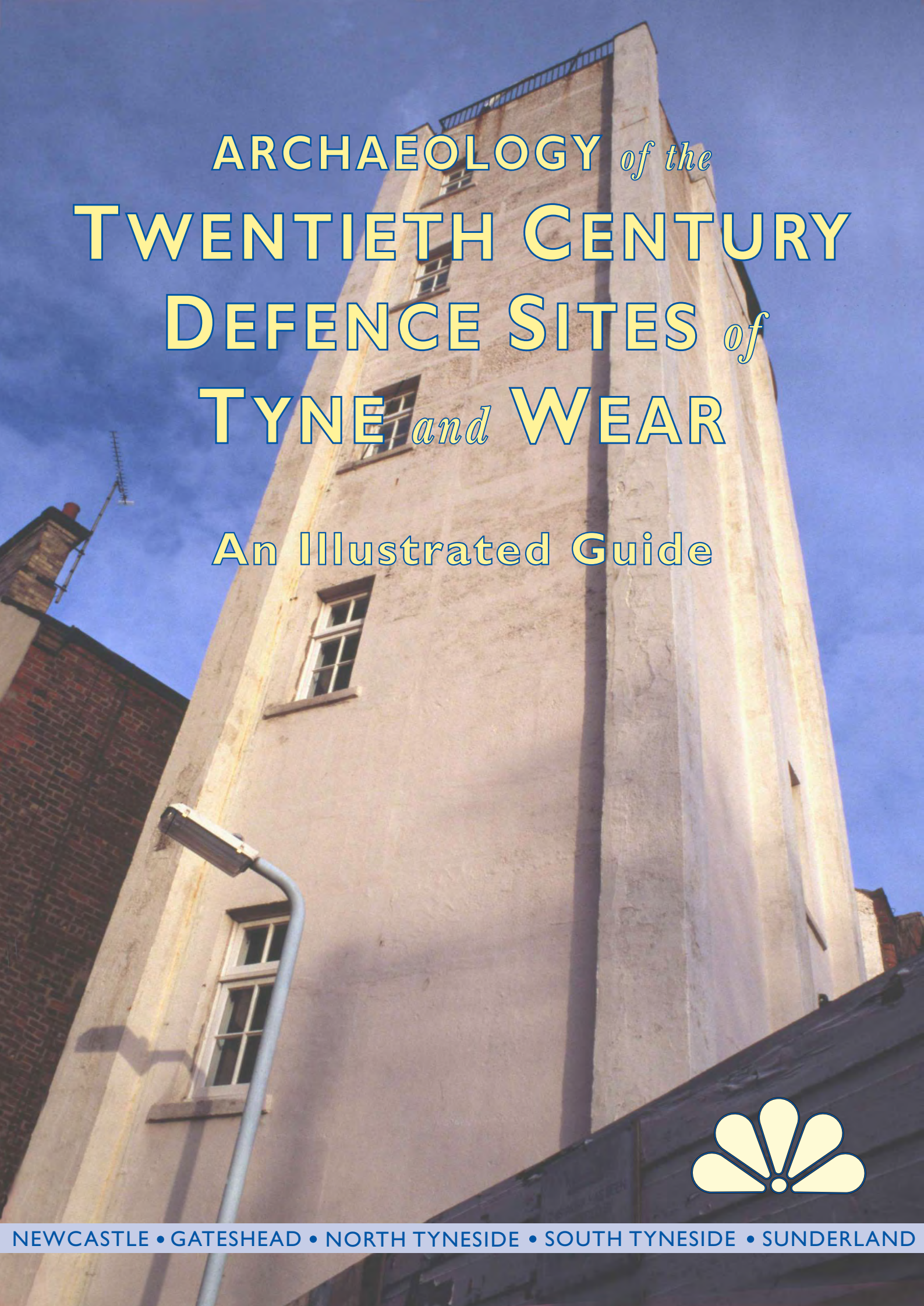

ARCHAEOLOGY *of the* TWENTIETH CENTURY DEFENCE SITES *of* TYNE *and* WEAR

An Illustrated Guide

NEWCASTLE • GATESHEAD • NORTH TYNESIDE • SOUTH TYNESIDE • SUNDERLAND

A GUIDE TO THE ARCHAEOLOGY OF THE TWENTIETH CENTURY DEFENCE SITES OF TYNE AND WEAR

by

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PREFACE

By Alan Rudd

Over the centuries the North of England attracted a wide variety of defensive structures to counter threats from both near neighbours and Europe. This led to the development and building of a large number of defensive structures varying from the Roman Wall to the medieval castles for which Northumberland is renowned, up to the twentieth century fortifications of pillboxes and nuclear bunkers. These structures cover a wide variety of types and design, reflecting the military engineering techniques of the time.

