probably from late 1917. The existing east coast defences were augmented by pillboxes of various designs, an innovation which was technologically influenced by the hardening of defences on the Western Front following German withdrawal to the apparently impregnable Hindenburg Line in March 1917. Superficially, it is difficult to understand why these new defences were considered necessary when the invasion threat had receded following the Battle of Jutland. However, the collapse of Russian opposition later in 1917 following the Revolution had freed 50 divisions of German troops from the Eastern Front. There may have been a British perception that an invasion was possible using these forces; in the event, the divisions were switched to the Western Front, enabling the Germans to eventually launch massive counterattacks against the Allied front lines in their 1918 'Spring Offensive' as an attempt to win the war before American troops arrived in large numbers.

The increase in German forces was certainly a cause for concern: even if there was no immediate attempt to create a second front through invasion, had the German offensive in France and Belgium succeeded, a possible subsequent invasion would have become a constant threat. Hardened defences were built in considerable numbers in Kent, Suffolk and Norfolk in late 1917 and 1918, using techniques and designs now in widespread use in France and Belgium. The Lys Offensive of April 1918 saw the German army push north and west towards Dunkirk, Calais and Boulogne, ports from which the British would be expected to embark if forced back. German possession of these ports would certainly have allowed them to contest control of the Channel, and considerably shortened the invasion route. Their capture of Antwerp in 1914 had been of little use, as the neutral Dutch controlled the River Scheldt and the Royal Navy effectively blockaded the port; without access to further Channel ports, the Germans relied on their own ports at Wilhelmshaven and more distantly, Kiel, neither of which were suitable departure points for invasion fleets if they were to remain undetected. German advances were also made further south towards Paris. The fall of Paris, which had been part of the original German design in 1914, would almost certainly have triggered a French collapse as it had in previous

wars, and as it was to do again, in 1940. In the event, the attacking forces outstripped their own supply chain and momentum faltered, allowing the Allied 'Hundred Days' counter-offensive to push the Germans back beyond the Hindenburg Line.

The concept of pillboxes had a pre-First World War origin as individual small blockhouses forming point defences surrounding the perimeters of existing forts and batteries in the later Victorian and Edwardian periods. Godwin Battery, Kilnsea, and the Spurn Batteries were protected by well-built blockhouses of similar pre-war design, although they were constructed just after hostilities had started (Osborne 2008, 35–6). Pre-cast concrete beams and blocks augmented by steel supports were the preferred construction material, although concrete cast in situ and stone facings were also used. These early structures reflected the fact that time and funding were less of a problem in the pre-war period, but more rapid and cheaper construction techniques were required once war had started.

On the Western Front, although concrete and brick artillery observation towers were constructed as the front line became static, it was not until late 1916–early 1917 that the German army began to construct the first permanent defences behind their own front line, using aggregates brought through the neutral Netherlands, allowing them to fall back to almost impregnable positions in spring 1917 (Oldham 2011, 18–19). This series of pillboxes, machine-gun positions, observation and command posts, bunkers and hardened artillery defences was referred to by the British as the Hindenberg Line. Raiding parties comprising Royal Engineers protected by infantrymen collected details of these new types of structure, and almost immediately the British army made use of the information and began constructing its own versions. There was some initial resistance to their use among senior officers, in case front-line troops became used to sheltering in apparent safety and refused to emerge to take part in assaults ('bunker mentality') but the general staff finally accepted that pillboxes and machine-gun emplacements could be used to slow down and break up attacks. They agreed a system of tripartite defences based on 'forward', 'battle' and 'rear' zones (ibid, 68–70).

Circular brick and concrete machine-gun types were used on the Western Front from autumn 1917, although the examination of captured German defences in the Hindenburg Line demonstrated that concrete blocks alone (without reinforcement or an interlocking design to tie them together) had virtually no blast resistance. Solid unreinforced concrete was prone to shatter and concrete stiffened with girders or rails to fall apart in sections. Reinforcing mesh was found by experience with German bunkers which had been blown up by mines exploded under the Messines Ridge to provide better support and protection (Oldham 2011, 34).

This experience was fed back into the design of later defences and a factory for creating prefabricated concrete pillboxes was constructed in late 1917 at Aire-sur-la-Lys, while other precast installations, such as the Moir pillbox and Hobbs machine-gun casemate, were manufactured in kit form at Richborough, Kent, for transport to the Front; the majority of these types, however, were not available until well into 1918, with delivery continuing to the war's end, leading to stockpiles of unused components (Osborne 2008, 44–6). In practice the Royal Engineers often improvised with whatever materials were available, also copying German types; a hexagonal pillbox was one result, appearing in the GHQ Defence Line Specification of 1918 (Oldham 2011, 110). This had two machine-gun embrasures in the angled walls at the front and a door at the rear, and the general layout reappeared in the Second World War as the Type 22.

Of those constructed of cast concrete rather than prefabricated parts, some were relatively well finished, while others were extremely rough, with the concrete hastily mixed. A number of structures appear to have been built within sandbag formers; the sandbags were often left in place as additional protection ('blaster' layers), detonating the fuses of shells before they reached the main structure, a role also taken by additional external layers of concrete blocks and earth. In surviving examples, the sandbags, although long gone, have left their impressions in the concrete, and it is apparent that the Third Army in particular used this method, with roughly-finished pillboxes appearing in the Gommecourt to Sailly-au-Bois sector (Oldham 2011, 108). Square machine-gun posts for Vickers and Lewis guns similar in external appearance to the East Yorkshire type, but much more substantial, were built in July–August 1918 around the village of Hénencourt, Picardy (ibid, 165).

On the Home Front, it is assumed that the First World War pillboxes could not have antedated those on the front line, and they are likely to have been built in 1918, or the end of 1917 at the earliest. They were never as numerous or as varied in form and function as those built in the Second World War, and were generally less substantial. The use of hexagonal, square and circular forms has also meant there was a typological resemblance in many cases to Second World War standard types, leading to a general perception that no small-scale home defences were constructed in the First World War; from a late 20th-/early 21st-century viewpoint, the invasion threat also appears to have been much less apparent than that of 1940–1. As such, many First World War structures have gone unrecognised, even among experienced recorders; the East Riding of Yorkshire and northern Lincolnshire have fared worse than Kent and East Anglia in this respect, although there may be other parts of the country where work may reveal examples of early defences.

Undoubtedly, the experience with constructing hard defences on the Western Front benefited those responsible for home defence, as did the availability of mass-produced pre-cast concrete blocks and beams, those in the south possibly obtained from the factory set up at Richborough. Parts of the Kent and East Anglian coasts were reinforced with stop lines created to the rear of the coastal crust, such as the Chatham Land Front, which included pillboxes, redoubts, trenches and artillery positions. Blockwork was commonly used in East Anglia (see below), but in Kent, and as we shall see, East Yorkshire, pillboxes seem to have been cast in situ around expanded metal mesh within plank formwork, whereas in Lincolnshire, a mixture of sandbag and plank shuttering was used to create massive structures more akin to those built in France and Belgium.

Osborne has identified four main types of pillbox in use in Britain (Osborne 2008, 49–56).

A circular design c 4.5m in diameter was adopted on parts of the Norfolk and Suffolk coasts, built with thin walls of pre-cast concrete blocks containing up to five loopholes and with a cast slab roof. Several pillboxes of this type survive in the Aldeburgh–Bawdsey area and along the River Ant stopline. In many cases these structures were probably incorporated into later defensive schemes, although most were not visibly altered. The roof of this type was supported on girders and steel sheets, which presumably acted as shuttering during construction; this method was commonly used on the Western Front, where as well as allowing concrete to be rapidly poured (an advantage near the front line), the steel served to support the roof following a direct hit, protecting the occupants from falling and splintering concrete, as an examination of captured German defences in the Hindenburg Line had demonstrated (Oldham 1995, 171–96).

Osborne's second type was hexagonal, just 2.1m across and built of shuttered concrete, again characterised by thin walls. Like some of the Western Front prototypes, it superficially resembled the Second World War Type 22; once again, these are found in Norfolk and Suffolk. Both of these types were often built in pairs to provide mutually supporting fire.

The third type was a larger and more substantially built version of the hexagonal pillbox produced for use as a heavy machine-gun post. These were located on the Chapel St Leonards–Mablethorpe sections of the Lincolnshire coast and in the Thames–Medway area; none have survived the post-Second World War demolition programme which affected this part of the coast, but they appear to have been c 3m across, thick-walled, with five wide embrasures for the machine-gun mounts; there would have been triangular concrete tables fixed under the embrasures to support the weapons.

The fourth relatively common type was around 2.1m square, with loopholes in three walls and a door in the fourth, which Osborne believed was confined to Kent (Osborne 2008, 53), but has now been identified in East Yorkshire. Extant square pillboxes survive in the Sittingbourne–Chatham area, similar to the Yorkshire examples, but with arch-headed doorways like the ovoid heavy machine-gun pillboxes in the same area (see below) and some front-line bunkers on the Western Front; there are good examples on Newington golf course, Wormdale Farm, Newington, Keycol Hill, Sittingbourne, Danaway, near Stockbury, and elsewhere. These were constructed of plank-shuttered concrete with the roof cast on interlocking steel sheeting. The loopholes (usually three) were small and rectangular internally but were recessed externally using squared steps rather than angled splays, a measure designed to prevent ricochets from being deflected into the interior. The pillboxes were relatively thin-walled compared with Second World War examples, and could have withstood nothing more than small arms fire for any length of time. Other examples had just one or two loopholes, possibly for Lewis machine-guns rather than rifles. Despite minor differences in detail, the overall similarity of design suggests they were all built by the same controlling authority.

A large rectangular First World War machine-gun post of heavier design formerly survived on the beach at Bawdsey, Suffolk, similar to examples built on the Western Front (ibid, 55). This has subsequently been broken up by the tides, but it had been a substantial structure, with two embrasures in the front wall; the slab roof was supported by steel girders which were presumably covered by steel interlocking sheets acting as shuttering during construction. Bawdsey also has at least one circular pillbox, hexagonal types and World War 2 structures (Foot 2006: Defence Area 29).

Other variants, often one-offs or in very small surviving numbers, were also known, including a small number of massively-built trapezoidal pillboxes found in Lincolnshire. Osborne suggests there were at least four examples (Osborne 2008, 55–6), which has been confirmed by this project, while fragments of two further demolished examples have been identified.

There were also several ovoid heavy machine-gun pillboxes constructed along the Chatham Land Front, Kent; these had long horizontal slits to allow a wide arc of fire, with triangular cast concrete tables beneath the openings to support the machine-guns. Examples are known at Beaux Aires House and Parsonage Farm, Sittingbourne; these had arch-headed doorways like the local square pillboxes. The roofs were cast on interlocking steel sheets and contained a probable stovepipe hole near the wall.

In 2011, a previously unrecorded large irregular hexagonal pillbox with the date '1919' cast into the roof was identified near North Berwick, West Lothian. This had three substantial heavy weapons embrasures and 13 vertical rifle slots, some at least protected by external metal shutters (http://pillboxstudygroup.freeforums.org/strange-8-sided-pillbox-t552.html). The presence of inset iron rods, cast recesses and wooden shelves below the heavy weapons embrasures indicate relatively sophisticated installations similar to those present in Second World War pillboxes. This particular structure may have been part of a defensive system based around the entrance to the Forth estuary, protecting the approaches to Rosyth naval dockyard. The structure was subsequently scheduled by Historic Scotland.

A note on weapons used

The structures described in this report were designed for the use of the main defensive infantry weapons of the day. The long arm used by British and Imperial forces during the First World War was the Lee Enfield rifle. Introduced in 1895 it remained in service until 1957 with some modifications to enable cheaper mass production, as the standard service rifle used during both World Wars and Korea in its Short Magazine variant (SMLE). The SMLE used the standard British .303 cartridge and had a recommended range of 550yds/500m, although capable of firing much further.

The army was also equipped with the water-cooled Vickers medium machine-gun which was introduced in 1912 and used until 1968, using the same .303 cartridge as the SMLE. Several types of pillbox were designed or adapted specifically for this weapon, and as it required at least three crew to operate and was tripod-mounted, heavy weapons pillbox designs often lacked rifle slots, but have one or more wider embrasures, often with concrete tables beneath to support the weapon. There may also be space or built-in recesses to hold condensing tanks, where water from the cooling jacket surrounding the barrel was conveyed via a hose and then returned to the jacket. The effective range was 2187yds/2000m, although the barrel could be elevated to provide plunging fire on hidden targets over twice that distance.

The American air-cooled Lewis light machine-gun was adopted in 1915, and used until 1953, adapted by the British to use .303 ammunition. The effective range was 880yds/800m, although the maximum range was four times that distance.

North Yorkshire

Principal garrisons on the North Yorkshire coast were Whitby, Scarborough and Filey, the latter at the time just in the East Riding. Each of these would have been at the centre of an extensive sector of coastal defences, although these would have been relatively lightly held by mobile forces forming patrols and maintaining watch posts, as until 1916 the initial defensive strategy was based on central forces being brought up from camps well to the rear.

At the start of the war, the 1/1 Btn East Riding of Yorkshire Yeomanry moved straight from their summer camp to defences in the Filey and Scarborough areas before moving north to the Hartlepool area, remaining on coastal defence duties until early 1915. In Filey, the 3/4 Btn Border Regiment was posted to the town in November 1917, moving the short distance from Hunmanby, a mile inland. The 3/8 Btn Manchester regiment was similarly posted to Filey in April 1918, also moving from Hunmanby, while the 3/5 Btn was posted to Scarborough in July 1917. Also at Filey were the 2/1 Independent Heavy Battery, Royal Garrison Artillery. Several battalions

of the Yorkshire Regiment (Green Howards) were raised at Burneston Barracks, Scarborough, with the 1/5 Btn posted in the town at the start of the war. The Northumberland Hussars (Yeomanry) were based in the town from May 1915, but only A Sqn remained after April 1916. In that month, the 3/4 Btn East Lancashire Regiment moved to the town from Whitby and the Huntingdonshire Cyclist Btn were also stationed in the town, moving north to Whitby in June 1918.

As a result of the fieldwork carried out in East Yorkshire, two possible First World War structures have been retrospectively identified in North Yorkshire from records made during Phase 2, located in Cayton Bay (CY18) and Filey Bay (FY70). As these were retrospective, no field visits were made and as such, the identifications cannot be confirmed. The attributes of both structures as visible in 2009 closely resemble the more numerous pillboxes recorded to the south, although there are difficulties in interpretation, and the resemblance may be purely coincidental.

Both CY18 and FY70 are small square concrete structures, c 2.0m square, with walls c 0.17–0.2m thick, showing signs of iron reinforcing mesh, and with a central doorway on the landward side. CY18 is constructed using large diameter aggregate; FY70 is of finer concrete, showing traces of external plank shuttering. Both may have moved from an original location close to the cliff edge, although it is unclear whether they are inverted or not. On balance it is more likely that the visible portion represents the original top of the walls, with the roof slabs broken off, but with the floor slabs still intact below the beach, holding the structures together (see BA4 below). In that case, they are likely to have slid relatively gently to their present positions as a result of cliff slips.

These structures are both located in strategically important locations which were at the centre of extensive Second World War defences of more readily identifiable form, including ‘eared’ pillboxes and beach defence lights. CY18 was sited just south of the main entrance to the bay, Mill Lane, at a point where a path gave access to the beach. There is no indication, however, that a similar structure was located closer to the more significant Mill Lane exit, unless this had been demolished at some subsequent time. It is not impossible that CY18 was the last survivor of a number of pillboxes constructed at intervals on the cliff as on the Holderness coast, but the original identification as a Second World War forward command/observation post or similar is also possible.

FY70 is located at the end of a trackway leading to the sands, formerly the beach entrance of RAF Hunmanby Moor. No trackway is shown in this location before construction work began in 1939 on what started out as one of Butlin’s holiday camps. FY70 cannot, therefore have been intended to defend a regular access point, although there was already a natural declivity which would have provided a route inland. Other access points were to the north near Flat Cliff and immediately to the south at Butcher Haven, and it is not impossible that FY70 is the last survivor of a chain of First World War pillboxes constructed in the bay at potential landing points, although the original interpretation as a Second World War command/observation post is also valid.

East Riding of Yorkshire

A number of units were posted to the East Riding coast at different times on rotation, with Bridlington and Hornsea acting as Brigade headquarters at the centre of defensive sectors. The 7th Cyclist Brigade, incorporating reserve battalions of the county’s three yeomanry (nominally mounted territorial) units, the East Riding of Yorkshire Yeomanry, the Yorkshire Hussars and Yorkshire Dragoons, were based in

Bridlington between late 1916 and May 1918 and probably manned the defences in the Barmston and Skipsea areas during that period. The 3/4 Btn Yorkshire Regiment and 3/5 Bn Durham Light Infantry were based in Hornsea in 1917–18; the latter garrisoned the coast at least as far north as Atwick, joining the 21st and 23rd (Reserve) Btns DLI, stationed there in 1916–17 as part of 20th Reserve Brigade, which also included 19th, 30th and 31st Northumberland Fusiliers. Further south, the 3rd (Reserve) Btn East Yorkshire Regiment was based at Withernsea from April 1916. The 3/4 and 3/5 Btns Yorkshire Regiment (Green Howards), were based at Hornsea in late 1917 for coastal defence work. No 1 Works Company and No 2 Electric Light Company Royal Engineers were based at Hull in 1914 as part of the North-Eastern Coastal Defences; the latter was presumably concerned principally with providing and maintaining anti-zeppelin searchlight units, but the Works Company may have overseen construction along the coast. Other units may well have been based in the area at times.

At some time during the war, probably in late 1917 or 1918, the RCZAS has shown that a series of hardened defences were constructed along the Holderness coast, including a number of pillboxes and several command/communications posts. This may reflect the move after 1916 to hold any invaders on the beaches for as long as possible, and the experience gained in developing hardened defences on the Western Front from 1917 onwards would have assisted in the design of home anti-invasion fortifications.

The East Yorkshire pillboxes identified in Phases 1 and 2 generally resemble examples constructed in the Chatham/Sittingbourne area of Kent. Although there are variations between individual structures (see below) there is considerable consistency in design which indicates a single agency responsible for the construction of the pillboxes identified between Barmston and Skipsea, and the command/communication posts at Atwick and East Garton. There is some evidence to suggest that similar structures were constructed elsewhere on the Holderness coast and possibly further afield, with single damaged examples of square structures identified in Cayton and Filey Bays among more easily identifiable Second World War types, as already discussed.

Most of the pillboxes consist of a simple, flat-roofed structure c 2.1m square with a central doorway generally located in the landward (western) wall, and usually with a single small loophole in the centre of each of the other three sides. The loopholes are either squared off or splayed, but never stepped, an important difference between these structures and those constructed in Kent. External splays are generally a bad idea from a defender's point of view, as incoming bullets can simply be deflected into the interior: internally splayed arrow slits are a feature of medieval castles, but the concept appears to have been ignored where the East Yorkshire (and Lincolnshire) First World War pillboxes are concerned. As a rule, Second World War pillboxes have the splay in the interior, although the embrasures of heavy machine-gun posts often have an angle on the exterior to allow them a wide traverse.

There are no internal walls or traces of iron fittings other than for the doorframe and a ventilation pipe in the centre of the roof. The standard of construction is generally good, occasionally careless, with the walls and roof cast in situ around small diamond expanded mesh within wooden formwork consisting of horizontal planking. Several show pronounced pour lines in the walls and at the level of the slab roof, while the mesh reinforcement often shows around the edges of embrasures, as well as where the concrete has spalled. The walls are generally thin at c 6in/0.15m, suggesting that the pillboxes were barely proof against small arms fire, grenades and shrapnel from shell bursts, but would certainly not have withstood direct or proximate

shell bursts; the roofs sometimes consist of two superimposed slabs, which might have given some protection against plunging mortar fire, while some examples also had thicker walls, including a command/communications post at Skipsea (SK49), which would have been in a more exposed forward position.

The nearest Second World War equivalent was the Type 26, which is superficially similar, and has led to incorrect identification of the First World War structures. The Type 26 was, however, larger at 10ft (3m) square, although both smaller and larger variants were built to the same basic design. The Type 26 generally had bulletproof walls 0.45m thick, with a loophole sometimes present in the rear wall to protect the entrance, and was sometimes of prefabricated panels (Osborne 2008, 174–6). There are sufficient differences between these Type 26 variants and the East Yorkshire First World War types to be clear that the latter are not of Second World War design.

It is now almost certain that a considerable number of pillboxes and other defensive structures existed along the northern section of the Holderness coast, but the further south the distance travelled from Barmston, the greater the degree of coastal erosion. Many Second World War structures now lie on the beach as piles of broken concrete becoming increasingly close to the low water mark, and any earlier less robust examples, like the First World War pillboxes, are much less likely to survive in recognisable form. Significantly, a 1955 plan in the East Riding Archives (NBT/435) shows pillboxes already lying on the beach, some identifiable as known First or Second World War monuments, but others previously unrecorded; these may include structures of early date, although only further fieldwork could elucidate this without question.

The most northerly point where surviving First World War structures have been identified is Auburn Farm at the north end of Barmston parish. The site of a DMV, the farm stands above a shallow declivity in the cliff at the end of what was described in 1955 as a ‘Very good single track road from Fraisthorpe to Auburn. Concrete ramp on sand. Easy access to beach’. Auburn was clearly considered an important strongpoint in both world wars, being at the centre of a heavily defended access point to the beach. The site, if taken, would have allowed a flanking attack to move quickly inland, cutting the coast road and Hull–Scarborough railway line on the way, to begin the process of encircling and isolating Bridlington a few miles to the north.

The Second World War area defences at Auburn included a long double row of concrete anti-tank cubes, a fixed gun emplacement, several pillboxes and a minefield; the farmhouse itself was almost certainly fortified, and this was probably the intention in the First World War had an invasion been imminent. To the north, the remains of a square pillbox, BA4, were identified on the beach in 1994, having fallen from the cliff since 1955; this appears to have been intended as a machine-gun post, with wider than standard embrasures (Plate 1). BA10, located in a grassed area immediately in front of the farmhouse, is slightly larger than the other square pillboxes in the area, with thicker walls (Plates 2–5). The door is in the west side facing the farm (Plate 6), and there was originally a single relatively small splayed loophole in the east wall, probably for a Vickers (or possibly Lewis) machine-gun firing within a restricted arc towards the gap in the cliff (Plate 8). This pillbox had been converted, presumably in the Second World War, by crudely enlarging the existing loophole and knocking two further large openings in the north-east and south-east corners (Plates 7, 8). The three large openings were created to greatly improve the field of fire and presumably allow the freer use of heavy machine-guns; in the Second World War it would have provided supporting fire for a 6-pdr gun position constructed in front next to the beach access point. The pillbox is sunken almost to the level of the base of the original loophole, with the Second World War

embrasures cut at a slightly higher level, and the rear doorway may have been reached by a ramp, now infilled, assuming the ground level was not raised after construction. The interior in particular presents clear evidence of the plank formwork used in construction (Plates 9–11).

BA10 is flanked to the south by BA19, BA22, and the possible pillbox BA21. Of these, BA19 is a large rectangular blockhouse located 97m south of BA10 and capable of holding a rifle section; the north side overlooked the valley, looking directly towards BA10 (plates 12–14). It shares the construction characteristics of the smaller pillboxes described below, with thin walls cast around small diamond mesh, and small loopholes. In this case the openings were cut through the finished walls rather than cast in situ, and the splays were then smoothed with mortar, leaving jagged protruding pieces of reinforcement, which would in some cased have snagged a Lee Enfield rifle if used in anger (Plates 15, 16). The long north and south sides contain three loopholes each, the end walls have two loopholes, one either side of a central doorway; the roof slab forms the doorhead, and was also cast on a formwork of plank shuttering, the impressions of which are clear on the outer and inner wall faces (Plates 17, 18). The roof contains three possible ventilator holes formed by the simple expedient of setting ceramic drainage pipes into the concrete. Crucially, this structure was large enough to be shown on the 1927 1:2500 Ordnance Survey map, confirming the First World War date; most of the other First World War structures were presumably too small for the OS surveyors to map, suggesting that they operated a filter of c 10ft/3m.

The construction of the square pillboxes is identical to BA19, with diamond mesh used as reinforcement for the concrete, which was poured between horizontal plank shuttering, visible on the outside and in the interior. Each of the square types have a single ceramic pipe set in the centre of the roof, but no trace of other installations other than various metal fixings or sockets in the doorways to secure the frames, which are largely missing. First World War pillboxes in the south-east and East Anglia often appear to have had steel doors and window shutters similar to those used on the Western Front, but this cannot be confirmed in the East Riding sample. The embrasures are sometimes splayed, but in other instances are not. Unlike BA19, they mainly seem to have been cast as part of the design rather than cut later, although the metal reinforcement is sometimes visible at the edges, suggesting that some might have been cut and the reinforcing rods turned back; one of the embrasures of BA190 seems to have been cut and smoothed with mortar.

BA22 is a small 2.1m square pillbox of standard design hidden 140m to the south-west of BA19 at the edge of a small copse to provide second-line support (Plates 19–22), while BA21 has only tentatively been identified as the remains of a similar structure on the beach; it was presumably a front-line pillbox like BA4. Together with the farm buildings, these would have provided a strong defence of the beach access point east of the farm.

Located 390m to the south of BA19 is a pair of small square pillboxes set less than 3m apart (BA30) straddling a field hedgebank (Plates 23–35). These would have been located deliberately to hold up a flanking attack advancing along the line of the field ditch with the intention of outflanking the defences at Auburn. The two structures are a mirror image of each other, with doors to the west, and loopholes facing east and outwards, but with no inward facing loophole (Plate 26). Unusually, the doorways contained the remains of narrow wooden lintels (Plates 27, 29), although these may have been part of the original shuttering, to ensure the doorhead was level when the roof was cast; in this case, the roofs consist of two separate pours.

South of here, the other pillboxes are strung at intervals inland of the cliff, their locations often duplicated by more substantial Second World War structures. Fragments of one or possibly two examples have been located on the beach at BA36, but the next extant pillboxes are BA74 (Plates 36–41) and BA190 (Plates 44–49) on field boundaries south of Barmston Main Drain. These pillboxes would have been set some distance from the contemporary cliff, possibly as second-line defences, preventing sneak attacks along the deep drainage ditches and hedgerows. Both now stand 9m and 18m respectively to the rear of much larger Second World War lozenge pillboxes (Plates 41, 48) and they were presumably retained in the later conflict to provide covering fire for the line of retreat along the ditches. BA74 has a wider embrasure on the east side, suggesting the possibility that it was intended for a machine-gun, although the intention may have been simply to improve the field of fire.

Further south, BA94 stands to the east of Hamiltonhill Farm within a field 200m inland overlooking a drain cutting through a low-lying area where the cliff is at beach level (Plates 42, 43). This was inaccessible at the time of the visit, but an earlier photograph taken in 2009 showed it to be the same design as the others, although the eastern embrasure was wider than normal, probably to allow use of a machine-gun, or simply to take advantage of the wide field of fire available in the exposed location. The doorhead on the west side is lower than usual compared to the top line of the roof, suggesting a variant heavy type with a thicker roof slab, similar to BA10.

Further south is BA118, set well inland close to a Second World War lozenge pillbox (Plates 50, 51). This is again of standard construction, with the door to the west, but could not be closely approached due to access problems.

No First World War structures were positively identified in Ulrome, although two pillboxes of unknown design are shown on the 1955 beach obstructions plan, one of which had already fallen by 1946, and may therefore have been of First World War date; concrete fragments still survive at both locations (UL60, SK71).

Due east of Skipsea village at the end of Cliff Road is a structure identified in 2001 by Defence of Britain as a Second World War observation post with loopholes, located on the cliff edge (SK11). On the beach at this point in 2009 was a square concrete slab and other remnants (Plate 53), suggesting the possibility that this was in fact a First World War pillbox or forward observation post (see SK49 below). The 1955 beach obstructions map shows two pillboxes on the beach in this location, the northernmost of which can be identified as a Second World War eared pillbox, the southern may be SK11.

Continuing south, Withow Gap, Skipsea was another area which was defended in both wars, although severe coastal erosion has destroyed much of the evidence. Two square pillboxes, SK50 and SK63, are located behind the cliffline here and a possible forward observation or command/communications post, SK49, was identified on the beach. The pillboxes are both of the same design as the Barmston examples, differing in that the embrasures were cast without a splay. SK50 is located some distance inland on the line of a hedgebank (Plates 58–60), while SK63 is much closer to the beach, also on the line of a field boundary, now removed (Plates 61–63).

On the beach is a jumble of broken concrete extending either side of Withow Gap, including the remains of a number of Second World War pillboxes, a beach defence light, gunhouse and other structures. Among them, immediately north of the Gap, was a small structure, SK49, c 1.8m square (Plates 53–57). In 2009, this structure

was the correct way up, with a double-thickness slab roof c 0.4m thick directly over the doorway, which was offset to one side of what at the time was the north wall. SK49 was sunk into the beach sand, and it was not noted at the time whether any embrasures were visible. Photographs from c 2010 show the beach level much reduced and the structure had been entirely revealed (Plate 53), but by 2012, it had been inverted by tidal action and the roof (now the base), sunk into the sands, with the doorway now at the south side (Plate 54). Interestingly, the 1955 beach obstructions map shows that BA49 was already on the beach, indicating the progress of erosion since the end of the First World War.

Taken together, the evidence shows that the lower walls of SK49 had been trench-built, with concrete poured into a pit and showing no external sign of shuttering, unlike the upper sections and interior. Vertical steel rods had been used for reinforcement. There seems to have been no floor, or at least no slab was present, although this may have been poured after the walls were finished and become separated. In addition, there were the truncated remains of what appeared to be integral stub walls either side of the doorway, and a protuberance below it containing the impression of a step or threshold (Plate 54). This suggests that the pillbox was constructed partly below ground, with retaining walls either side of the doorway and steps or a ramp leading down. At c 0.4m, the walls and roof are thicker than the standard pillboxes (Plate 55), and it more closely resembled BA10, which also appears to have been semi-sunken. Photographs from c 2010 show a single small square embrasure with a wide internal splay (Plate 53) and the base of the embrasure at beach level was visible in 2012 near one corner with two large bolts below (Plate 57). It is most likely that SK49 was a forward observation or command/communications post, although it could have been a machine-gun pillbox, similar in concept to BA10, with the bolts holding a mounting or support bracket. It is unclear in that case why the embrasure was near a corner, as it would have severely restricted the arc of fire, unless SK49 was located in a position where a full arc of fire was not possible; unfortunately its original location (and orientation) cannot now be determined.

To the south, the cliff was higher and increasingly affected by erosion, destroying any potential evidence for front-line defences. Two pillboxes were, however, present on the beach in 1955 in front of what is now Far Grange golf course, neither of which have been recorded elsewhere. Around 200m inland at Atwick, however, is a semi-sunken structure identified previously as a Second World War command post (AT24), located south-east of the site of a First World War airfield, RNAS/RAF Atwick (Plates 64–69). In the light of the discoveries made further north and the fact that it is clearly shown in the centre of a field on the 1927 1:2500 Ordnance Survey map, this unusual structure was re-examined as it obviously antedated the Second World War. Despite a different layout and purpose, and the fact that only the upper portion was visible above ground level (Plate 65), AT24 proved to be of the same general construction as the other First World War structures, built between plank shuttering and using the same type of concrete (Plate 65). The structure was rectangular, c 4.0 x 3.5m, with walls c 0.16m thick. There was a rebated doorway in the west side (Plates 66, 67) but no embrasures, just a row of ventilation pipes set near the top of the north and south walls (Plate 68). The doorway was flanked externally by two thin wing walls forming the sides of a sunken passage leading down into the semi-sunken structure, possibly with steps at the west end. There are traces of a brick internal partition dividing the structure into two cells (Plate 69). The roof has been cast around four iron girders set in a diamond shape from the midpoint of the walls, with the soffits exposed; the plank shuttering for the roof had been applied directly below the girders. On the roof, the tops of two east–west girders are exposed, flush with the

concrete. These were presumably fastened to the diagonal girders as additional reinforcement.

A re-examination of the 1927 1:2500 OS to identify any further possible First World War structures in the Atwick area revealed a north–south rectangular structure of the same apparent dimensions as blockhouse BA19, located to the east of AT24 at the west end of a field next to the junction between Long Lane and Cliff Lane. Although this has subsequently been demolished without trace and there is no evidence of construction, the structure was not present on the 1910 1:2500 OS. If this was also a blockhouse, it would have commanded the main access route from the beach to Atwick village; a similar structure was shown surrounded by barbed wire (AT25) next to the road at the cliff edge a little further east in the Second World War, a location which no longer exists due to erosion.

Following the identification of AT24, two further semi-sunken structures of similar apparent construction were identified to the south, both also originally identified as Second World War command centres. The first of these (AT58) was located south-east of Atwick with a Second World War lozenge-pillbox (AT59) immediately to the south-east (Plates 97–101). Small loopholes or observation holes had been knocked through the outer walls, possibly after it went out of use for its original purpose; like AT24, it had consisted of two cells and was entered via a concrete-lined passage leading down on the west side (Plate 98). AT58 was not, however, present on the 1927 1:2500 Ordnance Survey, but was shown as a small earthwork mound on the first post-Second World War map edition, next to the pillbox. On re-examination, the structure was found to be considerably larger and of different construction and finish to AT24, more closely resembling nearby pillbox AT59: the original Second World War date was therefore upheld.

At East Garton an identical structure to AT24 was identified (EG27). There is a sunken entrance passage with steps on the west side (Plate 70) and the roof is again constructed around a diamond of diagonal girders. Like AT58, there is a Second World War lozenge-shaped pillbox immediately to the south-east, but in this case it is clearly later as EG27 does appear on the 1927 1:2500 Ordnance Survey, supporting the early date, but is interestingly identified on that plan as an ‘Icehouse’, presumably because of its semi-sunken position and general location within the grounds of Grimston Garth. The construction of the walls and type of concrete used in AT24 and EG27 is similar to other First World War structures to the north, and they are assumed to have fulfilled a command/communications function in the second line of defence. The Second World War structure AT58, although larger and obviously much later, has features in common suggesting that its layout or at least its general details were inspired by the First World War posts.

A search of the available records has not revealed any further First World War structures for some distance to the south until the area at the end of Pasture Lane, Roos, is reached; this was a heavily-defended access point north of Tunstall, with a concentration of Second World War pillboxes, trenches, and a ‘Diver’ anti-aircraft battery.

Not now verifiable due to coastal erosion are a ‘Second World War square pillbox surrounded by a barbed wire perimeter, situated to the N of Monkwith’ (RO29) and a ‘Square semi-sunken structure with earth blast walls’ identified as a Second World War fire command post on the cliff at Old Hive, north of Easington (EA5). In view of what is now known, the latter may have been a structure of the same type as those described, quite possibly a forward version like SK49, although whether it was of First or Second World War date is unclear. Pillbox RO29 was in the same area as

two square brick examples with concrete roofs, also now lost; these were probably Second World War Type 26 variants of which there were several examples in the southern sector between Hornsea and Easington. No brickwork is mentioned in the case of RO29, although this may be a simple omission.

No comparable structures are present in the area of the Godwin and Spurn Batteries, although a number of original First World War buildings survive apart from the main batteries, including blockhouses, searchlight installations and observation posts, mainly of concrete-block construction.

Elsewhere, there is a suggestion that First World War square pillboxes were built to the north, with single examples possibly represented in Filey and Cayton Bays (Plates 72, 73). These were, however, identified retrospectively from photographs taken in 2009 and further field investigation would therefore be required to confirm their date; both were originally considered to be Second World War structures, but resemble no known types in these areas.

The Monuments

This section describes each structure in more detail; tabulated summaries with recommendations are also included in Appendix 1 (Gazetteer).

Drawings and photographs are bound at the end of the volume.

BA4
(Fig 4; Plate 1)

This pillbox now only survives as fragments on the beach at TA 1705 6320 (Plate 1), although the 1994 Defence of Britain record described the structure as square with three embrasures. The largest fragment consists of a complete wall laid flat with adjoining sections of two other walls, each of which preserved traces of a splayed embrasure. The walls are of standard 0.15m (6in) thickness with the central mesh reinforcement visible and the surviving wall shows the full width and height was the same as the preserved examples (c 2.1m). The top of the wall is flat where the roof slab was formerly laid across, and the pillbox has an integral floor slab.

Although only one end of each of the two remaining embrasures survived, this was sufficient to demonstrate that they are wider than standard, possibly c 0.7m, which would suggest that the pillbox was designed as a front line machine-gun post, although the intention may simply have been to create a wide field of fire.

BA10
(Figs 4, 7; Plates 2–11)

Located in front of Auburn Farm at TA 1686 6280, this structure differs in detail from the other First World War pillboxes recorded during this current phase of work, although the construction method and materials are clearly the same. The pillbox was semi-sunken with only the upper c 0.8m visible; this may have been the original intention, to reduce the profile of the structure (Plates 2–6). The western (landward) entrance is almost completely blocked by soil, and a visual inspection of the interior could only be carried out from outside with measurements made using a handheld laser distance measurer (Plate 6). The interior is filled almost to ground level with water and organic matter (Plates 9–11).

BA10 is of concrete cast between plank shuttering; on the eastern exterior, the planks were, unusually, set vertically, whilst on all other sides and on the interior, they had been set horizontally, which is the case elsewhere. Elsewhere, the First World War structures contain characteristic small expanded diamond mesh reinforcement, although this could not be confirmed in the case of BA10.

The structure is orientated east–west with the entrance on the west (landward) side; this may have been reached by a ramp if the pillbox was sunken at the time of construction, although it is possible that the ground has been raised subsequently. There was a single original embrasure on the east (seaward) side (Plate 8) and it is therefore likely that this was a machine-gun emplacement with the gun firing on a fixed line within a limited arc. There are two further embrasures on the north-eastern and south-eastern corners; these are a much later, probably Second World War addition as discussed below (Plate 7).

Externally the pillbox measures 2.70m east–west, 2.42m north–south, and internally 2.22m east–west, 1.96m north–south, with the thickness of the walls varying only slightly between 0.24–0.26m. The roof was comparatively thin at 80mm, with no signs of steel reinforcing beams, although presumably at the least it contained steel mesh. The overall height of the structure was impossible to determine due to its semi-sunken condition. However, the observable measurements show that the minimum height exposed on the exterior was 0.80m on the seaward side and an additional 0.30m internal height (to the water line) was also determined. It is probable from comparison with other First World War structures that the original height was a little over 2m, but without internal excavation, this cannot be confirmed.

The doorhead on the landward side entrance is set 0.36m below the external roof line and the opening is 0.60m wide; there was no evidence of any remains of frame or lock fastenings on the visible portion of the entrance, and no frame or door rebate (Plate 9).

There are only very partial remains of the base of the original splayed embrasure on the east side due to later alterations (Plate 8). The shape is typical of the First World War embrasures recorded on other pillboxes, splayed towards the outside; 0.21m wide on the interior increasing in width to the exterior to 0.45m, giving an approximate 45° field of fire. Only 90mm of the original sides remain above the lower sill, the remainder having been destroyed by probable Second World War modifications.

These modifications consist of a substantial widening of the original embrasure and the addition of two further embrasures on the north-eastern and south-eastern corners. These appeared to have been created using a jack hammer or power chisel; regular 30–40mm diameter marks left by metal chisel points are particularly visible on the base and sides of the embrasures (Plates 7, 8). The width of the original central embrasure was increased to 0.81m with a height of 0.35m (0.44m above the base of the original embrasure). The dimensions of the corner embrasures differ. The south-eastern embrasure extends 0.50m along the south side and 0.40m along the east side and is generally 0.20m high. The north-eastern embrasure extends for 0.50m east–west and 0.48m north–south, and was 0.29m high. Their relative heights below the external roof level varied also between 0.40m (south-eastern embrasure) was cut below this level, 0.32m (central embrasure) and 0.34m (north-eastern embrasure). The corner embrasures are cut perpendicular to the walls whilst the eastern one has a slight outward splay.

BA19
(Figs 4, 8; Plates 12–18)

This structure is a rectangular blockhouse (orientated east–west) set fairly well back from the current cliff and significantly inland of the First World War coastline south of Auburn Farm at TA 16855 62692 (Plates 12–18). It must have been intended to shelter a number of soldiers: ten embrasures are present, sufficient for an infantry section. There are three in the northern and southern sides and a further two each on the shorter western and eastern sides. An unusual feature is the presence of entrances in the western (landward) and eastern (seaward) end walls, flanked by loopholes (Plates 13, 14), suggesting that the blockhouse may have been designed for rapid dispersal of its occupants. It may have been intended to function as a central point to garrison the surrounding trenches and pillboxes.

Both entrances were blocked by obstructions at the time of examination, so access to the interior was not possible; however, internal measurements were made using a handheld laser distance measurer.

BA19 is of cast concrete construction using wooden planked shuttering laid horizontally on both the exterior and interior (Plates 13, 17, 18). This structure uses small diamond mesh reinforcement, like other First World War pillboxes recorded in this area. This was identified mostly around the edges of the embrasures, where it appears that during construction the concrete had been poured into the wooden shuttering and the embrasures may either have been only roughly formed, or were cut later, possibly even before the concrete had fully set. In either case, the mesh has been exposed and was roughly snipped where it extended into the embrasures; the edges of the embrasures were then smoothed using cement (Plates 15, 16). Given that the mesh was never fully tidied up or snipped cleanly to the edge of the embrasures, it is possible that they never saw any use, as the wire would have snagged the barrels of weapons and possibly hands (Plate **).

The external measurements are 4.48m east–west and 2.66m north–south. The internal measurements are 4.04m east–west and 2.37m north–south. The thickness of the walls varied from 0.12m (west), 0.15m (north and south) and 0.14m (east). The overall height of the structure is problematic, like the majority of the structures recorded and is a composite of external measurements and internal measurements, bearing in mind that in this instance, like many others, the interior has some build up of soil. With that in mind, the overall observed height is 1.80m from the internal ‘floor’ to the external roof line, and an original height of at least 2.0m is likely.

The roof consists of double layers of concrete, with the second layer probably poured almost immediately after the first had set on its plank formwork. Overall, the thickness of the roof is 0.16m, with each layer being 80mm thick.

The entrances on the landward and seaward sides are set centrally to their respective walls, with the head of the doorway formed by the soffit of the roof slab (Plate 17). The difference between the width of the entrances is minimal; 0.78m (east) and 0.76m (west); neither are rebated. On the seaward entrance jamb there are rectangular recesses set 0.52m below the doorhead, each being 40mm high and 40mm deep; these may have been for a hinge, although they may have held clamps for a door frame (Plate 18).

The embrasures are not set at rigidly regular intervals, possibly because they appear to have been cut rather than cast. They are however set at a standard height of 0.47m below the external roof level (Plates 17, 18). Their dimensions vary only

slightly; the width of the external splay ranges between 0.33–0.36m and height between 0.20–0.24m (Plates 15, 16). Internally, the taper of the splay reduces the width to between 0.20–0.22m.

Also present are three vertically-set ceramic vents set into the thickness of the roof (Plates 13, 17). These were formed using cut sections of 0.15m diameter ceramic pipe or land drain; the first is located 0.80m from the eastern edge, 1.22m from the northern edge, the second 3.51m from the eastern edge, 1.22m from the northern edge and the last is situated in the south-western corner of the roof, offset from the western side by 0.48m and the southern side by 0.45m.

BA21
(Fig 4)

Fragments of a possible First World War square pillbox were located on the beach c 100m south of Auburn at TA 1702 6261 close to the location of a previously recorded structure (HSMR ref MHU9983). There was no sign of the pillbox remains in 2012 and no further details are available.

BA22
(Figs 4, 9; Plates 19–22)

BA22 is located within a pasture field next to a small copse to the south of Auburn Farm at TA 16724 62642 (Plates 19–22); at the time of the visit the pillbox was being used by cattle as a shelter and full access to the interior was not possible for health and safety reasons.

This pillbox is typical of the style of First World War pillboxes recorded in the area (Plates 20, 21). The plan is 2.14 x 2.14m square and the structure is of poured concrete within a wooden plank shutter formwork, the planks set horizontally both on the interior and exterior. It is likely that an expanded steel lattice was used to reinforce the structure. The maximum exposed external height of the structure is 1.70m whilst the thicknesses of the walls are a uniform 0.13m and the thickness of the roof is 80mm.

The pillbox has three embrasures in the centre of the north, east and south faces, each is slightly splayed outwards (Plate 21) and all have the same dimensions, 0.32m wide and 0.20m high. There is a central entrance to the west, 0.73m wide. There are traces of recesses for clamps on the inner edge of the door reveals at either side near the top, and a small square bolt socket or similar near the base on the south side. The interior was devoid of features, other than the formwork impressions.

Possibly related, just outside the entrance at the south-west was a hardened lump of concrete in the shape of a sandbag (Plate 22). It is unknown if this is a more recent deposition, or a leftover remnant of the original construction. The concrete certainly has similarities to the actual structure itself in terms of its appearance.

BA30
(Figs 4, 30; Plates 23–35)

This site comprises a pair of square pillboxes straddling a field boundary south of Auburn at TA 16898 62309 and TA 16999 62313, separated by a north–south distance of only 2.35m; they have a commanding joint field of fire (Plate 23).

Both pillboxes are of the same type of construction (Plates 25–26); cast concrete using wooden plank formwork set horizontally on the exterior and interior. The northern pillbox has two embrasures, one on the northern face and one on the eastern face. The southern pillbox is a mirror image, with embrasures on the southern and eastern sides; there is no embrasure on the inward facing sides. The entrances to both are to the west. The structures are similar in dimensions and the dimensions of the northern pillbox are therefore given here.

In plan, the pillbox measures 2.12m east–west and 2.14m north–south. The height from the external roof line to the internal floor level is 2.04m, with the roof being a double layer of concrete, each layer being 80mm thick.