The period covered in this book is from 1900 to 2000, the Twentieth century, a period of rapidly changing military threats and hardware. We have seen in the period the advent of the plane and the tank and the wane of the military threat from close quarters, to the development of the nuclear bomb and the long-range Cruise missile.

In Tyne and Wear a large number of Military structures have been built in this period, these structures began with the redevelopment of the coastal batteries on the Tyne at the start of the century. The batteries built at both Tynemouth and South Shields were at the time “state of the art” with all new guns and emplacements. The next building period came with the onset of the First World War, when some new structures were build though little remains today. The greatest period of building came with the total war period of the Second World War and reflected the advent of air power and the threat of invasion. There are a number of structures from this time still in existence throughout the County. With regard to the post-War period, though some building were built, these were more transient in nature and have in the most part been removed and redeveloped.

This book will hopefully provide an overview of what is left to see and give an appreciation of their place in history along with an indication of the importance of individual structures within the military tactics of the time.

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Introduction

There is perhaps no time in history, either recent or from the distant past, that continues to generate as much popular interest as the time that spans the two global wars of the first half of the twentieth century. As these events are made remote by the passage of time, it is possible to see the monuments of that era as only the latest in a long sequence of defences that stretch back to the distant past. The twentieth century fortifications on the British coast are located on the same cliff tops and promontories as the Roman “Saxon shore” forts and signal stations, and at the mouth of the Tyne we can trace in detail how the nature of defensive instillations evolved through eight centuries of naval warfare. In the Middle Ages, the stone fortress of Tynemouth Castle formed a strong-point which controlled the lower Tyne and access to its hinterland but by the sixteenth century, the need to establish suitable positions for cannon saw the replacement of the stone tower by carefully designed artillery forts, first at Spanish Battery and then closer to the river at North Shields. The seventeenth century fort here, Clifford’s Fort, was converted from a 40 gun artillery position to a mine-laying base in the late nineteenth century. These sites were all adapted for use in the two world wars, but supplemented with other installations to meet the changing character of the threat.

The Second World War saw the full development of a process, begun in the 1914-18 War, that saw the civilian population and economy totally immersed in the conflict,

Tynemouth Castle

both as a target for offensive action and as the means of defeating the enemy by "out-producing" them. The remotest rural communities were brought into the fight on the Home Front, working with the Land Army to prevent the U-boat blockade from bringing the country to the verge of starvation, or acting as safe havens for children evacuated from the urban centres.

The industrial conurbations of Tyneside and Wearside were of such strategic importance that they were among the most heavily defended parts of the country, as can be seen from the density of known sites plotted on Maps 2, 3 & 4. The importance of the coal-exporting ports led to the extensive mining of coastal waters, and the beaches of Northumberland and Durham were defended by anti-invasion obstacles to prevent their use as landing sites. Anti-aircraft defences were concentrated around the ports, which were particularly vulnerable to air attack both by day and night (Map 3).

After the war, the beaches were quickly cleared and the military installations dismantled, but many of the less dramatic features were left in place in order to tackle the more urgent priorities of rebuilding houses and converting industry back from military to civilian production. Once a ubiquitous feature of the landscape, defences that were hastily throw-up during these years have been steadily removed by the remorseless pace of development and

Kenton Bunker

less than 5% of the original buildings and installations survive today. If we are to save these sites for posterity, we must take steps to preserve them now.

Many sites, like anti-aircraft batteries and pill-boxes, were erected on the edges of the built-up areas, on marginal land and scrub, and have survived through neglect and the economic decline of traditional industries. Increasingly, however, the need to utilise every available hectare of land to meet the rising demand for new housing and to provide industry with modern factory accommodation, has seen the re-development of marginal swathes where the few remaining sites are located. The problems of finding new uses for these buildings are exacerbated by the nature of the structures themselves. Many of the

Trow Point

apparently substantial monuments of this period were hastily constructed with cheap materials and with little thought for long-term maintenance. Not meant to last, they were poorly integrated into existing services and communications. Even the larger buildings, like the regional headquarters and control centres, were of basic construction, and lacked the features that make the structures readily adaptable for other use. It is too easy to see military sites as little more than eyesores on the edges of wasteland, targets for graffiti and places that attract anti-social behaviour. In some cases, the best solution

we can hope for in the short-to-medium term is preservation by "benign neglect" – in the case of bunkers and pillboxes, burial of entrances and blockage of openings, to prevent their becoming nuisances to local communities. A few have been given statutory protection, like the recently listed Kenton Bunker (Gazetteer No. 23) but too often it is the last remaining example that is designated, as much for its rarity value as its intrinsic importance. In the long term, however, we would hope that the types of site describe in this guide can become integrated into the new landscapes that develop from regenerated marginal scrubland and derelict industrial complexes, and valued as monuments that are worth conserving in their own right, made accessible to the public and interpreted in the same way as other relics from past conflicts.