The eastern entrance is centrally set, with the doorhead located 0.14m below the external roof line (Plates 27–28). There is the recess for a wooden lintel at this upper level, which may have acted as a former while casting the entrance opening. The lintel is 0.90m wide and 40mm deep, the entrance immediately below was 0.80m wide. There are the remains of elements of the doorframe fixings, most noticeably a partial hinge on the northern side of the entrance 0.50m below the upper section of the former door. The southern pillbox has a modern doorframe fixed with mastic and contains some furnishings, the signs of recent occupation (Plate 29).

All of the embrasures are set central to the walls (Plate 30) and traces of the iron reinforcement are visible around the openings (Plates 31, 32). The height above ground varied: the top of the northern embrasure is set 0.40m below the external roof line compared to 0.58m for its eastern counterpart; by comparison the southern embrasure on the southern pillbox is set 0.60m below the roof line. The sides of the embrasures are slightly splayed, each being 0.38m wide on the exterior (Plate 30) narrowing to 0.27m on the interior (Plates 33, 34); all are 0.20m high.

Also present on both pillboxes is a single vertically-set circular ceramic vent, each with a diameter of 0.12m (Plate 35). Their positioning is not central to the roof, but both are offset to the south by 0.30m from the centre point.

BA36
(Fig 4)

A complex of Second World War obstacles were recorded through aerial photographic analysis at Fraisthorpe Sands during Phase 1 of the RCZAS (TA 1695 6184). Nothing now survives, but traces of one, possibly two square pillboxes of presumed First World War vintage were found in the e same area at TA 1693 6182 and TA 1693 6188. These were not visible in 2012, and no further details are therefore available.

BA74
(Figs 4, 11; Plates 36–41)

This pillbox is located on a field boundary to the rear of a Second World War lozenge pillbox (BA75) south of Auburn at Watermill Grounds (TA 1688 6115). BA74 is square, of concrete construction using plank shuttering with thin and narrow diamond expanded mesh reinforcement, exposed in the upper north-western corner of the interior (Plates 36–41). The shutter planks were set horizontally on the exterior (Plates 37, 38), but were vertical on the interior. BA74 is orientated east–west with embrasures on the north, east and southern walls and an entrance on the landward (west) side.

Like the majority of the recorded pillboxes recorded, the position of the structure on a field boundary means that it is slightly sunk into the surrounding landscape with some internal soil accumulation, although the full height can be calculated using composite measurements.

The external dimensions of the pillbox are 2.12m east–west and 2.14m north–south. Internally, the dimensions recorded are 1.84m east–west and 1.84m north–south. The average thickness of the walls ranged between 0.12–0.16m. The thickness of the roof is 0.14m and the overall height from the external roof to the interior floor level is 2.20m.

The three embrasures are similar in size and shape and set 0.54m below the external roof line and 0.23m high. They are 0.40m wide externally narrowing to 0.30m on the interior giving a narrow field of fire. The embrasure on the eastern (seaward) side, however, has a significantly larger external splay, being 0.68m on the exterior but just 0.32m on the interior. There are no indications to suggest that the embrasure was modified for use by a machine-gun, and it is likely that the intention was simply to give a much increased field of fire either side of the field boundary, which certainly obscured the view (Plates 38, 40); this may not have been an original feature, but could have been widened after the Second World War pillbox was constructed to the east (Plates 37, 41).

The entrance on the western (landward) side is partially blocked by the ingress of soil and detritus (Plate 37). The width of the entrance is 0.60m and the height is the same as the internal floor to ceiling measurement of 2.06m. On the northern side are two cast recesses set 0.60m apart, the upper one being rectangular (90 x 40 x 70mm deep) and the lower 80 x 80 x 60mm deep) and on the southern side are two further recesses, the lower one at the same level as its opposite number but smaller at 60 x 30 x 40mm deep, whilst the upper slot is set 0.65m higher 110mm wide, 30mm high with a sub-circular slot at the eastern side, possibly for a bolt (Plate 39). The slots are presumably for frame fixings.

BA94
(Fig 4; Plates 42, 43)

This pillbox was situated on a rise in the centre of a field at Low Grounds (TA 1674 6023) which was cropped at the time of the site survey in 2012 and the previous survey in 2009, and was therefore inaccessible. Examination of the available photographs taken on these occasions (Plates 42, 43), however, reveal that it is a broadly standard 2.1m square pillbox with the entrance on the west side, and small, slightly splayed embrasures c 0.35–0.4m wide in the north and south sides, the tops c 0.65m below the top of the roof. There are, however, several differences form the standard design. The most obvious is the presence of a much larger splayed embrasure in the east wall, c 0.9m wide on the exterior, reducing to 0.65m on the inner face (Plate 42), suggesting that it may have been designed to house a heavy machine-gun, although as the pillbox had a good field of fire, it may have been intended simply to maximise its location by widening the arc. The impressions of horizontal shuttering planks are clearly visible.

The second difference is that the doorhead is set c 0.7m below the roof level, implying a much thicker roof slab than standard, since the lintel is normally formed by the soffit of the roof. The top of the door is also at the same level as the top of the embrasures, whereas the embrasures are usually at a much lower level, c 1.4–1.5m from floor level. It could be the case that the door is lower than usual, otherwise the defenders would have required a firing step.

BA118
(Fig 4; Plates 50, 51)

This structure is located north of a holiday camp in a field which was under crop at the time fieldwork was carried out in 2012 and was consequently only visible from a distance.

Two pillboxes are located close to TA 1692 5960 on the line of a former field boundary, with the northern example being a standard Second World War lozenge (Plate 50). Forty metres to the south is a smaller, First World War 2.1m square pillbox of standard type with an entrance on the west side and small single embrasures in the other three walls. The seaward (eastern) example is close to c 0.4m in width, the top c 0.6m below the top of the roof suggesting that it is the same as BA22, BA30, BA74 etc, albeit the embrasures are set a little lower or the roof is higher.

The pillbox is still over 120m inland today, and is likely to have formed part of a second line of defences. Aerial photographic analysis undertaken for Phase 1 of the RCZAS showed that in the Second World War both pillboxes were contained within a barbed wire perimeter extending east, with two corridors extending to the west and a trackway leading from the south towards the present-day Barmston Beach Holiday Park; it was clearly reactivated, therefore.

BA190
(Figs 4, 12; Plates 44–49)

The pillbox is located on a field boundary at TA 16867 60685 to the rear of a Second World War lozenge pillbox, BA84 (Plate 44). Like the others, BA190 is of cast concrete utilising wooden plank formwork, the boards laid horizontally on the exterior and vertically on the interior. It is a standard pillbox, with three embrasures, one each on the northern, eastern and southern sides with and entrance to the west and is orientated with the entrance to the west.

Externally the dimensions are 2.14m north–south and 2.14m east–west and internally 1.88m east–west and 1.88m north–south giving a wall thickness of 0.13m. The thickness of the roof is 0.12m and combined with the visible internal height, gives a total of 1.64m; the original height would have been substantially greater, but the interior has been partly infilled.

The centrally-set entrance in the west wall is 0.70m wide with the doorhead set 0.12m below the roof line (Plate 45). The southern side of the entrance retained the remains of ferrous hinges and recesses indicating that the door there had been reset at least twice during its period of use; up to five examples of decayed ironwork were noted (small stubs) as well as two recesses (up to 100m high and 40mm wide filled with decayed wood) which are offset from each other.

Each embrasure is centrally set to their respective walls with the tops 0.38m below the external roof line, and they are slightly splayed (Plate 46, 47). The dimensions are similar for all three: 0,40m wide on the exterior narrowing to 0.36m on the interior and 0.30m high.

SK11
(Fig 5; Plate 52)

Recorded as a Second World War observation post with loopholes on the cliff edge next to the beach access east of Skipsea village, the 2009 survey revealed a square concrete slab and other fragments on the beach at this location (TA 182 552: Plate 52); these were not visible in 2012 and the site was therefore not investigated further. The size of the slab suggests SK11 may in fact be either a First World War pillbox or a forward observation/command post similar to SK49. Two structures are shown on the beach here on the 1955 beach obstructions plan, one of which may be the known Second World War pillbox SK9 to the north.

SK49
(Figs 5, 13; Plates 53–57)

This structure at the time of recording is currently inverted on the beach at Withow Gap (TA 18384 54659), but during the Phase 2 survey in 2009 it was the correct way up (Plate 53); the beach level had dropped significantly in this area in 2012 and a combination of shifting sands and wave action has been responsible for the inversion. The loss of sand is probably the result of one of the periodic 'ords' (wave-like movements) which move southwards between Barmston and Spurn over a period of years, carrying beach sediment with them.

At the time of the 2012 survey, SK49 had sunk to approximately one third of its height, exposing 1.52m of what had formerly been the base (Plate 54). The action of the tides has begun to erode the outside of the structure, thereby reducing the overall measurements, although not significantly as yet. In addition, it is clear that the concrete raft foundation, if one existed, has been destroyed or moved elsewhere. The 2009 photographs show the roof was still present, and it is assumed that this is in place below beach level.

SK49 is of concrete construction cast within a wooden plank formwork, with the planks set horizontally on the exterior and interior.

This structure is broadly square in plan, particularly on the interior. Externally, the dimensions recorded are up to 2.10 x 1.96m; internally the measurements are 1.26 x 1.32m. The thickness of the wall is generally 0.36m (Plate 55) but did appear to have additional reinforcement next to the entrance extending the thickness to a total of 0.60m in places; this however is almost certainly related to the original provision of retaining walls supporting a sunken access passage. An attempt has been made to correlate the photographs taken during Phase 2 of the RCZAS project and the current record to produce a composite plan and elevation (See Fig *). It is suggested that the minimum height for this structure taken from the drawing is a little over 2.0m.

The entrance is offset from the centre of its position within the wall by 0.20m and is 0.56m wide; the height is currently unknown although can be calculated (Plate 56). On each side of the doorway there is a series of three 0.1 x 0.1m recesses, five of which contained wooden plugs, the empty recess being 70mm deep. It is likely that these plugs would have held screws for the doorframe.

On the wall opposite the entrance is the base (currently the top) of a small 0.12m^2 opening set 1.20m above the probable original floor level and offset from the centre by 0.40m (Plate 57). There is a bolt in the wall below the base, which may have supported a shelf bracket. This aperture was visible during the previous visit to the site (Plate 53). It is considerably smaller than embrasures recorded elsewhere, and it is probable that it was not used for defensive purposes, but was perhaps intended for forward observation or communication in a position which was potentially exposed to enemy fire. If this is the case, it explains why the walls of the structure are

considerably thicker than others recorded during this phase of work and also why it was partly sunken.

SK50
(Figs 5, 14; Plates 58–60)

This pillbox, like the others, is square in plan and is located on a field boundary at TA 18059 54727, with the entrance to the west. It is formed of cast concrete within a wooden shutter frame construction and appears to be well made and robust in appearance, possibly because the embrasures are smaller than usual and the impressions of the shuttering boards are prominent, with the planks set horizontally on the exterior as well as the interior. As usual, there are three embrasures on the north, east and southern sides and an entrance to the west. Access to the interior was not possible to the presence of both dense hedges/trees in addition to modern barbed-wire fencing, restricting access to a Countryside Stewardship Scheme to the immediate south of the structure.

The external dimensions of the pillbox are 2.17m east–west and 2.16m north–south; the internal measurements are 1.78m and 1.80m respectively, the thickness of the walls being 0.18m thick on average. The roof is fairly substantial, 0.21m thick, cast in a single episode. An area of concrete had decayed or flaked off at the south-western exterior, revealing the diamond-shaped iron lattice-work reinforcement (Plate 59). The total composite height of the structure is 1.72m (0.18m for the roof and 1.54m internally to the artificially infilled floor level), but by analogy with other examples, would have been c 2.1–2.2m.

The entrance in the west wall is centrally set, 0.60m wide, with the doorhead 0.16m below the external roof line. On the northern side of the entrance are the remains of two iron hinges set 1.22m apart which project from the structure by 40mm. These would have supported a door which had an attachment on the southern side of the entrance positioned 0.82m below the entrance top, recessed by 40mm deep and 80mm high.

The embrasures are not splayed which clearly have restricted the effective field of fire although may have given a marginal degree of protection to the occupants of the pillbox by removing the splay, which would have been prone to deflecting ricochets.

Each embrasure is broadly similar and their dimensions varied only slightly; the height below the external roof level varied between 0.44–0.48m, the external (and internal) width varied between 0.31–0.34m. Their height ranged between 0.20–0.24m. Reinforcing mesh is exposed at the edges of the embrasures (Plate 59). In the case of this pillbox, they have been cast at the level of one of the tiers of shuttering boards both inside and out (Plates 58, 60), whereas normally the pattern of planks seems to bear no relation to their position.

SK63
(Figs 5, 15; Plates 61–63)

This is a typical square pillbox of cast concrete construction using wooden shuttering set horizontally both on the exterior and interior. The structure is orientated with the entrance to the west on a field boundary at TA 18397 54460. The pillbox has an entrance at the west and three embrasures, one on each of the northern, eastern and southern faces. Again, this pillbox has a massive appearance from the three principal elevations, with smaller embrasures set well below the roofline (Plate 61).

Externally, the dimensions are 2.20m east–west and 2.20m north–south, internally the dimensions are 1.86m and 1.88m respectively, with the wall thickness varying between 0.16–0.18m. The overall height from the exterior roof line to the interior concrete floor level is 2.28m and the roof is of one slab 0.20m thick.

The entrance in the west side is central, 0.66m wide, with the top formed by the soffit of the roof, as is standard (Plate 62). On the southern side of the entrance are the remains of two iron hinges which project c 40mm from the wall. On the northern side is a small recess 80mm wide and 30mm high which goes through the thickness of the wall, probably to hold a bolt or similar locking mechanism. There is also a single further remnant of an iron attachment set 0.18m higher than the recess which may have also been a catch of some description, now too degraded to gain a better identification (Plate 63).

The three embrasures on the remaining sides are remarkably uniform. There is no splay and each embrasure is set centrally to its wall with the tops 0.62m below the external roof line, similar to BA118. The dimensions of each embrasure range in width between 0.42–0.48m and their heights are all the same at 0.22m.

Other than the shuttering impressions on the interior of the structure, there are no further details worthy of note.

AT24
(Figs 5, 16; Plates 64–69)

This structure clearly had an entirely different function to the First World War square pillboxes. In the first instance, its position was set well back from the coastline on a slight rise in a field just north of Atwick (TA 19386 51153: Plate 64). Secondly, it is unusual in that, other than an entrance on the western (landward) side, the structure has no other openings or embrasures and was partly sunken. AT24 is therefore interpreted as a command/communications bunker.

Currently set within an arable field and heavily overgrown around its external perimeter, this structure is rectangular in plan, orientated east–west. The visible upper portion is of similar appearance to the pillboxes, with the impressions of horizontal plank formwork clearly visible (Plate 65). It has a western entrance with a sunken access corridor, which was presumably reached by steps at the west end (Plates 66, 67). The corridor extends 1.60m to the west of the western exterior of the structure and is 0.98m wide and 1.0m high; the sides are supported by 0.11m wide concrete retaining walls with their tops flush with the ground level.

The entrance is only slightly offset from the centreline by 0.30m to the south. The opening is unusually wide at 0.92m and 1.88m high with a 40mm lip around the inner edge forming an external recess for a doorframe. Traces of iron spur hinges are still apparent.

The concrete roof is supported and reinforced by ‘I’-beams or RSJs set across the corner angles to form a diamond arrangement, with the soffits visible in the underside of the roof slab (Plate 68). Two more girders run perpendicular to the longitudinal section of the blockhouse.

Externally, the structure is 4.28m long by 3.22m wide, internally 3.96m by 2.91m, with the walls being 0.26m thick. The overall height of the structure from the internal floor to ceiling height is 1.88m with the 0.20m thickness of the roof giving a total of 2.08m. The thickness of the raft foundation is unknown.

On the northern and southern sides, set just below the roof line, are a series of three vents which are not equidistant, but are mirrored across the width of the structure. Each vent is 0.10–0.12m in diameter and consists of ceramic land drain sections set into the wall instead of the roof, as is the case with the smaller pillboxes (Plate 68).

Internally, the only feature is the remains of an internal brick partition offset from the west wall by 1.84m and extending from the south wall for 1.08m (Plate 69); residual traces on the face of the south wall indicate that the brickwork ran from floor to ceiling. The wall is a single brick in thickness (0.10m).

EG27
(Fig 5; Plates 70, 71)

Described by the Defence of Britain project as the site of a Second World War underground bunker, possibly used as a magazine for a nearby lozenge pillbox, EG27, however, appeared on the 1927 1:2500 Ordnance Survey, proving a pre-Second World War origin.

The structure is located south of Grimston at TA 28755 34945) and was inaccessible during the Phase 2 and 3 visits to the area due to the growth of vegetation, but a study of internet photographs of the 'bunker' reveals that it is identical to AT24 (www.derelictplaces.co.uk/main/showthread.php?t=20828).

EG27 takes the form of a sunken reinforced concrete structure measuring around 4.28 x 3.52m with an entrance on the west side reached by descending two steps at the west end of a passage flanked by concrete retaining walls (Plate 70). The doorway appears to be slightly offset to the north of centre, and over the opening is the void left by a lintel; the sides of the entrance included a narrow recess to seat the door. Externally, the structure shows the impressions of horizontal plank shuttering, with a substantial 'fault line' in the upper part of the wall, suggesting a different pour; the concrete contains large aggregate inclusions which are visible around the edges of the roof slab and doorway. As is the case with AT24, the roof is cast around a diamond-shaped arrangement of girders set at 45° across the corners from the midpoint of each wall, with parallel girders between (Plate 71).

There are no windows or embrasures, and the structure is ventilated by small ceramic pipes set just below the ceiling in the north and south walls. A scatter of bricks in the entrance passage suggest that it may have had an internal wall dividing the building into two cells, as is the case with AT24.

RO29
(not illustrated)

A structure identified as a Second World War square concrete pillbox surrounded by a barbed wire perimeter was recorded on aerial photographs on the cliff to the north of Monkwith near TA 30385 33115. This was immediately south of two square brick pillboxes with concrete roofs, probable Second World War Type 26 variants, several of which seem to have been constructed between Hornsea and Easington. It is possible therefore that RO29 was indeed of Second World War date, but as it was of concrete rather than brick walled, it was not necessarily of the same phase and an earlier date is quite possible.

All of these structures have been destroyed by coastal erosion and there was no trace of them in 2009; the site was not visited in 2012.

EA5
(not illustrated)

A structure identified as a Second World War fire command post was recorded on the cliff to the north of Out Newton at TA 38205 22985. EA5 was said to be a square, semi-sunken structure with earth blast walls, a description which might suggest that it was similar to SK49, or possibly the larger 'inland' version represented by AT24 and EG27, although equally, it may resemble AT58.

Lincolnshire

Shortly after the war started, defence of the Cleethorpes area fell on the 3rd (Reserve) Btn Manchester Regiment, and on the Tetney and later Grimsby areas to the 4th (Extra Reserve) Btn. These units would have been responsible for providing the first coastal garrisons and patrols, and would almost certainly have constructed the earliest soft defences (e.g. trenches, observation posts, artillery positions). Subsequently, the 4th/5th (combined) Btns Leicestershire Regiment were based at North Cotes in late 1916 or early 1917, while the 7th/8th (combined) Btns Sherwood Foresters were based at Saltfleet from 1916–early 1918. The latter units therefore are likely to have formed the garrison in the sector where the structures described below were constructed, although the actual construction work was presumably undertaken by civilian contractors or pioneer units under the direction of Royal Engineers.

Concentrated in a short stretch of the coastal area is a small group of trapezoidal pillboxes, of which five have been identified: NS65, 74, SH1, 4, 8, SA11. Pillboxes NS65 and NS74 have been demolished, in the case of NS74 leaving most of the roof slab (in two sections), and fragments of the walls (Plates 75-78), sufficient to confirm the overall shape and construction method. NS65 is less well preserved, with two relatively small sections of displaced roof being the only extant remains, although these are also sufficient to show the use of sandbag shuttering and what would have been a central vent pipe in the roof (Plate 74), similar to examples in the surviving structures, such as SH4 (Plate 90).

The shape of the pillboxes bears a general resemblance to some German examples constructed as part of the 1917 Hindenburg Line defences (Osborne 2008, 47, fig 35), but a regular trapezoid is, in effect half a hexagon; as has already been mentioned, hexagonal British pillboxes were known both on the Western Front (ibid, 48, fig 36) and in Britain. The trapezoidal plan may therefore have been achieved simply by building the forward-facing half of a standard hexagonal design with embrasures on the side angles for machine-gun emplacements, closing the open side with a thinner wall containing the doorway.

In addition to NS74, NS65, three of the extant pillboxes (SH1, SH4, SH8) were largely built within sandbag shuttering (e.g. Plates 79, 87, 92), giving a heavily rusticated appearance similar to examples seen on the Western Front, including the Sailly-au-Bois/Gommecourt area (Oldham 2011, 167). One corner of SH8 has the characteristic ridges of corrugated sheeting at one corner, suggesting the builders used any materials to hand or later repairs were made. SA11, however, shows the impressions of plank formwork (Plate 94). There are also some indications that this pillbox had a slightly different plan, although the rear is buried beneath soil dumped in front of the adjoining seabank at the time a later tower was constructed (see below), and this could not therefore be confirmed. SA11 is built wholly using horizontal plank shuttering, similar to the East Yorkshire pillboxes; it also had

irregular concrete lumps cast directly on the roof to break up the outline (possible a Second World War feature) and an offset doorway (Plate 94).

The interiors of SH1, SH4 and SH8 have the impressions of plank shuttering with the top of the front walls battered inward (Plates 86, 89), reflected externally by stepped-back sandbag impressions from the level of the top of the embrasures upwards (Plates 81, 82). SA11 has no batter, although additional concrete was added to the roof, perhaps in a retrospective attempt to create one. It is assumed that the batter was intended to deflect shot over the roof, although it may have been designed to increase the thickness of wall a horizontal shell would need to pass through. The occasionally visible ends of girders suggest that the roofs were cast around a steel frame, each also had a single central ventilation pipe (Plates 77, 84).

The most visible example, SH1, shows clear horizontal breaks approximately every four courses of sandbags, suggesting pauses between concrete pours and incomplete tamping down (Plates 79–81). The sandbag impressions continue across the breaks in places, showing that the shuttering was built up just above the level of each pour. A particularly visible break runs just below the doorhead, including the recessed jambs (Plate 79), while another runs immediately below the embrasures (Plate 81). Patches of large diameter aggregates are exposed, with one particularly large area in the east wall (Plate 82, 83), indicating that the pouring and tamping down process was uneven, and that the aggregates used were probably too coarse for the purpose; this is also a feature of other pillboxes, including the lower part of SH8. White calcite flows have formed a coating in places, reflecting leaks into the structure flowing through voids in the core (Plate 83).

The pillboxes all had a single splayed embrasure in the centre of the two side walls (Plates 79–81, 85, 92, 93, 95) to provide enfilading fire along the shoreline and a central door to the rear, but there is no corresponding embrasure in the front walls overlooking the intertidal saltmarsh (Plates 82, 92). The thickness of the walls and the angle of the embrasures suggests that these structures were intended to house two heavy machine-guns with limited arcs of fire aimed diagonally across the front of an invading force for maximum effect. In this, the design pre-empted Second World War types, such as the ‘eared’ heavy weapons pillbox (see below) which also had two angled embrasures, the cone of fire being aimed almost along the front line of an advancing enemy force to increase the chance of hitting targets. The fire from the pillbox would have intersected with that of others set further down the defensive line to provide interlocking fields. The lack of a forward firing embrasure would have provided some protection to the gunners from direct fire from the front, and a weapon pointing directly forwards through the thinnest part of the advancing enemy line would in any case have been far less effective. Splayed recesses below the windows may have been intended for spare magazines, or perhaps frames supporting the guns, but they may also have contained baths to cool spare machine-gun barrels (Plate 85).

Several of the pillboxes showed signs of Second World War and post-war usage.

On the roof of SH4 are the remains of a superimposed concrete structure set at a skewed angle (Plates 87, 88). This was interpreted by the Defence of Britain project as a Second World War gun emplacement, although the First World War pillbox below had not at that time been identified as such. It does seem likely that the structure was a later emplacement using the pillbox as a foundation, possibly also related to the target range.

Four Second World War or post-war concrete blocks had been cast around SH8 (Plates 91, 92), supporting a wooden tower associated with RAF Theddlethorpe bombing range a little further south, again at an angle to the original structure. The tower remained until the late 1960s or early 1970s; Theddlethorpe was closed in 1973 and its operations were transferred to RAF Donna Nook. For some reason the tower was set at an angle to the pillbox rather than square on.

SA11 has what are considered to be holdfasts for a Second World War AA gun on the roof as well as added rustication (Plate 94), and may have formed part of the 'Sea View Post' defended platoon locality at that time.

NS65
(Fig 6; Plate 74)

The remains of NS65 consist solely of two concrete roof sections at TF 43892 97943, each no more than c 0.75 x 0.75m across, with no traces of walls visible above ground. These were originally identified during the Phase 2 walkover as part of a Second World War roadblock; however, their general appearance with 'rusticated' edges left by sandbag impressions and the edge of a ventilation hole closely resemble the remnants of NS74, a demolished pillbox to the south (Plate 74). The pillbox is situated on the former seabank near the end of an access track, suggesting that it was intended to defend access; RAF Donna Nook was located to the north-west, although this was not established until after the war ended. Second World War and post-war defences also survive in this area, and there is a possibility that NS65 had been incorporated into these, perhaps being demolished when it became redundant or in a poor state of repair.

NS74
(Figs 6, 17; Plates 75–78)

This site is formed of the fragmentary remnants of a First World War rusticated trapezoidal pillbox of which only two large fragments nearly forming a complete roof and a separate much smaller third fragment probably belonging to the same have been located at TF 44209 96711 (Plates 75–78). Their position implies that the lower portion of the pillbox is located close by, but a visual inspection during the current recording phase could not identify the original site.

Otherwise, the remains of the structure compare favourably with others recorded along this stretch of the coastline. It is of cast concrete and the remains of the rusticated exterior have been formed by the use of sandbag shuttering (Plates 75, 78).

The two main components are 7.80m apart on a north–south alignment (Plate 75). A composite drawing of the two fragments together (Fig**) demonstrates that in plan the roof (and therefore the plan of the structure itself) is trapezoidal, the longitudinal, landward side is 4.40m and the seaward side is 3.20m long, the distance between the two is 2.40m. The angled sides where any potential embrasure might have been located are 2.60m long on each. The thickness of the slab fragments varies between 0.60m along the exterior edges to 0.80m through the centre.

There is evidence for a nearly central vertical cylindrical vent with a diameter of 0.23m which penetrates through the entire thickness of the slab (Plate 76), comparable with SH4 and the remains of NS65.

Also present is a single iron 'I'-beam or RSJ at an 80° angle to the longest side of the roof and located 0.80m below the external level in the larger fragment (Plate 77). This is paralleled in SH1 where similar iron reinforcement has been noted.

SH1
(Figs 6, 18; Plates 79–86)

Located at TF 44529 95828, this is the best surviving example of the First World War pillboxes recorded along this stretch of the Lincolnshire coastline due to its full exposure above ground level and to the relatively good opportunities to record the interior measurements and details using a handheld laser distance measurer. It is orientated south-west to north-east from the rear door to the seaward wall. The pillbox is of poured concrete with the interior cast against wooden shutter construction and the exterior against a wall of sandbags, lending the structure a rusticated appearance (Plates 79–83). Iron 'I'-beams or RSJs were also used to support the roof. The ends of two such beams are exposed on the exterior of the landward and seaward sides although their orientation was not determined (Plate 84).

The maximum height of the structure is 2.60m on the landward (west) side from the base of the trench, but is generally 2.10m high from the general unmodified ground level which slopes down towards the front after 2.30m. The length of the west wall is 5.0m, the north, south and east walls are similar lengths at 3.20m, 3.30m, and 3.15m respectively. The north wall is substantial at 1.25m thick, while the south and east walls are 1.05m and 0.95m–1.20m respectively; By contrast, the landward wall, which was not likely to be struck by shellfire, is between 0.32–0.36m thick.

The walls are near-vertical except for a 40°–45° batter at the top of the seaward (east) wall (Plates 81, 82) which carries through to the inner face (Plate 86). This would have been intended to deflect incoming shellfire, although in practice the uneven rusticated finish is perhaps as likely to have caught and detonated shells on impact. Another benefit, though, was to increase the thickness of concrete a shell moving horizontally would need to pass through if it hit the top of the wall.

There are just two embrasures, set in the angled north and south sides. The northern opening is offset from the centre of the north wall by 0.40m to the eastern (seaward) side. Both embrasures are splayed, the northern example being 0.90m wide on the outer face reduced to 0.45m on the inner. The southern embrasure is set on the centre line of the southern wall and is also 0.90m wide on the external face, narrowing to 0.42m.

On the landward side is a shallow, 0.50m deep and 0.60m wide trench which runs the length of the rear wall, allowing access to the door (Plate 79). The doorway, later blocked by mortared brickwork, is recessed by 0.14m and centrally set in the landward wall (Plates 79, 80). The bottom step, not recessed, is 0.90m wide and 0.24m high. The overall width of the door recess is 0.90m and 1.60m high above the step, with a 0.16m recess on each side and just 0.08m along the lintel. The door opening itself is 0.58m wide and 1.54m high with a chamfer angling down towards the interior.

The interior of the structure was more difficult to record due to the entrance being largely blocked by brickwork. However, using careful observation and a laser distance measurer, it was possible to gain the following information.

The interior follows the same trapezoidal plan as the exterior; however, it was built between wooden plank shuttering which provided a smoother finish (Plates 85, 86). The inner length of the wall on the landward side is 2.94m and the corresponding seaward side is 1.26m, the two walls separated by 1.80m. The angled walls on the northern and southern sides are each 2.02m. The interior is half filled by sand and modern rubbish, and it was not possible to get a true measurement of the interior height. However, measuring from the filled in level to the interior roof and transposing that approximate level to the concrete step below the entrance gave a combined measurement of 1.65–1.70m. It is likely by comparison with the East Yorkshire pillboxes that the full internal height is between 1.80–2.0m.

Approximately 0.10–0.15m below each of the embrasures and offset from the centres by c 0.15m, are deep recesses cast into the wall, presumably for ammunition or coolant storage; each is c 0.40m wide, 0.20m high and up to 0.60m (2ft) deep (Plate 85)

Also present at intervals on the inner wall faces is a series of fairly regularly-spaced 50 x 50mm (2”) wooden plugs, probably attachment points for the plank formwork used during the original construction of the pillbox; they are mostly centred around the side walls, in particular around the embrasures (Plate 85). As already mentioned, the batter of the front wall is apparent inside the structure, being a feature of the plank formwork before casting took place (Plate 86).

SH4
(Figs 6, 19; Plates 87–90)

This pillbox is almost entirely sunk into the surrounding vegetation, and like SH1 is set on the seaward side of the modern seabank at TF 4490 9510, although unlike the preceding example it is positioned at its foot, rather than on the edge of the saltmarsh (Plate 87). The ground level also appears to have risen since construction, whether as a result of deliberate action or natural processes is unclear. This means that very little of the upstanding structure remains above ground level when compared with SH1. In addition, SH4 has had a Second World War installation added to the roof and on the seaward side, which will be discussed below.

SH4 is significantly smaller than SH1, although it is otherwise identical and the style of construction mirrors that of the others in the area. It is of concrete, presumably with some form of internal iron reinforcement (not confirmed for this structure) and the exterior is rusticated, again as a result of being cast within sandbag shuttering, whilst timber formwork was used for the interior.

The structure is orientated south-west to north-east (from the rear doorway to the seaward wall). In plan, the external dimensions of the landward wall is 4.25m at ground level, reducing through a slight batter to 3.70m wide at roof level, the seaward wall is 3.15m at ground level and 2.80m at the top, with the upper section battered inside and out at c 70° as a glacis to deflect shells (Plate 89). The north and south walls are 2.80m and 2.60m long respectively.

Much of the structure lies beneath the raised ground level, and the landward wall is most visible near the central doorway, although only the upper 1.0m is exposed (Plate 87). On the seaward side, the maximum exposed height of the structure is 1.30m. The head of the partially exposed doorway is set 0.50m below the roof line and, like SH1, is recessed by around 0.14m. The overall width of the recess is 0.85m and the exposed height is 0.50m. The width of the recess on both sides of the door is 0.14m, reduced to 0.10m at the lintel. The entrance opening itself is just 0.60m wide

at its maximum with an angled chamfer towards the interior over a distance of 0.20m. The thickness of the landward wall is 0.30m thick at the doorway.

Due to the build up of the surrounding land, the embrasure on the northern wall is not visible at all, although it is presumed to be present. Only a small section of the southern embrasure is exposed under very heavy vegetation. It appears to be set centrally in the wall, with the top located 0.80m below the roof line. No width, height or depth measurement could be recovered for this embrasure, and only the western upper corner is partially visible at the time of recording.

There is very little information available to describe of the interior, due to lack of access. Using the laser distance measurer, it was determined that the interior of the seaward wall is located 1.62m from the inner face of the landward wall and a suggested outline of the interior shape, including the projected southern embrasure, is shown on Figure 19.

The only other item of note recorded for this structure is on the roof itself, where a 0.20m diameter central circular vent is located, revealing that the thickness of the roof is 0.85m (Plate 90); a similar vent was noted on the broken remnants of the roof slab of NS74.

In the Second World War or later, the shallow strip footing for a rectangular concrete structure was constructed at an angle on top of the roof (Plate 87), with a concrete block foundation on the exterior of the seaward wall for additional support (Plate 88). The strip footing was just 0.07m high and there appeared to be a slight chamfer on the seaward side in addition to a shallow, 10mm deep and 20mm wide linear depression along the top, again on the seaward side. The overall dimensions in plan for this later structure are 3.0m east–west and 2.55m north–south. Equidistant along the perimeter of the foundation are a series of eight pairs of upright threaded ¼" bolts, some of which are set in rectangular iron plates 220 x 80mm with an unknown thickness. Given the apparent slightness of the foundation and positioning and type of bolts used, the type of structure set on this pillbox is likely to have been an iron or wooden framework for an observation post, possibly relating to RAF Theddlethorpe bombing range.

SH8
(Figs 6, 20; Plates 91–93)

Located at TF 45652 94329, pillbox SH8 had been extensively altered during Second World War or later, with a series of mostly square substantial concrete pillar foundations added to the corners, in addition to further work undertaken on the roof and the dumping of soil to raise the ground level to the rear (Plates 91, 92). This work significantly obscures the original layout; although it is assumed that the original First World War element is trapezoidal, there is a possibility that it is an irregular hexagon, similar to Second World War Type 24 pillboxes.

The visible details of SH8 reveal that it is of the same construction as the other First World War pillboxes recorded along this stretch of the coastline. The heavily rusticated exterior was created by the use of sandbag shuttering on the upper half although the lower half appears much smoother, and planks may have been used here and there. In addition the northern corner seems to have been cast behind a vertical section of corrugated iron sheeting (Plate 92), either an original variation of the shuttering or a later repair, since the upper elements of the structure in this area have been damaged.

The orientation of SH8 is south-west to north-east and the exposed external length of the seaward wall is 2.60m, the northern wall 1.60m, the southern wall 1.05m and a minor return at the west/north-west side (suggesting the possibility of an irregular hexagonal shape) 0.35m. The maximum exposed height of the structure on the seaward side is 2.20m although it probably extends below the ground level for a significant distance given the level of the two exposed embrasures which are present near the base of the exposed sections of the north and south walls (Plate 92).

The top of the splayed southern embrasure is 1.35m below the roof line and is presumed to be centrally set in the wall, or nearly so. The opening is 0.68m wide and 0.26m high on the exterior, with the internal width reduces to c 0.30m; the wall itself is c 0.80m thick (Plate 93).

The northern embrasure appears not to be centrally set, but offset to the landward side (west) by c 0.20–0.30m (Plate 92). Again, the top of the opening is 1.35m below the roof line and is 0.75m wide and 0.24m high, while the internal width is c 0.50m, rather larger than the other opening, and a reflection of the lack of uniformity in these structures. The thickness of the north wall is 0.90m

Based on the measurements taken, it is possible to suggest that the distance between the northern and southern walls is around 2.20m where the embrasures faced each other. It is not possible to give any further details regarding the interior as no access is currently possible.

There is presumably also a circular vent located towards the seaward section of the structure, but this has been sealed with a modern circular steel cap with “E + A” stencilled into it.

The dominant aspect of the later additions is clearly apparent; as briefly mentioned above these consist of four smoothly finished concrete pillar foundations, situated at the corners of the earlier structure (Plates 91, 92). The two present on the landward side are the largest; in plan, the western foundation is 1.30 x 1.30m, the southern foundation similar at 1.30 x 1.35m. The northern pillar is 1.16 x 0.85m whilst the eastern pillar is much smaller at 1.40 x 0.50m. The tops of the pillars are flush with the original roof slab, while the bases continue below the raised ground surface. The maximum height exposed is at the base of the slope at the eastern corner where the wall exceeds 2.20m. Nearby is a concrete block which appears to be the base of a set of steps, presumably relating to the tower (Plate 92).

The roof as presently exposed is largely of Second World War or post-war date, with the exception of a small area near the north-east corner. There are elements of thin screeds of concrete, probably part of the sub-base for a floor. Set centrally to the corner foundations is a 0.40m^2 raised plinth with a chamfer on the exterior on all four sides, and with a central square hole, 0.16m^2 and 0.10m deep (Plate 91). A photograph of Skidbrooke from the 1960s shows a black tower in the position of this structure which local knowledge has attributed as an observation tower for nearby RAF Theddlethorpe (www.francisfrith.com/saltfleet/memories/is-this-the-watch-tower_52351). The tower was demolished in the 1960s or 1970s, presumably at around the time the RAF bombing range closed.

SA11
(Figs 6, 21; Plates 94–98)

This pillbox is located within a tall sand dune at TF 464 925 and faces seaward, orientated south-west to north-east. The structure is trapezoidal in plan and is of

concrete, unusually for the area cast entirely within plank shuttering with no use of sandbags (Plate 94). The walls on the exterior are therefore vertical and smooth although much of it is buried within the sand dune, meaning that internal visibility is very poor with only a small section of the top of the doorway still visible above ground level at the rear and a smaller portion of the northern embrasure visible at ground level (Plate 95). The southern embrasure is fully buried and not visible (Plate 96).

The maximum height of the structure exposed above ground level is 1.45m next to the top of the northern embrasure. Elsewhere around the external perimeter, the height above ground level varies between 0.70–1.25m to the roof line. The length of the rear wall is 4.72m; the lengths of the southern, northern, and eastern walls are 3.24m, 3.40m and 3.0m respectively.

The doorway, unusually offset to the right of centre by a significant margin, is 0.66m wide with a chamfer at the top angling to the interior of the structure at c 35–40° (Plate 94). The thickness of the landward wall at the doorway is 0.44m.

Only the northern embrasure is partially visible. Here, its width on the exterior is 0.86m and the thickness of the wall appears to be c 0.75m. The upper part of the embrasure is set 1.20m below the flat roof line (Plate 95).

Additional irregular areas of concrete have been added around the northern, eastern and southern sides (Plates 94, 96). This has the appearance of natural 'rocky' camouflage and is up to 0.75m in width and between 0.20–0.50m in height. The camouflage spills over the northern and southern corners on the eastern wide of the structure where some attempt has been made to create a rounded chamfer to smooth off the hard edge (Plate 97). It is uncertain why or when this was added, but SA11 seems to lack the batter present on the other extant structures and this may have been an attempt to create a rough batter to deflect shells or alternatively to camouflage the structure by breaking up the regular outline.

Little could be seen of the interior due to the level of the infill (Plate 98), although the laser distance measurement between the interior of the doorway and the interior of the seaward wall is 1.85m. The walls and ceiling, as usual, show signs of the plank formwork used in their construction.

In the central area of the roof, there is evidence for a superstructure in the form of a degraded, smooth concrete screed or surface into which are set two ½" bolts with hexagonal nuts set 0.85m apart on a line at a 45° angle to the main structure itself. The bolts and concrete screed resemble similar features present on the roofs of SH4 and SH8, suggesting a Second World War or post-war addition, such as a timber watchtower or observation post. It is possible that further remains of the structure lie under the small areas of turf developed on windblown soils which have formed in the sheltered area inside the concrete camouflage.

4.2 Selected Second World War monuments

Background

With the prospect of war against Germany rapidly approaching in the late 1930s, attention was again paid to the organisation of coastal defences, which had been allowed to deteriorate in many instances. Until late summer 1940, British General Headquarters (GHQ) still expected any main invasion to take place somewhere on the East Coast, and many First World War batteries were reinstated with more up-to-date guns, including the Spurn forts and Godwin Battery, while others were

constructed on new sites. Aircraft were now a major threat compared with the relatively limited impact of zeppelins and early bombers during the First World War, and anti-aircraft and searchlight batteries were therefore also built, together with barrage balloon installations. The innovative use of paratroops and gliders by the Germans as early as 1940 during the invasion of Belgium also created a new course of concern, since they were able to neutralise defences in advance of seaborne landings.

Even when it appeared that the much shorter route across the Channel made an invasion of the South Coast more likely following the fall of France, a diversionary attack or large-scale raids on the East Coast could not be ruled out. A substantial second front could have been opened, cutting the country in two and preventing the retreat of British forces from the south by seizing areas around ports such as Bridlington and Scarborough to create substantial bridgeheads; from these it would be possible to drive rapidly inland across the narrowest part of the country to cut the few major roads and railway lines which formed the only connections between the ends of the country. For this reason, very intensive anti-invasion defences began to be put in place in areas considered to be the most vulnerable, including the stretch between the Humber and Scarborough, with the many potential landing points along the Holderness coast, Filey Bay and Cayton Bay particularly well served by pillboxes, coastal batteries, beach searchlights, anti-tank blocks, walls and ditches, earthwork defences, roadblocks, barbed wire, army camps, minefields, flame fougasses and anti-glider posts. These defences were more intensive than any seen further north on the Yorkshire coast or to the south in Lincolnshire and parts of East Anglia, although these areas were certainly not neglected, and parts of the Northumbrian coast were also well defended.

In May 1940, the Directorate of Fortifications and Works (FW3) was set up to oversee the development and implementation of a system of national defences, based around a series of standardised pillboxes. GHQ operating Instruction No 1 (June 1940) stated that ‘Defences wherever possible will be of concrete construction and provided with overhead cover’. Beaches selected for defence would be protected by light machine-guns in pillboxes and beach exits were to be mined and also protected by pillboxes. GHQ Operating Instruction No 3 outlined the role of inland Stop Lines where anti-tank obstacles were to be constructed and protected by pillboxes containing anti-tank guns and machine-guns. There were many complaints that pillboxes were often badly sited or orientated incorrectly, while the designs also often left a lot to be desired in terms of ease of use and the degree of protection offered.

Six basic designs of pillbox (Types 22–27) were developed by FW3 in the following months, including variants for both rifle and machine-gun defence. Plans for gun emplacements (‘Type 28’) and a medium machine-gun pillbox were also produced. Thickness of the walls and roof varied considerably between designs, but also between contractors, the thinnest walls notionally being 1ft/0.3m (rifle-proof), the thickest at least 3.5ft/1.1m (shell-proof), with the roofs being 6in/0.15m and 1ft/0.3m respectively. The standard designs were adopted to local conditions, including the site and materials available. Brick, timber (planks or ply) and corrugated iron sheeting could all be used as shuttering during the construction process, in some cases being left in place to assist in disguising the pillbox; the use of brick facings or other forms of camouflage could hide what was otherwise a standard structure

There were a number of important additions to the initial designs, with three of the most distinctive being located solely in parts of the study area: the ‘lozenge’-shaped, ‘eared’ and Type 23 Lincolnshire three-bay variant pillboxes described in this section.

Lozenge pillboxes of the type considered in this report are only found on the coast between the Humber and East Yorkshire, while the eared type has only a restricted distribution between Holderness and Cayton Bay, the Type 23 Lincolnshire variant, as the name suggests, is found only in present North-East Lincolnshire and Lincolnshire. Various designs for angled or linear section posts were also produced, together with many other designs; examples of two slight variants recorded in this report were built in Cayton Bay and Robin Hood's Bay, North Yorkshire,

In addition to purpose-built, centrally-designed or prefabricated types, local defences including the loopholing of walls and the fortification of farms and other buildings were developed.

In practice, many of these solutions ranged from barely adequate to wholly inadequate, when compared with the type of modern weapons they were likely to face in action, and it is certainly the case that many pillboxes and other defences were badly sited, with little apparent understanding of tactical defence by those responsible. Many defences were constructed in haste, particularly in 1940 and early 1941, and revisions were already being suggested. 'A Post in Concrete, Infantry Training 1937, Supplement No 1, Tactical Notes for Platoon Commanders' (War Office 1941) stated:

> '1. The concrete pillbox is a great aid to defence if intelligently used; if not, it may become a death-trap.
> 2. Concrete is a protection against bullets, shell splinters, and weather. Sometimes it affords protection against shell fire. If properly camouflaged, it is also a protection from ground and air observation.
> 3. Many concrete posts are not complete protection against a direct hit from a shell or from an aerial bomb. They all have the disadvantage of limiting the field of view and the field of fire. The garrison will be unable to use all their rifles at the same time because of the fewness of the loopholes. Finally, the garrison is hindered in the employment of the hand grenade and bayonet;
> 4. Therefore the garrison of a pillbox locality will act as follows:
> (a) The sentry or sentries on duty will be stationed outside the pillbox, where they can see and hear all round them.
> (b) Temporary cover from view, shell fire, and aerial bombing may be sought inside the pillbox; but beware that the enemy are not creeping towards you under this covering fire, whilst you are hiding inside.
> (c) When the attack comes, the light machine gun or machine gun will fire from the pillbox, if it can carry out its task. If not, it must come out to a prepared position.
> (d) Those men who cannot use their weapons inside must man the trenches outside where they can do their duty.
> (e) If the pillbox is surrounded, all except for those who can fire from the loopholes will fight outside, where they can employ all their weapons to the best advantage.'

It was recognised that many pillboxes would never be occupied either due to being sited in inappropriate positions, as mentioned earlier or to insufficient troops being available to man all available positions. There were concerns that early pillboxes had too many embrasures which would allow the enemy to close in and fire through; any openings were also a source of structural weakness. Some embrasures were therefore recommended for blocking, while pillboxes, either inland or for beach defence which local commanders did not intend to occupy were to be made inoperable, either by blocking the embrasures and doorways with cement/bricks or filling the interiors with wire. The exception to this was pillboxes on stop lines which were to be maintained so they could be occupied by relieving or reinforcing troops ordered to keep the line. Many blocked embrasures and entrances visible today may therefore be the result of early wartime instructions rather than post-war alterations.

By early 1942 pillboxes were already considered to be redundant, despite the fact that many had been completed as recently as the previous year. A GHQ memo,

'Construction of Field Defences', dated February 23rd notes: 'All experience of modern warfare points most strongly to the fact that the pillbox is not a suitable type of fortification for either coastal or nodal point defences.' The development of increasingly powerful weapons, including armour-piercing shells and concrete-busting bombs meant that most of the existing pillboxes were too thin to be of any use in an invasion, while the great thickness of reinforced concrete which would be required would both make the pillboxes highly visible and severely reduce the arc of fire unless wide and therefore vulnerable loopholes were provided. All new field defences were now to consist of well-sited earthworks capable of all-round defence. It was recognised that many pillboxes occupied the best firing positions – these could be retained in defence schemes but alternative earthwork positions would have to be provided.

A note on weapons used

The basic infantry weapons used by the British army for much of the 20th century were extremely robust and were in use for long periods, with some modifications to take into account different theatres of war and improvements in materials and manufacturing techniques. The Lee Enfield was still the standard service rifle used by British, Imperial and later, Commonwealth, forces until 1957 in its Short Magazine variant (SMLE); the First World War-vintage Vickers and Lewis machine-guns were both still employed. These weapons had the advantage of using the same .303 cartridge, also used in the Bren Light Machine Gun.

The air-cooled Bren LMG was a major new weapon adopted by the British Army in 1938 and used until 1991. It was derived from a Czech design but was altered to use .303 calibre rounds. The gun was supplied with a folding bipod, but a more complex tripod was also available. The Bren tripod restricted the arc of fire to 38° and was therefore not popular in the field; gunners generally preferred to operate the weapon from the hip suspended from a sling when in open country. This was less of an obstacle when fired on fixed lines through the narrow splay of a pillbox embrasure.

In the spring of 1941, the complex Turnbull Mount was approved for the use of machine-guns in hard defences. The mount consisted of a frame fitted to the inside of an embrasure, supporting a cradle which enabled the gun to traverse and elevate or depress; a gun bar attached to the frame allowed the mount to hold either a Vickers, Bren, or Lewis gun, for which modified variants were available. The cradle would permit a traverse of 90°, an elevation of 11.5° and a depression of 12° and allowed the gun to be fired either on a traversing arc or on a fixed line. More specialised mounts were constructed during the war to allow the gun to be operated in an anti-aircraft role from weapons pits. One type which could hold two Bren guns side-by-side was useful for airfield defence and could both elevate and depress quickly as well as traversing through 360°; another AA mount took the form of a tripod with a long vertical pole with the Bren mounted at the top. For AA use, the Bren's distinctive curved magazine was often replaced by a 100-round drum. Although the sights could be set to 2000yds/1828m, the Bren had a recommended range of 600yds/548m and a maximum practical range of 1850yds/1691m. The American M1928A1 .45 Thompson submachine-gun ('Tommy gun') was used by British and Commonwealth forces from 1941. The Americans supplied this initially with a circular 50-round magazine clipped on below, but this was replaced following British criticisms by a 20-round box magazine, later enlarged to hold 30 rounds.

The pillboxes may also have accommodated the 0.55 Boys Anti-Tank Rifle, capable of attacking armoured vehicles, and introduced in 1937. The recoil when fired was so fierce it was rarely hand-held, and although it could be provided with a single leg

(monopod) it would have required some kind of mounting in a pillbox; variants of the Type 24 irregular hexagonal pillbox and the Allan Williams turret could accommodate these weapons. The Boys had a firing rate of nine rounds per minute and was designed to combat the type of light tanks developed between the wars, but they were far less effective against the thicker armour developed in the late 1930s/early 1940s. The effective range, even on light armour, was just 100yds/91m, and although this was improved upon later, the Boys was quickly abandoned in favour of the American .50 Browning heavy machine-gun equipped with armour-piercing rounds, and the British-designed PIAT (Projector, Infantry, Anti-Tank), introduced in 1943 and used into the 1950s; this fired a 2.5lb (1.1kg) bomb and was short enough to be used in a restricted space, without the backblast of the American 'bazooka'.

Fylingdales section posts

With its potentially suitable beach for landings by raiding parties or invasion forces, Robin Hood's Bay was a defended sector in the Second World War garrisoned initially by the 197th Infantry Brigade, but from February 1941 by B Company the 7th Btn North Lancashire Regiment (Loyals), 215th Infantry Brigade as part of the Durham and North Riding County Division. The battalion was relieved in the same year by the 7th Btn South Staffordshire Regiment.

The clifftop was the site of two rare angled section posts. These were effectively fortified trenches with concrete walls and a slab roof capable of holding an infantry section; the plan form varying to include straight, L-shaped and angled types (Osborne 2008, 254–65). Second World War rifle sections consisted of 10 men, including the corporal in charge, six privates with rifles, and a light machine-gun group consisting of a lance-corporal, a gunner and loader. As such, they held more men than a standard pillbox, which might hold a half-section or less. The number and disposition of loopholes varied between individual locations.

As was the case in Cayton Bay (see below), section posts seem to have been constructed in areas where there was no suitable site for a more standard type such as the local lozenge-shaped pillboxes, which could also house a section. As such, they were tailored to address the constraints of individual sites, such as narrow clifftop locations, without sacrificing firepower. The two Fylingdales examples, FD60 and FD80, remained in good condition at the cliff edge at the time of recording, but both were in danger of falling to the beach due to erosion; part of FD60 had already been undercut, and in March 2013, a demolition notice was served by the Local Planning Authority. Following Osborne (2008, 257), these are categorised as 'boomerang-shaped' section posts (Type 14c), with loopholes on the outer face and the ends, the latter giving covering fire to entrances protected by blast walls, although in this case, there are steps at the landward ends and observation platforms facing the sea. Each consists of two straight sections meeting at slightly differing angles, 43° and 50° respectively.

The Fylingdales section posts are located 1.5km (1mile) apart, FD60 north of Boggle Hole, FD80 to the south of Stoupe Beck. They appear to have been sited at almost 90° to the cliff to provide sideways (enfilading) fire along its line, with only the shorter east end facing the beach itself; here, the presence of an observation post would have facilitated coastwatching duties with the section posts presumably otherwise unmanned except during exercises and alarms. In active use, the disposition of the posts would have allowed the occupying infantry section to target invaders scaling the cliff while sheltering them from direct rifle and machine-gun fire from the landing ground. At this distance, the posts are further apart than the effective range of the standard .303 Lee Enfield rifle (503m), but well within the maximum range. It is

uncertain whether there were more defences in this area which have not survived, but the North York Moors coast in general was not as intensively defended as the area south of Scarborough, probably because it was perceived to be a less likely target for a major invasion.

FD60
(Figs 2, 22, 23; Plates 99–106)

FD60 is the more northerly of the two angled section posts located in Robin Hood's Bay; the site is close to the centre of the bay near Farsyde Stud Farm at NZ 9531 0430. At the time of recording, the section post lay on the very edge of the cliff and the seaward (north-eastern) end was partially undercut by cliff falls and under threat of collapse on to the under cliff below (Plate 99). Although FD60 was generally in a fair condition, its location on the cliff edge had already caused a significant section of the floor to drop away and a number of recent hairline cracks were visible in the south-eastern wall. These cracks originated from the top part of three of the embrasures and ran up to the angle of the ceiling and the wall. From here the crack continued along the angle between the ceiling and the wall and they all appeared to join up (Plate 106).

Due to a combination of extensive vegetation cover and erosion much of the exterior of the section post was inaccessible and it was only possible to make a detailed record of the internal features; as already mentioned, the post was considered to be at risk of collapse in March 2013, and a demolition notice was served.

As recorded, the structure has a single step down along its length to allow it to contour better into the gently sloping landscape approaching the cliff edge. The step is positioned at a point slightly to the north-east of where the section post is angled. The 43° angle of the post allows a wider arc of fire to the seaward side which covers the approach to Boggle Hole, the assumed landing place for any attempted invasion or raid. The section post has ten embrasures along the seaward side which are evenly spaced along both arms. Directly under these embrasures on the inside of the walls are the remains of a series of concrete brackets (Plate 100) which originally would have carried a fire support shelf, probably made of wood, which would have been secured with iron nails into small wooden plugs set into the upper face of the bracket (Plate 101).

The fire support shelf is at two different heights with the landward end and the three corresponding embrasures above it set c 0.15m higher than the seaward section (Plate 102).

Regularly spaced along the landward facing side of the section post are nine embrasures which are offset so that if they had to be used simultaneously with the seaward side, personnel would not obstruct one another. The offsetting would also prevent the defenders from being silhouetted against the embrasures on the opposite side and being susceptible to shots fired straight through; finally the loops on either face would allow a through draught to dissipate cordite smoke during extended periods of firing. Where the original external ground level could be observed it could be seen that the bottoms of the embrasures are flush with the surface.

Internally the shuttering for the construction of the post could be clearly seen to run vertically at c 0.15m intervals and the concrete of the floor had been tamped down across its width. The planks in the ceiling had been arranged across the width of the post. Externally the shuttering is at the same intervals but the planking had been laid horizontally. The exception is at the seaward end where there is an open observation

post (OP). Here the concrete had been rough-cast into the construction trench (Plate 103). Overall the quality of the finish of this section post is much poorer than the ones recorded at Stoupe Brow (FD80) and Cayton Bay. Little attempt had been made to float finish the surfaces and in several areas concrete had partially escaped from between the shuttering. Externally some of the pour lines could be clearly seen (Plate 103) which now form weak points in the structure as the cliff continues to erode.

The roof of the section post is c 0.33m thick with chamfered edges whilst the walls and base are c 0.26–0.28m thick. The embrasures are all of a very consistent size being 0.39m square internally narrowing to 0.17 x 0.23m externally, suggesting a standard template was used during casting; it is known that pre-cast embrasures were sometimes supplied to builders to speed the construction process, although there is no evidence that was the case here. The concrete itself appears to have a high gravel content which may be exacerbating the break up of the structure.

On the roof at the landward (south-western) end is a shallow groove which had been cast into the concrete (Plate 104). The groove deepens as it approaches the edge of the roof and appears to be to carry away rainwater from over the doorway into the section post.

Internally the seaward c 2.5m of the floor has already given way (Plate 105) and is currently lying a few metres down the undercliff. From the break in the floor it can be seen that the section post was built with wire mesh reinforcing; although it is not possible to determine the size of the mesh, it would seem to be reasonable to assume that it is the same as seen in other structures in the area. The step down seen externally is repeated internally with a drop of 0.15m in the floor and 0.18m in the ceiling.

The access steps at the north-western corner of the post are almost completely obscured by vegetation but it was possible to note some details. The steps are protected by a roofless L-shaped concrete blast wall whose top is flush with ground level. Although mostly obscured, from its size it is assumed that it is similar to section post FD80 described below and as such would probably have had three steps down.

FD80
(Figs 2, 24–26; Plates 107–114)

This angled section post, located towards the southern end of Robin Hood's Bay near Stoupe Brow Farm at NZ 96111 03121, survives substantially intact and in a good condition with only relatively small areas of damage visible on the external faces. However, the seaward end has already been undermined by erosion and it is unlikely that it will survive intact for much longer (Plate 107). A measure of the rate of erosion is that according to local information it was still possible 'about 16–18 years ago' (i.e. 1994-1994) to safely walk all the way around the pillbox.

The structure is stepped to allow it to fit closer to the contours of the cliff top (Plate 108). The stepping visible externally is reflected internally but has been slightly offset to allow for the thickness of the roof (c 0.28m). Externally the roof had originally been covered in a thick layer of soil and vegetation which is now badly eroded and missing from a c 0.75m margin around the edge which exposed the tamping lines from the original construction. The remainder of the external faces had all been surface finished with a float and this had obscured the majority of the shuttering lines. The only shuttering lines visible are on the east side and could be seen to be at 0.12–0.14m intervals. Where the cliff had fallen away around the OP at the northern end of

the pillbox the rough-cast nature of the underground portion of the structure could be clearly seen.

There are eight embrasures in the two long sides with each of the four main faces containing four rectangular embrasures; this is fewer than FD60. The southern end of the post had two embrasures and the west wall adjacent to the entrance steps only had a single loop. All of the embrasures measured c 0.18 x 0.24m externally widening to c 0.35 x 0.37m internally.

The entrance steps are located on the western side at the southern end of the pillbox and appeared to consist of three steps down. Only two are visible due to the influx of water washed sediments but from their size a third step can be confidently inferred (Plate 109).

At the northern (seaward) end of the pillbox is a small (1.3 x 1.4m) observation post (OP) (Plate 110) which is accessed by a doorway from the main body of the structure. The OP is unenclosed with the surrounding wall standing c 1.2m high. Due to a large amount of dumped debris and infill it is not possible to obtain full height measurements in many parts of the pillbox. In the north-eastern corner of the OP there are two iron fittings; the lower example is a 60mm thick round bar set into the angle of the wall 0.6m down from the parapet of the OP. The second is a 20mm thick dog set into the top of the parapet. The function of these features is uncertain, but may have been to support heavy binoculars/range finding equipment or to secure the top of a rope ladder to allow access down the cliff face.

Internally the pillbox is in very good condition with the float-finished walls substantially intact. The majority of the floor has been obscured by dumped debris and waterlain sediments but it is possible to determine the internal height at c 1.78m, it is also possible to identify the location of the internal changes in height which coincided in the change in direction of the structure (Plate 111). At the southern end of the pillbox a secondary step is located which appears to be a fire step for slightly higher embrasures on the east side of the landward end (Plate 112).

All of the concrete brackets used to support the fire support shelf are intact. These are located along the western and southern sides of the pillbox and the scar for the original line of the shelf (probably wooden) could still be clearly seen along the walls (Plate 113).

The top of the shelf supports still retain the wood fillet along with the trapezoidal wooden inserts into their upper surface used to secure the shelf itself (Plate 114).

From the disposition of the fire support shelf it can be seen that the pillbox was built to primarily cover the area of Robin Hood's Bay to the north and north-east. As was the case with FD60, the embrasures on the east side are offset and would allow both sides of the pillbox to be manned simultaneously without personnel obstructing each other. As mentioned earlier, the offsetting would also prevent the defenders from being silhouetted against the embrasures on the opposite side, while improving ventilation to allow smoke to escape during firing.

Cayton section posts and command post OS10

Despite restricted access, Cayton Bay would undoubtedly have been an attractive landing point, enabling an invading force to quickly move inland to cut the coastal road and railway leading into Scarborough from the south and begin to encircle and isolate the town with its sandy beaches and harbour, seizing the villages of Cayton,

Seamer and East and West Ayton to form a chain of strongpoints. Presumably for this reason, Cayton Bay was much more heavily defended than Robin Hood's Bay, with the density and variety of hard defences more closely resembling Filey and Bridlington Bays to the south. Eared machine-gun pillboxes and minefields located on the beach and lower cliff were the first line of defence, no doubt augmented by anti-tank and anti-landing obstacles. A fuller description of the defensive scheme, including contemporary aerial photographs, are included in Foot 2006 (Defence Area 26), from which some of the details below have been taken.

The first pillboxes in Cayton Bay and Cornelian Bay were built in July and August 1940 by 257th Field Company Royal Engineers, occupied initially by the Lancashire Fusiliers, followed from early 1941 by the 9th Btn North Lancashire Regiment (Loyals) of the 215th Infantry Brigade. These structures were standard 'eared' machine-gun pillboxes, identical to those recorded in East Yorkshire, and those built in Cayton Bay/Cornelian Bay seem to have been the northernmost examples of the type.

On the clifftop above the beach were supporting defences including two angled section posts (CY9, CY11) with multiple light machine-gun or rifle embrasures. These seem to have been part of a slightly later phase of construction, but had both been built by March 1941 to a special design, which reflects the fact that there were few suitable clifftop sites for standard pillboxes; this had caused a problem with the civilian contractor. The cliff in this area is certainly prone to slippage due to the nature of the drift geology and the presence of many springs, recently affecting dwellings on Knipe Point at the north end of Cayton Bay.

Like FD60 and FD80, which they resembled, the section posts were sited to provide enfilading fire, although in this case they appear to have been constructed almost back to back, with CY11 overlooking the main access point 300m to the west, while CY9 appears to command a sweep of cliff and beach where access would only have been possible with some difficulty; this appears to have been the south-easternmost point of defence in the bay. At the time of the first visit in 2009, CY9 had already fallen from the cliff edge with substantial parts scattered down the coastal slope. However, CY11 currently survives more or less intact although its position on the edge of the cliff has led to the north end being undermined and lost, and the remainder of the structure is likely to collapse in a few years.

The remains of a third possible section post (CY19) were located on the beach in 2009. This had been c 10.0m long and at least 3.0m wide, and appears to have had two or more bays. The identification of this structure is far from certain, however, and there are no documentary references to it; at 3.0m, it is also two side to have been a standard section post. Due to the burial of this structure by sand at the time of investigation in 2012, it was decided to record a possible Second World War forward command/observation post OS10 at the northern end of the bay, since this and other structures in the bay are now being noticeably affected by coastal erosion.

OS10
(Figs 3, 27; Plates 115–118)

This structure is currently lying on its side with what was originally the front elevation facing upwards and its rear partially embedded in the beach near Johnny Flinton's Harbour at TA 06321 85113 (Plate 115). This is due to the structure having fallen from the undercliff in an apparently intact condition, probably due to a combination of erosion from undercutting by the sea and the movement of ground water through the unstable clays of the local undercliff, causing slippage.

The main body of the structure is 2.8m wide and c 2.6–2.8m deep: an unknown proportion of the rear section is buried in the beach. The structure is 2.2m high and the doorway is located on its left hand (northern) end. The doorway is protected by a simple L-shaped blast wall with a rear-facing access. No signs of steps are visible so it is assumed that the whole structure was originally designed to be located above ground level. This would seem to be supported by the lack of any rough-cast concrete seen in the other surveyed structures (e.g. CY9 and CY11) where there is a significant proportion below ground level.

The forward-facing elevation contained a single rectangular opening considered likely to have been an observation slit (1.58 x 0.8m) with the base of the opening 0.98m from the floor (Plate 116). The southern edge of the opening starts at the south wall of the building and has an angled reveal, unlike the northern end which is formed by a single step in the concrete. The walls are 0.36m thick.

Internally the only feature that could be seen is a large iron beam (possibly a short section railway line) which is partially set into the roof (Plate 117). It is uncertain as to the function of this beam, beyond supporting the roof, but it may have also been used to suspend equipment such as range finders.

The structure is entirely constructed from reinforced concrete which had been poured into wooden plank formwork around 0.15m steel mesh (Plate 118). The remains of the construction process could be seen in the traces of vertical shuttering lines at c 0.13m intervals on the exterior surfaces. Internally the shuttering had also been built vertically, but due to very limited accessibility it is not possible to obtain an interval measurement. The concrete had been poured as a series of separate mixes, as discrete pour lines could be seen within the structure.

Overall the condition of the command post is reasonably good but there are now some areas which are becoming eroded. Typically these are the corners which are prone to damage from wave tossed rocks and pieces of concrete which are scattered around the beach. In addition the different pour lines from the original construction are a point of weakness and these are now starting to be attacked by mechanical erosion. As on any sandy beach the solid nature of the command post acts as an ideal substrate for the holdfasts of various species of seaweed and although it is at the head of the beach, and thus exposed for long periods of time, there are still significant areas of weed cover.

CY9
(Figs 3, 28, 29; Plates 119–125)

The pillbox is one of two angled section posts that are located at Killerby Cliff and is currently located towards the bottom of the slope of the under cliff at TA 07297 84138 where it has fallen or slid from the cliff top above. The pillbox is lying with its forward face embedded up to 0.9m into the clay of the landslip, which was probably caused by the movement of ground water through the unstable glacial clays (Plate 119). The fall of the pillbox from the cliff top has caused considerable damage to the eastern end of the structure where it has broken open to reveal some of the internal detail (Plate 120).

Like the Fylingdales examples, CY9 is built as an angled section post: a rectangular structure with a change of direction partway along it which would allow a much great arc of fire to its front. In the case of CY9 the surviving forward face runs for 4.8m (3.5m for the rear face) before deviating at an angle of 70° for a further 3.4m (1.68m)

to the break. The surviving structure has a maximum height of c 2.26m of which c 1.36m was originally buried leaving c 0.9m exposed, the structure is 1.86m wide.

The whole structure is entirely built from reinforced concrete poured around steel mesh (0.15m mesh size) into a formwork of plank shuttering. Within the original casting of the concrete it is possible in some places to distinguish different pour lines from different mixes.

The buried portion of the pillbox is easily identifiable from its very rough-cast nature where the concrete was poured directly up against the excavated sides of the pit, whilst the inner faces are defined by wooden shuttering. Internally the shuttering had been positioned vertically with a plank interval of c 0.17m. The shuttering interval for the underside of the roof is slightly greater at 0.2m. Externally the above ground portion had also been poured between shuttering with a plank interval of 0.17m. The walls are 0.32m thick with embrasures set at ground level. The original ground level could also be seen in a narrow 'apron' of concrete which had over topped the hole in the ground during the original pouring process. The roof is 0.26m thick and still retained the parallel tamping lines from the original casting.

Only one intact embrasure is visible on the forward face of the section post (Plate 121) as the rest have been buried by a land slip. The position of a second could be determined from the pattern of the shuttering lines. The embrasure measured 0.24 x 0.2m externally, splayed to 0.34 x 0.34m internally.

The positions of two embrasures on the rear face were noted and appear to be offset from those on the forward face for reasons mentioned in the discussions of FD60 and FD80 (Plate 122).

Internally the section post is very simple with the only feature being a 0.46m wide, c 0.05m thick reinforced concrete shelf running the length of the inside of the forward face (Plate 123), a variant of the wooden shelves employed in the Fylingdales examples. This would have been used as a rest for rifles and heavier weapons such as Bren and Vickers machine guns, as well as supporting equipment such as range finders. The shelf may also have been used to store ready-use ammunition and keep general stores off the floor which was probably damp at most times.

Access to the post is via a short flight of four cast concrete steps protected by a simple, roofless, L-shaped blast wall (Plate 124). At the bottom of the steps is a 90° turn into the main body of the section post.

Lying some 10m to the east of the portion of CY9 described above are further reinforced Second World War concrete structural remains. This section of building is buried almost to roof level for its whole extent (Plate 125) with the landward (southern) end broken off. Although very little is currently visible, it is possible to determine the extent of the remains in plan (4.88 x 1.86m). At the northern end of the visible portion are the remains of a set of steps protected by a simple roofless L-shaped blast wall; this arrangement is very similar to the installation marking the access to CY9. This can be taken as evidence that the majority of the structure was below ground with, presumably, embrasures at ground level, again very similar to CY9.

It is quite likely on balance that this structure formed the opposite end of CY9 beyond the point where it has broken off, but without further investigation by excavation it is currently impossible to be certain.

CY11
(Figs 3, 30; Plates 126–130)

CY11 is the second of two angled section posts located at Killerby Cliff. It is currently still sited on the cliff edge in its original position at TA 07273 84130 (Plate 126) but its northern end has partially collapsed over the cliff edge due to extensive undercutting (Plate 28).

As with CY9 the pillbox takes the form of an angled section post. In the case of CY11 the surviving forward face runs for 6.34m (5.32m for the rear face) before turning at an angle of 40° to run for a further 4m (2.4m) to the broken northern end (Plate 127). The surviving structure has a maximum height of c 2.0m of which c 0.98m was originally buried leaving c 1.02m exposed; the structure is 1.90m wide. Like CY9, the structure is of concrete reinforced by steel mesh (0.15m mesh size), formed within wooden shuttering. The buried portion of the pillbox is easily identifiable from its rough-cast finish where the concrete was poured directly against the excavated sides of the pit, whilst the inner faces are defined by wooden shuttering. Externally the shuttering planks are 0.15m wide. The walls are 0.28m thick with embrasures set at ground level. The original ground level could also be seen in a narrow 'apron' where concrete had overflowed the construction trench during the pouring process. The roof is 0.28m thick and still retains the parallel tamping lines from when it was originally cast.

A series of embrasures were recorded at ground level along both the eastern and western sides of the section post. All of the embrasures are between 0.92–0.98m apart and measure 0.24 x 0.18m externally, increasing to 0.38 x 0.38m internally (Plate 128). The eastern side retains five loops and the western side has seven whilst the southern wall has a single loop centrally located; the northern end of the post is missing. As with CY9 the embrasures on each side are offset from those on the other (Plate 129).

Internally the pillbox is very simple with the only feature being a c 0.46m wide, c 0.05m thick reinforced concrete shelf running the length of the inside of the forward face (Plate 129), for supporting weapons and possibly for the storage of ready-use ammunition etc.

Access to the pillbox would have been via a short flight of cast concrete steps protected by a simple, roofless, L-shaped blast wall (Plate 130). The number could not be ascertained due to the entrance having been blocked with modern concrete and building debris, but probably would have been very similar to that seen in CY9.

A total of six circular iron fittings are set into the roof of CY11; three of these are evenly spaced on each side of the north–south section (Fig *). These fittings have external and internal diameters of 20mm and 10mm respectively and a minimum depth of 20mm. They appear to have been part of the original construction and may originally have been intended to secure additional camouflage netting.

CY5
(Plates 131–133)

The location of eared pillboxes in beach locations and weaknesses in design has made them particularly vulnerable to the continual effects of coastal erosion, and many have been destroyed or severely damaged. During the Phase 3 survey of section posts on Cayton Bay, for example, it was noted that CY5 had suffered significant damage since the original Phase 1 survey in 2008 (CY5: Plate 131). The

protecting blast wall on the eastern side of the pillbox has been completely broken off and is lying to one side on the beach (Plates 132, 133), although it is uncertain exactly when this damage occurred. In addition to this example of wave damage it was noted that all the structures located within the intertidal zone bear evidence of recent damage in the form of fresh 'scars' of recently exposed concrete caused by rocks propelled by wave action. It appears that mechanical damage of this type is increasing in the bay, but the Holderness coast south of Barmston is also a high risk area.

CY19
(not illustrated)

Remains of a rectangular reinforced concrete structure were identified on the upper beach in 2009 at TA 07022 84337. The visible portion was c 10.0m long and at least 3.0m wide and appears to have consisted of at least two bays. At the time of the initial survey, this was considered to be a section post or similar, although was considerably wider than CY9 and CY11; it was not visible in 2012, and details and identification could not be confirmed.

The location of the structure in front of a narrow beach access point, close to the location of possible First World War pillbox CY18 does support a military function, and CY19 may have been a one-off type of blockhouse protecting the beach exit. No documentary records appear to exist, however, suggesting either that this was not built at the same time as the other structures, or that the interpretation is incorrect, and this is a non-military site.

Lozenge-shaped pillboxes

BA104
(Figs 4, 31, 32; Plates 134–146)

The lozenge-shaped pillbox is principally found only in the north-east of England in the former Northern Command area, between the Humber and the Northumbrian coast, although there is a variant form found in South Wales (Osborne 2008, 118) and there may be others elsewhere, these differ considerably in detail. The example used in this report is located in Barmston (BA104), and although there are local variations in design (some of which are discussed below), this is representative of the rest of those to be found in the East Riding (Plate 134–138).

Like the North Yorkshire angled section posts, the lozenge pillbox appears to have been designed to hold up to a full section of infantry armed with rifles and the section's allocation of light machine-guns (LMGs), and therefore generally has ten loopholes in the main structure. Lozenge pillboxes are, however, characterised by an extended hexagonal plan, with the front and rear walls significantly longer than the others, and they could be seen, therefore, as a stretched form of the Type 22, which does not appear in this area. In the rear wall is an offset entrance, which is protected by an L-shaped blast wall (Plates 137, 138). In North Yorkshire and Northumberland the main roof and floor slab extend over the blast wall to create a strong enclosed porch, but in East Yorkshire they are left open to the sky, weakening the structure, and in a number of cases the porch wall has fallen away as a result. This change seems to occur north of Bridlington, with the extant examples at Flamborough Head and Speeton having enclosed porches.

A major feature of the interior is a longitudinal anti-ricochet wall which supports the centre of the roof and would also have given some protection against incoming

rounds, flamethrowers or grenades entering the front embrasures (Plate 145). This inner wall is sometimes built of concrete blocks rather than cast, and very occasionally contains loopholes, presumably introduced to allow the defenders to continue fighting after the enemy had reached the front wall.

The lozenge type is normally sited either in clifftop locations, partway down a cliff, in the centre of fields or on rises with good visibility, and hardly ever seems to have been located on beaches, although many have found there way there as the result of coastal erosion. The long front wall generally faces forward, but they are also often found along field boundaries at 180° to the main line of attack or at an angle calculated to provide the maximum volume of enfilading fire across lines of approach, including lanes, ravines, and drainage channels.

Depending on its location, this type of pillbox could either be fully exposed as a deterrent or sunk so that only the embrasures and roof are visible, with the interior reached by concrete steps in the porch; the roof itself might be earth covered, either to assist in camouflaging the structure from aerial attack or to absorb the blast of bombs or plunging shellfire, since the pillboxes themselves were only proof to small-arms fire. Four ceramic ventilation pipes are set in the roof (Plate 146), which would restrict the area which could be covered unless the pipes were somehow extended through the earth mound. Like other structures of the period, lozenge pillboxes were built with the walls and roof slab cast between plank shuttering around large square mesh reinforcement; the floor was also presumably reinforced. Rows of small holes at intervals presumably held temporary bolts holding the faces of the shuttering during casting. The pillboxes are generally c 6.5m in overall length, 3.8m wide, with the long sides and short end walls c 4.5m and 2.1m in length respectively. The roof and walls are no more than 0.4m thick, including the blast wall protecting the entrance.

The stretched plan form allows space for four rifle embrasures in the front wall (Plate 134) and single LMG embrasures in each of the four shorter angled end walls (Plates 135, 136), all with an approximate 80° field of fire. The rear wall has just two rifle embrasures to one side of the offset entrance, with another often located in the porch blast wall, as is the case with BA104 (Plates 135, 144). While the East Yorkshire examples appear to have been standardised, there are variations in Northumberland. The Northumbrian version usually has three rifle embrasures at the front and rear, with four larger LMG openings at the ends, although the central opening at the front might also be designed for an LMG. A larger example from Black Hurworth has ten rifle embrasures, including one at the central point of each of the short ends, with a single large central LMG opening in the front wall (Osborne 2008, fig 112, 119).

Set in the inner face of the walls below the embrasures are L-shaped iron brackets, although many pillboxes have lost theirs (Plate 139). The brackets supported timber firing shelves which occasionally survive, and these would have allowed the defenders to support or rest their weapons; there are examples in Northumbria which have cast concrete shelves, again reflecting regional variation, although most would have been wood, with rounded corners to prevent injury. In some cases the shelves continued around the interior, suggesting that they were also used to store spare magazines or other equipment, possibly including a radio or field telephone.

In the East Yorkshire examples, the rifle embrasures on the front and rear elevations are c 0.18m square, with internal splays c 0.35m to increase the angle of fire. On the outer face, the openings have stepped rather than splayed recesses, which was good practice; splaying was not favoured, as incoming bullets would simply be deflected into the interior.

The LMG embrasures on the angled corner walls are c 0.35m wide, also with an internal splay and external squared recesses. They generally include rectangular moulded recesses below each opening on the internal face, although these do not generally seem to have been a feature of the Northumbrian examples (Plate 140). These were presumably designed to accommodate the front leg of a Bren tripod, with a firing shelf to support the rear of the tripod or rest the gun; these may have been extended or modified in some instances, as 'Bren Gun platforms' are occasionally referred to in contemporary documents (WO 166/4215). The recess would also have allowed other non-standard weapons to be used, such as the hand-held Thompson sub machine-gun with its box magazine projecting below.

Angle-iron frames sometimes survive below the LMG embrasures, as in the case of BA104 (Plates 141–143). These are probably the remains of Turnbull Mounts which were issued from 1941 to hold a variety of machine-guns including the Bren and were designed to allow weapons to traverse and elevate or depress freely. A pintle at the front was attached to a frame set in the loophole to allow movement. To operate the weapon correctly using a Turnbull Mount technically required c 4ft 9in (1.44m) space for the gunner to stand behind while firing; the gap between the back of the Mount and the central anti-ricochet wall was actually less than that unless the gunner stood to one side.

Heavy weapons ('eared') pillboxes

CA24
(Figs 4, 33, 34; Plates 147–154)

The 'eared' type heavy weapons pillbox is, like the lozenge pillbox, found only in the north-east of England, between the Humber and Cayton Bay, North Yorkshire. It was designed to house two medium machine-gun (MMG) positions, probably Vickers, and takes its colloquial name from the external blast walls projecting either side of the structure behind the two entrances. The illustrated example in this report (CA24) is located in Carnaby, but is typical of others in the area (Plate 147).

As standard, the type has an unusual plan, consisting of two irregular hexagons, the front part of which is the actual pillbox, the rear consisting of the dual entrances (Plates 150, 151). The forward-facing wall is relatively short and has no openings, but there are single large embrasures in each of the slightly longer two side walls, which are angled at c 35° (Plate 148). The embrasures are therefore set at c 70° to each other, with a combined arc of fire approaching 180°. Projecting from the wall below each of the two embrasures is a large hollow 'box' constructed in front of an internal recess at the base of the wall, either to accommodate a cooling system for the machine-gun or the front leg of a heavy tripod mounting (Plate 149). Tripod-mounted weapons would have been able to fire on two wide arcs to the left and right of the pillbox (Plates 153, 154), although there was potentially a narrow blind spot directly in front where it would have been difficult to lay down fire. There was no way to direct defensive fire directly to the side and round to the rear in case of encirclement or flanking attack, although most of the pillboxes were located in positions against cliffs or walls where this would in any case have been impossible. The size of the embrasures and the presence of the external box structures below are a source of structural weakness, with this pillbox type breaking up relatively easily when exposed to wave action or ground movement.

Internally, there is a short anti-ricochet wall separating twin entrances set in the two rear angles of the hexagon, each protected by an external blast wall. Some examples still have range markers above the embrasures.

Overall, the pillboxes are c 5.5m long, 4.5m wide, with the front wall slightly thicker than the rest at c 0.5m, the other walls being c 0.38m. The embrasures are c 0.9m wide with squared outer rebates but no internal splay. Below each are the large recesses formed by the external boxes (Plate 152).

Although occasionally found inland or at the top of cliffs where there was better visibility, this design was generally set at, or close to, the base of cliffs. The lessons of First World War trench warfare had demonstrated the effectiveness of intersecting fire from machine-guns spaced at intervals along a defended front, and the eared pillbox was therefore designed specifically to provide fixed arcs of enfilading rather than forward fire, as a defender had a much better chance of scoring hits on advancing lines of spread-out infantry obliquely. Several pillboxes set at intervals provided intersecting fields of fire, sweeping wide sections of beach. Machine-guns firing on fixed horizontal traverses are, however, only useful up to a point, and the type was designed to be part of an integrated defensive system, augmented by rifle, LMG and mortar fire from infantry pillboxes, trenches, weapons pits and foxholes which were sited to the rear. On the Holderness coast and in Filey Bay, the eared type is found in conjunction with beach searchlights, which were also constructed at the head of the beach and were designed to shine powerful beams at a similarly oblique angle across the beach to illuminate troops attacking by night.

Despite its tactical advantages, the design was badly thought through, particularly in the lack of protection for escaping troops, and the life expectancy of those occupying the machine-gun posts and the accompanying beach searchlights would have been short. The angle of the forward-facing end walls offered minimal protection from direct incoming fire, as the large machine-gun embrasures presented an easy target. The standard position, which was often set directly against or close to a cliff, also determined that the twin entrances were set in the side angles rather than the rear wall. The characteristic projecting blast walls at the back edge of the doorways ensured that any escaping defenders would be exposed directly to enemy fire; the provision of wing walls in front of the entrances would at least have offered some cover and protection. There are variants of this design in the Scarborough area including one at Cayton Bay (CY5) which is, however, not set directly against a cliff, but is located on rocks a little distance down the beach. This example therefore has three additional rifle embrasures in the rear-facing walls either side of a single entrance protected by a blast wall in place of the standard twin 'eared' entrance. These modifications would have given the defenders a better chance of escape as well as the option of returning fire on enemy troops who had been able to encircle the pillbox.

Lincolnshire three-bay pillboxes

NS59
(Figs 6, 35; Plates 155–163)

The Lincolnshire three-bay pillbox is a variant of the standard FW3 Type 23 two-bay type. The standard Type 23 was never common, accounting for just c 2.6% of the surviving British pillboxes in the Defence of Britain database, but it was widely distributed, including examples as far apart as Kent, Derbyshire and Northumberland; the variant form, however, is found only in Lincolnshire and North-East Lincolnshire. The variant is locally very common on the North Sea coast of Lincolnshire, where few

other types seem to have been built, but in the Wash, they are interspersed with FW3 Type 22 regular hexagonal pillboxes, often in pairs. The latter are more common in the Freiston–Frampton area, but the Type 23 variant again predominates on the southern coast of the Wash. A typical example in North Somercotes (NS59) was selected for detailed recording as a representative of the class.

The standard Type 23 is a dual-role infantry and anti-aircraft pillbox, although variants are known. The most common form consists of a single enclosed blockhouse adjoined by an open-topped gunpit containing a square concrete post for mounting a Bren or Lewis gun to provide light anti-aircraft (LAA) defence (Plate 158); they are generally c 4.3 x 2.7m, with the walls usually built to a small arms standard of between 0.38–0.46m thick (Osborne 2008, 162).

The overall dimensions of the Lincolnshire variant, however, are c 6.6m x 2.7m. It comprises two enclosed blockhouses which sometimes contain internal anti-ricochet walls, flanking the open-topped central gunpit (Plate 155). The gunpit floor is a raised concrete slab, with a substantial void beneath, presumably for ammunition storage or similar use (Plate 160) with the concrete post for the AA gun mounted near the centre (Plate 158).

The external entrance is centrally located at the rear of the open gunpit section and has a raised step, with doors to the left and right leading into the covered end sections (Plate 159).

There are small, almost square, embrasures in each of the outer three sides of the covered sections, each c 0.3m across (Plates 156, 157). There is a small outer splay, but in the case of NS59, those of the seaward and end walls have been cut back to improve visibility, although this would have increased the risk that the defenders would be hit by deflected incoming fire. Internally, the splays are c 0.9m wide, allowing a considerable angle of fire (Plate 161); below are angled recesses and the remains of iron supports for firing shelves (Plate 162). The recesses may have been designed to accommodate a Bren bipod, but they would equally have provided space for the magazine of a Lee Enfield, allowing them to be used either by rifles or light machine-guns.

The structures were entirely built within a plank formwork (Plate 163).

There are a few variants to the standard design. At least one example has an external blast wall forming a porch, although this is extremely rare (Osborne 2008, 164). Two examples recorded on the outer dock walls at Grimsby have concrete firing shelves (Brigham & Jobling 2012), while in at least one example outside the RCZAS study area in the Saltfleetby/Theddlethorpe area, 2km inland of the Rimac defended locality, the central gunpit is roofed over to create three chambers and the rifle loops have been replaced by three wide machine-gun embrasures to create a heavy weapons design; the rear entrance in this case is protected by flanking pistol-loops (ibid, fig 171, 165).

The adoption of the multi-purpose Type 23 variant on the east coast of Lincolnshire and parts of the Wash coastline to the almost total exclusion of other types reflects a different defensive philosophy to the East Yorkshire section, where the infantry/LMG heavy machine-gun and anti-aircraft roles were separated through the use of different structures. In practice, the position of the doorway in the exposed central section would have made the Type 23 difficult to escape from safely during a concerted aerial attack, although it should be borne in mind that no type would have been safe places when facing a determined, well-equipped enemy.

Further selected sites

AT58
(Figs 5, 36; Plates 165–168)

This semi-sunken concrete structure was examined because of its general similarity to the two First World War command/communications bunkers (EG24, EG27) described above (Plate 164). In the event, the original Second World War date given in Phases 1 and 2 proved to be correct, although it has features in common with the earlier structures, suggesting that it may have copied their general layout: AT24 is a little over 800m to the north.

The structure is located in a field to the south-east of Atwick at TA 19776 50405 immediately north-west of a Second World War lozenge pillbox (AT59). Crucially, it is not shown on the 1927 1:2500 OS, unlike both AT24 and EG27, but is present as an earth mound on the first post-war edition, together with the pillbox. From the air, the site appears to be very similar to the First World War examples, an earth mound with an entrance on the west side and the edges of a rectangular roof slab just visible.

On the ground, AT58 the exterior is only visible in places, particularly around the entrance which is reached via an external sunken passage with three steps between concrete retaining walls (Plates 164–166). The entrance consists of a double doorway as the structure is subdivided internally into two identical cells by an east–west concrete wall which extends to the entrance itself; there is no internal communication between the two rooms. The overall dimensions are 5.80m east–west, 5.40m north–south, with the entrance passage extending a further 3.0m to the west. The outer walls are a little over c 0.2m thick, although the west wall and internal partition are thinner at c 0.16m.

There are frequent vents all around the upper walls, including the central partition, consisting of 3”–4” (75mm–0.1m) ceramic pipes set in the concrete (Plates 167, 168). Small horizontal slots are also present in each of the four corners and near the centre of the east wall of each cell; these may have been cut through during the Second World War, but could be post-war additions relating to another use, such as for farm storage.

Ringbrough Battery
(Fig 1; Plates 170–174)

Return visits were made to two East Yorkshire sites to update previous conditions surveys carried out in 2006 and 2009/10. The Second World War Ringbrough Battery (AL52), located south-east of East Newton, Aldbrough at TA 2745 3735, was not easily accessible owing to further rapid deterioration of the cliff and beach access at time of visit, and monitoring was restricted to the remaining structures associated with the monument to the south-west of Ringbrough Farm, which was itself sealed off. These include a lozenge-shaped pillbox constructed before the Battery was built to the south-west at TA 27255 37195 (AL55), much overgrown (Plate 169), the battery plotting room, stores, workshop and water tower (Plates 170, 171). An engine room survives on the north side of the farmstead, but the eastern part of the farm is now at the edge of the cliff following the collapse of the Battery Observation Post in winter 2009/10.

The brick-faced reinforced concrete BOP itself, despite a cliff fall and two years of battering from the tides, remains in remarkably good condition at the foot of the cliff

(Plates 172, 173), and traces of other structures, including the magazine also still remain on the beach (Plate 174).

Godwin Battery
(Fig 1; Plates 175–186)

East of Kilnsea at TA 4177 1606, the First/Second World War Godwin Battery (EA182) shows clear signs of further deterioration and movement of major structures forming part of the gun positions and magazines. A selection of photographs taken during the conditions review is reproduced in this report (Plates 175–186).

The westward migration of the lower water mark will ensure that the seaward elements are progressively lost; these already include the remains of an Operation Diver anti-aircraft battery (EA171) north-east of the main battery at TA 41663 16292 and much of the original sea defence wall, although the blockhouse and traces of the Battery Observation Post at the south end of the seawall survive (Plate 175). The last traces of cement block ancillary buildings in the cliff face between the former gun positions and immediately south of the Battery are unlikely to remain in situ for more than 1–2 years (Plates 176, 179, 180), although several similar buildings, formerly part of the army camp behind the Battery, are still in use in the present 'Sandy Beaches' holiday camp. Immediately south of the northern gun position is an intact structure on the beach, possibly a shelter, store or blockhouse, with two small loopholes on the east and west walls. This may originally have been located beneath the buildings (Plates 180, 181). The concrete used for this structure closely resembles the First World War pillboxes in the Barmston/Skipsea areas, although it has largely been rendered or tanked with cement.

As mentioned, the two gun positions and their magazines have seen further movement, with the northern magazine particularly affected in the last few years, the southern site having collapsed earlier (Plates 177, 178, 182–186).

RAF Theddlethorpe turret-firing and air weapons ranges
(Fig 37; Plates 187–214)

It had been hoped to undertake a fuller survey of the earthworks and structures relating to the Second World War turret-firing range (TS9) and air weapons range (TS27) at RAF Theddlethorpe, Lincolnshire, but the site was extremely overgrown in 2012 and two key sections have been removed since the previous visit in 2009. A further photographic survey, particularly of the turret storage and maintenance building, was however, undertaken, included here with some photographs from the 2009 survey (Plates 187–214).

RAF Theddlethorpe was used from at least as early as 1927 until 1973. Initially the beach was used as a bombing range by RAF North Cotes until c 1940, together with Donna Nook, which outlasted it. The site entrance was originally reached from the west via Clowes Bridge, which carried the A1031 over the Great Eau, but the bridge was demolished after the Second World War and the road has been straightened, with a new crossing located further south.