The Gazetteer

The following pages briefly describe some of the more notable types of wartime site. Each site type is followed by a gazetteer of examples in Tyne and Wear. The gazetteer does not claim to be exhaustive – these are merely the most important sites we know about. There will have been many, many more and our archaeological and historical database, the Tyne and Wear Historic Environment Record (HER), is being continually enhanced, mostly by members of the public who have personal experience that is far more extensive than the written sources. The aim of the gazetteer is to illustrate the richness and variety of our wartime heritage and to demonstrate the degree of survival of such structures in Tyne and Wear. We are grateful to those members of the public who answered our request in the media for information on sites we may have missed.

Some of the sites listed below no longer survive. Most of the sites lie on private land and public access is not allowed. Where public access is known to be possible this is noted under the text with a grid reference. The number in brackets refers to the Historic Environment Record, which is accessible on the Web at http://museums.ncl.ac.uk/sitelines. This will provide a map of the individual site and may contain more detail than the gazetteer.

We have not included war memorials in this publication as these have already been included in "A Guide to the Public Monuments & Sculpture of Tyne and Wear", by I. Ayris, P. Jubb, S. Palmer and P. Usherwood, 1995. We have not included aircraft crash sites, partly because the precise location of these sites is often difficult to determine and also due to the emotive nature of these sites and the need to respect the wishes of any living relatives of the pilot. The 1986 Protection of Military Remains Act makes it an offence to disturb the remains of any aircraft within the UK or its territorial waters without a licence from the Ministry of Defence. The potential historic and archaeological importance of aircraft wreck sites has been recognised by English Heritage's Monument Protection Programme.

FROM 1900 TO THE END OF THE FIRST WORLD WAR

By the time of the First World War, existing coastal batteries on the east coast, most of which had been built during the nineteenth century against the perceived threat of France, had been adapted or new batteries created to take the new breech-loading guns. At the outbreak of hostilities, it was the Admiralty that was responsible for overseeing the home shore defences, as the Army was overstretched providing men and equipment in France, Belgium and the Middle East. Because of the concentration of strategic factories and installations (in Tyne and Wear for example, twelve armaments factories) the North-East coast was one of the most heavily defended areas in the country; the perceived threat was initially against bombardment or invasion from the sea, but by 1916, when the Army took over command of the home defence, the aerial threat from Zeppelins and, in southern Britain, heavy bombers, was the most