While it is not entirely clear how many structures relating to the interwar phase survive, a group of buildings near the site entrance are likely to have been constructed as part of the bombing range, located well away from the target area on the foreshore. The main building is a substantial neo-Georgian two-storey brick building with hipped roofs, which appears to be of typical 1920s/30s interwar construction, closely resembling structures built as living and office accommodation

on pre-war airfields (Plate 187). A single-storey wooden building of the period near the entrance, in a position normally occupied by a guardhouse, was still in use after the Second World War, but as a games hut. There was a water tower to the rear of the main building, where there was also a motor transport area and several outbuildings. A number of these structures still survive; the main building is a residential home, largely unchanged externally, although new windows have been added to replace the original 24-paned frames, with other outbuildings retained for ancillary use; the water tower has been demolished. A modern dwelling stands on or close to the site of the guardhouse immediately west of the main building. There is also a roofless ruin next to a hedgeline a little to the north, part of a small group of structures which formed part of Clowes Bridge House; this was demolished after the Second World War, possibly at the same time as the bridge; the farm may have been requisitioned for use by range personnel, but it was of 19th-century date, and was not constructed as part of the range.

During the war, a turret-firing range was built alongside a narrow concrete east–west surfaced track between the barracks and the bombing range (Plate 188). Similar ranges were constructed elsewhere for training RAF Bomber Command and other air force personnel; there are substantial remains, for example of the RAF Combined Gunnery Range at Snettisham, Norfolk, which trained RAF and from 1943, 8th US Army Air Force crew. This site consists of an early RAF Bomber Command range identical to that at RAF Theddlethorpe, alongside a much simpler but substantially longer range built for USAAF use (many details listed below are taken from details associated with the Snettisham range: www.forum.armyairforces.com/1-CCGS-Snettisham-Site-report-m180497.aspx, accessed 29/11/12).

The training courses lasted between 3–14 days using ground-based turrets firing at moving wooden targets and streamers towed by aircraft, before moving on to air-to-air practice. Demonstrations included not only firing, but also how to strip down, clear and rebuild weapons which had become jammed or frozen at high altitude.

The concrete trackway linked the small complex of administrative and accommodation buildings near the entrance to the 200-yd (183m) turret-firing range itself. The site would need to have accommodated both the staff and the ‘students’, but given the short course duration, tents were probably provided when necessary, although Nissen huts or other temporary accommodation might have been built and cleared away at the end of hostilities.

The training site proper consisted of the turret-firing area and the target range itself, which consisted of a moving target track surrounded by protective banks. The earthworks surrounding the track appeared to be newly constructed in aerial photographs dated 1940, which were examined during analysis undertaken for Phase 1 of the RCZA.

On the north side of the track between the barracks area and the firing ranges is a large rectangular building at TA 4723 9057, located next to a concrete slab hardstanding (Plates 189–202); this housed the turrets when not in use, together with maintenance workshops and an ammunition store, although the latter may have been located at a distance for safety reasons. The building is of rendered red brickwork supported by regular buttresses and with an inner facing of concrete blocks. In plan, there is a c 5m square enclosed bay at either end, linked by a rear (west) wall, with three central bays open to the east (Plate 191), with folding wooden doors, a set of which survive at the north end (Plate 193). The flat corrugated roof, now substantially collapsed, extends from the east side for its full length to create a verandah (Plates 193, 194), supported by a steel frame, although the roof otherwise has a grid of

wooden beams. The counterpart of this structure in the original RAF range at Snettisham was almost identical.

The windows in the end blocks are narrow vertical openings with metal-framed casements divided into five horizontal panes, each opening having three vertical internal security bars (Plate 195); the inner face of the walls is unplastered (Plates 196, 197). At the north end of the west side is a small brick lean-to, which may have housed the power supply (Plates 200, 201).

Some internal fittings remain, including a toilet with high-level cistern (Plates 198, 199), which may relate to a final use as part of the post-war site, as there are other indications of re-use, such as fire extinguisher instructions (Plate 202).

The concrete apron on the east side of the building (Plate 191) was the firing platform for a series of practice gun turrets located along it at intervals. The weapons used could either simply be mounted on concrete pillars or consist of both mocked-up and actual aircraft turrets. These would have been the same type of revolving turret mounted to most types of large and some medium RAF bombers, and capable of traversing and elevating to fire at moving targets.

The target range consisted of an ovoid 3ft (0.9m) gauge track, with the rails probably mounted on a concrete bed; the 1951 1:10560 Ordnance Survey shows a complete oval which might represent the trackbed, although this no longer survives. The distance from the turrets to the nearest point of the track was a little over 100m (110yds), with the total range being c 182m (200yds). Immediately west of the track was a low north–south bank which protected the target trolleys and track from low-flying munitions; this had a concrete retaining wall on the east side. A much higher three-sided bank forming a horseshoe open to the west, was constructed around the inner side of the east end of the track to absorb bullets passing the targets (Plate 203–210). Aerial photographs taken in 1940 suggest the bank consisted initially of just a substantial earthwork, but whether this was the case or not, concrete retaining walls were added at some point.

Target trolleys were pulled around the track on wires, emerging from behind one end of the bank where they would have been engaged by the trainee gunners. In the case of the two Snettisham ranges, a spur of track ran from a trolley shed at the north end of the turret firing aprons, suggesting that the targets were stored in the adjacent building and were replaced by crews working in this area, ensuring that all personnel were safely located behind the turrets. The trolleys would then have been pulled along the spur to join the target circuit, where points (presumably electric) would have switched them onto the main track. At Theddlethorpe, there is a small area of concrete at the north end of the firing apron which might have supported a trolley shed, although post-war structures were located in this area (now removed) and the slabs could be much later. It is, however, possible either that the track began next to the north end of the western protecting bank where a small concrete structure (a crew shelter and/or trolley shed) formed an integral part of the retaining wall, or that the track in this case formed a closed circuit, with the target maintenance and replacement area located behind the eastern bank. This would have been a better arrangement in some ways, obviating the need for a long spur and points. The 1951 1:10560 Ordnance Survey shows structures in the area immediately east of the bank which do not appear at Snettisham, and these may include an engine or generator house to power the trolley cables and a store for the targets. These had been demolished before 2009, although there are mounds in the undergrowth in the area.

The south and east banks at the east end still remain, although the north side bank and its concrete wall (Plate 210) have now been removed and the field has been restored. The western bank protecting the front of the target track had also been cleared by 2009 and the field restored to its original configuration, so that nothing now remains between the surviving eastern bank and the turret firing area (Plate 203). Large piles of broken concrete were visible next to the track (Plate 206) and the north bank (Plate 210) in 2009, which can with hindsight be seen to have represented the remains of the concrete walls of these two structures.

After the war, the original bombing range became a bombing and gunnery range for RAF Manby, with a small grass emergency landing strip. The road continues past the south side of the turret range across the seabank and dunes to the site of the beach bombing range. The range originally included two large wooden or steel platforms mounting permanent optical targets and later radar reflecting targets. There was a small observation and control tower on the edge of the dunes containing aircraft detection equipment to co-ordinate air traffic, augmented by a Decca lorry-mounted radar. In the 1970s, scaffolding platforms covered in hessian were used as 30mm Aden Gun Targets. Some initial tests were carried out on the Rapier Ground to Air Missile System issued to the British Army and later used in the Falklands campaign. Theddlethorpe was also the scene of early 20mm air cannon trials.

There are few visible remains of the bombing range. The final stretch of track through the seabank is retained by concrete walls similar to those used in the turret range (Plate 211), and there is a group of corrugated sheds on a concrete hardstanding at the top which was almost certainly part of the facility next to a large turning loop. On the foreshore is the hull of a Comet Mk IV tank, used as a 4lb retard bomb target (Plate 212); parts of a concrete track or building base (Plate 213), and several timber stakes or piles which may be the remains of Second World War and post-war target structures, since two contain iron reinforcement and they are unlikely to be of earlier date (Plate 214). Part of an iron or steel wreck recorded near the piles may have been a hulk used as a target.

Away from the site in Saltfleetby was a concrete bombing target arrow, pointing towards the northern part of the range, which no longer survives, while a disused First World War pillbox (SH4) has been encased by the concrete supports of an observation tower which is thought to have been related to the range.

5 DISCUSSION & RECOMMENDATIONS

5.1 Discussion

World War 1

Several interesting aspects of the First World War defences described have become apparent.

There are clear regional distinctions between types of construction and forms between the south-east (represented by the Chatham–Sittingbourne defences), East Anglia, Lincolnshire, and East Yorkshire. Significantly, similar regional differences are present in the Second World War, and these may reflect the practices of different Army Commands. During the First World War, Yorkshire and Lincolnshire were both part of Northern Command, with its headquarters at York, yet there is a very pronounced difference between the structures identified either side of the Humber in terms of general form and construction method; these also seem to reflect differing defensive strategies.

As far as can be determined from the surviving monuments, the strategy for the East Riding of Yorkshire seems to have varied between the two ends of the county. In the north, clusters of defences were established in the Barmston and Skipsea areas, particularly at the major beach exit points at Auburn and Withow Gap. In both places the cliffs were extremely low and vulnerable to attack along a wide front, with the inland district at Barmston (Low Grounds) formed by a silted former mere.

Extending south of Auburn were individual and paired pillboxes with fields of fire directed forward and intersecting to either side. The pillboxes were sited in half-hidden locations along field boundaries, where they could take advantage of deep ditches and hedgerows, at the edges of small groups of trees, and, less commonly, in plain view. The purpose of this must have been to control movement by deterring invaders from the visible threat of an exposed pillbox towards field margins, where they would be met by fire from hidden defences. As on the Western Front, the pillboxes are unlikely to have stood in isolation and they were probably added to pre-existing networks of trenches and foxholes to act as hardened point defences; earthwork defences had already been in place in some areas since 1914–5, and these are likely to have been continuously improved along similar lines to those on the Western Front. As many pillboxes were built in field boundary ditches, it is clear that the latter would have been used as access, communications and escape routes, as well, perhaps, as ready-made trenches.

Most of the extant pillboxes were designed for use by riflemen and heavier weapons would presumably have been sited nearby in earthwork defences or fortified buildings. The value of well-sited and protected machine-guns, however, became increasingly apparent as the British Army began to adopt the German strategy for increasing the numbers of heavy weapons in infantry battalions as well as creating dedicated machine-gun units. BA10 appears to have been a more substantial semi-sunken machine-gun pillbox with a single embrasure facing forward, protected by flanking fire from the larger blockhouse BA19. BA94, with its wide seaward embrasure, also seem to have been designed to house a machine-gun. As we shall see, the Lincolnshire pillboxes appear to have been specifically designed to provide interlocking arcs of machine-gun fire, drawing on Western Front experience, and foreshadowing Second World War anti-invasion installations, such as the ‘eared’ pillbox type.

The defensive strategy in the northern part of the county was a simpler version of that adopted in the Second World War, with the same general locations often reused later; in several instances, Second World War pillboxes were placed next to existing structures, while Auburn and Barmston were again developed into important defended locations.

The thin walls of most of the First World War pillboxes suggests that they were intended for light defence only, although it is likely that more substantial front-line pillboxes and observation posts (like SK49) were built which now lie among the general concrete jumble of Second World War structures on the beach. The condition of BA4, the possibility of fragments elsewhere (BA21, BA36), and the position of SK49 all suggest that this is the case, while the possibility that CA18 and FY70 represent similar structures in North Yorkshire support a broader defensive strategy even than that envisaged at the start of this phase of the RCZA. A 1955 plan in the East Riding Archives showing relict Second World War military obstructions on the beach (NBT/435) illustrates a number of pillboxes among the lines of anti-tank obstructions between Carnaby and the south end of Skipsea. Many of these are identifiable with RCZAS records and are certainly of Second World War date, but others are apparently unrecorded. Their location suggests that some at least were First World War structures as they appear to include SK49; only ten years had elapsed since the end of the Second World War, and it appears unlikely that sufficient erosion had taken place to account for the number of structures on the beach if they had only been built 15 years previously, although eared pillboxes and beach searchlights were, of course, placed on the beach to begin with.

Defensive strategy in the second half of the war determined that the pillboxes and other front-line defences were intended to act as a stop line, holding up an assault long enough for reinforcements from temporary camps and garrisons at Hornsea and Bridlington to be brought up and for the Royal Navy to deploy vessels to cut off the invasion fleet's line of resupply and retreat; the latter was estimated to require 24–28 hours in 1916, revised to a longer period in 1917. A similar strategy was presumably adopted in Kent and elsewhere. Unlike the Second World War, there is no indication that there were prepared second-line defences in this area, but it is likely that reinforcements would have quickly created a containment ring of trenches and fortified positions around invasion bridgeheads. This could have been done rapidly enough to contain an attack at a time before tanks, armoured personnel carriers and self-propelled guns had been developed, and the heaviest weapons likely to be deployed would have been machine-guns and the occasional field gun, both vulnerable to fire from prepared defensive positions. It would have been critical for an invader to capture a working harbour to allow the landing of mechanised transports and horses; this was still the case in June 1944, when the Allies provided their own facilities in the form of three prefabricated 'Mulberry' harbours following the D-Day invasion of Normandy.

Further south near Atwick and East Garton, a different strategy was apparently adopted. Here, two semi-sunken structures were identified as command and/or communications centres, with a third possible structure in Easington (EA5) now lost. The surviving examples were both set some distance from the cliff line and they may well have provided command facilities for sections of coastal defences. Both were clearly visible on the 1927 1:2500 Ordnance Survey and a close inspection of that and subsequent editions has revealed no further examples, although this does not necessarily prove that no more were built. There are no surviving traces of pillboxes, other First World War structures or infilled trench systems forward of these posts, but the rapid erosion of the cliffs of central and southern Holderness would not be conducive to their preservation. Structures with 0.15m thick walls would have rapidly

broken up following a fall from the cliffs and subsequent wave action over a period of almost a century; despite this, recognisable fragments may still survive.

The outstanding detail of the First World War structures in East Yorkshire is the apparent inadequacy of the protection offered by the walls. The British Army Field Service Pocket Book (issued in 1914 to all officers and NCOs, revised 1916) gives the following guidelines for bullet penetration through different materials of a standard .303 bullet (the German 7.92 G98 Mauser would have provided similar results):

Steel plate, best	7/16"
Steel plate, ordinary mild, or wrought iron	3/4"
Shingle	6"
Coal, hard	6"
Brickwork, cement mortar	9"
Brickwork, lime mortar	14"
Chalk	15"
Sand, between boards or in sandbags	18"
Sand, loose	30"
Hard wood, e.g. oak	38"
Earth, free from stones (unrammed)	40"
Soft wood, e.g. fir	58"
Clay	60"
Dry turf or peat	80"

Although concrete is not specifically mentioned (probably an indication that it was not commonly encountered until later), a performance slightly better than that of brick seems likely; in that case, 6-inch walls were quite inadequate for protection from standard weapons, let alone high-velocity sniper rifles. The British army also found rifle grenades shot through loopholes to be effective against small structures with no internal blast walls for protection.

The Lincolnshire pillboxes, by contrast, were set at intervals either along the foot of the contemporary seabank, where they were partly hidden, or a little to the front on the edge of the saltmarsh. They were clearly intended to provide local strongpoints, capable of putting out intersecting arcs of machine-gun fire, probably supported by intervening rifle trenches or sandbagged positions located along the seabank. This was much closer to the strategy adopted on the Western Front, where machine-gun posts were strung at intervals along the forward trench lines, and it is perhaps no coincidence that they more closely resembled pillboxes and bunkers constructed in France and Belgium in both form and method of construction. A similar strategy was also adopted in this sector in the Second World War, with the lines of the current and previous seabanks used as the locations for pillboxes and other defences, while providing cover for sheltering troops. Structurally, they closely resembled sandbag emplacements translated into concrete, but the much greater strength offered by the thick walls would have made the Lincolnshire pillboxes largely shellproof and much safer than their counterparts in East Yorkshire and elsewhere. The structures so closely match examples built on the Western Front that it must be considered whether they were built under the direction of returning Royal Engineers. Certainly they seem to have benefited from experiences gained from active service, while the East Yorkshire pillboxes would not have sustained a single near miss from a high explosive shell.

The construction date of these smaller-scale British home defences is not certain, but can be guessed at. Concrete pillboxes were not built on the Western Front until the second half of 1917, with construction continuing until the war's end in November

1918. By late 1917, the invasion threat had receded to the point of unlikelihood and it would have seemed more logical if they had been built at the same time as the coastal batteries in the period 1914–16. However, the fact that the army were apparently unable or unwilling to construct this type of structure on the Western Front until after the Germans had started their own programme in late 1916/early 1917 suggests that a late date (1917/18) is likely for the Home Front defences. Also, as already shown, concrete is not listed as a construction material in the 1916 Army Field Service Pocket Book ballistic penetration table, which suggests that it was not regularly used at that time.

World War 2

The Second World War saw the adoption of a much wider range of structures, largely in response to the range of threats posed by modern warfare. Many different types of pillbox were brought into use to reflect variations in site and task; four of these types are described in this volume, but they were supported in the study area by other types of installation, including 'Ruck' sectional machine-gun posts, searchlights, command and communications posts, anti-aircraft and coastal artillery batteries, radio and radar stations, anti-tank, anti-landing and anti-glider obstructions, roadblocks, minefields, trenches and weapons pits. Traces of several Ruck posts survive in Filey Bay and Lincolnshire, although their sectional construction, based on a shortened version of the prefabricated 'Stanton' shelter, has not lent itself to longevity when built on unstable ground or without the benefit of an earth covering.

Between the Humber and Cayton Bay, the basic defensive strategy was underpinned by two main types of structure, the lozenge-shaped infantry pillbox and the eared heavy weapons pillbox. The latter provided the principal front-line active beach defence, designed to sweep the area in front with machine-gun fire to pin down invading troops among the barbed wire entanglements and other obstructions which criss-crossed the beach. Infantry deploying from the lozenge pillboxes into neighbouring trenches located on the cliff would have been able to pick off sheltering invaders using higher precision rifles and mortars, with Bren guns remaining under shelter to provide close-quarters supporting fire.

North of Cayton Bay, a variety of pillbox types appear to have been used, including hexagonal forms, but as few survive, and few details are given in available records, it is difficult to be precise as to their layout; some may well have been lozenge types, as these were used as far north as Northumbria, but the dimensions and details given for a demolished pillbox in Fylingdales at TA 0322 9041 (RCZAS Ref FD55) do not match any known forms, suggesting that non-standard designs were widely used in this area. A Type 24 irregular hexagonal pillbox was formerly present further south at TA 955 041 (RCZAS Ref FD63).

The 'enclosed trench' section post was adopted in both Robin Hood's Bay and Cayton Bay, two widely separated locations, apparently in response to difficult clifftop sites. In terms of the identified section posts, as can be seen from the results of the most recent field investigations, the continued survival of these unusual types of pillbox is in doubt. A combination of erosion, location and relatively poor initial construction techniques means that the long-term survival of the posts is very unlikely, as the recent history of FD60 has shown. With the completion of these surveys a detailed record has now been made which allows for their 'preservation by record' for the future, which given their size and location would seem to provide the best solution for their long-term 'preservation'. Due to the precarious nature of some of the structures (e.g. FD60) it is quite likely that some form of intervention will have

to take place in order to prevent serious cliff falls which could endanger people on the beach below, with FD60 being the subject of a demolition notice in March 2013.

In addition, erosion continues to damage and destroy elements located on the beach, or which have found their way there through collapse of the cliff. The eared pillbox CY5 exemplifies this: in good condition in 2008, it is now damaged and deteriorating.

In Lincolnshire, the primary defence was provided by the Type 23 variant, mainly in its combined infantry and anti-aircraft roles, but also, much more rarely, in an infantry/heavy weapons variant, similar in concept to the lozenge pillbox. These structures were occasionally to be found in pairs, but were generally widely spaced, typically along the line of the sea defence banks on the North Sea coast and the Wash. In the Wash, however, regular hexagonal Type 22 pillboxes, singly but often in pairs, were also common.

5.2 Recommendations

General and individual site recommendations are included in the following sections; these are also summarised against individual entries in Appendix 1 (Gazetteer). Many of the structures described in this report are inaccessible, either because they are on private property, or because they are in a dangerous location or in poor condition. Rapid coastal erosion threatens most of the First and Second World War monuments in North and East Yorkshire in the short to medium term, and nearly all in the long term. Those in Lincolnshire are not considered to be at risk from coastal erosion in the foreseeable future, unless there is a substantial change in local tidal conditions. Demolition is more of a possibility, as the fate of NS65 and NS74 demonstrates. In some instances where the monument is generally accessible, the interior or parts of the exterior might not be due to earth blocking or vegetation. In some instances, accessibility could be improved through negotiations with landowners and remedial work to provide access to monuments which are safe and close to highways or public footpaths.

More specifically, in view of the rarity of the First World War monuments in the study area, it is recommended that some are considered for protection through being granted listed status. The four intact Lincolnshire pillboxes and command/communications centre AT24 are ideal candidates due to their relatively safe inland locations, but other sites may be considered, including machine-gun post BA10, blockhouse BA19, and individual examples of standard 2.1m pillboxes in the area where these are located sufficiently far inland to allow reasonable life expectancy, such as BA22, BA30 (pair), BA94, BA118 and SK50.

In order to better convey the importance and nature of the remains of the various defensive structures a range of interpretative media could be deployed including traditional information panels, self-guided walks, and more innovative formats such as QR (Quick Response) ‘patches’ for smartphone users. The available information should not only include details about the monument itself, but also about how it was intended to fit into a wider defensive strategy. Some monuments would benefit from individual boards, including all of the intact First World War pillboxes in Lincolnshire, which are accessible, but this approach would be particularly effective where a panel is created to deal with a group of monuments and (in the case of Second World War monuments) uses aerial photographs to illustrate an area as it was at the time. This should consider First World War and Second World War monuments included in this report, but also those listed as part of Phases 1 and 2, including those in Robin Hood’s Bay, Cayton Bay, Filey Bay (all Second World War) and stretches of the Holderness coastline, particularly accessible parts of the Auburn to Atwick area,

Godwin Battery the Spurn forts (all First/Second World War), which should be considered for selective interpretation and improved access. Monuments which are currently inaccessible could, as an interim measure, be given QR patches.

In North Yorkshire, specifically for FD80 as the pillbox is substantially intact and lies adjacent to the Cleveland Way it is suggested that the interior of the structure is cleaned of the dumped debris and mud and that access is allowed into the interior. The OP position is undercut and access should therefore be limited to the landward end by placing a grille across the interior in such a position that it would allow the internal features to be seen safely, with an interpretation panel/QR patch attached to the grille for information. The use of QR patches would provide a simple low maintenance method of providing detailed information and potentially links to other, related internet sites.

In the case of FD60, demolition will mean that no recognisable parts of the structure will survive, in comparison to the sites in Cayton Bay, which are being allowed to collapse naturally, retaining some of their original form for future interpretation. Like FD60, section post CY11 was undercut, but rather than being cleared, it has been allowed to partially collapse onto the undercliff. The current condition of the in-situ part of this monument appears to be reasonably stable; regular monitoring should be able to determine if there is any further deterioration. CY9 is also relatively stable in its current collapsed condition, but there is little to be achieved by further monitoring or recording work.

In terms of other monuments, the important sites of Godwin and Ringbrough Batteries continue to deteriorate and the remaining elements in the holiday camp at Kilnsea and Ringbrough Farm will eventually be lost. Significant monumental portions of both sites will, however, continue to form a visual reminder of their presence and former purpose for decades to come. The pace of coastal erosion is such that locating interpretation boards at either site would prove fruitless, but it may be possible to attach QR patches to the fabric in safe locations.

There has been considerable recent clearance work at RAF Theddlethorpe, demonstrating how vulnerable sites such as these are to development or agricultural improvements. It is suggested that what remains should be protected and interpreted, possibly stabilising the remains of the turret maintenance building and providing information boards for both the firing and bombing ranges.

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Field recording for this report, including the detailed drawings used as the basis for figures in this report, was undertaken by Doug Jobling (East Yorkshire and Lincolnshire) and John Buglass (North Yorkshire), who provided the photographs selected for this report as well as comments for the discussion.

The main report, recommendations and site gazetteer were written and edited by Trevor Brigham. Figure 1 was produced by Dave Atkinson, the remaining figures by Doug Jobling.

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Appendix 1: Cultural Heritage Sites

The locations of all Gazetteer entries are shown on Figures 96-100.

Table 1 Gazetteer of cultural heritage sites

RCZAS Gaz Ref	Name	Summary	Easting	Northing	SMR UID	EHA UID	Other Refs	Condition	Treatment
FD60	WW2 SECTION POST	Angled Second World War section post with two embrasures facing S. The surrounding land has been levelled up to the doorway making access difficult. It lies at 90° to the line of the cliff providing enfilade fire on to the beach. The external width is 2.1m and overall length, including the central bend, is 12.8m. The structure is half submerged, the internal height being 1.8m. Shelf supports remain along the internal S wall. This structure was in grave danger of slipping down the cliff in 2012and the seaward end had already collapsed. It was the subject of a demolition notice in March 2013.	495310	504300	5818, 58018.00		S0002768	Fair to good	Due for demolition from March 2013. No further work required
FD80	WW2 SECTION POST	Angled Second World War section post, similar to FD60/62, but facing N. Slab roof covered by earth. The N end of the pillbox is on the edge of the cliff in 2012 and undermined by cliff falls, although there seems to have been little movement in recent years.	496111	503121	58014	1418771	S0002767	Fair	Possible clearance of interior, setting up of internal grille and interpretation panels
OS10	WW2 ?COMMAND POST	Possible Second World War command post. It is a 2.1m square concrete block with a half-buried protected entrance. No embrasures or other openings other than the entrance. A further similar concrete block lies on its side nearby. Cayton Cliff/Johnny Flintons Harbour.	506321	485113		1418758, 1418761		Fair to good	Condition monitoring. Include in general interpretation of Cayton Bay defences
CY9	WW2 SECTION POST	Long, angled, rectangular section post with multiple light machine-gun and rifle embrasures in all faces, which had been built on the edge of the cliff at Killerby. It had already fallen over the eroding cliff by 2003 and the remains were in poor condition in 2012 although still interpretable.	507297	484138		1418766	S0002762	Poor	Include in general interpretation of Cayton Bay defences
CY11	WW2 SECTION POST	Long, angled, rectangular section post with multiple light machine-gun and rifle embrasures, built on the edge of the cliff at Killerby. In 2003, N end projected over the eroding cliff and broken off. A surviving doorway was at the SE end. There were five surviving embrasures in the E facing walls, one in the short S wall, and a minimum of five in the W wall (with others in the broken N section). This type of section post/pillbox is rare. An adjacent section post of this type	507273	484130		1418764	S0002760	Poor	Include in general interpretation of Cayton Bay defences

RCZAS Gaz Ref	Name	Summary	Easting	Northing	SMR UID	EHA UID	Other Refs	Condition	Treatment
		(CY9) has collapsed over the cliff a little to the S. Similar structures are known further N (FD60/62 & FD80).							
CY18	?WW1 PILLBOX	Remains of a small roofless square reinforced concrete building at beach level, probably associated with other beach defences. It was c 2m square, with an opening in the centre of the SW side and walls c 0.2m thick, built of concrete with large aggregate inclusions. Possibly a command or observation post, but could be a First World War pillbox.	506961	484362				Poor	Further site investigation to determine date and further details. General interpretation of Cayton Bay defences
CY19	?WW2 SECTION POST	Remains of a rectangular reinforced concrete building, probably associated with other beach defences. It was *c* 10.0m long and at least 3.0m wide and appeared to have had at least two bays. Possibly a section post or similar. Not visible in 2012	507022	484337				Poor	No further action unless exposed
FY70	?WW1 PILLBOX	Small concrete structure c 2m square with entrance to rear. It has fallen from the cliff and is now sited on the beach. The walls are c 0.17m thick and show signs of mesh reinforcement and plan formwork, suggesting it could be the remains of a First World War pillbox.	512650	477830	MNY24285	1418768		Fair	Further site investigation to determine date and further details.
CA24	WW2 PILLBOX, S OF WEST FARM	Second World War 'eared' heavy machine-gun pillbox. The pillbox has two large embrasures in the two angled front walls and twin doorways in the angled rear walls, with an external blast wall projecting from either side and separating the rear portion of the interior. The pillbox is c 5.5m long, 4.5m wide, with the front wall slightly thicker than the rest at c 0.5m, the other walls being c 0.38m. The embrasures are c 0.9m wide with squared outer rebates but no internal splay. The front walls are angled at c 35° and the embrasures are therefore at c 70° to each other, with a combined arc of fire approaching 180°. Below the exterior of the embrasures are large concrete boxes which cover internal recesses which are either for storage or to accommodate the front legs of a machine-gun tripod. The structure is built on a slightly larger concrete slab, while the roof contains four ventilation holes, formed from ceramic pipes.	517070	463720		1418841		Good	Most pillboxes of this type are in vulnerable locations and little can be done to protect them. Further recording of selected individual pillboxes in East and North Yorkshire could be considered to recover details of original fittings, graffiti etc
BA4	WW1 PILLBOX, AUBURN SANDS	Small square First World War pillbox with three embrasures in poor condition on the beach. Not visible in 2009 and the remains were presumably below the beach surface. A more recent photograph (not part of the RCZA) showed one wall lying flat with fragments of 2 adjoining walls with traces of two splayed embrasures. These may have been c 0.7m wide, possibly for machine-guns. The walls	517050	463200		1418856	S0002852	V poor	Further investigation of the site could be undertaken to identify further details of the

RCZAS Gaz Ref	Name	Summary	Easting	Northing	SMR UID	EHA UID	Other Refs	Condition	Treatment
		were 6in (0.15m) thick were central mesh reinforcement. The structure was c 2.1m square and of similar height.							visible wall and identify other fragments
BA10	WW1 PILLBOX, AUBURN SANDS	First World War square pillbox immediately E of Auburn Farm in centre of small field. Entrance to W and originally a single splayed loophole on the E side, perhaps for a HMG. This was roughly cut through by a large rectangular embrasure with others at SE and NE corners, possibly cut during the Second World War, again for HMGs. Partial earth covering. 2 Second World War anti-glider posts nearby.	516860	462800		1418858	S0002854	Good	No further work required, but First/Second World War defences in Auburn/Barmston area would benefit from research and interpretation. Consider for listing?
BA19	WW1 PILLBOX, AUBURN	First World War rectangular pillbox or blockhouse, visible on APs. Of the same construction as the small square pillboxes in the area, but capable of holding a larger number of men, suggesting it was used as a section post. The structure had three loopholes in the two long walls and two in the end walls flanking central doorway; the loopholes appear to have been cut after the structure was built and the rough openings smoothed over with cement mortar. There were three ceramic ventilation pipes in the roof. Identified on 1927 1:2500 OS.	516855	462692		1418861	S0002857	Good	No further work required, but First/Second World War defences in Auburn/Barmston area would benefit from research and interpretation. Consider for listing?
BA21	?WW1 PILLBOX, 100m S OF AUBURN DMV	Pillbox. Not visible in 2009 and presumably destroyed, but may be identified with fragments of a First World War pillbox at TA 1702 6261.	516950	462650	MHU9983			Destroyed	Further work could be undertaken to locate and verify remains
BA22	WW1 PILLBOX, AUBURN	Small square pillbox in good condition in 2009. Originally identified as Second World War, but of the same local First World War type as others in the area. Entrance on W side, small single loopholes in other 3 sides.	516724	462642		1418852	S0002848	Good	No further work required, but First/Second World War defences in Auburn/Barmston area would benefit from research and interpretation. Consider for listing?
BA30	WW1 PILLBOXES, AUBURN	Two First World War square pillboxes visible as structures on APs located at TA 16898 62309 and TA 16999 62313. These formed a pair less than 3m apart, with doors at the W side, single loopholes	516897	462305		1446434		Good	No further work required, but First/Second World

RCZAS Gaz Ref	Name	Summary	Easting	Northing	SMR UID	EHA UID	Other Refs	Condition	Treatment
		on the E side and on the sides facing outwards (not towards each other).							War defences in Auburn/Barmston area would benefit from research and interpretation. Consider for listing?
BA36	?WW1 PILLBOX, WW2 TRACKWAYS & BARBED WIRE, FRAISTHORPE SANDS	Second World War trackways and barbed wire obstructions visible on APs centred at TA 1695 6184. A large proportion of these features have been destroyed due to coastal erosion. Nothing visible in 2009 and presumed destroyed, but traces of one or possibly two First World War square pillboxes were found at TA 1693 6182 and TA 1693 6188.	516950	461840		1446388		Destroyed	Further work could be undertaken to locate and verify remains
BA74	WW1 PILLBOX, WATERMILL GROUNDS	First World War square pillbox, visible on APs. In good condition in 2009, located on a field boundary c 9m behind BA75. Entrance on W side, small single loopholes in other 3 sides; the E embrasure was slightly wider.	516880	461150		1418854		Good	No further work required, but First/Second World War defences in Auburn/Barmston area would benefit from research and interpretation. Consider for listing?
BA94	WW1 PILLBOX, LOW GROUNDS	Described as Second World War pillbox visible on APs centred at TA 1674 6023, but is a small square structure of First World War type. Entrance on W side, small loopholes in N & S sides with a larger embrasure in the E wall, probably for an HMG and the doorhead is much lower in comparison to the roof, suggesting this may have been a heavy weapons pillbox with a thicker roof, a similar concept to BA10.	516740	460230		1446468		Not visible	No further work required, but First/Second World War defences in Auburn/Barmston area would benefit from research and interpretation. Consider for listing?
BA104	WW2 PILLBOX, N OF BARMSTON	Second World War lozenge pillbox visible on APs. It is constructed of reinforced concrete cast between plank formwork. Rows of small holes in the outer walls and central internal blast wall presumably held temporary bolts holding the formwork during casting. The pillbox is c 6.5m long, 3.8m wide, with the long sides and short end walls c 4.5m and 2.1m in length respectively. The roof and walls are c 0.4m thick. There are four rifle embrasures in the front wall, two in the rear wall, and a further embrasure in the L-shaped blast wall	516440	459930		1444915		Good	Some pillboxes of this type are in vulnerable locations. Further recording of selected individual pillboxes in East and North

RCZAS Gaz Ref	Name	Summary	Easting	Northing	SMR UID	EHA UID	Other Refs	Condition	Treatment
		forming an unroofed enclosure protecting the offset rear entrance. The rifle embrasures are c 0.18m square, with internal splays c 0.35m to increase the angle of fire. On the outer face, the openings have stepped recesses. There are LMG embrasures in each of the four angled end walls, with small recesses below the inside of each, presumably for the legs of a Bren bipod or similar. The LMG embrasures are c 0.35m wide, also with an internal splay and external squared recesses. There is a central anti-ricochet wall and angle-iron brackets below each embrasure, or group of embrasures, for wooden firing shelves (missing). Below one SMG embrasure are the substantial remains of an iron hinged frame, assumed to be the major part of a Turnbull Mount for the MG. The pillbox stands on a slightly larger concrete slab, while the roof contains four ventilation holes formed from ceramic pipes.							Yorkshire could be considered to recover details of original fittings, graffiti etc
BA118	WW1/WW2 PILLBOXES & BARBED WIRE, BARMSTON CARRS	Two pillboxes, surrounding barbed wire obstructions, and a trackway are visible as structures on APs centred at TA 1692 5960. The larger lozenge-shaped pillbox dates to the Second World War and the smaller, square pillbox, which lies to the S of this, dates to the First World War. A Second World War barbed wire obstruction encircled the pillboxes on their E side and barbed wire obstructions form two corridors extending to the W. A trackway led up to the two pillboxes from the S. Both pillboxes survive in good condition. The First World War structure was of the same standard construction as others in the area. Entrance on W side, small single loopholes in other 3 sides.	516920	459600		1444920		Good	No further work required, but First/Second World War defences in Auburn/Barmston area would benefit from research and interpretation. Consider for listing?
BA190	WW1 PILLBOX	First World War square pillbox located in a field boundary c 18m to the rear of Second World War pillbox BA84, which it supported. Entrance on W side, small single loopholes in other 3 sides.	516867	460685				Good	No further work required, but First/Second World War defences in Auburn/Barmston area would benefit from research and interpretation. Consider for listing?
SK11	POSSIBLE WW1 PILLBOX	Square structure identified by DoB in 2001 as a Second World War observation post with loopholes recorded on cliff edge, E of Skipsea. Now on the beach in fragments, but in poor condition. The size is consistent with the structure being a First World War pillbox.	518200	455200		1429773	S0015754	Poor	Further work could be undertaken to locate and verify remains
SK49	WW1 ?OBSERVATION OR COMMAND/	Square First World War structure on beach at Withow Gap. Displaced but still apparently intact. In 2009 only the roof and the	518384	454659				Fair	No further work required, although

RCZAS Gaz Ref	Name	Summary	Easting	Northing	SMR UID	EHA UID	Other Refs	Condition	Treatment
	COMMUNICATIONS POST	top of the walls, including the doorhead, were visible above the beach. It was subsequently exposed fully, but in 2012 was inverted by tidal action and the roof and upper walls embedded. The structure is small, c 1.8 x 1.8 x 1.8m. There are rough concrete stubs either side of the base of the offset doorway, and the lower parts of the outer walls show no sign of shuttering, suggesting it was trench-built with steps or a ramp leading down; there are the remains of a step at the base of the doorway. Only a single small embrasure has been noted, offset in the wall opposite the doorway, with an internal splay, but this was buried in 2012 and could not be examined. The building appears to have had just an earth floor. Despite its small size, this was substantially built, with walls and roof c 0.4m thick, the roof forming the top of the doorway. The purpose of the structure is unclear. It may have been a forward command and/or communications post, but the small embrasure may have been usable as a weapons or observation slit.							condition could be monitored to record or amend details if further movement occurs
SK50	WW1 PILLBOX	Square First World War pillbox located inland on line of field boundary ditch. The pillbox was well hidden by vegetation, but was in good condition. Entrance on W side, small single loopholes in other 3 sides.	518059	454727				Good	No further work required, but First World War defences in Skipsea area would benefit from research and possible interpretation. Consider for listing?
SK63	WW1 PILLBOX	Square First World War pillbox constructed on the line of a field boundary ditch to the E of two weapons pits but now within an enlarged field. It lay within a series of Second World War earthworks and other defences (SK25), but was not identified from aerial photographic analysis. It is, however, a First World War pillbox which may have become well camouflaged by 1940–1. The pillbox was also not recognised during the 2009 field survey but was identified from satellite photographs and its identity was confirmed by a visit in 2012.	518397	454460				Good	No further work required, but First World War defences in Skipsea area would benefit from research and possible interpretation. Consider for listing?
AT24	WW1 POSSIBLE COMMAND POST	Rectangular First World War thin-walled concrete square semi-sunken structure. It has 3 earthenware pipes in the N & S walls immediately below the roofline for ventilation but no embrasures or	519386	451153	MHU9942	913608		Good	No further recording work required but would

RCZAS Gaz Ref	Name	Summary	Easting	Northing	SMR UID	EHA UID	Other Refs	Condition	Treatment
		openings other than the rebated doorway in the W side. The structure was rectangular, aligned E-W, c 4 x 3.5m. There were the remains of thin concrete walls supporting earth either side of the doorway, presumably with steps or a ramp originally leading down to floor level. The building originally had 2 cells as there are traces of a demolished internal brick dividing wall on the S side, now removed except for the base course, leaving just the scar to roof level. The roof was cast on a diamond arrangement of girders exposed on the underside. On the top of the roof were two N-S girders also flush with the roof, presumably resting on the lower diamond of beams as part of the reinforcement. This structure appears to be a command and/or communications post, perhaps at the centre of a defended sector. The building is in good condition and at little risk. Shown on 1927 1:2500 OS. Also shown on the OS to the E at TA 19540 51065 was a N/S rectangular structure which may be a blockhouse, similar to BA19.							benefit from research and possible interpretation although not close to right of way. A good candidate for listing for its rarity value
AT58	WW2 POSSIBLE COMMAND POST	Semi-sunken concrete structure of two cells positioned to the SE of Atwick. There are vents all around the structure, and it later had loopholes added to the E, SE and SW, a pattern mirrored in cell 2; these were possibly cut through during the Second World War. Accessed by 4 steps leading to a small porch to the W of the structure. Overall dimensions are 8.80m W-E and 5.40m N-S. Not shown on 1927 1:2500 OS, but is present as an earth mound on the first post-war 1:2500 edition which also shows a Second World War lozenge pillbox (AT59) was constructed a few metres to the SE. Satellite images show a mound with possible entrance on the W side and edges of the roof, suggesting a rectangular shape.	519776	450405		913540, 1427322		Good	No further work required
AL52	WW2 BATTERY AND CAMP, RINGBROUGH	Coastal artillery battery opened in 1941, sited on the cliff edge, with a dual role as a counter-bombardment and close defence battery. It included 3 gun positions, battery observation posts (NMR915346), searchlight emplacements (NMR915385, 915389, 915403), generator houses (NMR915366) and an earlier pillbox (AL55). The battery was abandoned in 1945. A reinforced concrete plotting room was in use as a garage in 1992; most other buildings have been lost through erosion. In December 2009, the BOP collapsed largely intact onto the beach. Some elements remained including parts of concrete tunnels to the gun positions, in imminent risk of loss, and a generator room among the abandoned farm buildings. Collapsed structures also survive on the beach.	527450	437350	MHU11466	915262, 915346, 915366, 915385, 915389, 915403, 1427290		V Poor	Occasional photographic monitoring to document changing conditions. Site interpretation could be considered, possibly in the form of a QR patch attached to the main monument
EG27	WW1 POSSIBLE COMMAND POST AND	Semi-sunken rectangular concrete structure with Second World War lozenge pillbox a few metres to the SE. The structure takes the	528755	434945	MHU18845	915579, 915597,	DOB S0013173,	Not visited	No further recording work

RCZAS Gaz Ref	Name	Summary	Easting	Northing	SMR UID	EHA UID	Other Refs	Condition	Treatment
	WW2 PILLBOX	form of a reinforced concrete structure measuring around 4.28 x 3.52m and is reached by descending two steps through a doorway on the W side, with flanking concrete walls revetting the stepped area; there were loose bricks here, suggesting there may have been an internal wall as at AT24. There are no embrasures, but what may be small ventilation holes in the side walls close to the roof. The roof was cast with angled girders across each corner and others crossing E-W. The lozenge shaped pillbox was of standard form. Both structures are in good condition, hidden within heavy overgrowth. The command post is shown on the 1927 1:2500 OS, where it is incorrectly interpreted as an 'Icehouse', perhaps because it is sunken and stands in the grounds of Grimston Garth. Both structures are visible on the first post-war edition.				1427299	DOB S0013172		required but would benefit from research. A good candidate for listing for its rarity value
RO29	POSSIBLE WW1 PILLBOX	Square pillbox recorded on APs as surrounded by a barbed wire perimeter, situated to the N of Monkwith. The site consists of a reinforced concrete pillbox surrounded by a barbed wire perimeter. Destroyed by 1992. Two square brick and concrete pillboxes, prob Second World War, were located just to the N.	530385	433115	MHU19104	917295		Destroyed	No further work
EA5	SITE OF ?WW1/2 COMMAND POST, OLD HIVE	Square semi-sunken structure with earth blast walls to the N of Out Newton identified as a Second World War fire command post, but may be a First World War command post similar to those seen elsewhere on the coast. Destroyed by 2009.	538205	422985	MHU19184	916388		Destroyed	No further work
EA182	SITE OF WW1/WW2 ARMY CAMP AND GODWIN BATTERY	Important coastal battery, named in honour of Major General Godwin, constructed in 1914 to strengthen the outer defences of the Humber and house two Mk.IV guns on Mk.V mountings. The Battery was protected by a sea wall 300yds (274m) long around the site to protect from the advancing sea. Behind this two 9.2"BL guns were mounted in circular concrete pits c 100yds (91m) apart. Between the guns were the underground magazine, crew shelters and workshops, the magazine roof being 5ft (1,5m) thick. On the right and left of the battery were two battery observation posts, one housing a rangefinder; both had defensive blockhouses built into their base. The barracks were substantially constructed of brick and concrete, and included a guard house, officers' quarters and a hospital. The defensive measures taken to protect the battery included a 6ft (1.8M) wall enclosing the landward perimeter while the seaward side was surrounded by a network of fire trenches and a 20ft (6.1m) ditch filled with barbed wire. Further protection was given by a large concrete blockhouse situated on the beach and a redoubt ('Murrays Post') on the rising ground to the NW. Another feature was the terminus of the Spurn Point railway. Godwin Battery	541770	416060	MHU10819	929478, 1421227		V poor	Continued monitoring and photographic recording of the site, particularly new features which emerge. Possibilities of interpreting the site should be explored, possibly OR patches and a display in the Blue Bell visitor centre