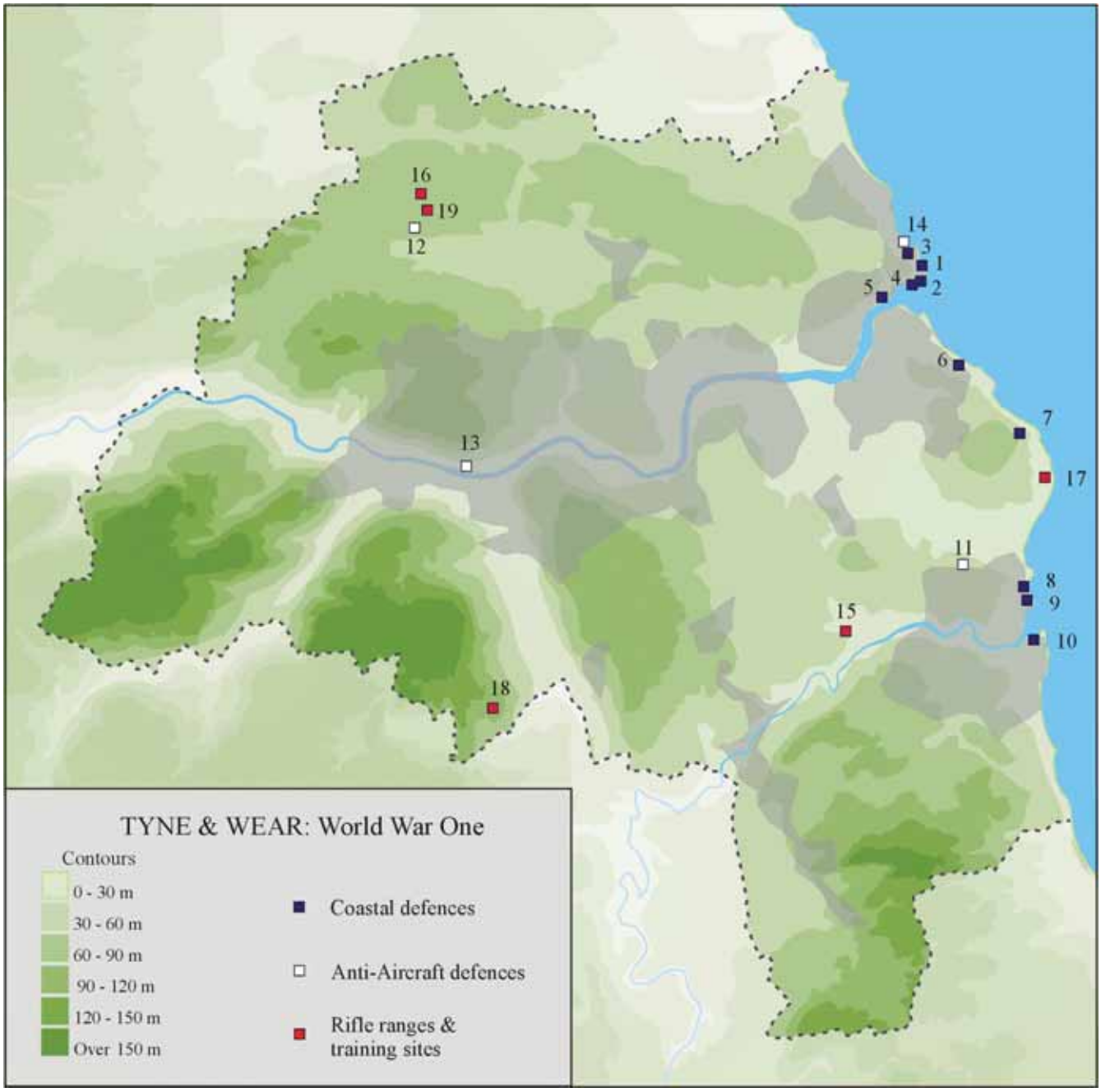


Figure 1

pressing concern, fuelled by panic among the civilian population, who were under attack from the enemy for the first time. In 1916 a network of searchlights was established 25 miles inland from Sussex to Northumberland.

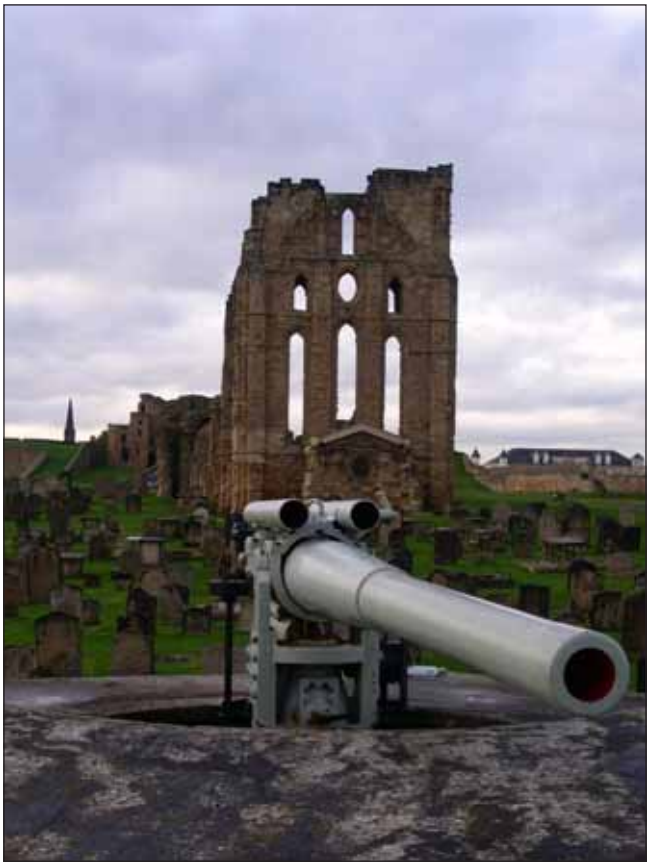
Coastal Defence (Fig 1)

A complex of batteries protected Britain's coastal and riverside industries - the naval bases, ports and harbours, shipyards and munitions factories - from attack from dreadnoughts and battle cruisers at sea. Scarborough, Whitby and Hartlepool were all severely attacked in 1914, demonstrating the need for coastal batteries (English Heritage 2000). Although never used in anger, their presence deterred attack, and as late as August 1916, Admiral Scheer, commander of the German High Sea Fleet, was planning a co-ordinated attack on Sunderland, but was prevented by the intervention of a Royal Navy submarine, which alerted the Admiralty to the threat (Sockett 1993/4).