RCZAS Gaz Ref	Name	Summary	Easting	Northing	SMR UID	EHA UID	Other Refs	Condition	Treatment
		remained active after the war and was used for a number of purposes including Territorial Army training. It was put back to full strength with the advent of the Second World War. Close defence was provided by a 4" BL Mk. 9 gun to the S of the right hand BOP, together with a single 90cm Coastal Artillery Searchlight. In 1940 0.5in (12mm) thick armoured plate anti-strafing shields were built around the two main guns. At the end of 1944 the 9.2" guns were removed and the battery placed in care and maintenance. In 1959 the site was put up for sale and became a caravan site. The gun pits were filled in, although their aprons survive; the BOPs have both been demolished. In 1992 the site was still in generally good condition, although the hospital building had been demolished, but was at risk from coastal erosion. By 1995, the sea wall had been virtually destroyed by wave action, as had the strongpoint, CASL and 4" BL emplacement. The gun aprons had both collapsed, half lying on the beach, half on the cliff top but highly unstable. In January 2007, the majority of the monument had either collapsed, been demolished, or rested on the beach, with little other than the magazines and part of a gun position in an original location, although the remains were very substantial. More of the monument, including most of the second magazine and the second gun position had collapsed by visits in 2009 and 2012, but the solid nature of the concrete structures is likely to resist erosion for many years. Demolished ancillary buildings continue to erode from the cliff between the former gun positions and to the immediate S.							
NS59	WW2 PILLBOX	3-bay concrete Lincolnshire-type AA pillbox facing NE near Warren House, embrasure for machine gun. E of A1031. Currently sinking into the saltwater marsh, with access into the interior possible only in dry spells. The pillbox consists of three cells, the central being an open-topped AA gunpit with a squared concrete post for the light AA mounting. At either end is an enclosed blockhouse each with three rifle embrasures in the three outer walls. There is a central rear doorway with a raised step leading into the AA gunpit, with the blockhouses accessed through doors to either side at the rear of the gunpit. The concrete gunpit floor is raised with a storage area below accessed from the rear. The overall dimensions are c 6.6m x 2.7m the walls usually built to a small arms standard of between 0.38–0.46m thick. The small, almost square, embrasures are c 0.3m across with splayed inner reveals of c 0.9m width. The outer splay is less apparent and those of the seaward and end walls have been cut back to improve visibility. Below the embrasures on the inner face are angled recesses and the remains of iron supports for	544367	396172	MLI43258			Good	Most pillboxes of this type are in relatively safe locations, but are still vulnerable from development or clearance. Further recording of selected individual pillboxes in Lincolnshire and North-East Lincolnshire could be considered to recover details of variations, original fittings, graffiti etc

RCZAS Gaz Ref	Name	Summary	Easting	Northing	SMR UID	EHA UID	Other Refs	Condition	Treatment
		firing shelves allowing them to be used either by rifles or light machine-guns such as the Bren. The pillbox stands on a thick concrete slab.							
NS65	WW1 PILLBOX	2 x 0.75m^2 concrete blocks. Originally identified as part of a former roadblock, these are now identified as parts of the roof of a First World War demolished pillbox similar to NS74, with similar rusticated finish, and one block showing the edge of a ventilation hole. The blocks have been moved from their original position, now being situated on a grass bank to the N of a current access path towards an active RAF observation post. Located within a Second World War military landscape represented by gazetteer entry NS48.	543892	397943				Poor	No further work. Original location could be found through research
NS74	WW1 PILLBOX	Trapezoidal First World War pillbox remains. 2 large (c 1.5 x 3 x 0.6m) sections of concrete, originally one piece, now broken in half, with other smaller fragments nearby. With very rough outer surface from sandbag shuttering, appearing much like the rusticated finish to pillbox SH1. The remains of a ventilation hole in the edges of the two broken sections and the trapezoidal shape conforms that this is the roof slab of a First World War pillbox identical to SH1.	544209	396711				Poor	No further work. Original location could be found through research
SH1	WW1 & WW2 PILLBOXES	Trapezoidal First World War pillbox with a single splayed embrasure in the thick N & S sides and a doorway in the much thinner W side. The interior was plank shuttered, but the exterior shows clear impressions of sandbag shuttering, giving a rough rusticated appearance seen on contemporary British concrete structures in Belgium. Below the embrasures are tapered recesses, possibly for ammunition storage or for water baths for machine-gun barrels. There is a central ventilation hole on the roof. Other features include the ends of several roof support girders in the outer walls. The door has been largely blocked by brickwork. Adjacent to a 3-bay Lincolnshire variant Type 23 pillbox facing NE at TF 4453 9583. Two roofed parts joined by the open area with the LAA mounting and the doorway. The roofed parts contain embrasures with an embrasure for a machine-gun in the end wall.	544529	395828	MLI43259	1421447, 1419815		Good	Both plllboxes could be restored and interpreted. First World War Lincolnshire pillboxes would benefit from research. Good candidate for listing.
SH4	WW1 PILLBOX	Trapezoidal First World War pillbox, originally identified as a Second World War gunhouse for 3-inch or 4-inch gun, but clearly similar to SH1 and other First World War structures in the area. The pillbox is largely buried, but has clear impressions of sandbag shuttering. On the roof at an angle to the main structure are later concrete strip foundations with an additional extension along the front wall, possibly for a Second World War observation/AA post or similar.	544900	395100	MLI43261	1419817		Good	Plllbox could be restored and interpreted, including any Second World War/post-war additions. First World War Lincolnshire

RCZAS Gaz Ref	Name	Summary	Easting	Northing	SMR UID	EHA UID	Other Refs	Condition	Treatment
									pillboxes would benefit from research. Good candidate for listing.
SH8	WW1 PILLBOX	Trapezoidal First World War pillbox originally identified as a Second World War pillbox disguised as rocks, but with later squared concrete block attachments largely disguising the original trapezoidal shape. These supported a wooden tower forming part of the RAF Theddlethorpe bombing range, demolished in the late 1960s.	545652	394329	MLI43262	1419818		Good	Plllbox could be restored and interpreted, including any Second World War/post-war additions. First World War Lincolnshire pillboxes would benefit from research. Good candidate for listing.
SA11	WW1 PILLBOX & WW2 TANK TRAP	Trapezoidal First World War pillbox with concrete lumps on roof to break up outline, originally identified as a Second World War pillbox. Now sunken in sand bluff with embrasures below ground and only top of doorway showing, but has impressions of horizontal plank shuttering rather than sandbags. The door is offset rather than central. Faces NE towards sea. Bolts on roof were taken to indicate AA gun mounting, but if so, this must be a later Second World War addition. This structure may represent Second World War 'Sea View Post' platoon locality. 'D' Coy 7th Btn. Royal Norfolk Regiment. Also 9 4x4 AT blocks, 2 AT cylinders and angled earthwork visible from APs at NE end of Seaview Farm car park. In 2009, the AT blocks, AT cylinders and earthwork could not be identified at ground level, presumably either moved or destroyed after 1945.	546400	392500	MLI43264	1419820, 1419821		Good	Plllbox could be restored and interpreted including any Second World War/post-war additions. First World War Lincolnshire pillboxes would benefit from research. Good candidate for listing.
TS9	RAF THEDDLETHORPE WW2 TURRET FIRING RANGE	Earthwork that appears freshly constructed in 1940 APs. Exact defence purpose not known. Shown on modern OS mapping. This structure was the site of a 200-yard turret firing range forming part of RAF Theddlethorpe (TS27). The structure originally consisted of an elongated oval target track, possibly on a concrete bed, with earthwork banks forming firing butts at the E end which were lined later with 3.66m high concrete retaining walls. There was a N-S earth bank with a concrete inner face at the W end to protect the	547450	390580			S0016232	Poor to fair	Recent clearance of some elements and the condition of the turret maintenance building suggest either further recording or some

RCZAS Gaz Ref	Name	Summary	Easting	Northing	SMR UID	EHA UID	Other Refs	Condition	Treatment
		target trolleys and track during firing, and a concrete apron and a large building at TA 4723 9057 for turret storage and maintenance; the apron was the site of the practice turrets, which fired over the W bank of the enclosure at the mobile targets. One or two small structures at the E end, protected by the high butts, would have housed the target controllers and their equipment. The 3 walls of the E half and the W bank remained until recently with a rectangular concrete building (possibly a shelter for the target control teams) behind the N end of the W wall. The target tracks and target control buildings at the E end have apparently gone, but there is an area of scrub against the outside of the E end and a mound, possibly comprising rubble. The N arm of the bank at the E end and the W bank protecting the track were cleared c 2009 and the area has since been ploughed.							form of protection and interpretation.
TS27	RAF THEDDLETHORPE AIR WEAPONS RANGE	Second World War beach bombing and turret gunnery range, in use from at least as early as 1927 as a satellite of RAF North Coates. It incorporated a turret firing range (TS9) which is likely to have closed at the end of the war or shortly after. In 1939, Fairey Battle K7593 of 604 Sqn crashed while using the range, then and in the Second World War it seems to have been in the charge of 1 Air Armaments Squadron, RAF Manby. After the war it was a satellite of RAF Binbrook, with about 40 airmen and an emergency landing strip. There were a number of structures N of an E-W access road which allowed access to targets on the beach (including TS18), possibly also including some of the wrecks and timber piles noted above. By the 1950s the site had a control tower near the beach access at TA 4769 9076 equipped with ground to air VHF, a turret firing range (TS9), and at the W end, a 2-storey barracks/offices with sheds, a water tower and other buildings located at TA 4690 9053. A Bedford truck was mounted with a mobile radar and Decca antenna, with generators mounted on other vehicles. There was also at least one raised visual target platform on the beach. The site closed in 1973, when it was replaced by RAF Donna Nook. The control tower, water tower and observation platform have since been demolished, the rest remain in variable condition. The barracks form part of a care home complex, Alderson House. There are corrugated sheet buildings above the beach, which is reached via a path cut through the seabank with concrete retaining walls.	546900	390530					

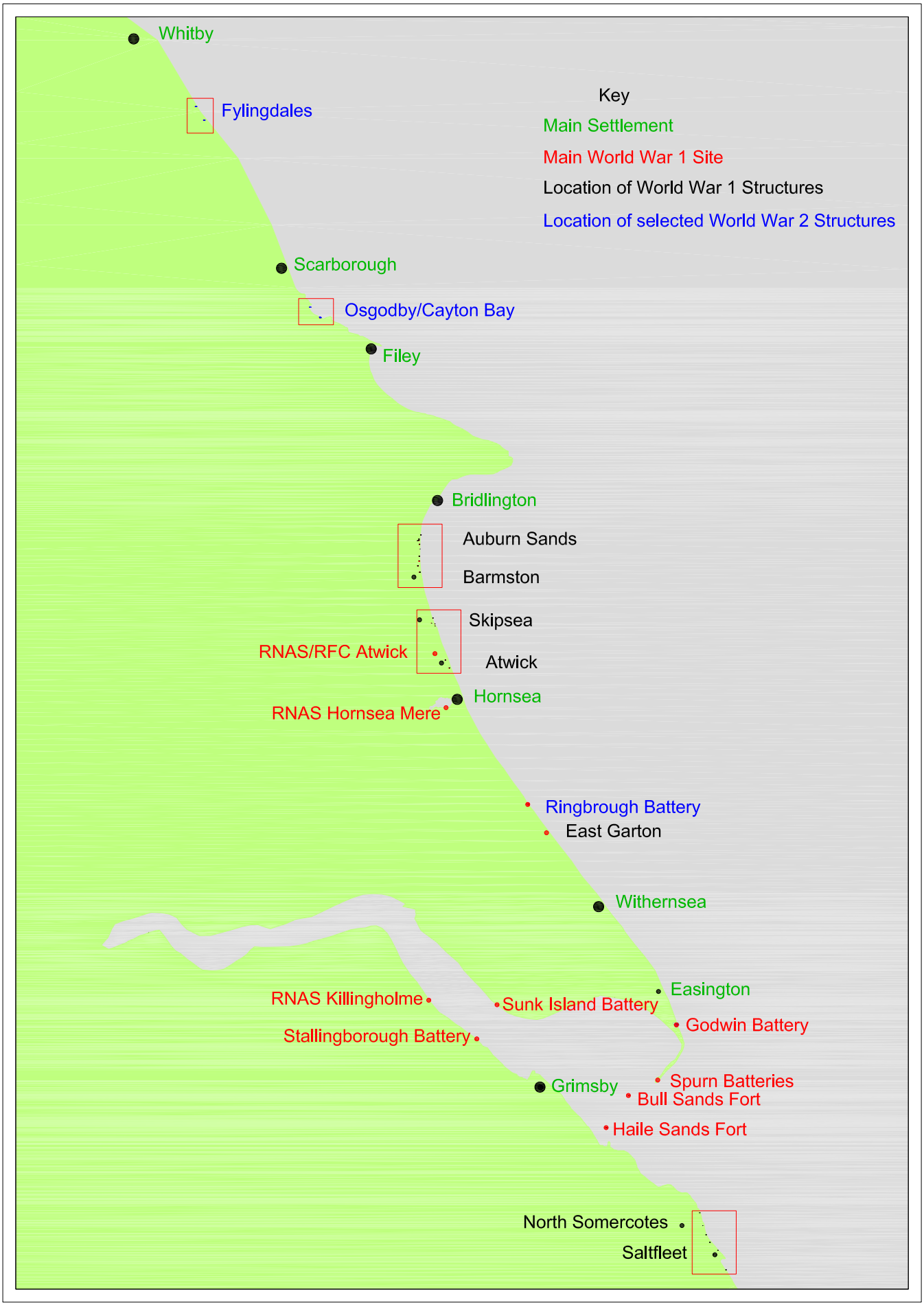

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Figure 1 Distribution of the main World War 1 defences, associated sites and selected World War 2 sites

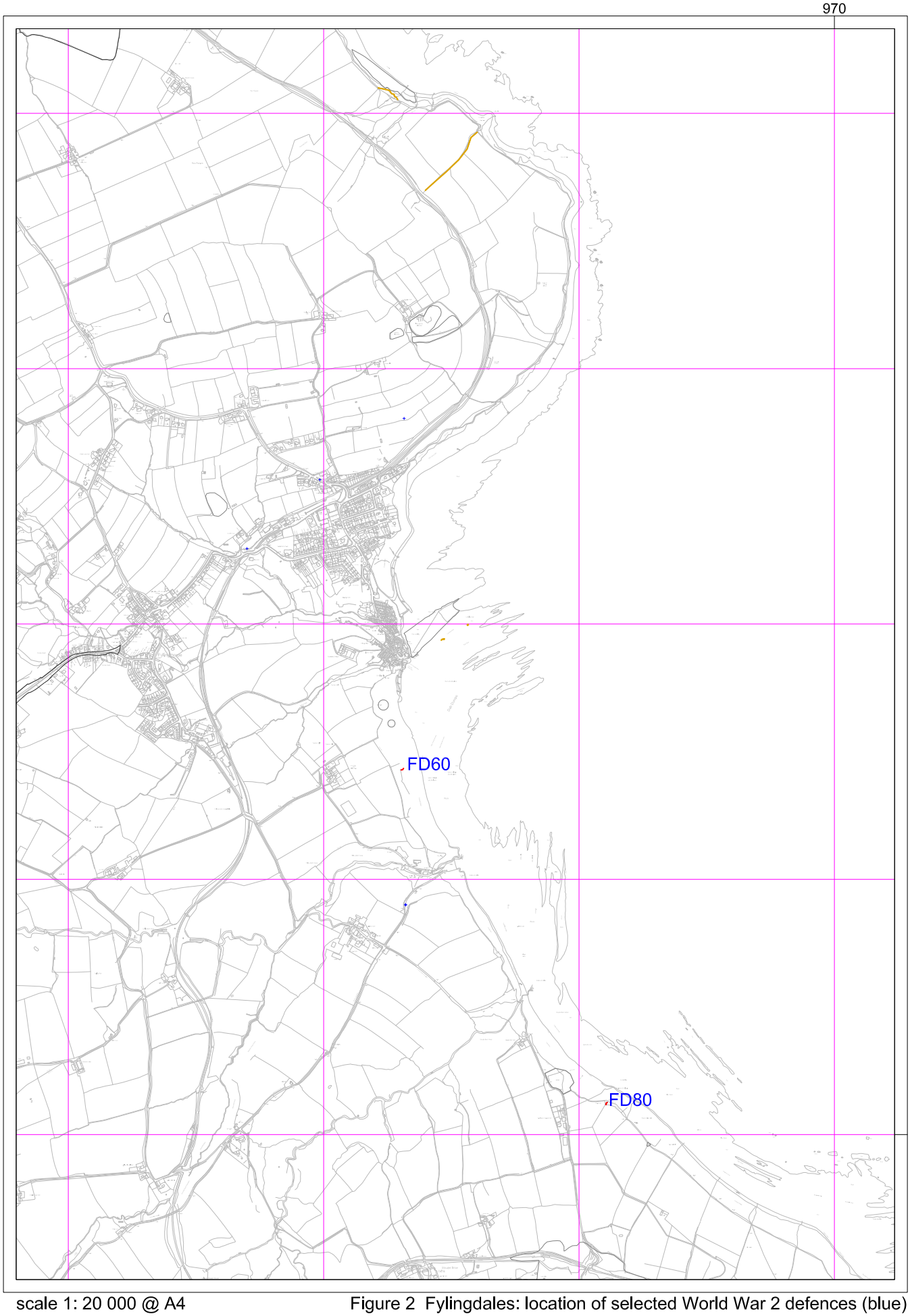

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Figure 2 Fylingdales: location of selected World War 2 defences (blue)

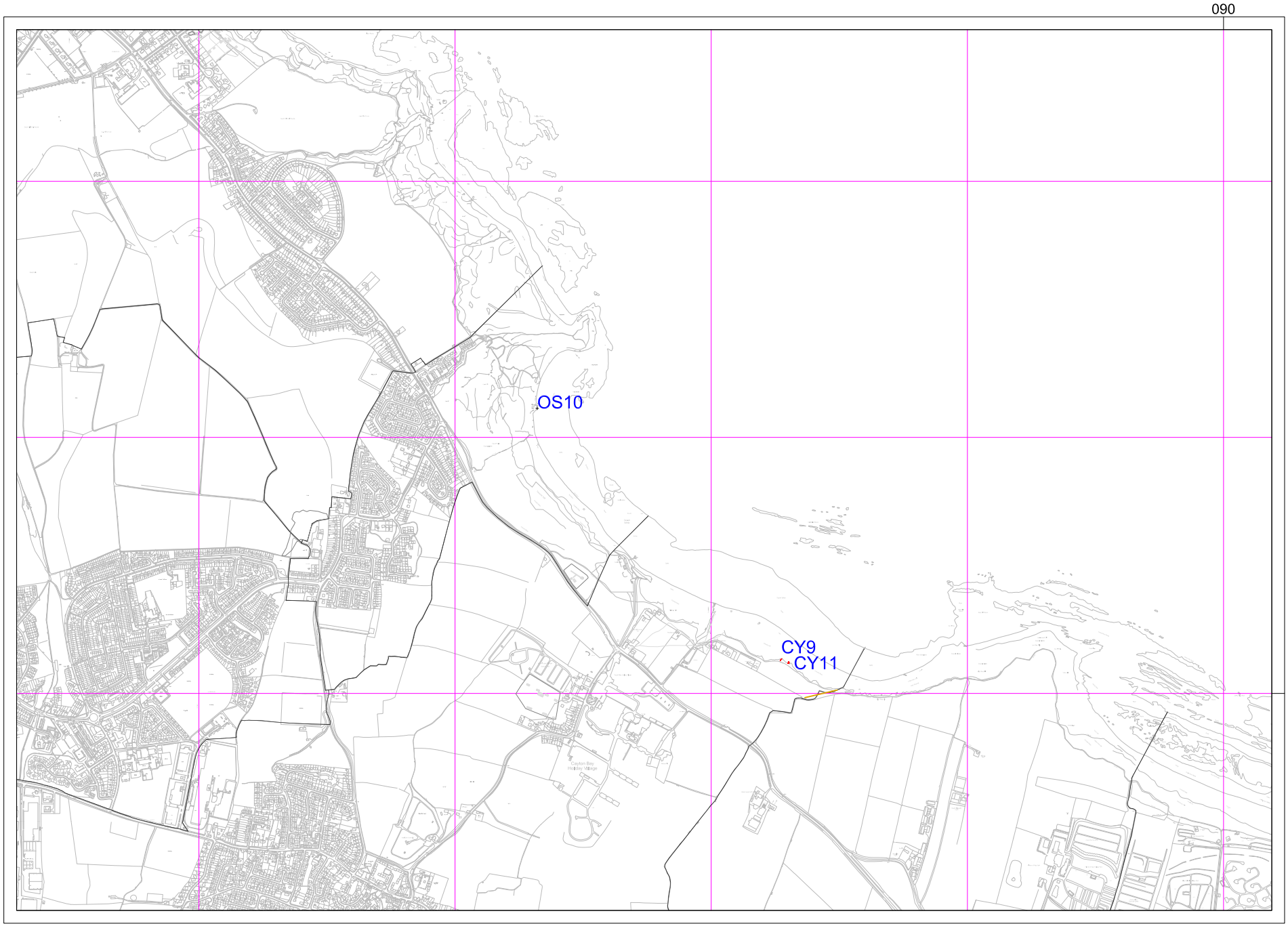

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Figure 3 Osgodby and Cayton: location of selected World War 2 defences (blue)

200

CA24

BA4

BA10

BA19

BA22

BA30

BA36

BA74

BA190

BA94

BA104

BA118

580

scale 1: 20 000 @ A3

Figure 4 Carnaby and Barmston: location of surviving World War 1 defences (black) with selected World War 2 defences (blue)

220

SK11

SK50

SK49

SK63

AT24

AT58

500

scale 1: 20 000 @ A3

Figure 5 Skipsea and Atwick: location of surviving World War 1 defences (black) with selected World War 2 defences (blue)

480

NS65

NS74

NS59

SH1

SH4

SH8

930

SA11

scale 1: 20 000 @ A3

Figure 6 North Somercotes to Saltfleetby: location of surviving World War 1 defences (black) with selected World War 2 defences (blue)

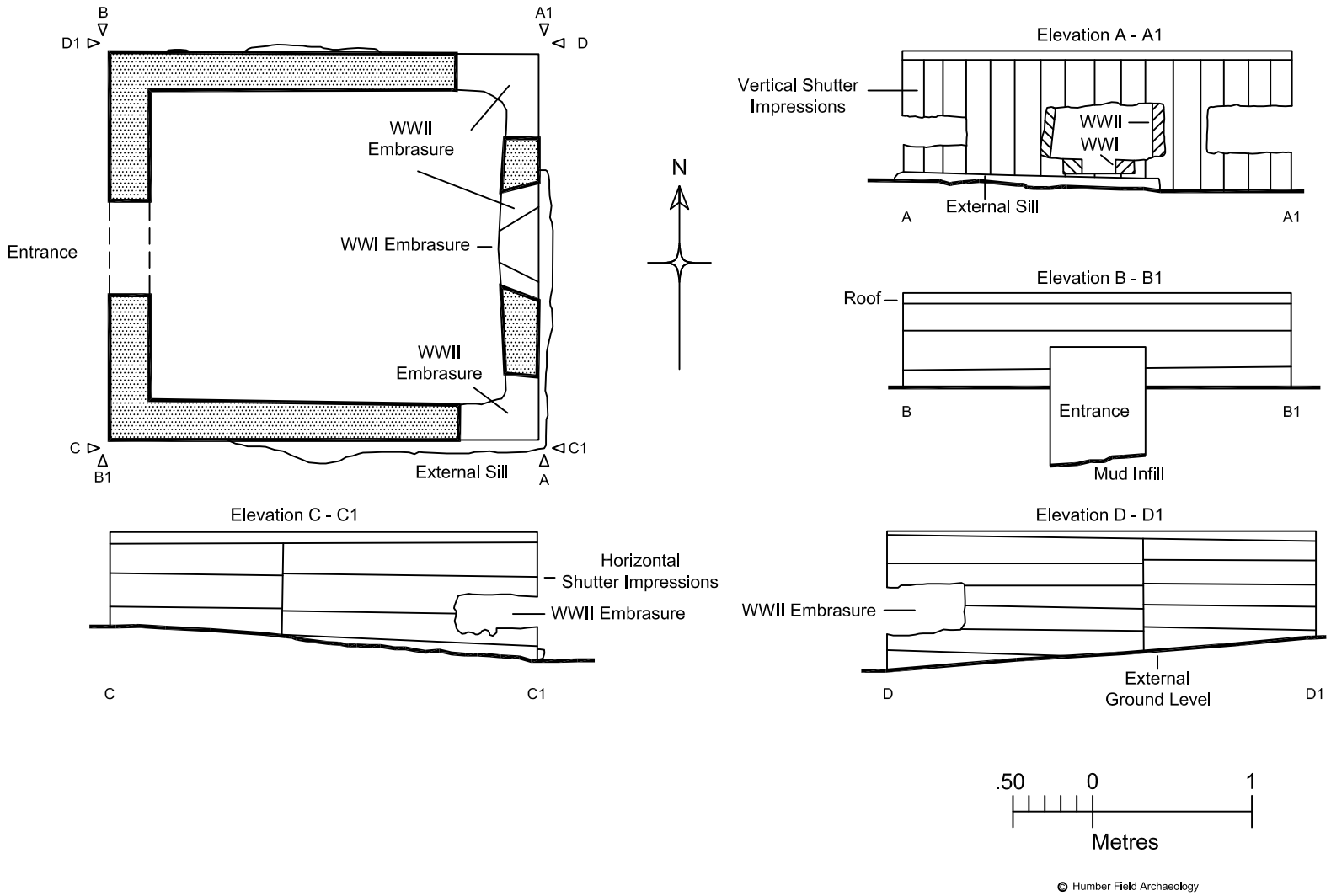

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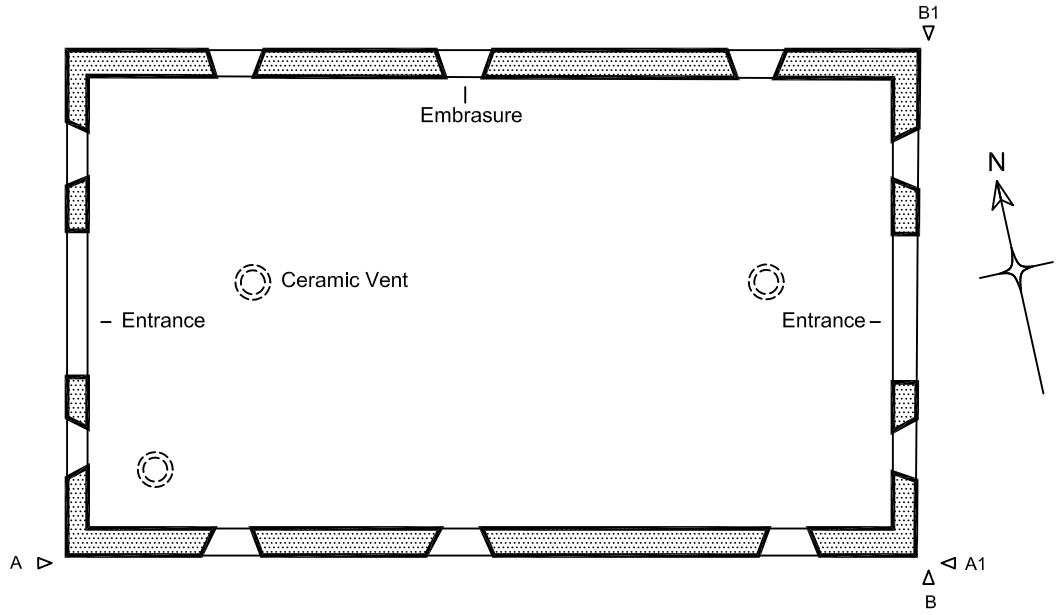
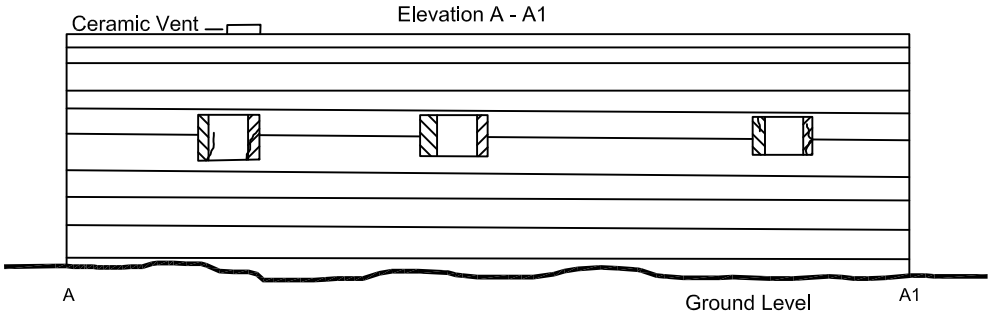
Figure 7 WW1 Machine Gun Pillbox BA10





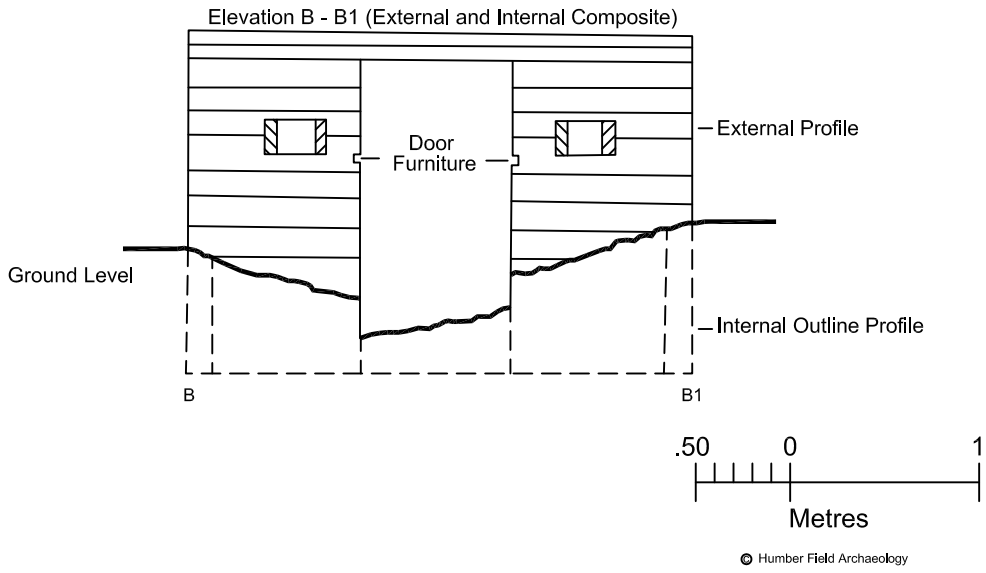


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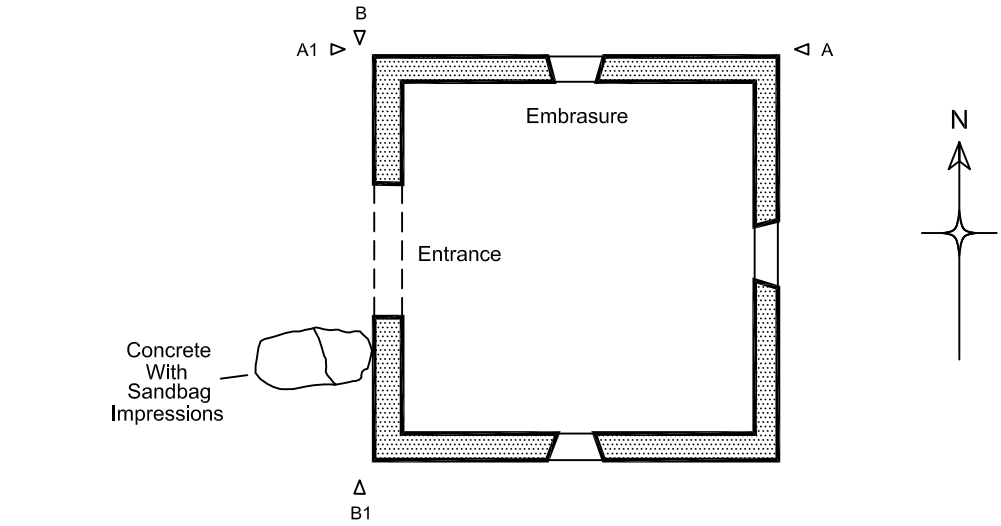
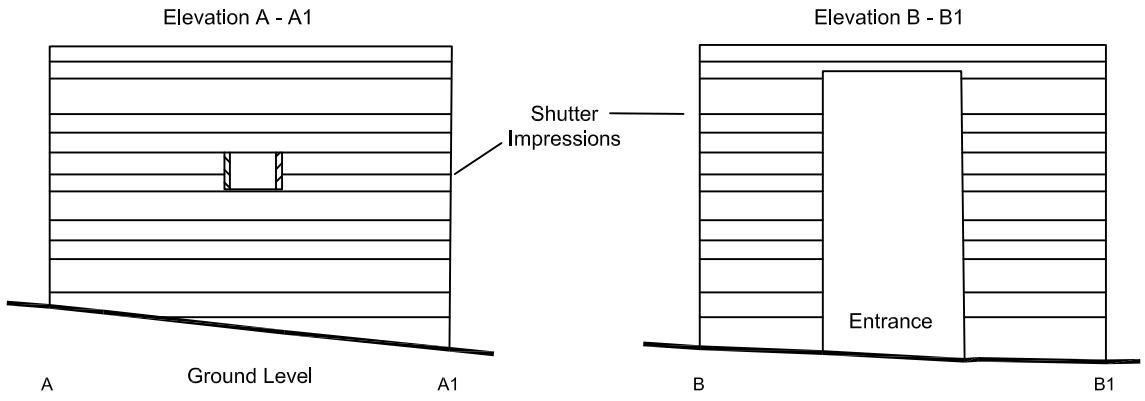
Figure 8 WW1 Blockhouse BA19





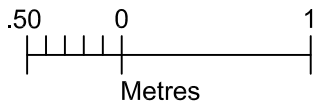


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Figure 9 WW1 Pillbox BA22

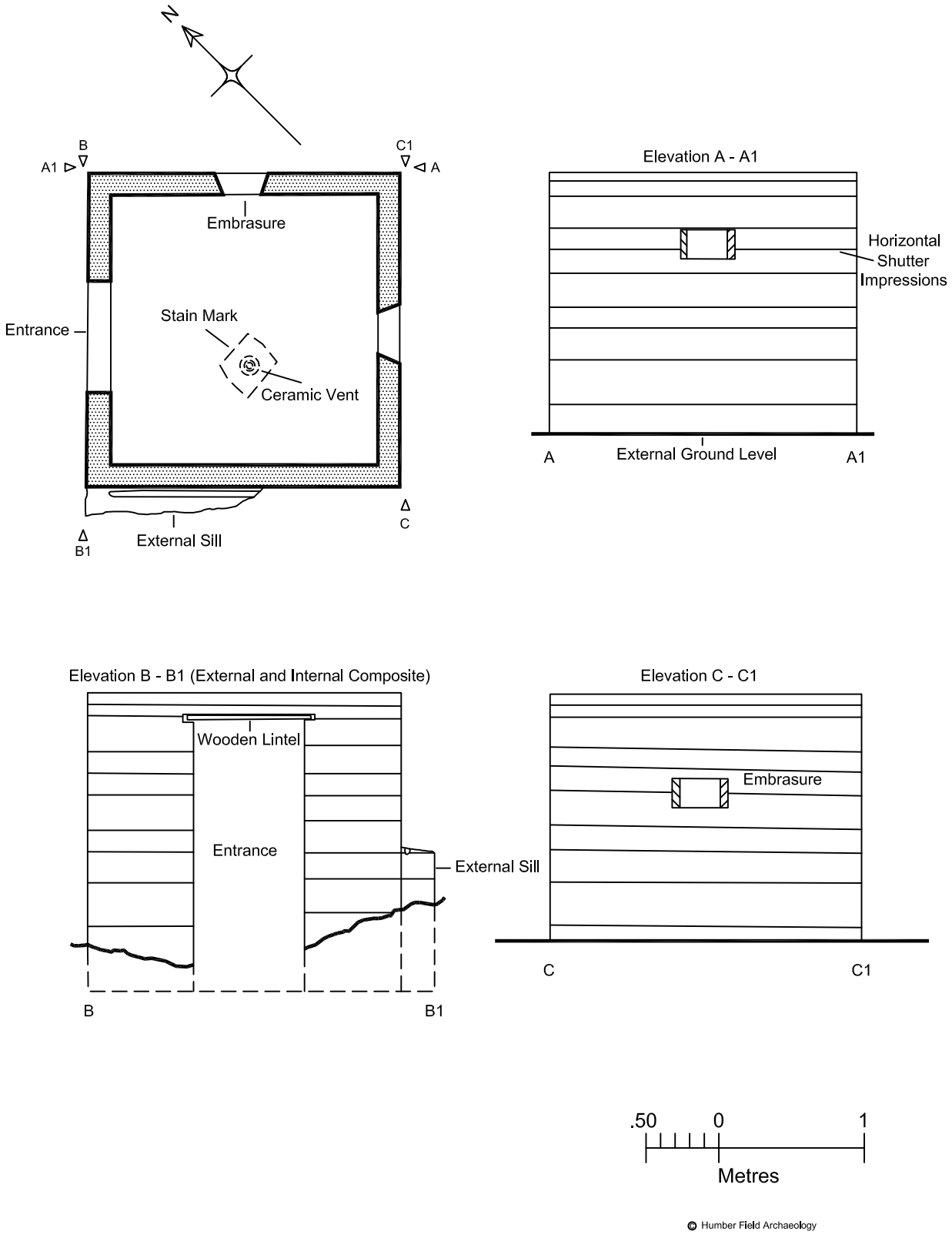

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Figure 10 WW1 Pillbox BA30 (North)

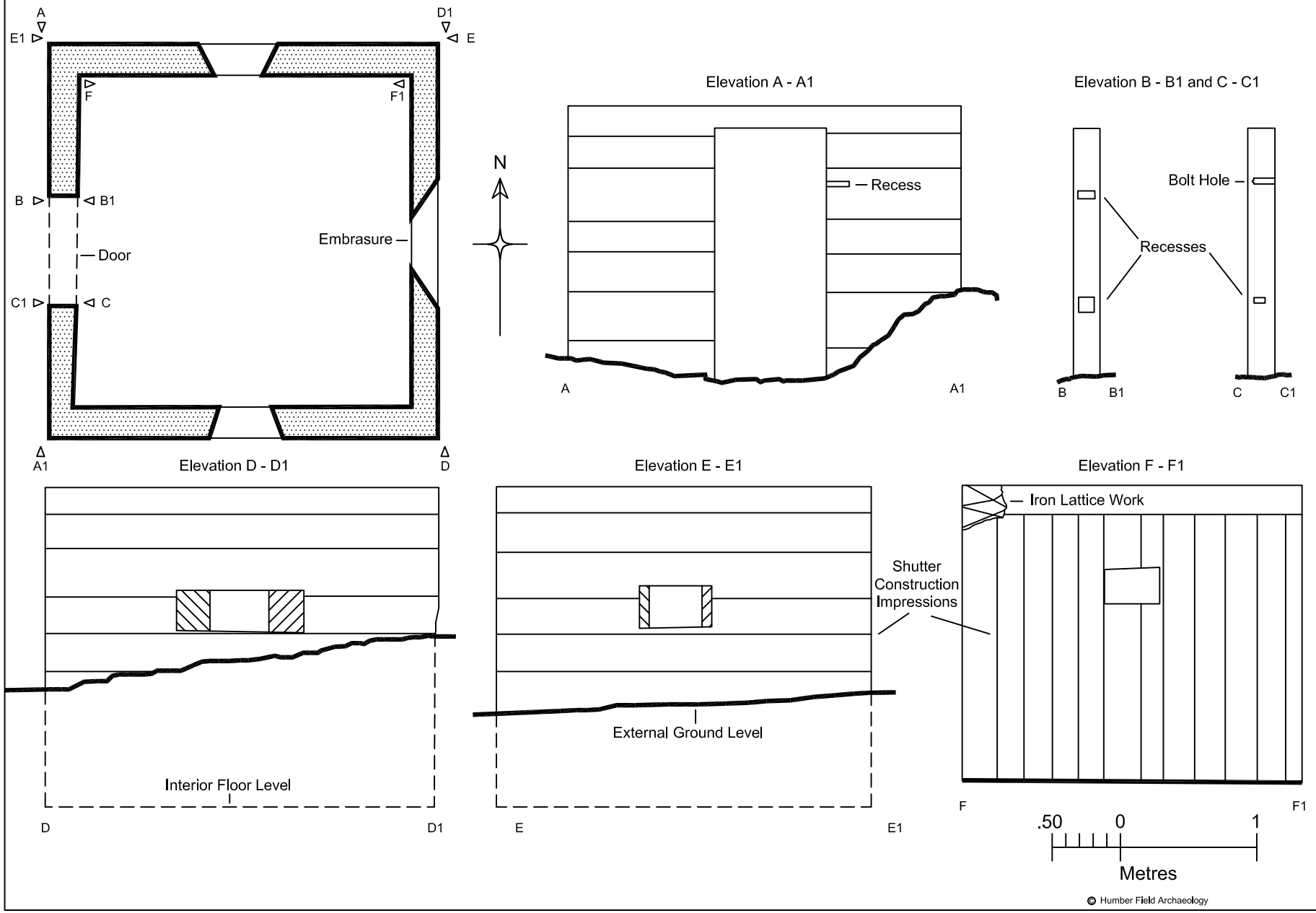

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Figure 11 WW1 Pillbox BA74

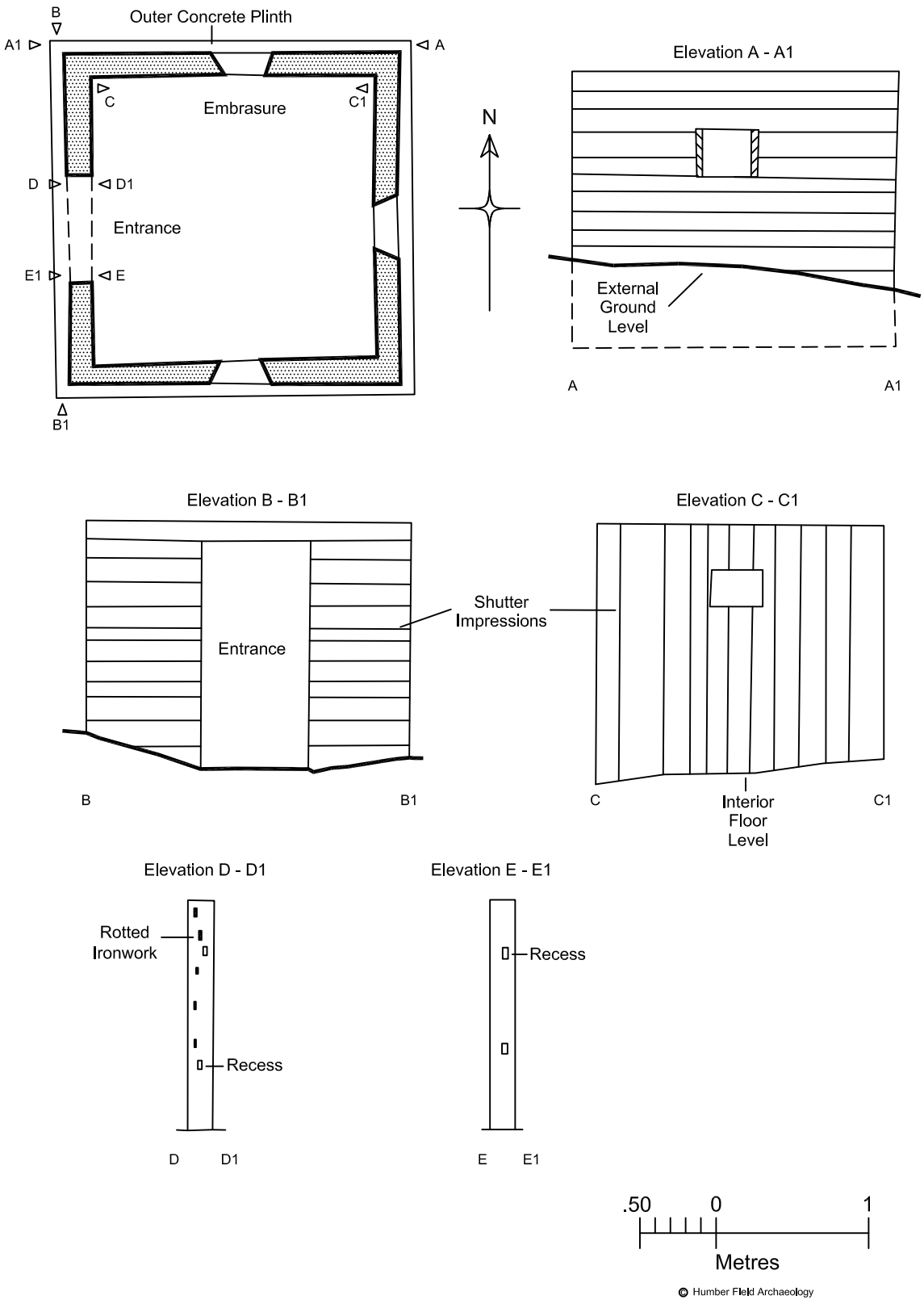

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Figure 12 WW1 Pillbox BA190

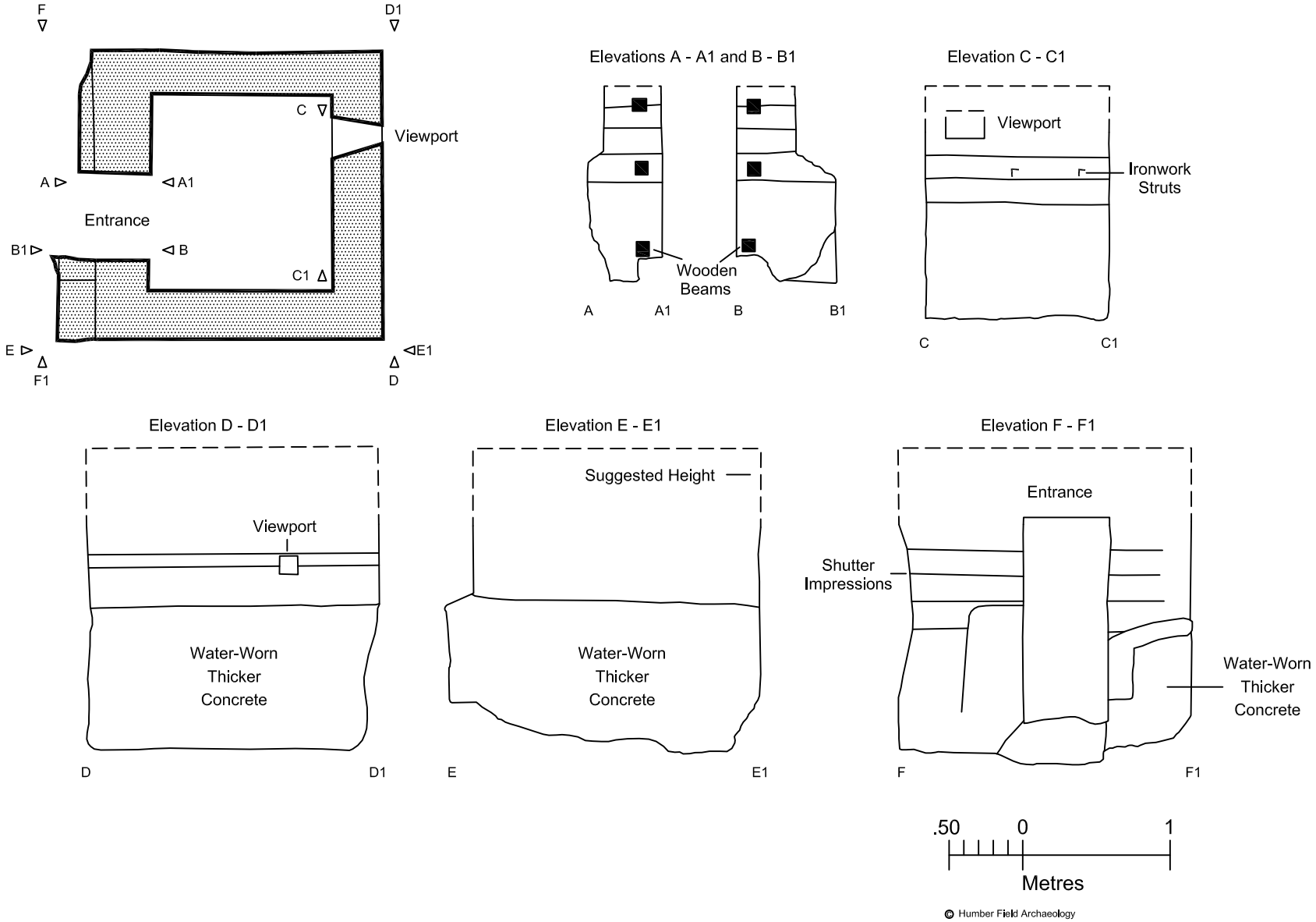

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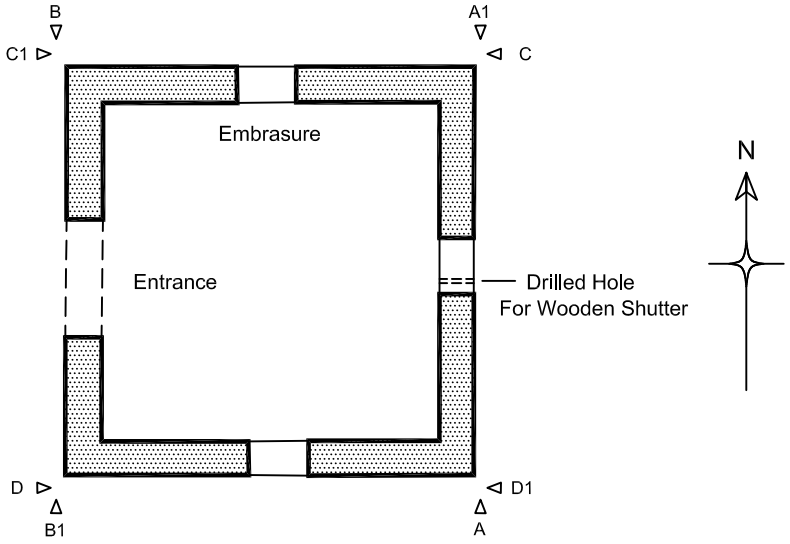
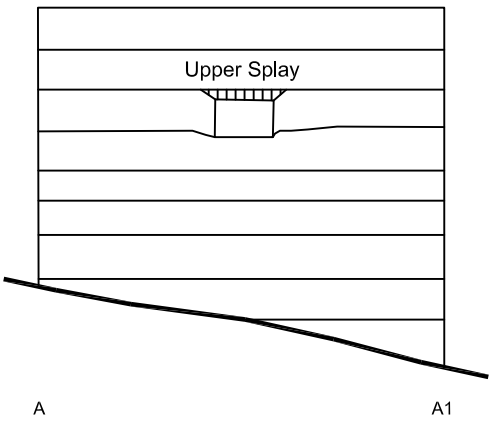
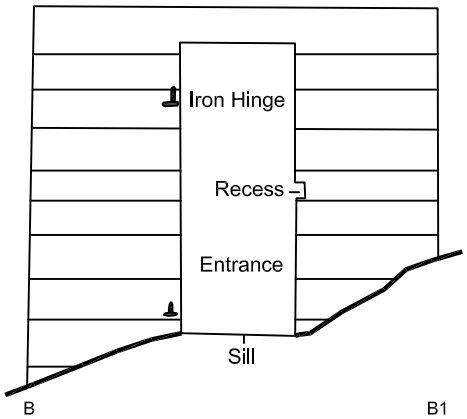
Figure 13 Probable WW1 forward observation post SK49