1 Tynemouth Castle (HER 135)

The commanding headland that Tynemouth Castle stands on has had an almost continuous history of fortification stretching back at least until the thirteenth century, and possibly back into prehistory. Since 1584, artillery has been mounted there to defend the Tyne against naval attack. In 1902, a new battery was built with two 6 inch guns, as well as two 12pdr Quick Firing guns. In 1904 a 9.2 inch gun was emplaced, which had a range of nearly 27km. However, in 1905 the Owen Committee report into Britain's coastal defences was published, claiming that the ports on the Tyne and the Wear were only at risk from low level attacks, and recommending that most of the guns defending the region should be removed. In 1913 Admiralty thinking changed again, and the 9.2 inch gun at Tynemouth was reinstated by the time that war was declared, and was used throughout World War One. After the armistice in 1918, the castle continued to be armed (Clarke and Rudd, 1988 and Foster 2004).

Scheduled Ancient Monument
English Heritage Guardianship
Public access with entrance fee
NZ 374 693



2 Tynemouth, Spanish Battery (HER 136)

The site of the Spanish Battery, a headland 300m south of Tynemouth Castle, was first fortified in 1545 to protect Henry VIII's fleet as it assembled in the Tyne before invading Scotland. The name is said to derive from the Spanish mercenaries who were the first to be garrisoned there. In 1902, the battery was modernised and equipped with a single 6 inch mark VII breech loading gun and two 6pdr Quick Firing (QF) guns, which were intended to be upgraded to 12pdrs. By 1905, a second 6 inch gun had been mounted. However, in 1905 the Owen Committee

Photograph by Tim Gates copyright reserved

report concluded that Newcastle and Sunderland were unlikely to face any attack other than from light, unarmoured vessels. Therefore, all guns were removed from the Tyne and Wear area, except for four 6 inch weapons: two at Tynemouth Castle, and two at the Spanish Battery (Craster 1907, North Shields Local Studies Library 1939, Clarke and Rudd 1988 and 1989, Jobey 1967 and Foster 2004).

Public Access
NZ 373 690

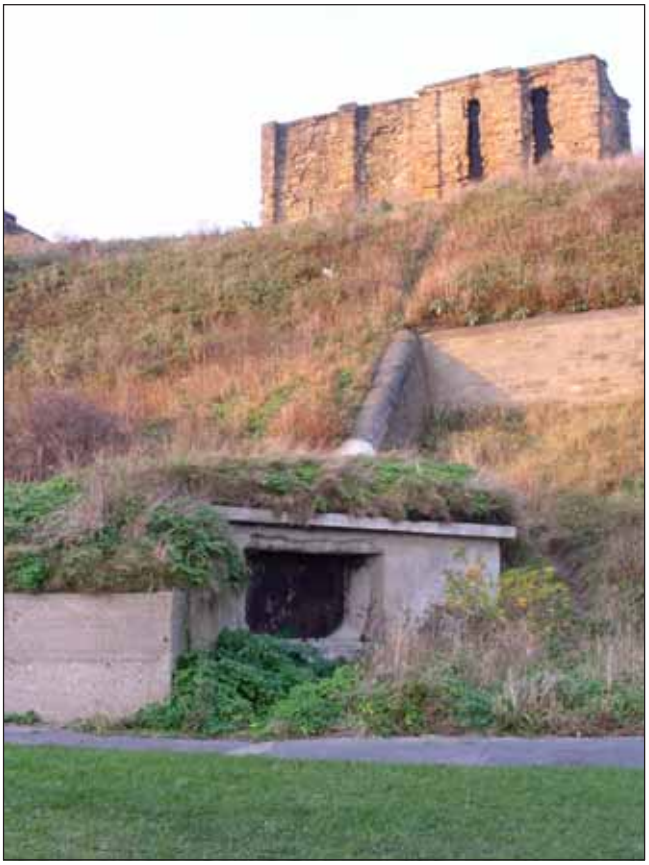
3 Tynemouth, No. 47A Percy Gardens, Command Post (HER 4617)

During World War One, No. 47A Percy Gardens in Tynemouth was in the ownership of the War Office, and was used as a command centre for the coastal defences, with an observation and range-finding post built into the roof of the house to control the Tyne guns. Around 1916 or after, a six storey tower was constructed, attached to the back of the house, and designed to act as a command centre for the two 'Tyne Turrets' [see entry on Kitchener Battery - Gaz. No.7]. Even though both turrets had been dismantled in 1925, the tower and house were retained until World War Two. During the September 1938 Munich Crisis, when it appeared that war with Germany was imminent, one of the first actions taken to prepare the Tyne for invasion was to install the fortress commander and staff officer at their offices in 47A Percy Gardens. The site is now a private residence (Hogg 1984 and DoE listed building description 8/107).