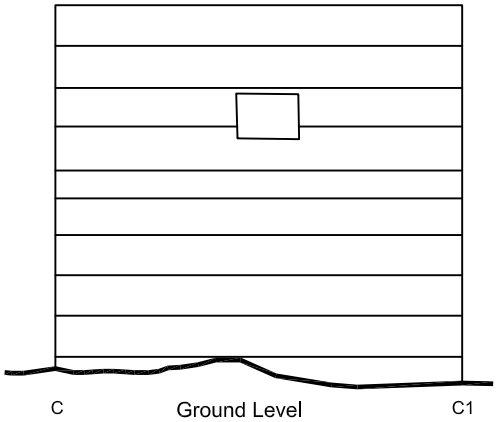
Elevation A - A1



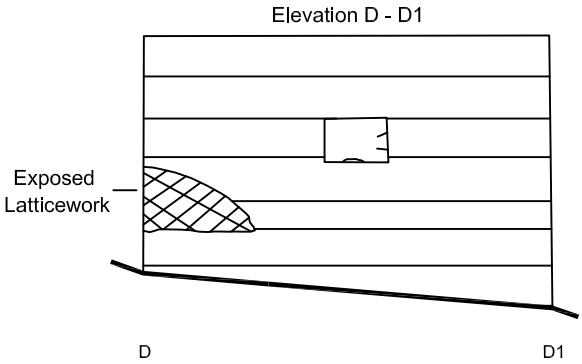
Elevation B - B1



Elevation C - C1



Elevation D - D1



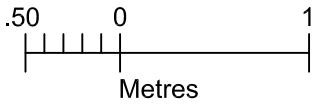


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Figure 14 WWI Pillbox SK50

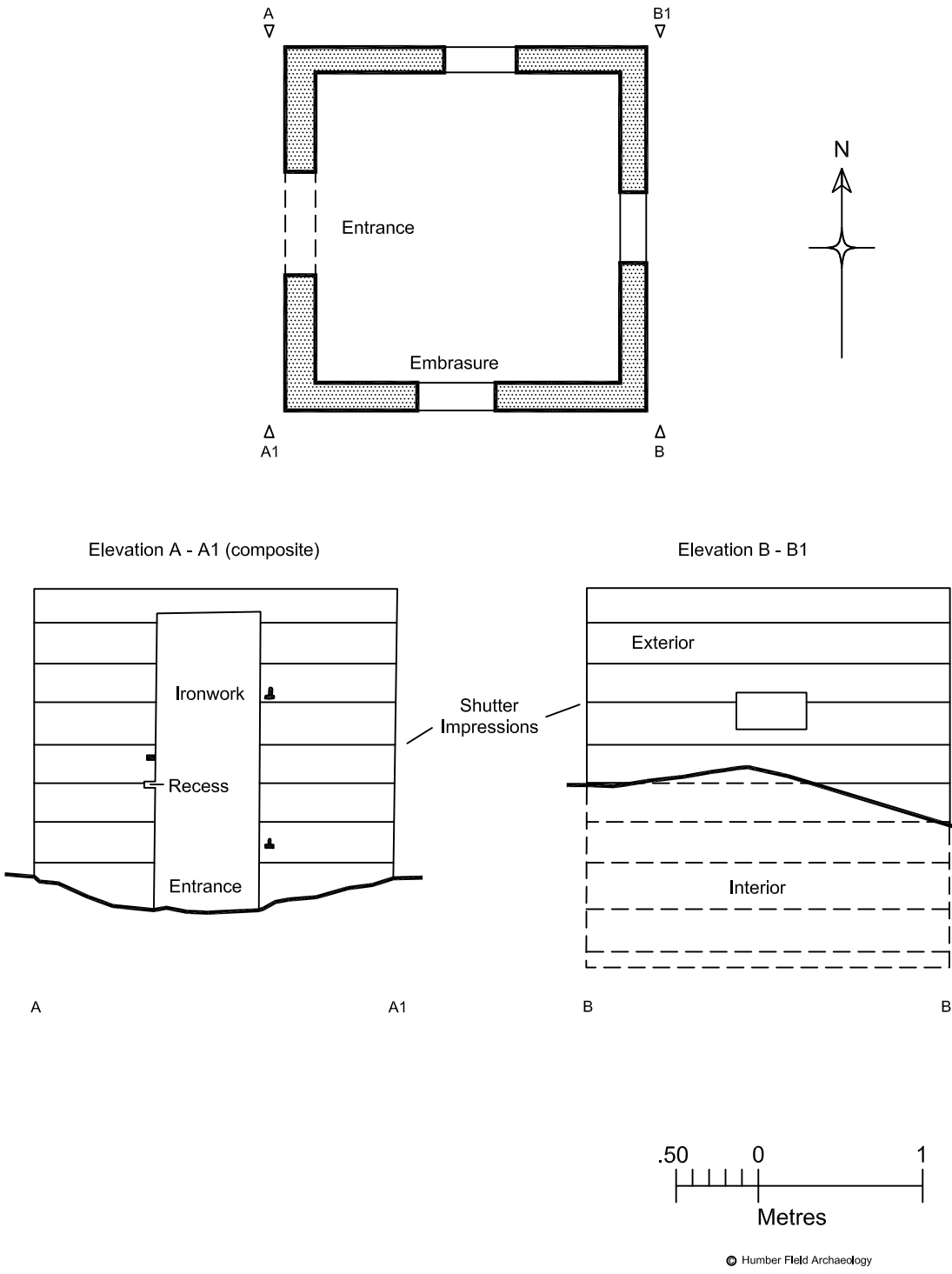

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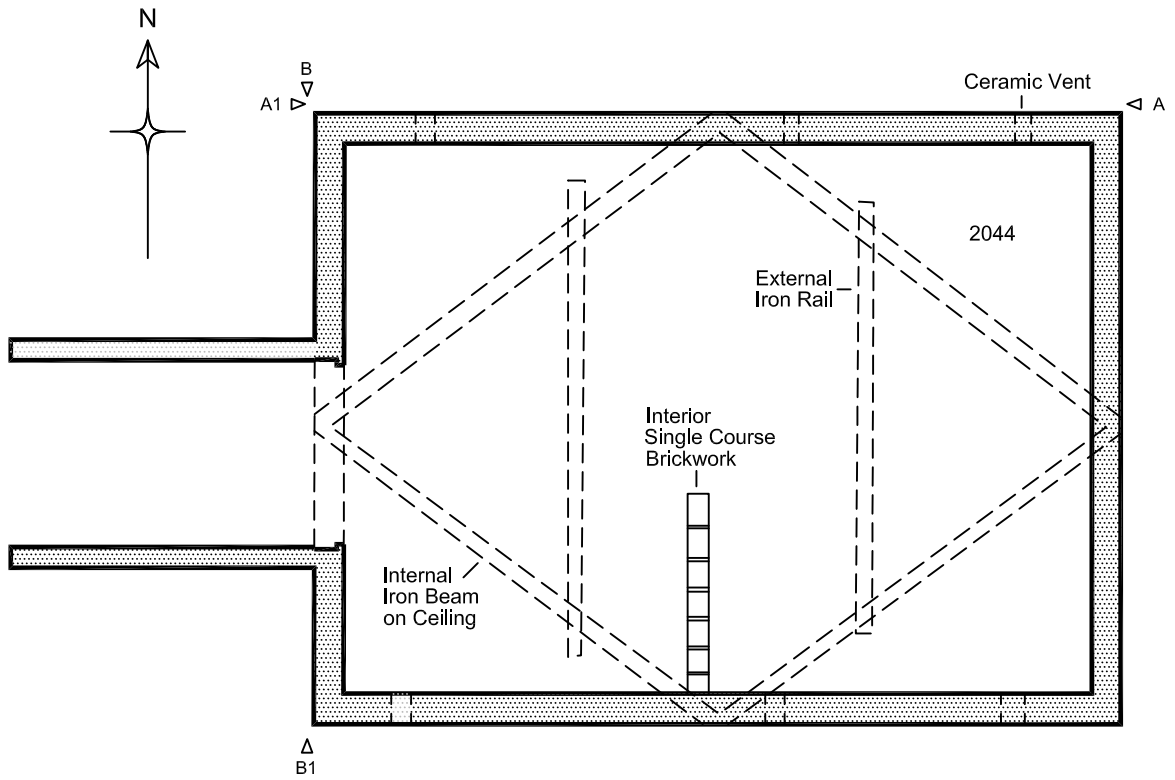
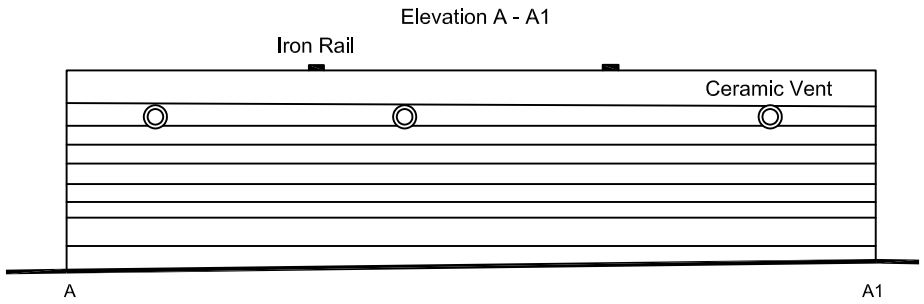
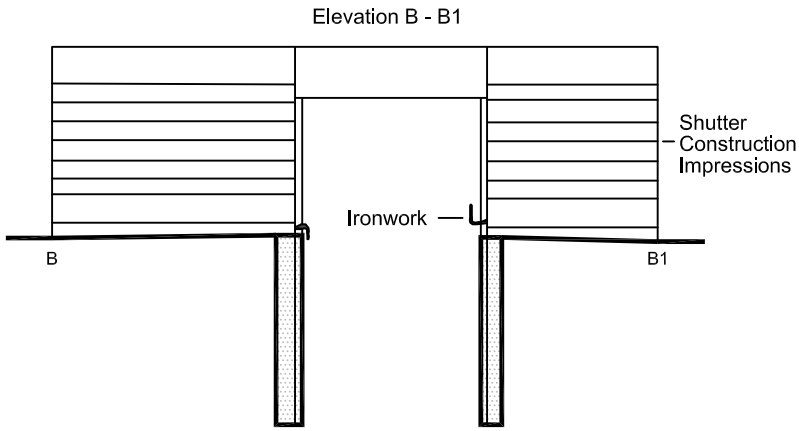
Figure 15 WWI Pillbox SK63







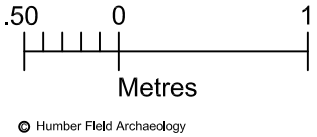


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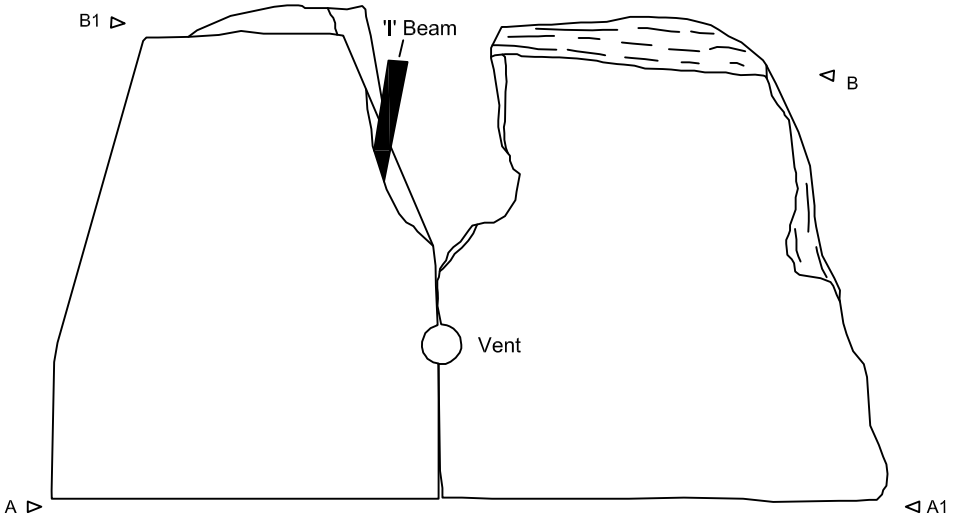
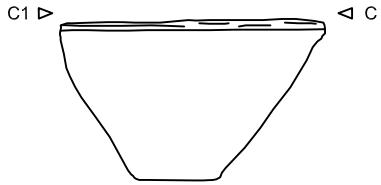
Figure 16 Command or Communication Post AT24





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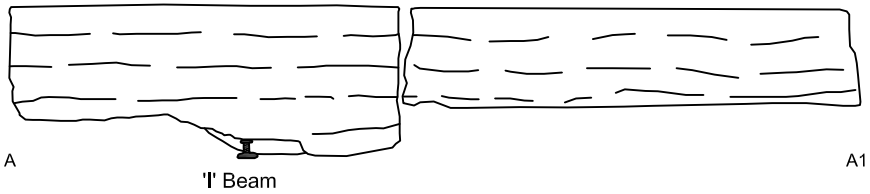

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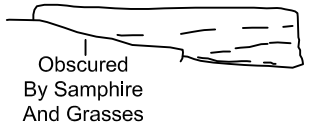
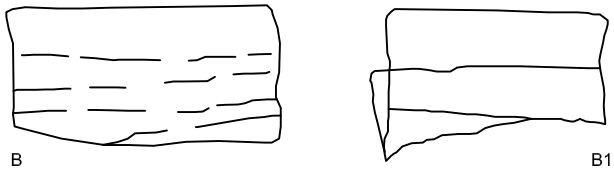


Elevation B - B1



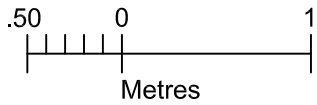


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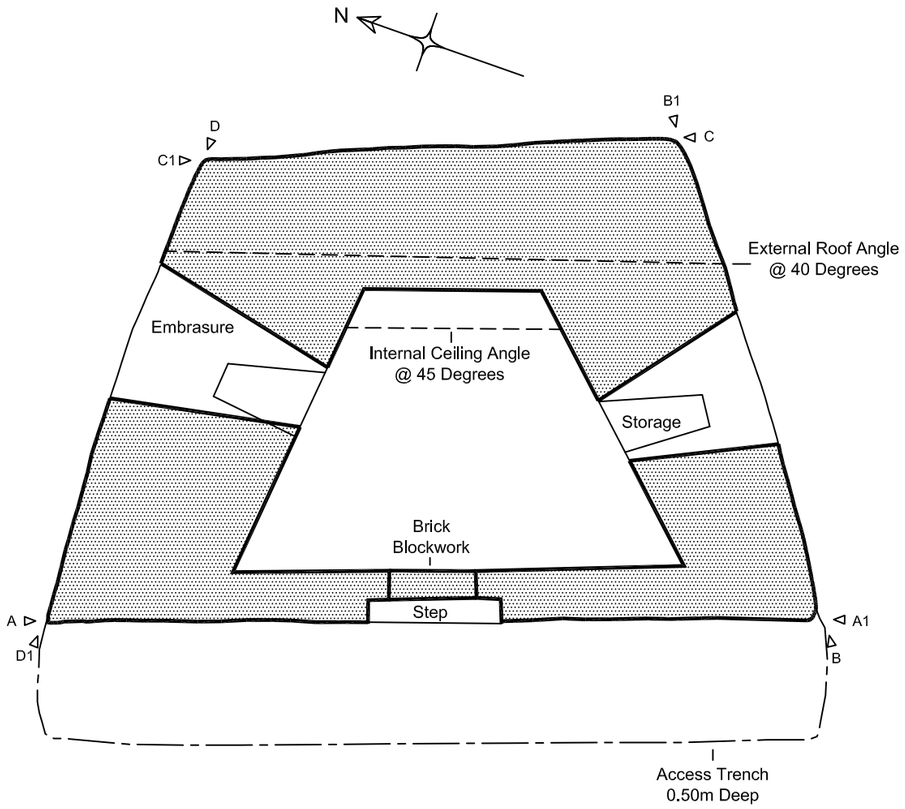
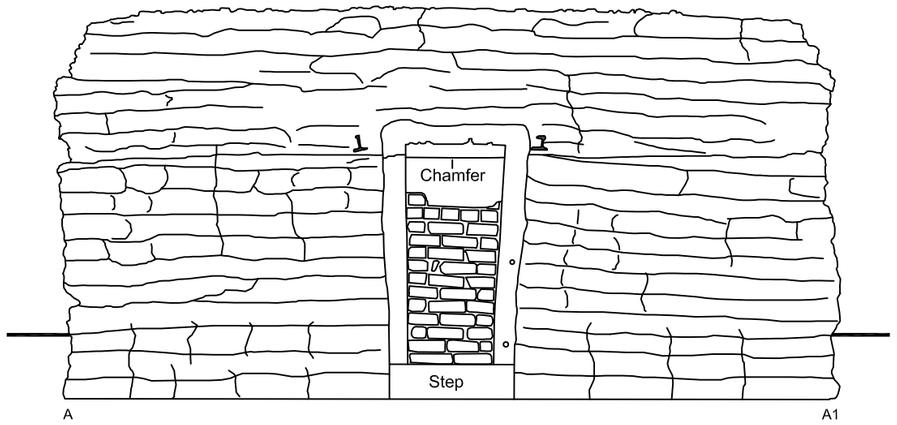
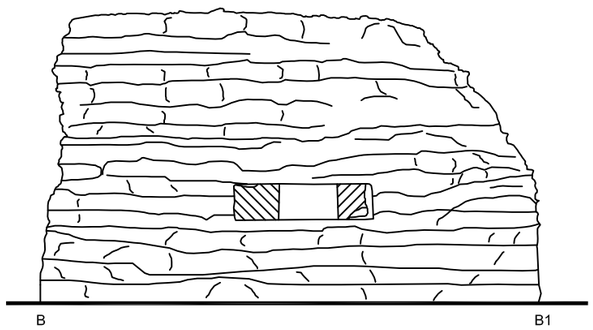
Figure 17 Composite and individual elements of the roof section for demolished WW1 Pillbox NS74



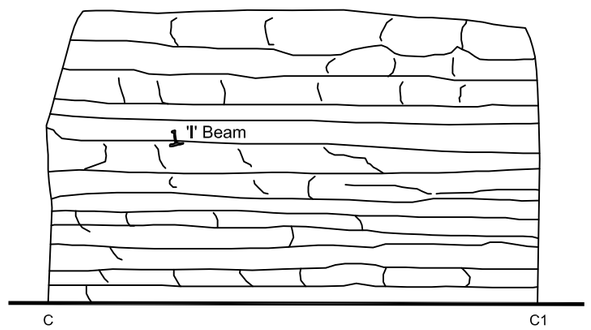
Elevation A - A1



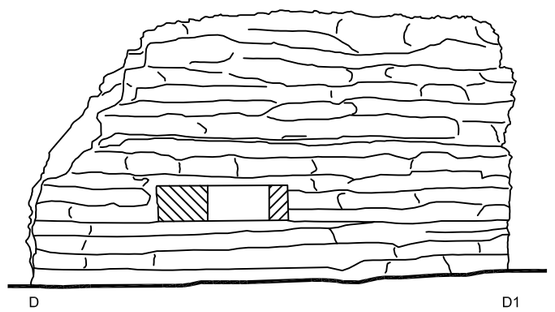
Elevation B - B1

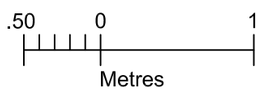


Elevation C - C1



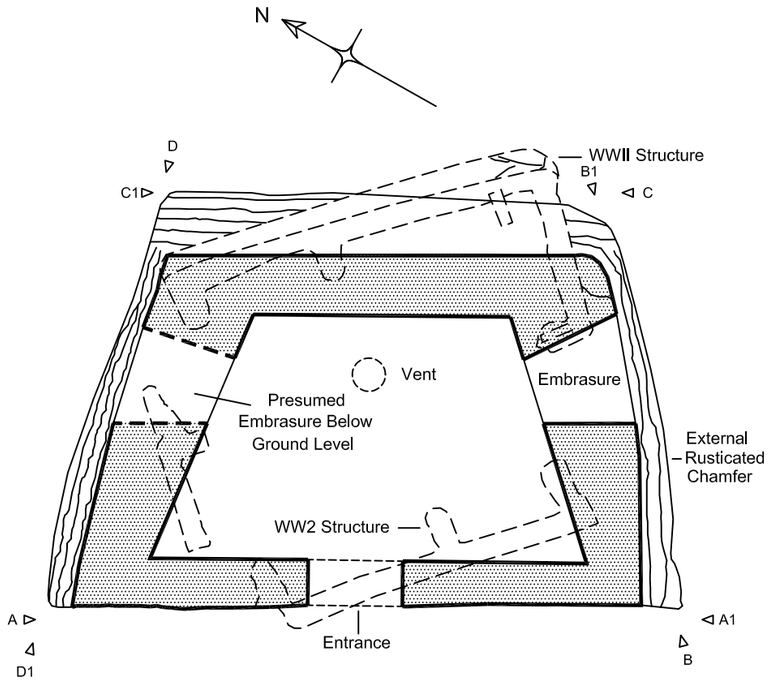
Elevation D - D1

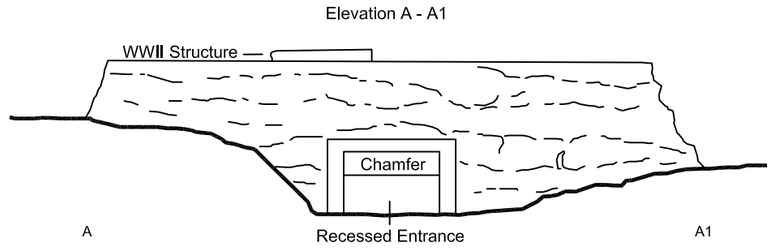


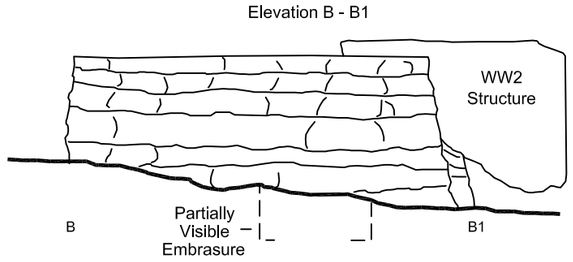


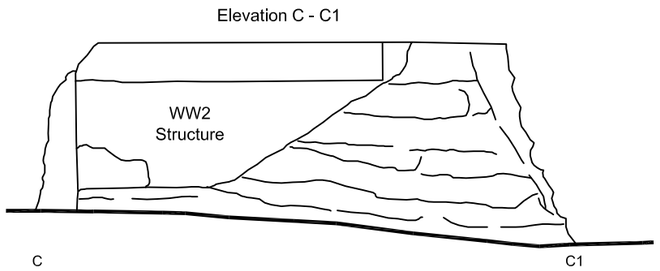
scale 1:40 @ A3

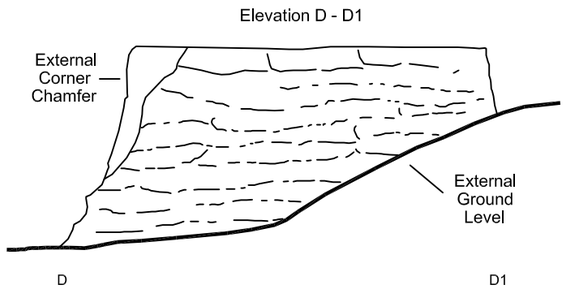
Figure 18 WW1 Pillbox SH1

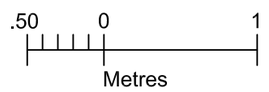






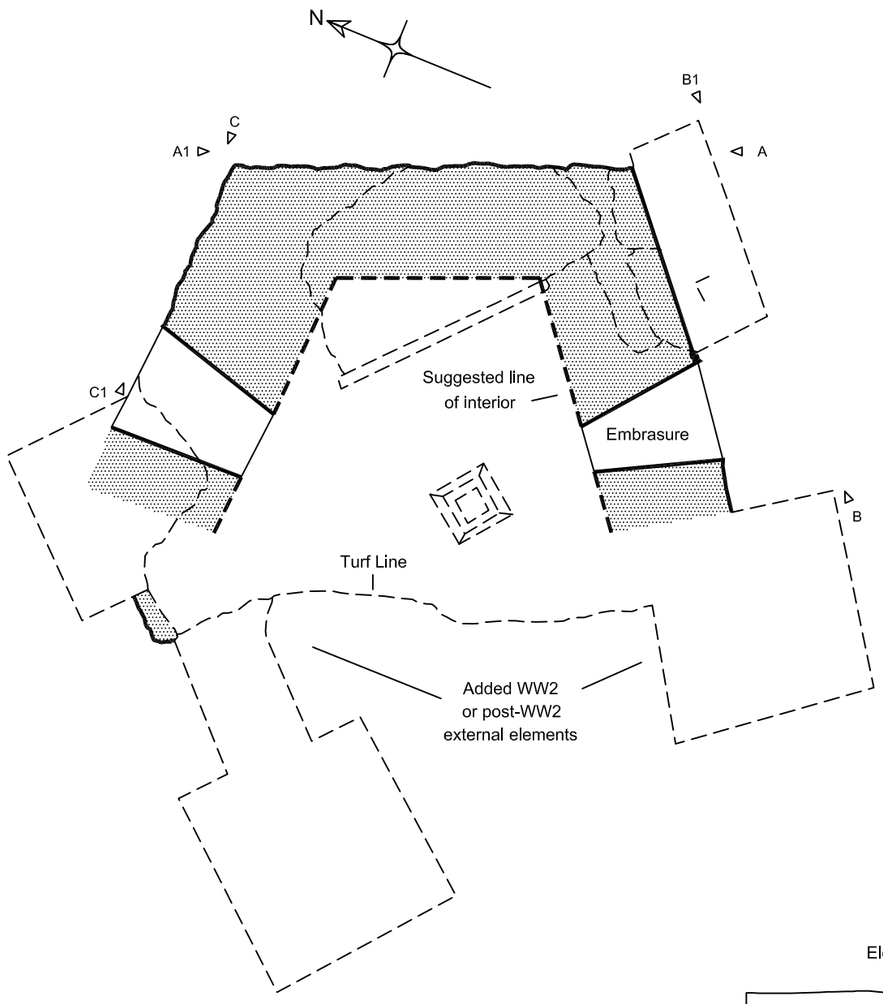


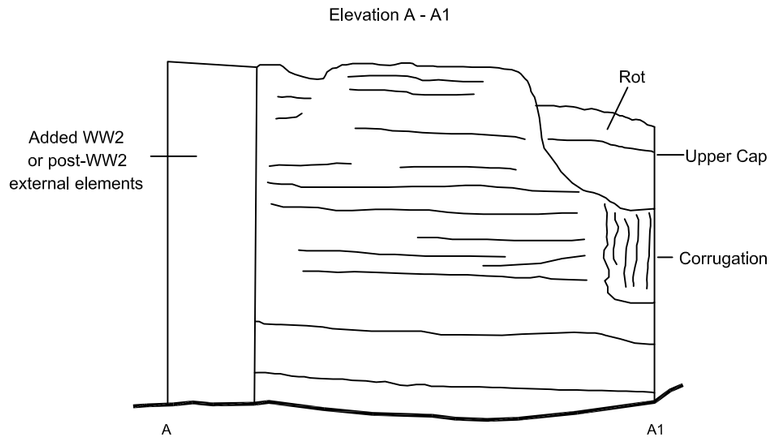


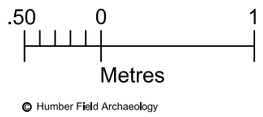


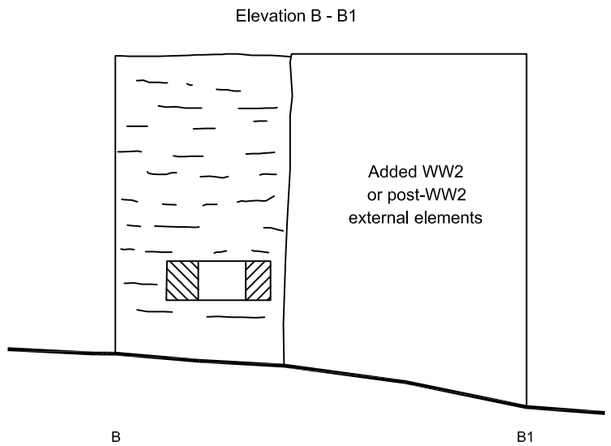
scale 1:40 @ A3

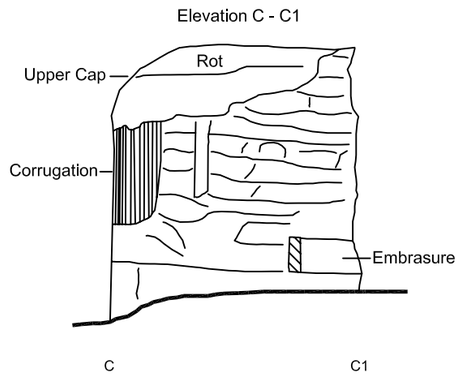
Figure 19 WW1 Pillbox SH4





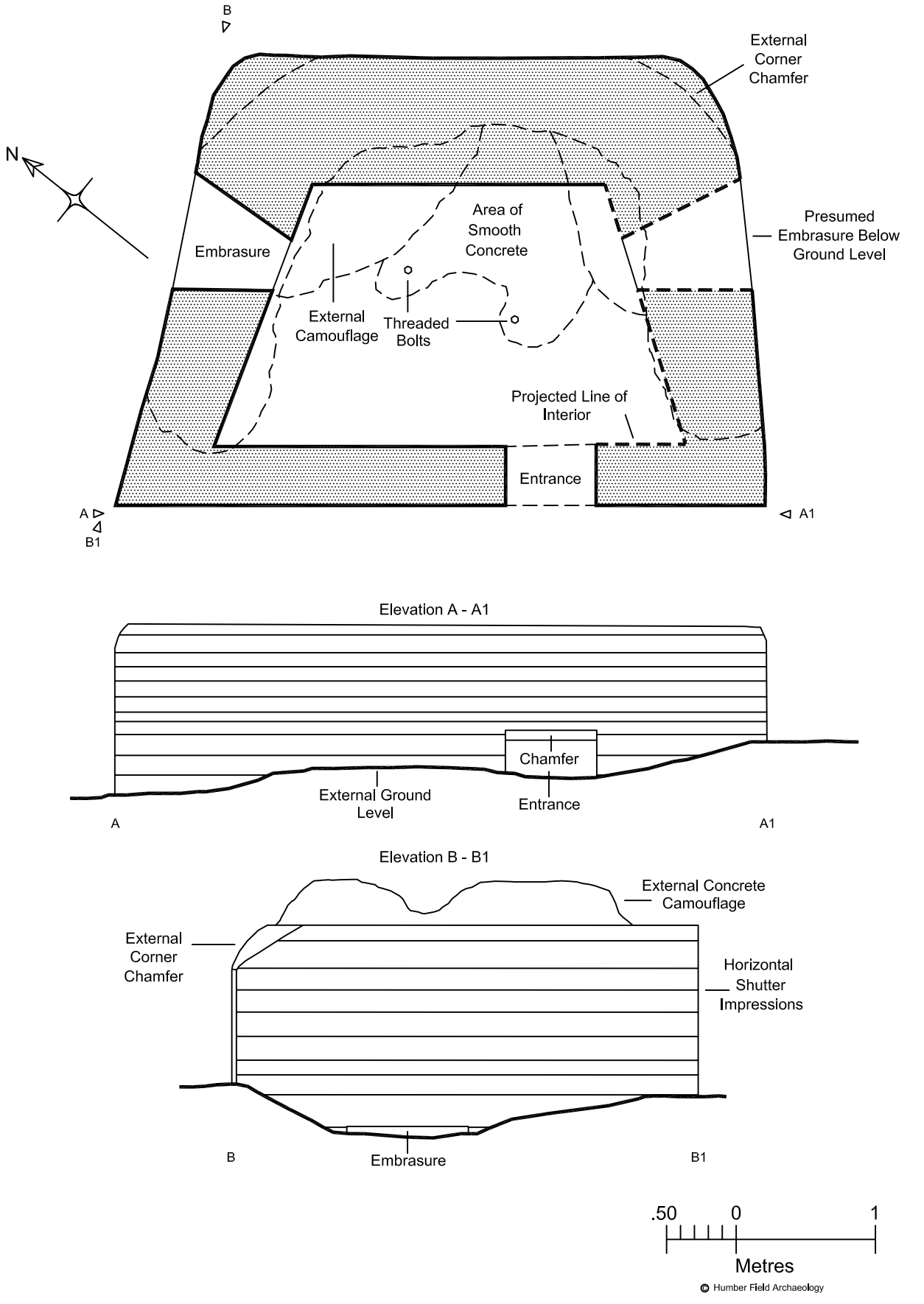






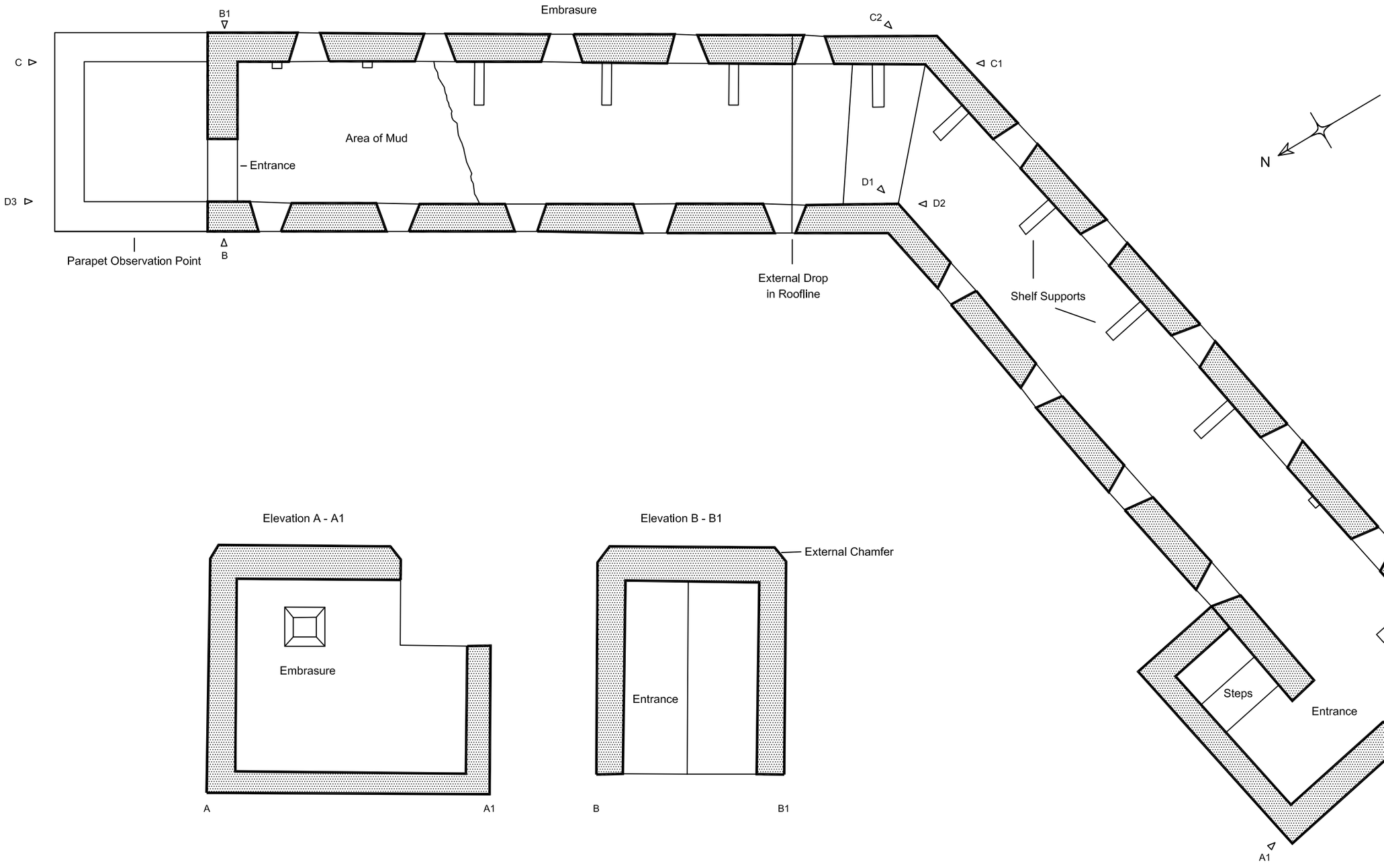
scale 1:40 @ A3

Figure 20 WW1 Pillbox SH8 with WW2 or post-WW2 additions



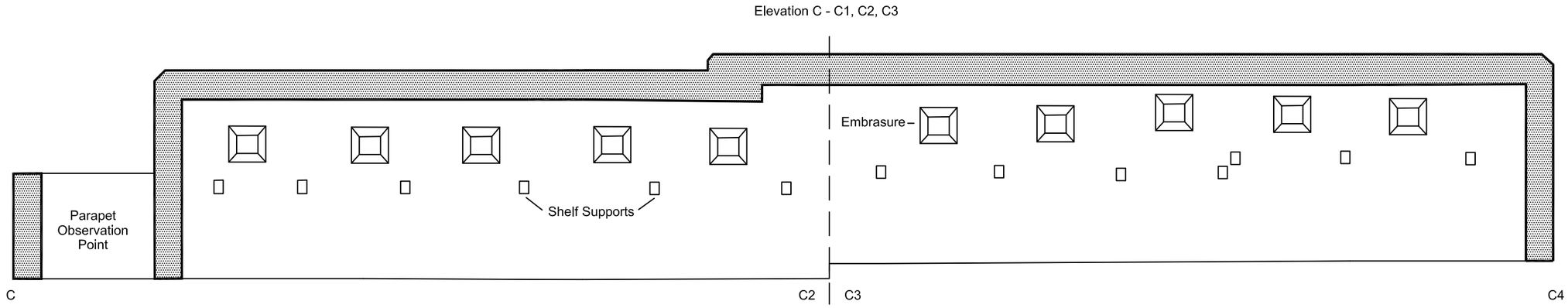
scale 1:40 @ A4

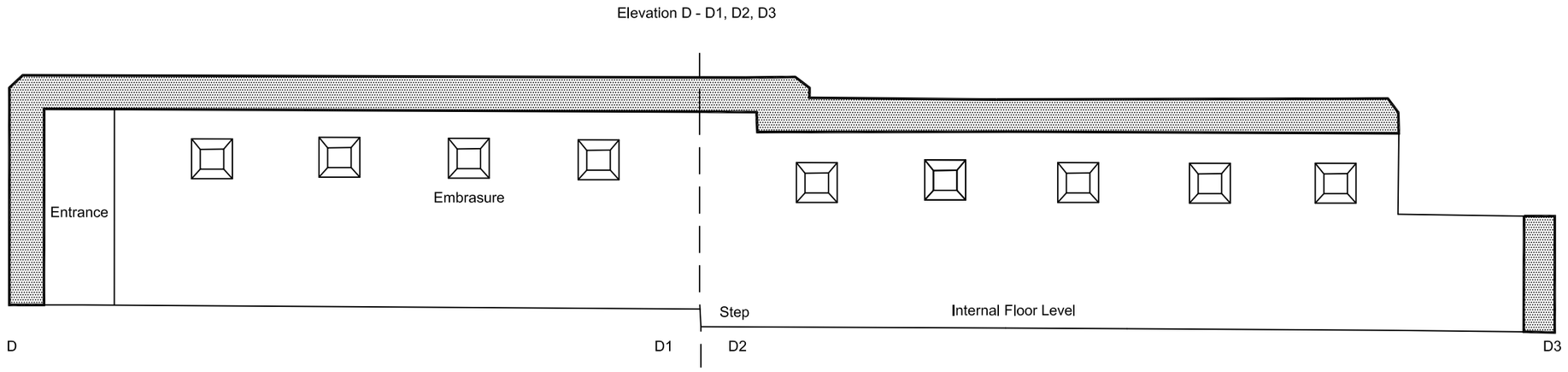
Figure 21 WW1 Pillbox SA11

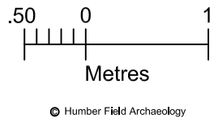


scale 1:40 @ A3

Figure 22 WW2 Section Post FD60

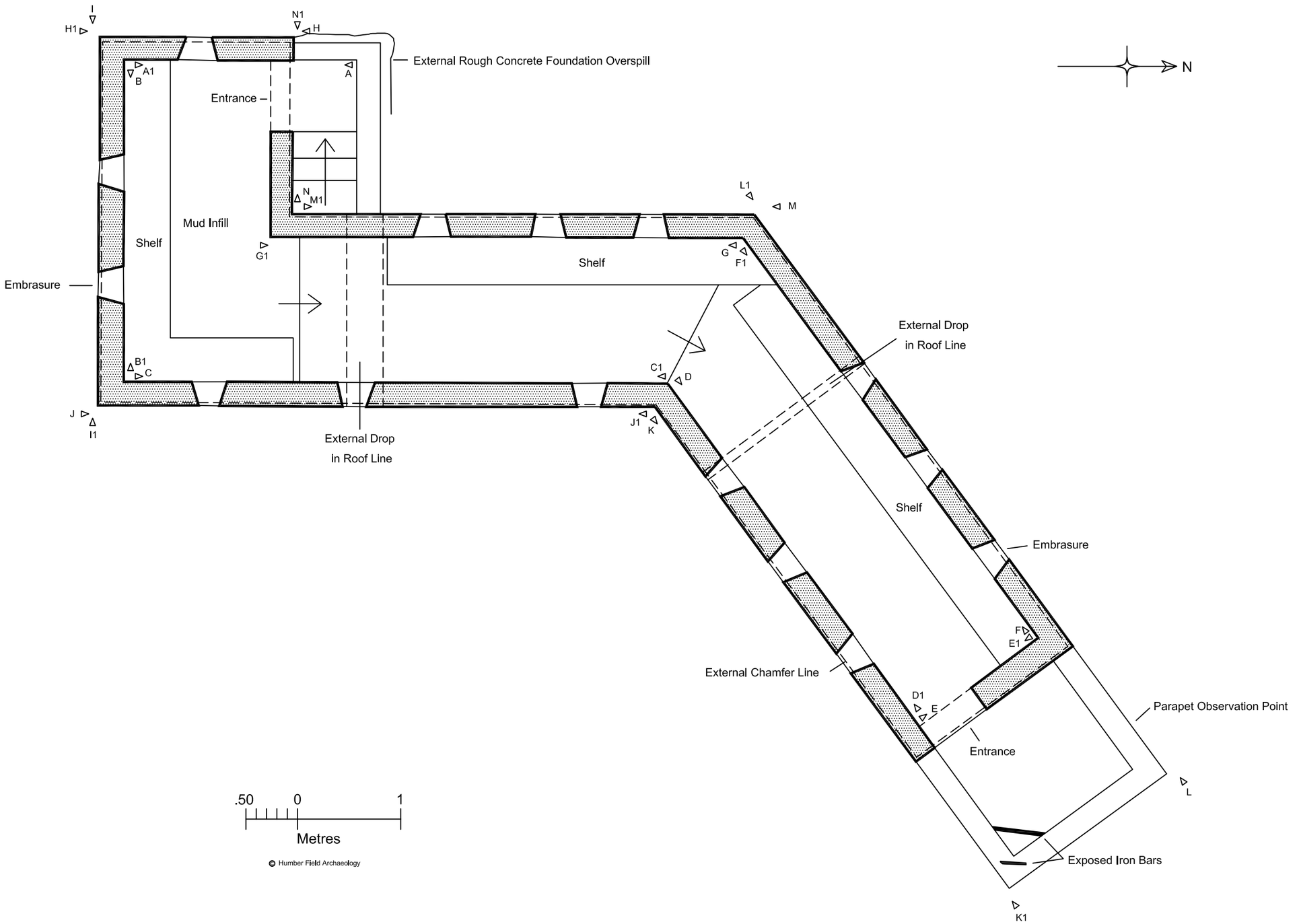






scale 1:50 @ A3

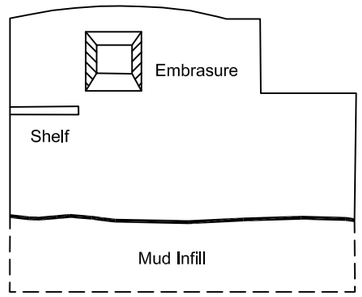
Figure 23 Internal profiles of WW2 Section Post FD60