Listed grade 2

4 Tynemouth Castle, Searchlight Emplacement (HER 1572)

To allow the guns at Spanish Battery and Tynemouth Castle to fire at night, a searchlight was emplaced on the south side of Tynemouth Castle, near to the quarry, and just by the path that leads along to the pier. It was manned and maintained by the Tyne Electrical Engineers, who were based at Clifford's Fort, and was in use throughout



World War One. By World War Two it had been replaced by a new searchlight nearer to Tynemouth pier. There had been a similar emplacement at the Spanish Battery, which has now been demolished. This site is the best surviving searchlight emplacement on Tyneside, and remains in good condition. It is a low, concrete building with a large aperture at the front (now sealed up), out of which the searchlight would have shone. Although it is slightly overgrown, it is easily visible, and much of the original form survives (information provided by Alan Rudd, 1995).

Public Access
NZ 372 693

5 North Shields, Clifford's Fort (HER 150)

Clifford's Fort was an artillery fort built in 1672 to a design by the Swedish Engineer Martin Beckman, to guard the Tyne from naval attack during the Second Dutch War. In 1882, it was decided to turn the fort into a facility for the deployment of underwater explosives to destroy enemy vessels approaching the Tyne. These "submarine mines" were laid in minefields near to Clifford's Fort, and would be controlled and detonated from the shore by means of an electrical cable. From 1888 volunteer Royal Engineer submarine miners (9 officers and 180 other ranks) had their Headquarters here. Most of the older buildings at the fort were demolished, and new facilities were installed, such as a narrow gauge railway track used to transport mines to the adjacent pier. The fort was armed with two 6 pdr Quick Firing guns and two machine guns. The concrete positions, including the circle of the mounting rings, can be seen cutting through the seventeenth century sandstone ramparts.

From 1905 to 1907 the fort's mining role was gradually phased out, and in 1907 the unit manning the fort was renamed the Tyne Division (volunteer) Electrical Engineers. The Electrical Engineers' role included manning the searchlight sites around the mouth of the Tyne, allowing the Tyne batteries to fire at night. At some point before 1914 the 6pdr guns were removed. When war came in

Artillery emplacements at Clifford's Fort

1914 the Navy and the Tyne Electrical Engineers collaborated to re-establish the minefield as quickly as possible. The fort was the principal recruiting centre in North Shields. In November 1914, the Royal Marines added two new 12pdr QF guns to the outside of the fort, and from 1915 onwards a detachment of the newly formed Royal Marine Submarine Miners were based there.

After the war, the fort was thought to be too small and inaccessible for use by the Territorial Army, and so in 1928 a new drill hall was acquired in Tynemouth, near the railway station and Clifford's Fort was sold to the Tynemouth Corporation, so that the Fish Quay could be expanded (Clarke and Rudd 1988 and 1989, North East Civic Trust 2001, Foster 2004, Northern Counties Archaeological Services 2003, 2004 and 2005 and Northern Archaeological Associates 2005).

Listed grade 2* and a Scheduled Ancient Monument
Public Access
NZ 363 685

6 South Shields, Frenchman's Point Battery (HER 869)

Frenchman's Point Battery was planned in 1882, and finished in March 1905. It was designed as a counterpart to the battery at Tynemouth Castle. It had two 6 inch guns, and one 9.2 inch. The shells were raised on a hydraulic lift. There was a caretaker's house, stores and a camping ground. Just months after opening, it was downgraded to practice only, to have some of its guns reinstated again by 1911. In 1913, realising the importance of the arms production and shipbuilding trade on the Tyne (which at this time accounted for 30% of naval production in Britain) the Admiralty rearmed Frenchman's Point Battery accordingly. Huts were built for the permanent soldiers. The large galvanised steel fence with prongs

Possible flying boat ramp

around the top could deflect bullets. Frenchman's Point Battery served throughout World War One. Four years after hostilities ended, in July 1922, the site was dismantled and cleared, being redeveloped as a holiday camp (Clarke and Rudd 1989 and Foster 2004).
Between the Groyne and the South Pier at South Shields is a ramp, constructed of large timbers bolted together with iron. According to local tradition, this was used as a ramp for flying boats (HER 6811), and was used to aid them out of the sea and onto a parking area below the Lawe top, although at what date is uncertain (Arbeia Society 2004).

Public Access
NZ 369 680

7 Marsden, Kitchener Battery (HER 4616)

By 1916, the Tyne and Wear area had many guns adequate for defence against ships near to the shore, including 6 inch and 4.7 inch Quick Firing weapons. However, only

Frenchman's Point. Copyright Colin Anderson

the 9.2 inch gun at Tynemouth Castle had enough range to prevent enemy ships bombarding the coastline from a long way out to sea. Therefore the North East relied heavily on the Navy for coastal defence. In 1916, the Admiralty informed the War Office that it could no longer spare enough ships to patrol the North East coast, and instead offered to dismount two gun turrets from the ageing warship HMS Illustrious. These turrets were handed over to the army for use in coastal defence, with one mounted north of the Tyne at Hartley, and the other south of it, at Marsden. This southern turret became known as the 'Kitchener Battery'. Fort House was the command post for the Hartley turret, and a new command building (HER 1835) was hastily built on Lizard Lane, but has since been quarried away (information provided by Alan Rudd). The guns at these two 'Tyne Turrets' had approximately 22km range, making them a good choice for counter bombardment, although they would require entirely new and very extensive emplacements to mount them. Massive reinforced concrete installations were built underground to contain the magazines, control rooms, and barracks necessary for the huge turrets. Although work began on the batteries during the war, they were not even close to being finished by the time of the Armistice in November 1918. By 1920, the installation had already cost £113,000, ten times the cost of a normal battery. In 1921, Kitchener Battery was finally completed. However, by now the 12 inch guns (first used in 1898) were very antiquated, and, almost as soon as the battery opened, it was suggested that a single 9.2 inch gun should be mounted instead, which would considerably outperform the existing turret. However, this never happened, and by 1925 the War Office was trying to get permission to close the battery entirely due to its "low efficiency" and "doubtful value". In 1926 the turret was scrapped by a local shipbreaker's yard (Clarke and Rudd 1989, Hogg 1984, Sockett 1993/4 and Foster 2004).

8 Sunderland, Roker Battery (HER 86)

Roker Battery in Sunderland seems to have originated in the eighteenth century, when four guns were stationed there. The armaments were occasionally upgraded, although until World War One it still relied on antiquated muzzle loading guns. By December 1902, all the guns had been removed, leaving no artillery pieces at any of the batteries around Sunderland, a condition that remained even after war had been declared. The Roker Battery was built in its present position (adjacent to the site of the old gun emplacements) in February 1916, when two 4.7 inch naval guns were positioned in simple earth emplacements. Two searchlights were added to help the battery defend against torpedo boats trying to approach the port at night. Roker battery was abandoned in 1922 (Clarke and Rudd 1988).

Site of Roker Battery. Copyright Colin Anderson

9 Sunderland, Abb's Battery (HER 2706)

The site of Abb's Battery is shown on the First Edition Ordnance Survey map of 1858 on the coast at the north end of Roker Rocks. Not to be confused with Roker Battery, which is 142m to the south, Abb's Battery was manned during World War One with two 4.7 inch QF IV guns (Clarke and Rudd 1988).

10 Sunderland, Wave Basin Battery (HER 84)

The general anxiety about the defences of the UK led to the River Wear Commissioners giving the War Office in 1860 a site for the erection of a battery on the south side of the River Wear, next to the Wave Basin. The precise date of construction is unknown, but the battery was certainly finished by 1882. It was "entirely constructed of masonry and consisted of a mole projecting into the river, surmounted by four gun emplacements".

"The main armament consisted of four 80 pounder Rifled Muzzle Loading (RML) Guns" - old 68 pounder smooth bore guns converted by the insertion of rifled liners. Because of the expansion of the port and construction of new piers, the battery was soon obsolete, and was retained only for training until perhaps the beginning of the twentieth century. Nothing was listed for it on the armaments return of 1913 - but the battery had two 6 inch gun emplacements in the twentieth century. Wave Basin Battery lies on private land within the Port of Sunderland (Clarke and Rudd 1988 and DoE listed building description 920-1/9/215).

Listed grade 2

Anti-Zeppelin Defences (Fig 1)

The possibility of attack by airship - first popularly mooted in H.G. Wells' 1909 novel "The War in the Air" - was a serious factor in military planning from 1912, spurred on by a wave of nocturnal "Zeppelin sightings" in southern England, as tension between Britain and Germany rose before the war. Advances in aviation technology resulted in the layout of anti-aircraft guns in Spring 1914, but the most effective weapon to combat the menace was the rapidly developing fighter aeroplane. Royal Naval Air Service detachments of 36 Squadron were established at Whitley Bay and Hylton Moor (later RAF Usworth - see No. 26 below). The first attack on the North-East coast was aimed at Tynemouth on the night of April14/15, 1915 , but the crew of Zeppelin L9 mistook the Wansbeck for the Tyne and the bombs fell on Blyth. Whitley Bay, Jarrow, Wallsend and South Shields were attacked on the night of 8/9 August 1916.