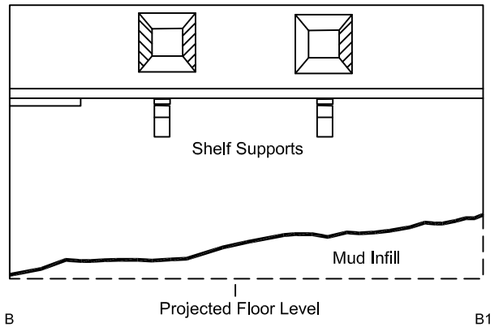
scale 1:40 @ A3

Figure 24 WW2 Section Post FD80

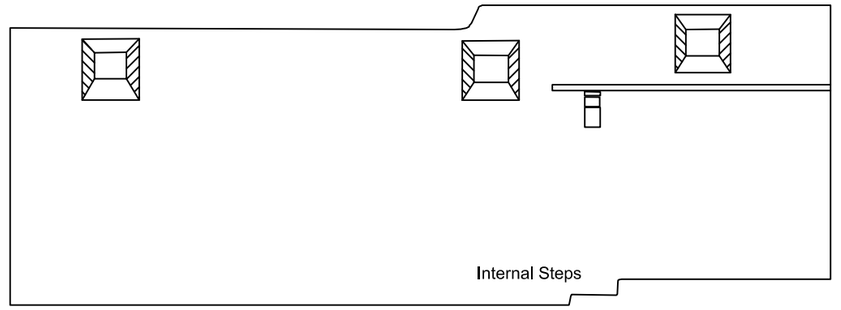
Elevation A - A1



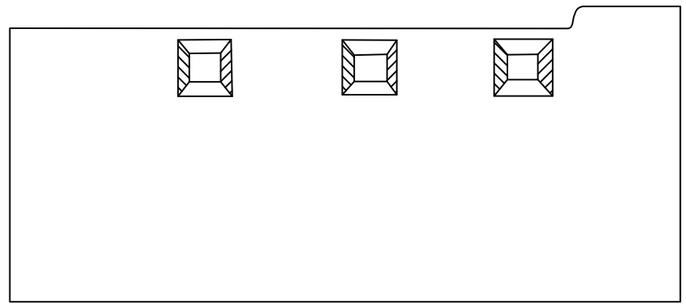
Elevation B - B1



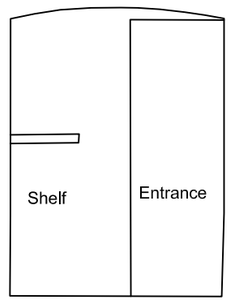
Elevation C - C1



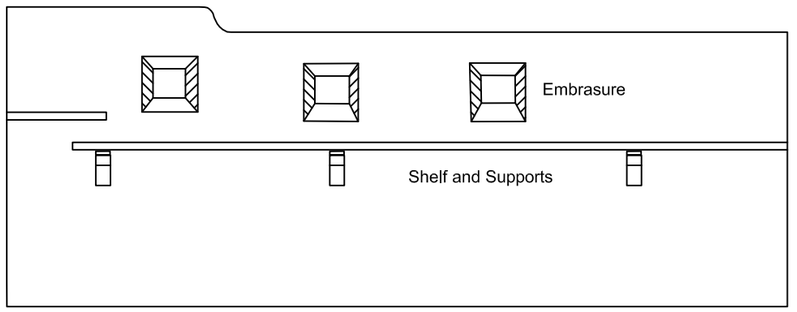
Elevation D - D1



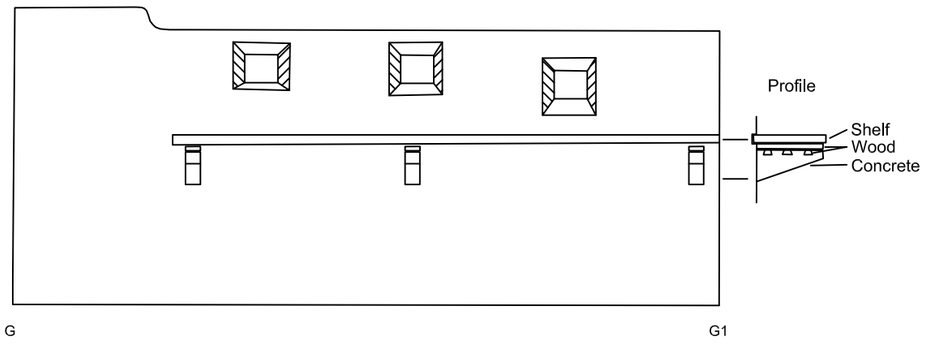
Elevation E - E1

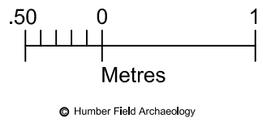


Elevation F - F1



Elevation G - G1

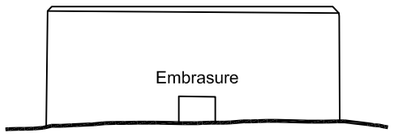




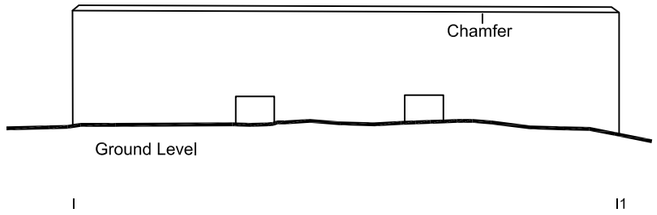
scale 1:40 @ A3

Figure 25 Internal profiles of WW2 Section Post FD80

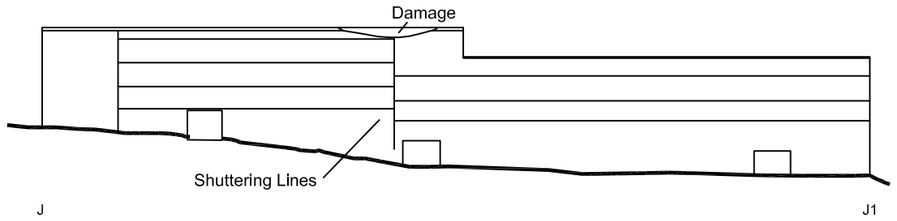
Elevation H - H1



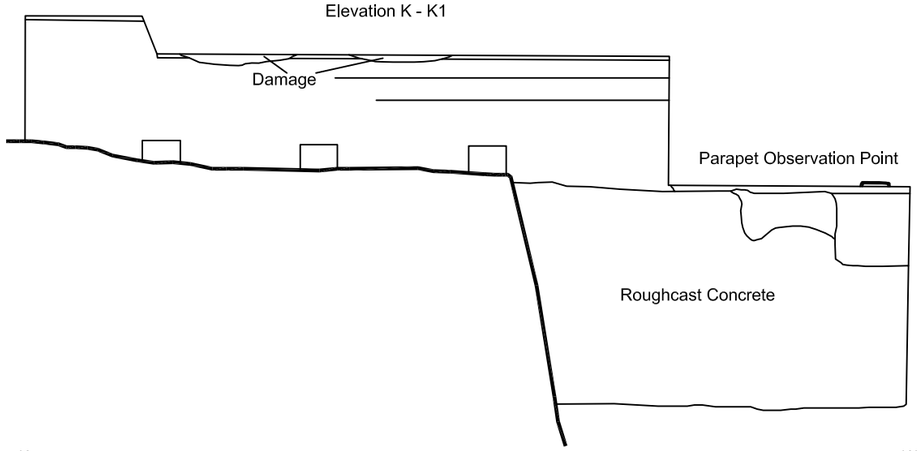
Elevation I - I1



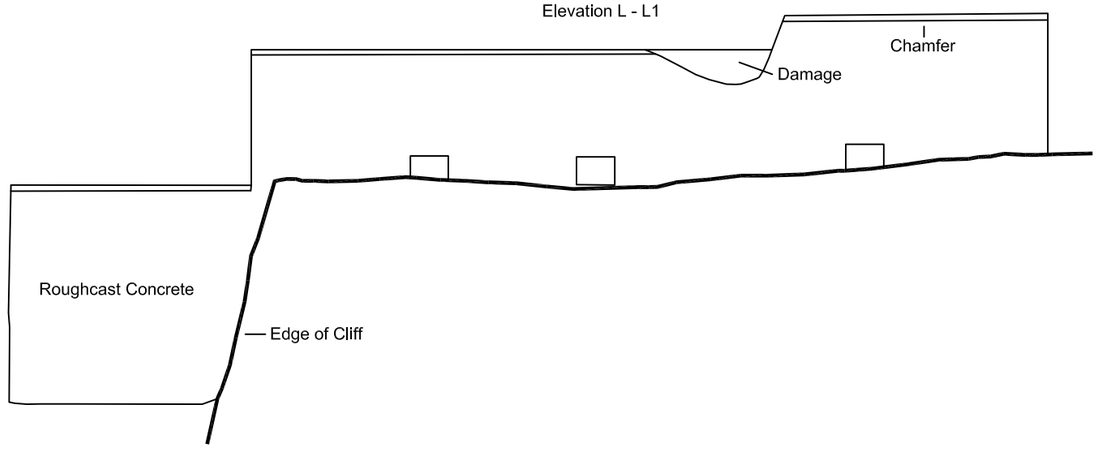
Elevation J - J1



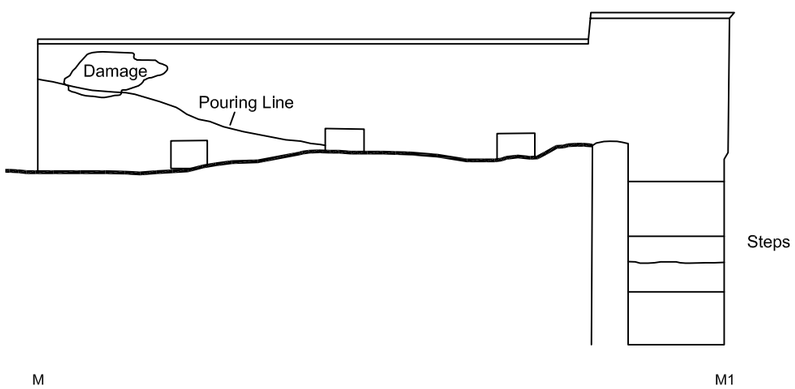
Elevation K - K1



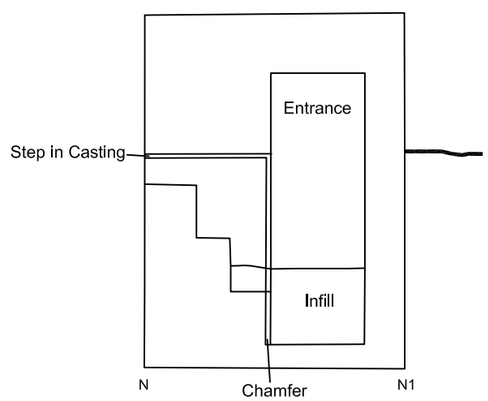
Elevation L - L1

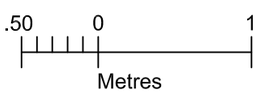


Elevation M - M1



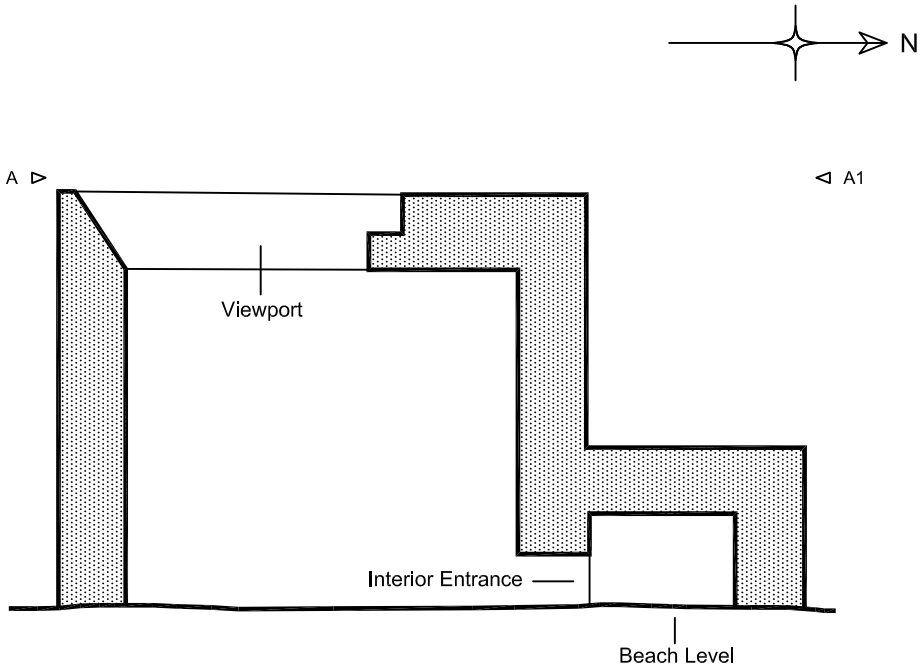
Elevation N - N1

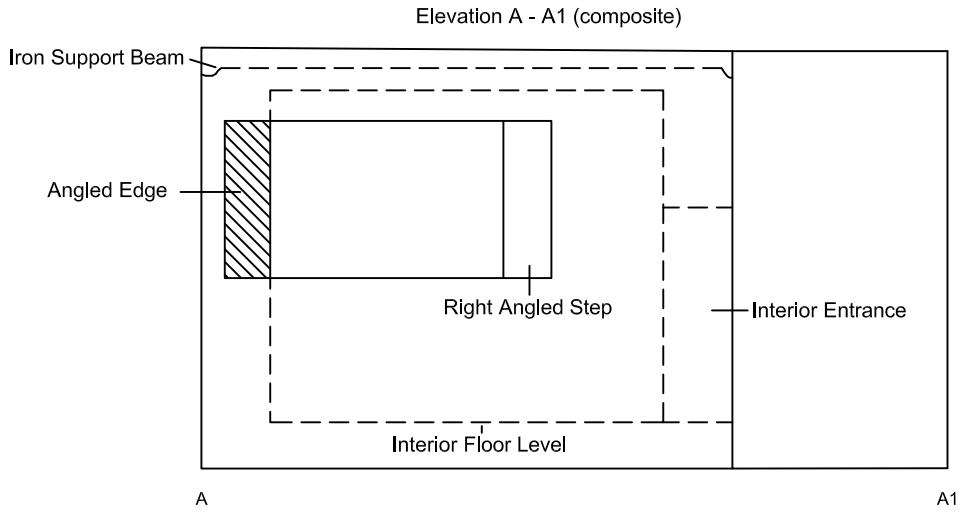


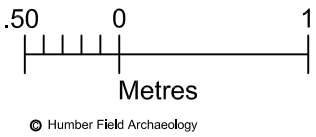


scale 1:40 @ A3

Figure 26 External profiles of WW2 Section Post FD80



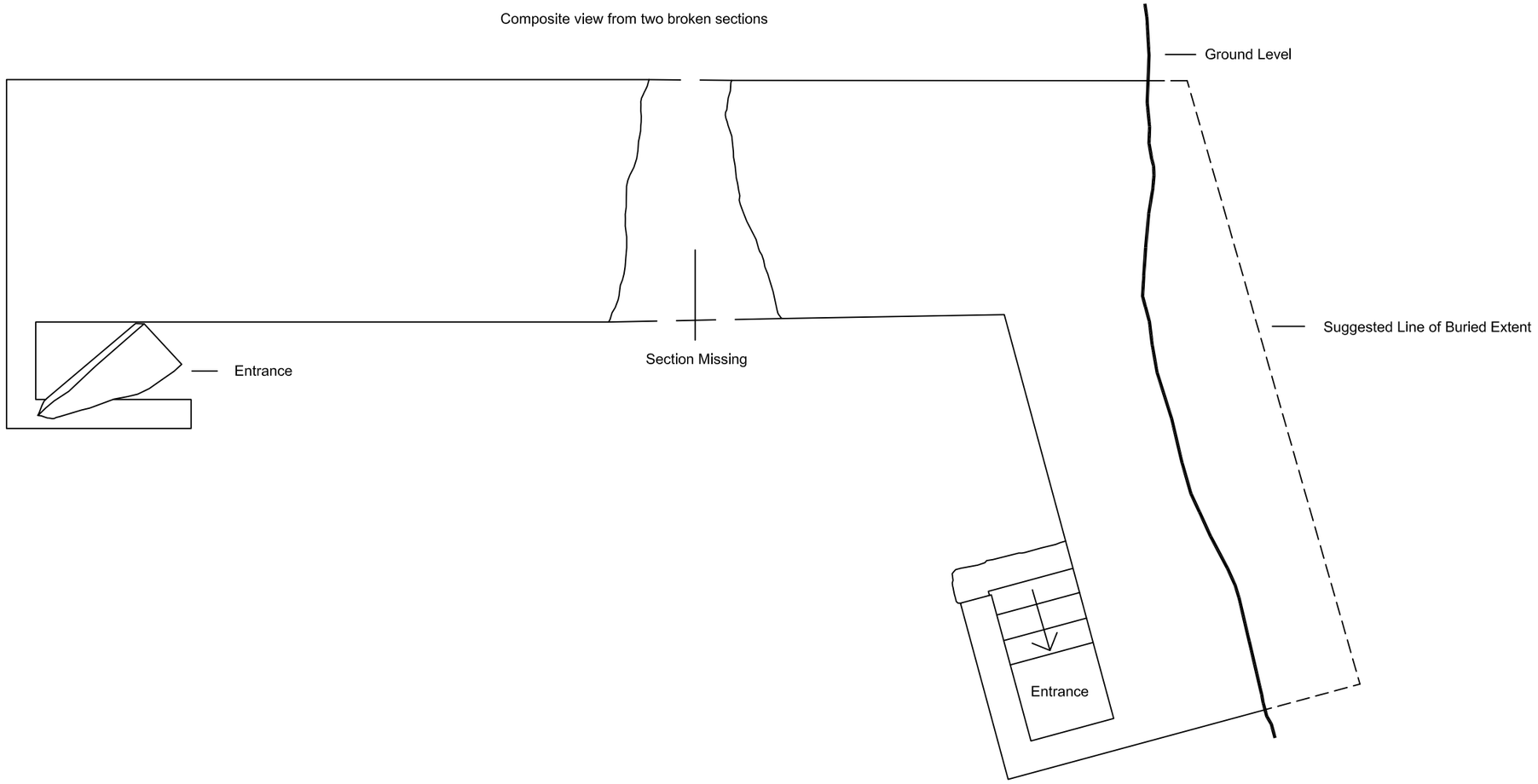




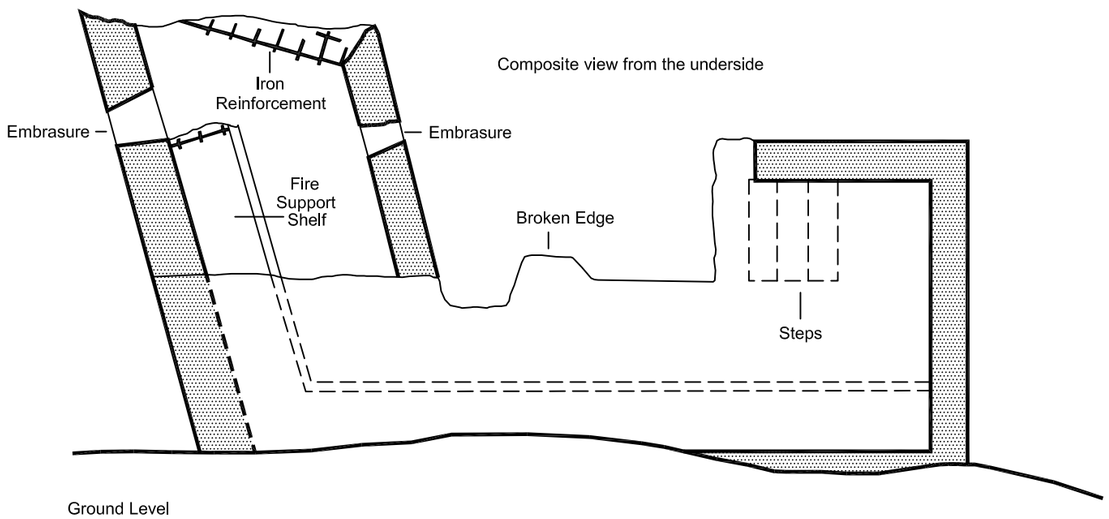
scale 1:40 @ A4

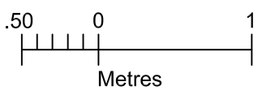
Figure 27 WW2 Command Post OS10

Composite view from two broken sections



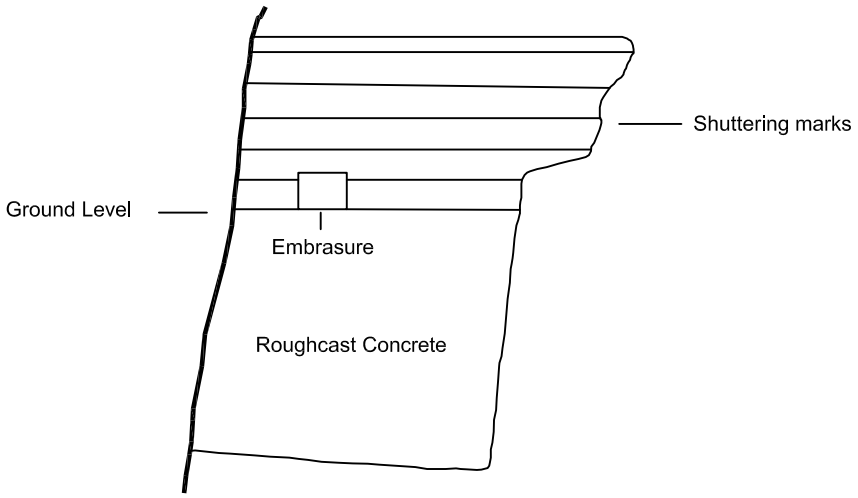
Composite view from the underside

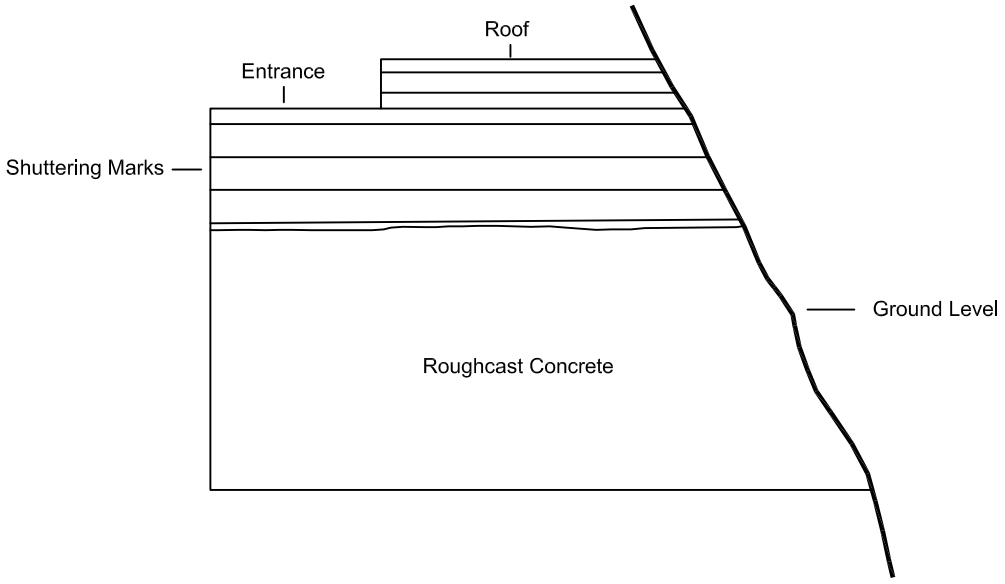


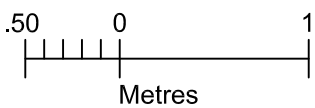


scale 1:40 @ A3

Figure 28 WW2 Section Post CY9

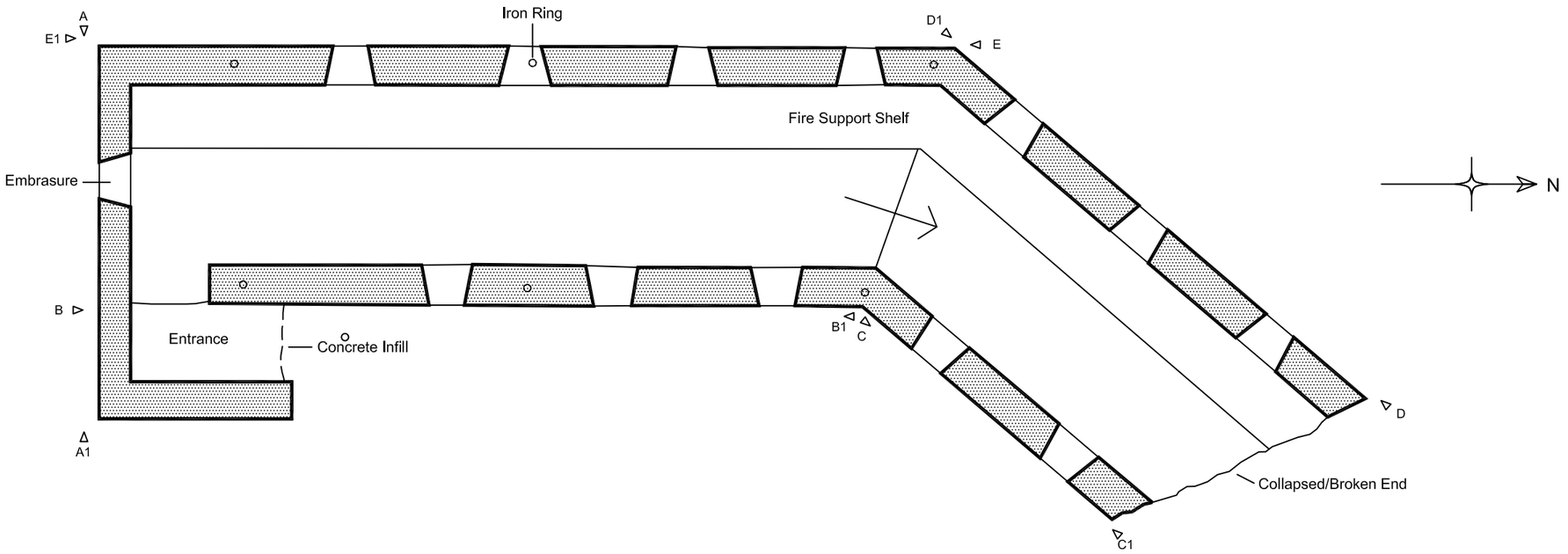




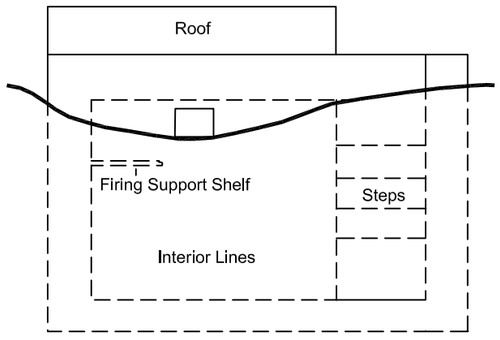


scale 1:40 @ A4

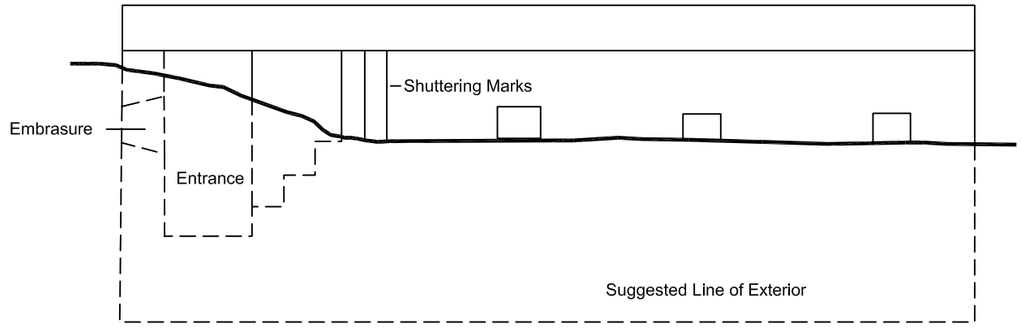
Figure 29 WW2 Section Post CY9 Elevations



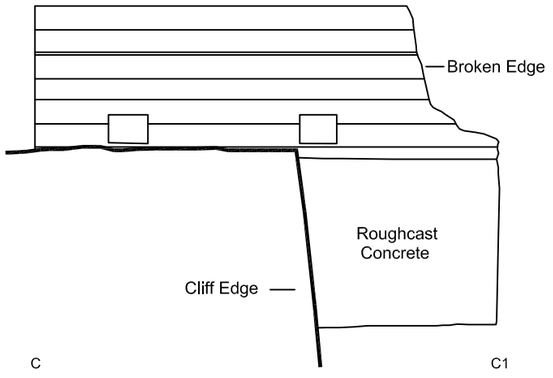
Elevation A - A1



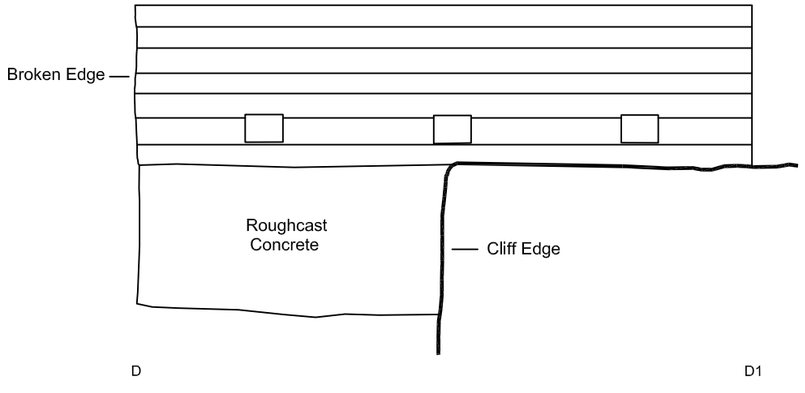
Elevation B - B1



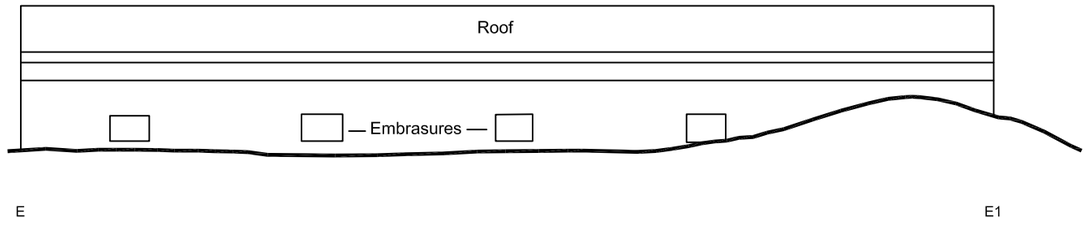
Elevation C - C1

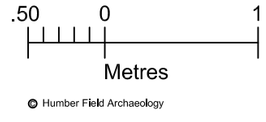


Elevation D - D1



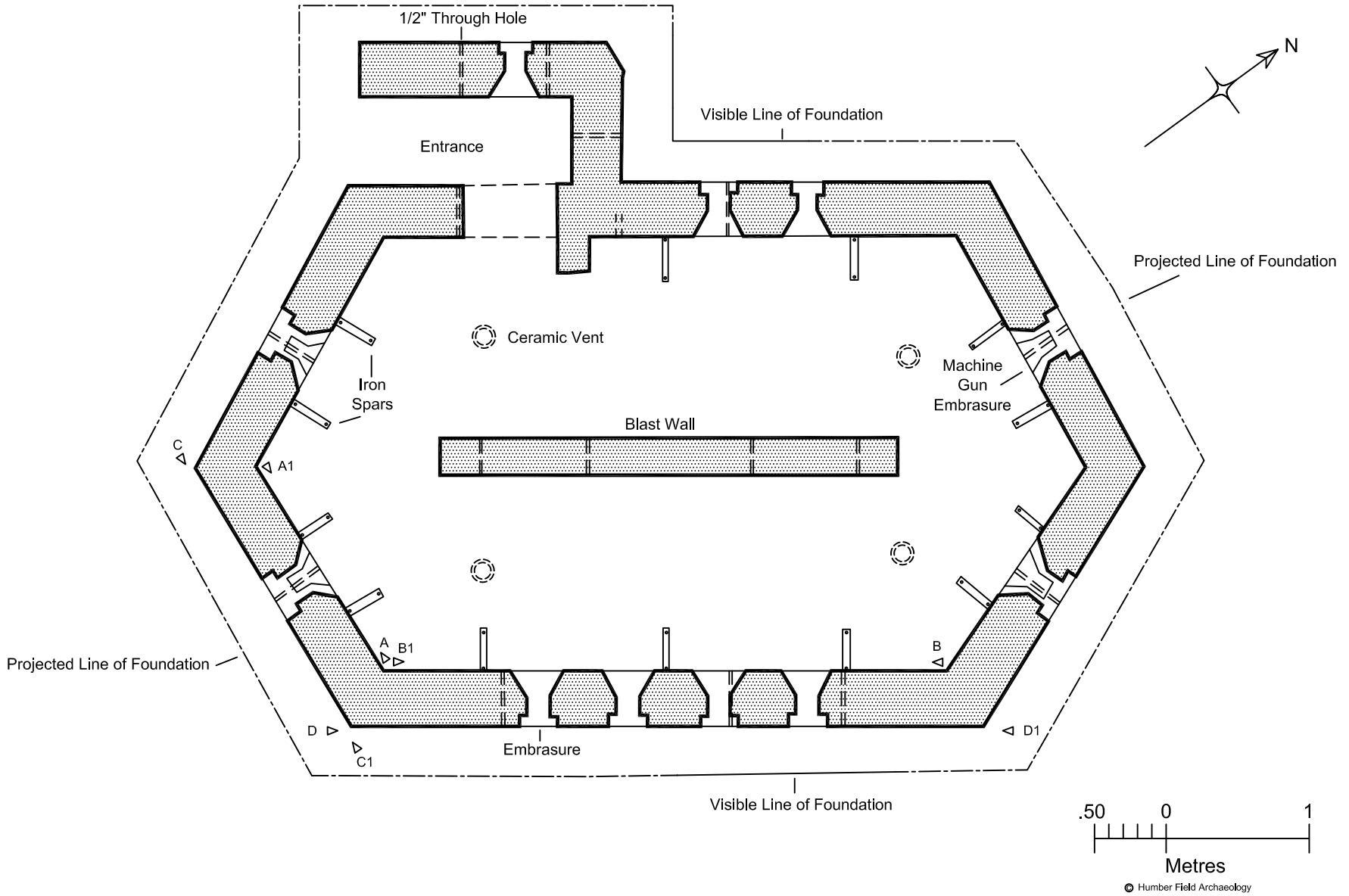
Elevation E - E1





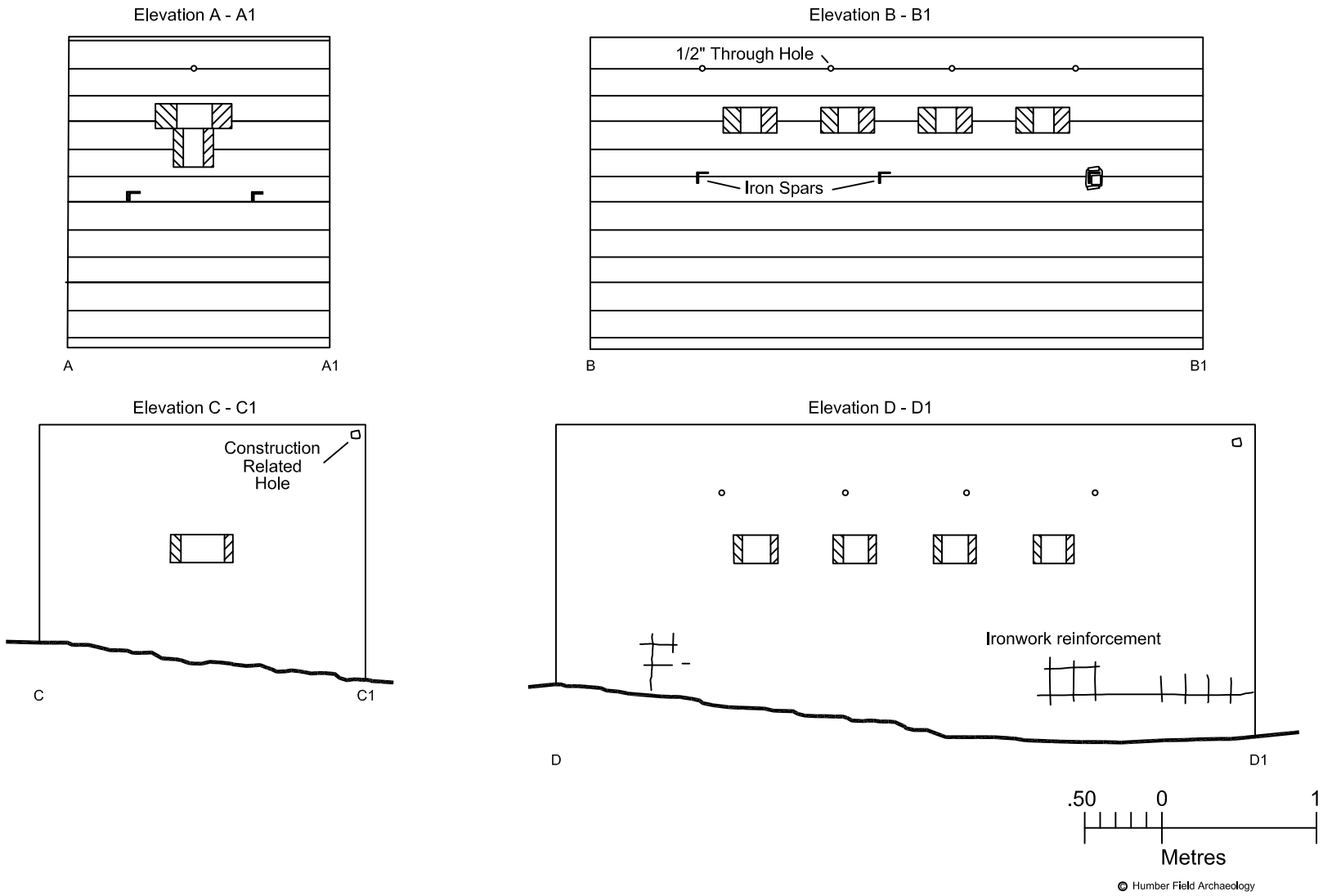
scale 1:40 @ A3

Figure 30 WW2 Section Post CY11



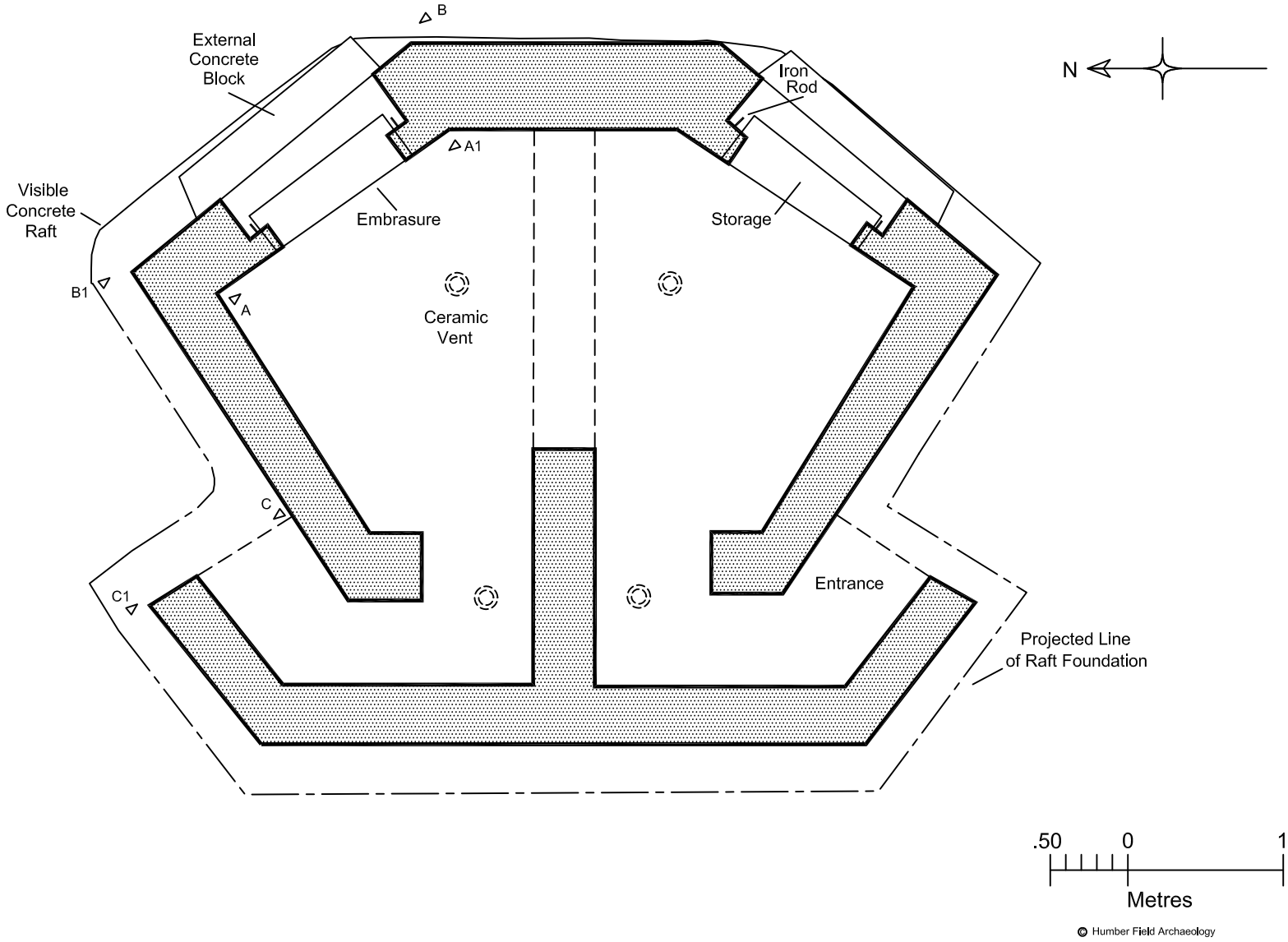
scale 1:40 @ A4

Figure 31 WW2 Lozenge Pillbox BA104



scale 1:40 @ A4

Figure 32 Profiles of WW2 Lozenge Pillbox BA104



scale 1:40 @ A4

Figure 33 WW2 Eared Pillbox CA24

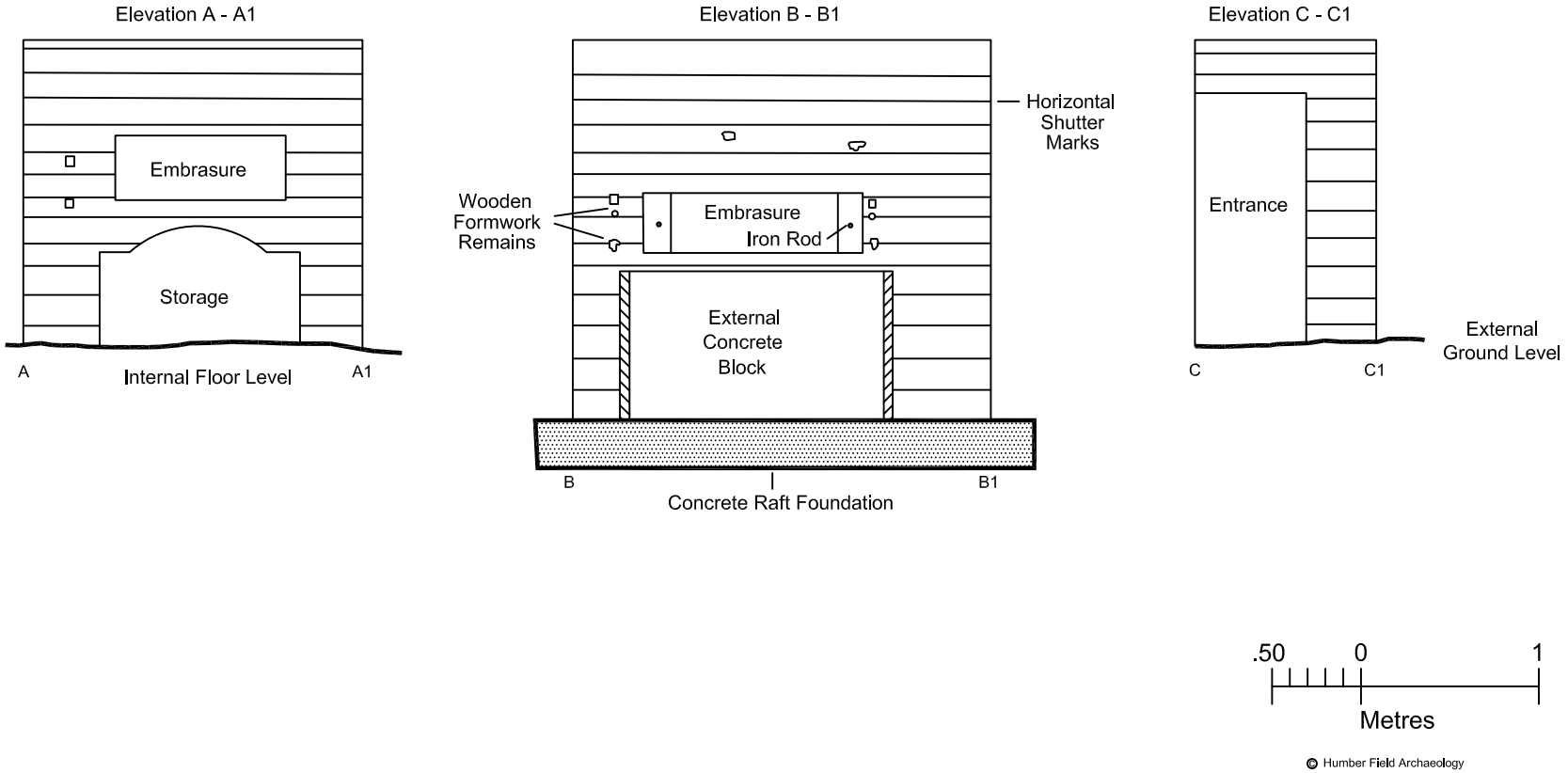


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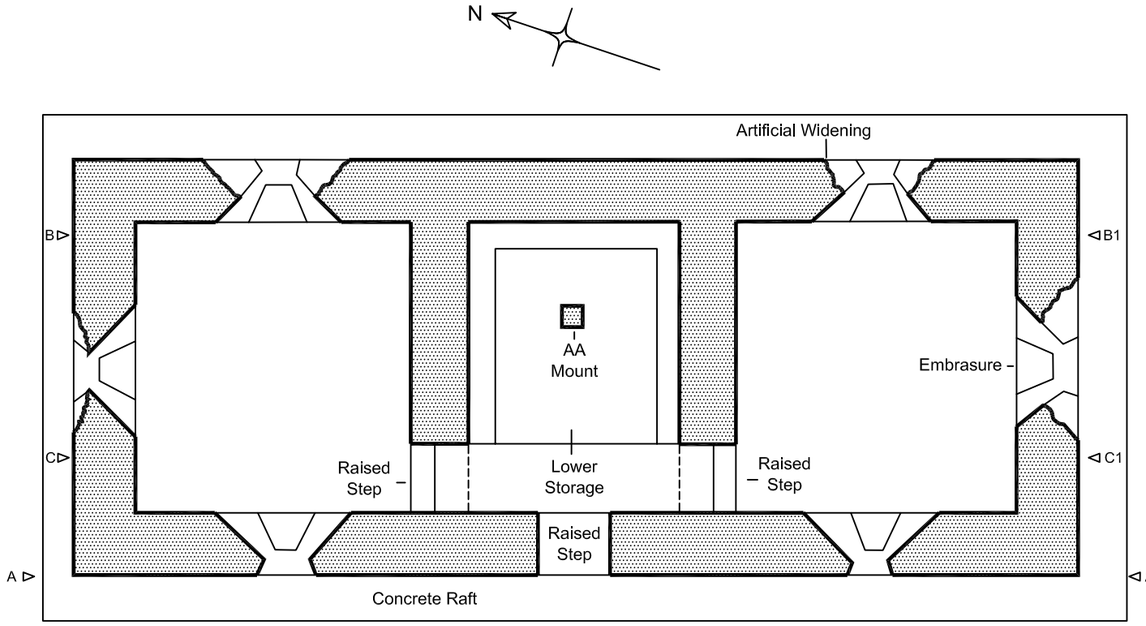
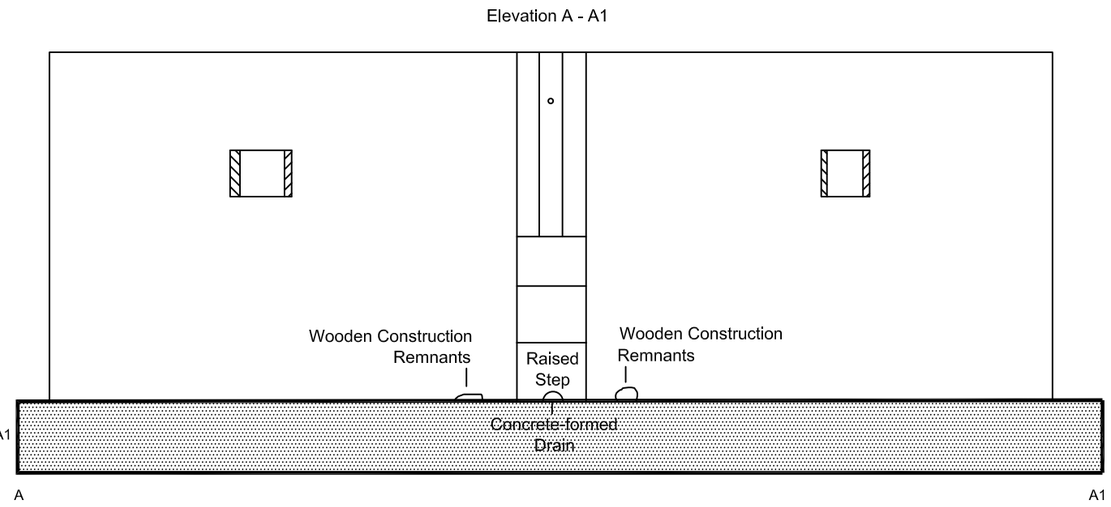
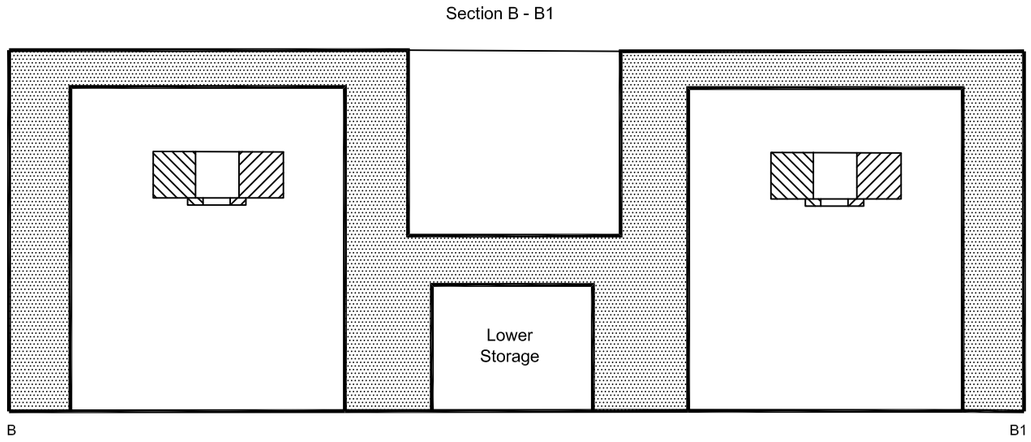
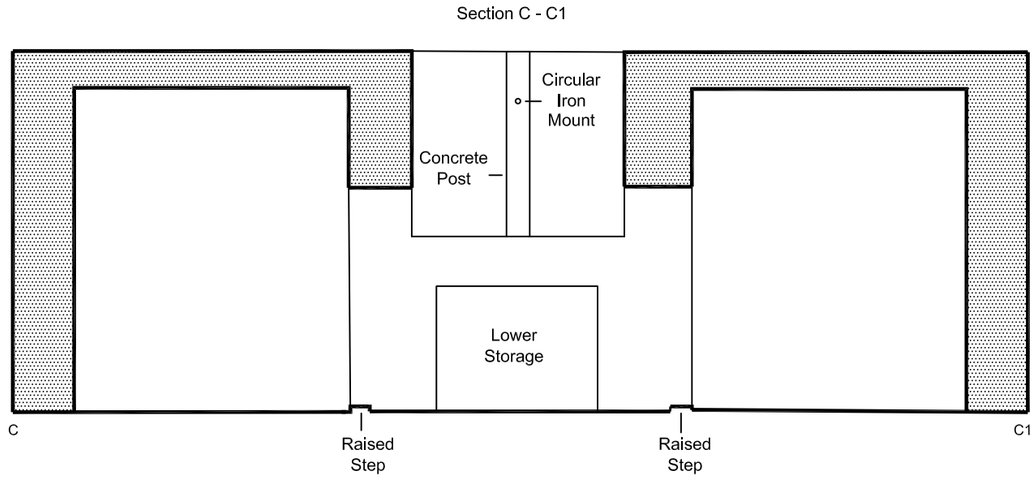
Figure 34 WW2 Eared Pillbox CA24 Elevations









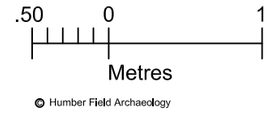


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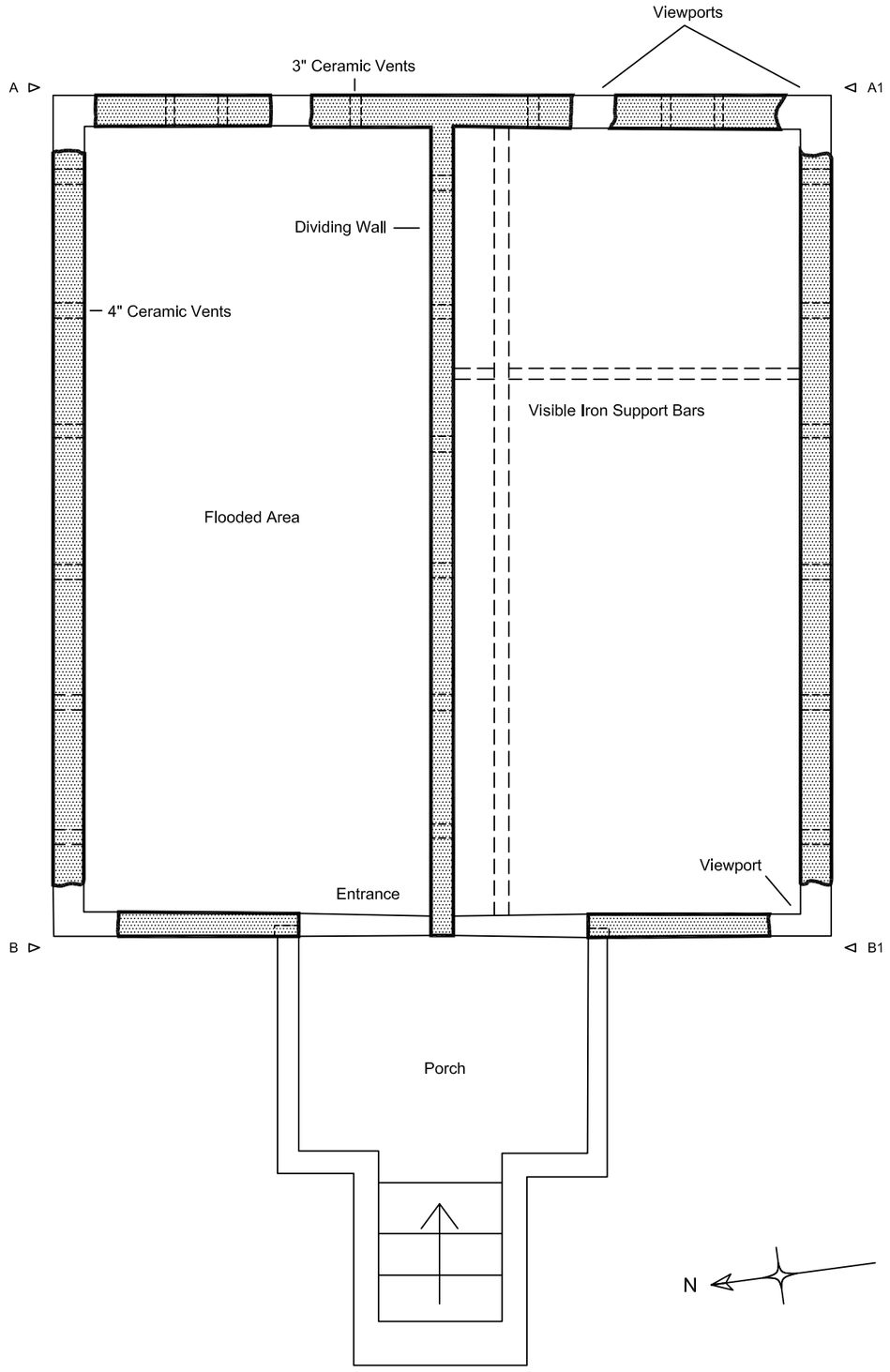
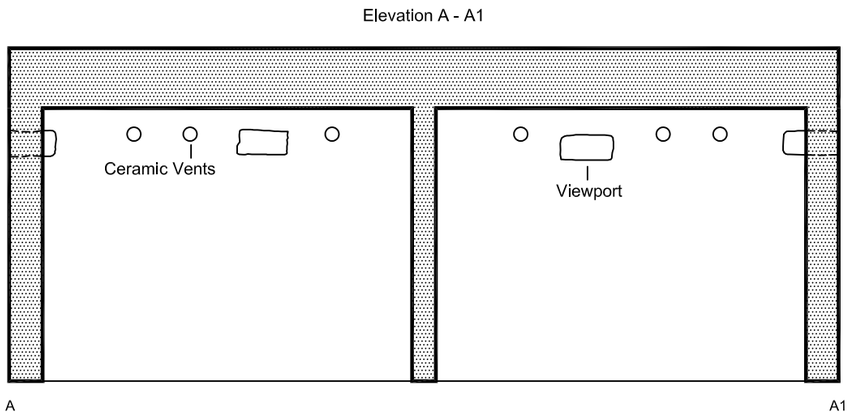
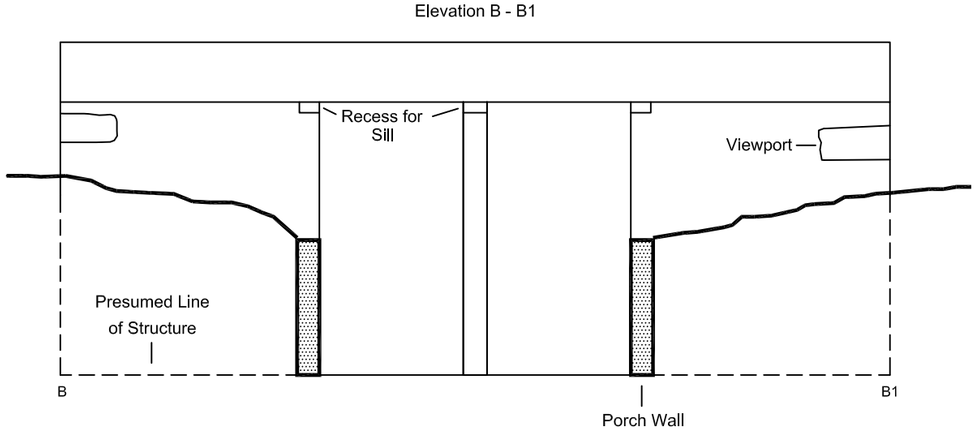
Figure 35 WW2 AA Pillbox NS59







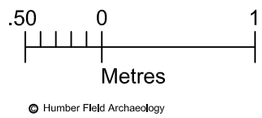


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Figure 36 WW2 Command or Communications Post AT58

470

905

N

Bombing Range

Target Track
(removed)

(demolished c. 2011)

Turret Firing Apron

Turret
Maintenance
and Stores

Turret Screening
Bank and Wall
(demolished c. 2010)

Bank and Wall

(demolished)

Target
Maintenance
Area

Headquarters

Alderson House

Burnside
House

Great Eau

SALTFLEET ROAD

Dunes

Drain

Track

FB

CS

Key

Buildings

Track and Apron

Firing Range

25 0 50

Metres

scale 1:2500

Figure 37 Principal features of RAF Theddlethorpe

Plate 1 Remains of pillbox BA4, with the top of the wall facing forward, the floor to the rear, and traces of two embrasures in the side walls

Plate 2 General view of pillbox BA10, showing location in front of Auburn Farm

Plate 3 East wall of possible heavy weapons pillbox BA10, modified in Second World War, looking west towards Auburn Farm (1m scale)

Plate 4 South wall of pillbox BA10, showing Second World War MG embrasure (1m & 0.5m scales)

Plate 5 North wall of pillbox BA10, showing Second World War MG embrasure (1m & 0.5m scales)

Plate 6 West wall of pillbox BA10, showing top of doorway and indicating depth of burial (1m & 0.5m scales)

Plate 7 Detail of Second World War embrasure cut through north-east corner of BA10

Plate 8 Detail of central Second World War embrasure of BA10, enlarging original splayed loophole. Traces of reinforcing bars visible at top of opening (0.2m scale)

Plate 9 Interior of west wall of BA10, showing impressions of plank shuttering on roof and walls

Plate 10 Interior of east wall of BA10, showing crude formation of Second World War embrasures

Plate 11 Detail of interior of BA10, showing standard lengths of shuttering planks

Plate 12 Blockhouse BA19, looking north towards Auburn Farm and BA10, showing positions of embrasures (2 x 1m scales)

Plate 13 Blockhouse BA19, showing doorway in east wall, three roof vents and impressions of shuttering, looking north-west. (2 x 1m scales)

Plate 14 Blockhouse BA19, showing positions of embrasures and doorway in west wall, looking south-east

Plate 15 Detail of embrasure cut through wall of BA19 and mesh reinforcement after casting, clearly showing cement smoothing around opening (0.2m scale)

Plate 16 Detail of embrasure cut through wall of BA19 and mesh reinforcement after casting, cement smoothing around opening has partly fallen away (0.2m scale)

Plate 17 Interior of blockhouse BA19, showing western doorway, embrasures and impressions of shuttering on walls and roof. A ceramic vent pipe is also visible

Plate 18 detail of interior of blockhouse BA19, showing fixtures in door reveal and thickness of wall, and cement surrounding inner edges of embrasures

Plate 19 Single pillbox BA22 south-west of Auburn Farm, showing hidden location to rear of small spinney, looking south-east

Plate 20 Pillbox BA22, showing doorway in west wall and embrasure in south wall, looking north-east

Plate 21 Pillbox BA22 in 2009, showing north wall embrasure, looking south

Plate 22 Pillbox BA22, detail of entrance, showing sockets for frame fittings and concrete sandbag, looking south-east

Plate 23 Pillbox pair BA30 south of Auburn Farm, showing commanding view of field to north

Plate 24 Pair of pillboxes BA30 straddling hedgebank, looking south-west (2 x 1m scales)

Plate 25 Pillbox pair BA30 straddling hedgebank, showing central doorways, looking east (2 x 1m scales)

Plate 26 Southernmost pillbox of BA30 pair (left), the northern pillbox shows the lack of inward facing embrasures (1m scale)

Plate 27 Detail of west wall of northern pillbox, BA30, showing wooden lintel and thickness of roof slab (2 x 1m scales)

Plate 28 Detail of doorway, northern pillbox, BA30, showing holes for frame and thickness of wall (1m scale)

Plate 29 Detail of modern frame inserted in doorway of southern pillbox, BA30, showing slot for original wooden lintel ().2m scale)

Plate 30 South wall of southern pillbox, BA30, showing central embrasure and impressions of plank shuttering (1m scale)

Plate 31 Detail of embrasure, BA30, showing bent ends of reinforcing mesh (0.2m scale)

Plate 32 Detail of embrasure, BA30, showing exposed reinforcing mesh and distinct division between concrete pours (0.2m scale)

Plate 33 Interior of embrasure, BA30, showing restricted view (0.2m scale)

Plate 34 Detail of interior, northern pillbox, BA30, showing impressions of plank shuttering (1m scale)

Plate 35 Ceramic pipe roof vent, BA30

Plate 36 Pillbox BA74, showing embrasure in east wall, looking west along hedgerow (2 x 1m scales)

Plate 37 Doorway in west wall, BA74, looking east towards Second World War lozenge pillbox BA75, showing thickness of roof slab (2 x 1m scales)

Plate 38 Pillbox BA74, showing embrasures in south and east walls and impressions of plank shuttering, looking south-west (2 x 1m scales)

Plate 39 Detail of fixing in reveal of doorway, BA74, showing thickness of wall (top of 1m scale)

Plate 40 Detail of interior of embrasure, BA74 (0.2m scale)

Plate 41 View of pillbox BA74 (left), to the rear of Second World War pillbox BA75, looking north-west

Plate 42 Top of BA94 in 2009, showing wider eastern embrasure

Plate 43 Pillbox BA94 in 2009, showing lower doorhead compared to standard design, looking south

Plate 44 Pillbox BA190, showing embrasure in east wall, looking west along field boundary from Second World War pillbox BA84 (2 x 1m scales)

Plate 45 Pillbox BA190, doorway in west wall, looking east towards Second World War pillbox BA84 (2 x 1m scales)

Plate 46 Pillbox BA190, detail of embrasure in north wall, showing traces of metal mesh reinforcement (0.2m scale)

Plate 47 Pillbox BA190, detail of interior of east wall (1m scale)

Plate 48 Pillbox BA190, view along field boundary of Second World War pillbox BA84 through eastern embrasure (0.2m scale)

Plate 49 Pillbox BA190, detail of doorway, showing frame fittings (1m scale)

Plate 50 First and Second World War pillboxes BA118 (left and right), looking west

Plate 51 Pillbox BA118, looking east

Plate 52 Square top of First World War pillbox or observation post SK11 in 2009

Plate 53 Possible forward command/communications post SK49 prior to inversion

Plate 54 Possible forward command/communications post SK49 inverted on beach (2 x 1m scales)

Plate 55 Inverted base of SK49, showing wall thickness and shuttering details

Plate 56 SK49, detail of doorway showing frame fixing points (0.5 scale)

Plate 57 SK49, inverted base of single small embrasure (0,5m scale)

Plate 58 Pillbox SK50, showing prominent shuttering impressions and small embrasures, looking north-west (1m scale)

Plate 59 Detail of SK50, showing exposed reinforcement in wall and at base of embrasure (1m scale)

Plate 60 Interior of SK50 showing very small embrasures in this pillbox

Plate 61 Pillbox SK63, looking south-west (2 x 1m scales)

Plate 62 Rear of pillbox SK63, showing details of doorway (2 x 1m scales)

Plate 63 Pillbox SK63, detail of possible external door fastening (1m scale)

Plate 64 Command/communications post AT24, looking east

Plate 65 Semi-sunken command/communications post AT24, looking west (2 x 1m scales)

Plate 66 Sunken entrance to AT24, showing rebated doorway and sidewalls of entrance passage (1m scale)

Plate 67 Sunken entrance to AT24, showing rubble in doorway and sidewalls of entrance passage (1m scale)

Plate 68 AT24, internal detail of ceiling, showing angled girder across corner and ceramic vents

Plate 69 Interior of AT24, showing demolished brick partition (1m scale)

Plate 70 Entrance to command/communications post EG27, showing intact concrete retaining walls of passage

Plate 71 Interior of EG27, showing angled girders across corners of the ceiling and the void left by the salvaged doorframe

Plate 72 Top of possible First World War pillbox FY70, Filey, North Yorkshire (1m scale)

Plate 73 Top of possible First World War pillbox CA18, Cayton Bay, North Yorkshire (1m scale)

Plate 74 Roof fragment of NS65 in 2009, showing vertical impression of vent pipe

Plate 75 Two roof fragments representing demolished remains of First World War trapezoidal pillbox NS74, clearly showing sandbag impressions

Plate 76 Detail of vent pipe through fracture of NS74 roof slab (0.5m scale)

Plate 77 Detail of steel reinforcement beam embedded in larger NS74 roof fragment (0.5m scale)

Plate 78 Detail of second NS74 roof fragment, showing sandbag impressions (0.5m scale)

Plate 79 Pillbox SH1, Saltfleetby showing rear entrance, machine gun embrasure in the angled side and clear impressions of sandbag shuttering (1m scale)

Plate 80 Pillbox SH1 and neighbouring Second World War Lincolnshire-type anti-aircraft pillbox

Plate 81 Pillbox SH1 showing the north embrasure, the angled top of the front wall, designed to deflect shellfire, and sandbag shuttering (2 x 1m scales)

Plate 82 Pillbox SH1 showing the angled top of the front wall and the roofs of both pillboxes

Plate 83 SH1, detail of sandbag shuttering showing areas of poorly mixed aggregate (1m scale)

Plate 84 SH1, detail of exposed end of steel reinforcement beam

Plate 85 SH1, interior of embrasure, showing built in storage locker below, evidence of plank shuttering and wooden pads which probably mark scaffold support positions

Plate 86 Interior of front wall, SH1, showing batter of upper section

Plate 87 Rear of SH4, with a Second World War or later structure at an angle on the roof, possibly related to the nearby bombing range, RAF Theddlethorpe (0.5m scale)

Plate 88 Front of SH4, with Second World War/post-war additional concrete base to left of 1m scale, original battered top of front wall to right, looking west

Plate 89 Largely infilled interior of pillbox SH4, showing top of blocked northern embrasure, possible scaffold holes with wooden plugs and internal batter (right)

Plate 90 Pillbox SH4, detail of central roof vent (0.5m scale)

Plate 91 Rear of pillbox SH8 with Second World War or later concrete supports for a timber observation tower serving the RAF Theddlethorpe bombing range (1m scale)

Plate 92 Front of SH8 showing two of the later tower supports, one obscuring an original embrasure, and the impression of corrugated sheets behind the 1m scale

Plate 93 Detail of southern embrasure, SH8, showing thickness of wall limiting the4 angle of fire

Plate 94 Rear of SA11, showing use of concrete on the roof to break up the outline, the offset door and the use of plank shuttering in place of sandbags (2 x 1m scales)

Plate 95 Top of embrasure, SA11, showing height of later dumping around structure (1m scale)

Plate 96 South side of SA11, clearly showing plank shuttering and concrete roof camouflage (1m scale)

Plate 97 Detail of coursing of facing and concrete core of SA11 (0.5m scale)

Plate 98 SA11, detail of interior, showing level of dumping

Plate 99 Second World War section post FD60, undercut observation post position at east end of FD60

Plate 100 Second World War section post FD60, line of brackets for the fire support shelf, looking south-west (1m scale)

Plate 101 Second World War section post FD60, wooden plugs with iron nails to secure the firing shelf

Plate 102 Second World War section post FD60, change in height of support shelf at south-western end (1m scale)

Plate 103 Second World War section post FD60, pour lines at the seaward end

Plate 104 Second World War section post FD60, shallow groove over door, possibly to catch rainwater, looking SE (1m scale)

Plate 105 Second World War section post FD60, missing floor at the seaward (NE) end of the post

Plate 106 Second World War section post FD60, Hairline crack leading from the gun loop to the angle of the ceiling

Plate 107 Second World War section post FD80, undermining of the seaward end

Plate 108 Second World War section post FD80, general view, looking east

Plate 109 Second World War section post FD80, entrance steps (1m scale)

Plate 110 Second World War section post FD80, inside of observation post at east end, showing iron bars across top right hand corner

Plate 111 Second World War section post FD80, internal view looking north towards seaward end of pillbox, with step in ceiling visible at angle (1m scale)

Plate 112 Second World War section post FD80, firing step for slightly higher gun loops on east facing side of landward end (1m scale)

Plate 113 Second World War section post FD80, surviving supports for the fire support shelf and the scars to show where they originally ran, NW corner of pillbox

Plate 114 Second World War section post FD80, detail of fire support bracket (1m scale)

Plate 115 Second World War command/communications post OS10, general view, looking south-west

Plate 116 Second World War command/communications post OS10, opening on present upper face, looking south-west

Plate 117 Second World War command/communications post OS10, cast iron beam in roof

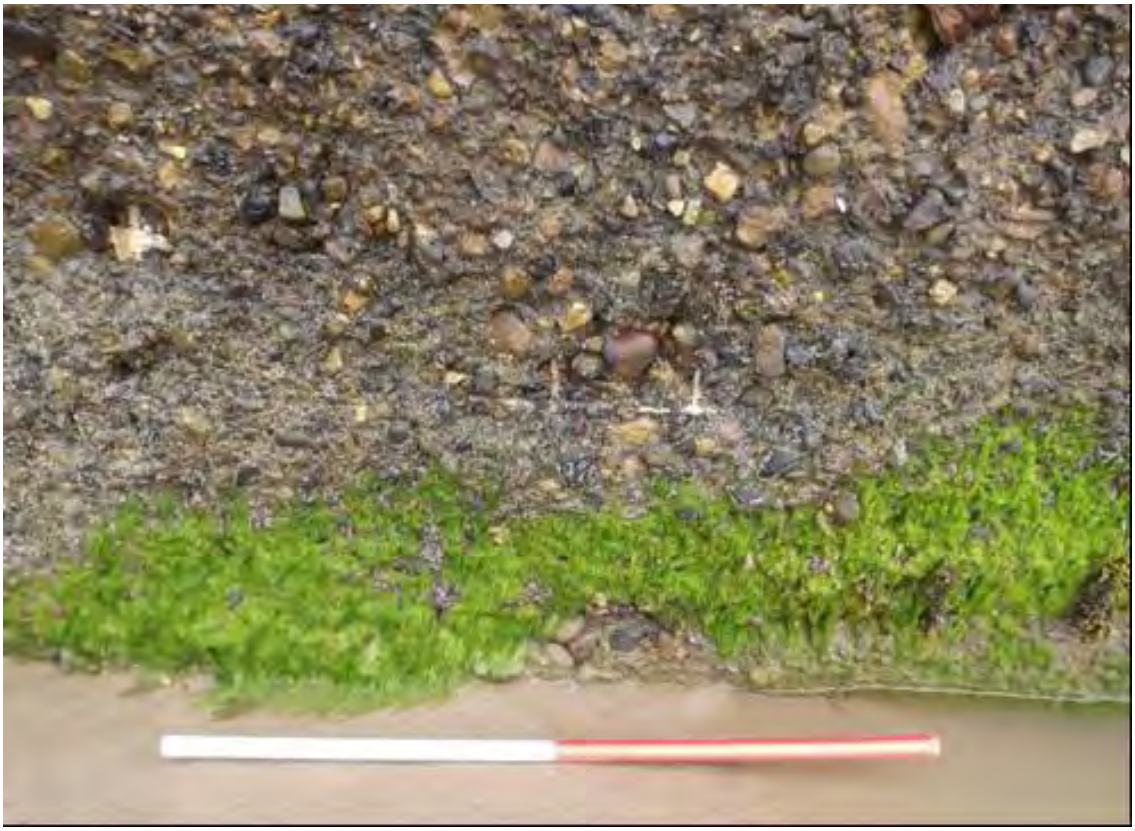

Plate 118 Second World War command/communications post OS10, erosion on base showing seaweed and reinforcing mesh

Plate 119 Second World War section post CY9, general view of roof, looking north-west

Plate 120 Second World War section post CY9, damage at eastern end, looking south (1m scale)

Plate 121 Second World War section post CY9, forward facing gun loop, showing rough cast concrete of the below ground portion and the overspill 'apron' of concrete at ground level, looking west (1m scale)

Plate 122 Second World War section post CY9, rear facing gun loop, looking south-west

Plate 123 Second World War section post CY9, reinforced concrete shelf running along the inner face of the forward wall, looking west with the light shining down the access stairs to the upper side of the image

Plate 124 Second World War section post CY9, access steps, looking north (1m scale)

Plate 125 Second World War building close to section post CY9 (in background), looking north-west (1m scale)

Plate 126 Second World War section post CY11 on cliff edge at Killerby, looking north-west (1m scale)

Plate 127 Second World War section post CY11, northern end showing erosion, looking north-west

Plate 128 Second World War section post CY11, ground level gun loops in the eastern side, showing thickness of roof slab, looking north-west (1m scale)

Plate 129 Second World War section post CY11, interior showing fire support shelf and alternating gun loops, looking south

Plate 130 Second World War section post CY11, filled in access steps on the south-eastern corner, looking south (1m scale)

Plate 131 Second World War eared pillbox CY5 showing condition of eastern side in 2008, with blast wall still in situ

Plate 132 Second World War eared pillbox CY5, east side in 2012, showing loss of blast wall

Plate 133 Second World War eared pillbox CY5, east side in 2012, showing collapsed blast wall

Plate 134 Typical Second World War lozenge pillbox BA104, showing rifle embrasures in east wall, looking west (1m scale)

Plate 135 Second World War lozenge pillbox BA104, showing east and north walls and blast wall with embrasure (1m scale)

Plate 136 Second World War lozenge pillbox BA104, showing light machine-gun embrasures in end walls, looking north-west (1m scale)

Plate 137 Second World War lozenge pillbox BA104, showing details of blast wall with embrasure protecting rear entrance, and exposed reinforcing mesh (1m scale)

Plate 138 Second World War lozenge pillbox BA104, showing details of blast wall and rear entrance (1m scale)

Plate 139 Second World War lozenge pillbox BA104, interior of east wall, showing metal firing shelf supports below rifle embrasures (1m scale)

Plate 140 Second World War lozenge pillbox BA104, bipod or tripod recess and firing shelf brackets below machine-gun embrasure (0.2m scale)

Plate 141 Second World War lozenge pillbox BA104, remains of Turnbull mount for machine-gun

Plate 142 Second World War lozenge pillbox BA104, remains of upper section of Turnbull mount for machine-gun

Plate 143 Second World War lozenge pillbox BA104, remains of lower section of Turnbull mount for machine-gun

Plate 144 Second World War lozenge pillbox BA104, detail of interior of external porch blast wall and embrasure (1m scale)

Plate 145 Second World War lozenge pillbox BA104, internal central anti-ricochet wall (1m scale)

Plate 146 Second World War lozenge pillbox BA104, detail of ceramic pipe supporting roof vent

Plate 147 Typical Second World War eared pillbox CA24, showing general location at edge of beach behind anti-tank cubes

Plate 148 Second World War eared pillbox CA24, showing details of front walls and angled machine-gun embrasures looking west

Plate 149 Second World War eared pillbox CA24, detail of angled north wall, showing machine-gun embrasure and cast bulge below, probably for watercooling system (1m scale)

Plate 150 Second World War eared pillbox CA24, rear view, showing projecting 'ears' containing forward-projecting side entrances

Plate 151 Second World War eared pillbox CA24, detail of northern entrance, facing forward towards oncoming invading forces (1m scale)

Plate 152 Second World War eared pillbox CA24, detail of interior of embrasure and projecting 'box' for cooling system (0.2m scale)

Plate 153 Second World War eared pillbox CA24, view northwards from northern embrasure

Plate 154 Second World War eared pillbox CA24, view southwards from southern embrasure

Plate 155 Typical Second World War Lincolnshire-variant (Type 23) pillbox NS59, rear, showing central doorway into AA gunpit and twin blockhouses to either side (2 x 1m scales)

Plate 156 Second World War Lincolnshire-variant pillbox NS59, view of north and east walls, showing embrasures of twin blockhouses at ends

Plate 157 Second World War Lincolnshire-variant pillbox NS59, south wall, showing central open gunpit and end embrasure of southern blockhouse with internal recess below

Plate 158 Second World War Lincolnshire-variant pillbox NS59, central gunpit with concrete mounting post for a Bren gun (1m scale)

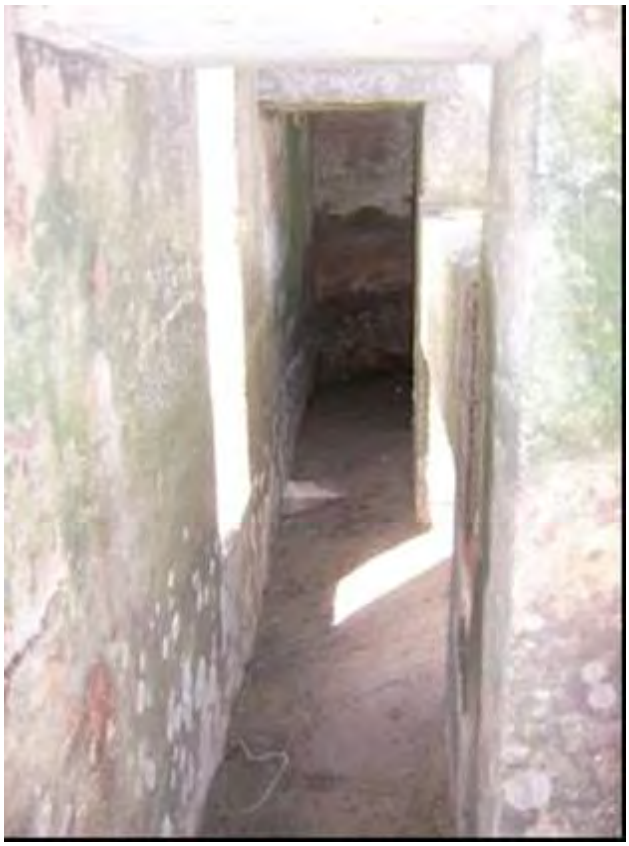

Plate 159 Second World War Lincolnshire-variant pillbox NS59, view across blockhouse entrances, with door at rear of pillbox (left) and central gunpit floor (right)

Plate 160 Second World War Lincolnshire-variant pillbox NS59, detail of storage area beneath central gunpit floor

Plate 161 Second World War Lincolnshire-variant pillbox, detail of interior of splayed embrasure, showing the lower recess, possibly for a Bren bipod

Plate 162 Second World War Lincolnshire-variant pillbox, detail of interior of embrasure, showing traces of metal firing shelf support brackets below (1m scale)

Plate 163 Second World War Lincolnshire-variant pillbox NS59, showing details of plank shuttering impressions

Plate 164 Second World War command/communications post AT58, showing sunken entrance and earth mound, looking north

Plate 165 AT58, detail of dual doorways and sunken entrance, looking east (2 x 1m scales)

Plate 166 AT58, buried stair in entrance (1m scale)

Plate 167 AT58, interior of northern room, showing wall vents and small later openings cut through upper east wall

Plate 168 AT58, interior of southern room, showing wall vents and small later openings cut through upper east wall

Plate 169 Second World War lozenge pillbox AL55 to the south-west of Ringbrough Battery, Aldbrough (AL52), looking west

Plate 170 Second World War Ringbrough Battery, Aldbrough (AL55), battery plotting room, looking north-east

Plate 171 Second World War Ringbrough Battery, Aldbrough (AL55), store/workshop and water tower, with battery plotting room to left, looking north

Plate 172 Second World War Ringbrough Battery, Aldbrough (AL55), collapsed Battery Observation Post, looking east from cliff

Plate 173 Second World War Ringbrough Battery, Aldbrough (AL55), collapsed Battery Observation Post, looking north-east from cliff

Plate 174 Second World War Ringbrough Battery, Aldbrough (AL55), collapsed remains of southern magazine, looking north-east

Plate 175 First/Second World War Godwin Battery, Easington (EA182), remains of southern blockhouse and Battery Observation Post, looking north

Plate 176 Godwin Battery, Easington (EA182), remains of officers' quarters and other buildings in cliff edge south of battery, looking west

Plate 177 Godwin Battery, Easington (EA182), remains of southern 9.2-inch gun position, looking north-west

Plate 178 Godwin Battery, Easington (EA182), remains of southern magazine, looking west

Plate 179 Godwin Battery, Easington (EA182), remains of stores/workshops immediately north of southern magazine, looking west

Plate 180 Godwin Battery, Easington (EA182), remains of stores/workshops immediately south of northern 9.2-inch gun position, looking west

Plate 181 Godwin Battery, Easington (EA182), remains of underground shelter or store immediately south of northern 9.2-inch gun position, looking south

Plate 182 Godwin Battery, Easington (EA182), remains of northern gun position, looking west

Plate 183 Godwin Battery, Easington (EA182), remains of northern 9.2-inch gun position, looking east

Plate 184 Godwin Battery, Easington (EA182), remains of northern magazine, looking west

Plate 185 Godwin Battery, Easington (EA182), remains of northern magazine, looking south

Plate 186 Godwin Battery, Easington (EA182), general view of site, looking south

Plate 187 RAF Theddlethorpe, main block next to entrance, converted to residential home

Plate 188 RAF Theddlethorpe, looking west along the concrete track past the turret firing area (right) towards the main complex

Plate 189 RAF Theddlethorpe, west wall of the derelict turret range maintenance and storage building, looking east

Plate 190 RAF Theddlethorpe, rear and south wall of turret range maintenance building, looking north-east

Plate 191 RAF Theddlethorpe, general view of east side of turret range maintenance building and firing apron, looking west

Plate 192 RAF Theddlethorpe, the south end block of the turret range maintenance building, showing the outer rendered brick construction and prominent buttresses

Plate 193 RAF Theddlethorpe, the north end block of the turret range maintenance building, showing the collapsing verandah and the last remaining folding doors

Plate 194 RAF Theddlethorpe, north end block of turret maintenance building, looking south-west, showing collapsed verandah (left) and lean-to (right)

Plate 195 RAF Theddlethorpe, turret range maintenance building, detail of typical metal-framed window

Plate 196 RAF Theddlethorpe, interior of end blocks, showing concrete block inner wall leaf

Plate 197 RAF Theddlethorpe, interior of end block, showing light fittings

Plate 198 RAF Theddlethorpe, detail of possible post-war toilet

Plate 199 RAF Theddlethorpe, possible post-war overhead toilet cistern

Plate 200 RAF Theddlethorpe, small lean-to, north-west corner

Plate 201 RAF Theddlethorpe, original door of north-west lean-to

Plate 202 RAF Theddlethorpe, fire extinguisher operating instructions in lean-to

Plate 203 RAF Theddlethorpe, looking west towards turret-firing area across the concrete-lined east bank of the target range (foreground)

Plate 204 RAF Theddlethorpe, concrete block at south-west corner of main firing range bank

Plate 205 RAF Theddlethorpe, concrete wall around south bank of turret firing range, looking north-east

Plate 206 RAF Theddlethorpe, concrete wall around east bank of turret firing range in 2009, looking west

Plate 207 RAF Theddlethorpe, concrete wall in area to rear of east bank of turret firing range, looking north

Plate 208 RAF Theddlethorpe, similar view of concrete wall to rear of east bank of turret firing range in 2009

Plate 209 RAF Theddlethorpe, top of the structure to rear of east bank of turret firing range in 2009

Plate 210 RAF Theddlethorpe, view across east bank of turret firing range in 2009, with north bank curving round to rear

Plate 211 RAF Theddlethorpe, concrete-lined access to the beach bombing range in 2009, with corrugated huts and hardstanding at the landward end

Plate 212 RAF Theddlethorpe, Comet Mark IV tank in 2009, used as beach bombing target

Plate 213 RAF Theddlethorpe, concrete hardstanding, part of beach bombing range in 2009

Plate 214 RAF Theddlethorpe, one of several timber piles visible in 2009, probably supporting bombing range targets

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