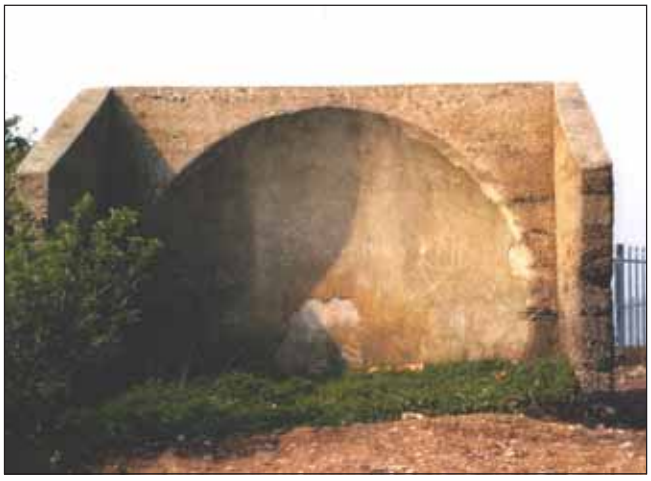
One of the principal problem facing the defenders was locating the raiders in time to mount an effective interception, especially as the planes available were only slightly faster than the airships and had a poorer rate of climb. Experiments involving parabolic sound mirrors for air defence were begun in Britain by a Professor Mather in the summer of 1915, in response to the Zeppelin raids which had begun to target British cities earlier that year. Such mirrors reflected and amplified the noise of an aircraft's engines, so that a listener, situated in a trench shelter

in front of the mirror, could raise the alarm. These experiments eventually led to a number of mirrors being constructed by the end of World War One, almost exclusively sited either on the South coast, or around the North East and Yorkshire (English Heritage, 2000). Once detected, the response was co-ordinated from the base of the Assistant Air Defence Commander, whose office was at 9 Osbourne Terrace, Jesmond. Instructions to the airfields were issued, and the few anti-aircraft guns available would be readied should the raider come within range. Warnings were passed to street wardens who would advise lights to be turned off, and warn civilians to gather their belongings and ultimately guide them into the air raid shelters.

By September 1916, the Royal Flying Corp, having taken over the night-fighting role from the Navy, was able to deploy explosive bullets against the raiders, and the tide turned in favour of the defenders, as the airships began to sustain unacceptable losses. From May 1917, the German air attacks were targeted on London, using Gotha heavy bombers.

11 Fulwell, Acoustical Mirror (HER 4992)

This is a “Coastal Watcher” type, 2km away from the sea. This type of mirror would have been able to detect a Zeppelin about 15-20 miles away, giving about 15 minutes warning for defences to be made ready. The mirror is set at a slight angle to point upwards. The mirror itself consists of a 15ft concave shape cut into a flat concrete wall, which has two smaller walls jutting out from it to stabilise the structure, and to exclude any noises which could interfere with the mirror’s operation. Research aimed at improving acoustic detection continued throughout the 1920s and 1930s. The Fulwell mirror is thought to have gone out of use in 1936 (Sockett 1990, Dobinson 2000, Lowry 1996 and English Heritage Scheduled Ancient Monument entry 34835).



Listed grade 2 and a Scheduled Ancient Monument
Public Access
NZ 389 596

12 Brunton, World War One Ranging Station (HER 5029)

There were originally three First World War ranging sites in Tyne and Wear - this one, another in Kenton, plus a third at an unknown site. They were used to triangulate the altitude and range of Zeppelin aircraft. At this site there is a low circular concrete base which would have housed the ranging equipment. Originally there would have been a compass direction dial and a telephone point, but these have now gone (information provided by Mr Fairburn, 2002 and Timescape Archaeological Surveys 2000).

13 Armstrong's Elswick Works (HER 4315)

The industrialist William Armstrong started manufacturing hydraulic equipment at a factory in Elswick in 1847. The site expanded hugely, and by the 1880s had begun producing armaments and shipping, making it the only factory in the world at the time that could construct and arm a warship independently. By the beginning of the 20th century, the works extended more than a mile along the north bank of the Tyne. The factory was still of crucial importance in World War One, and so became the site of one of the very first anti-aircraft (AA) emplacements in Britain. In April 1914, four months before war was declared, Elswick Works are listed as being defended by two Boer War era 1 pdr guns on travelling

Twentieth century arches at Elswick Works

carriage mounts, operated by the army. These were the only two AA guns in the region, at a time when there were just 17 in the whole country. They appear to have been still in position in May 1915, by which time there were another two guns in the Tyne region, this time 6 pdrs. However, the guns do not appear on a list of Tyne and Tees AA gun sites from June 1917, and had presumably been removed.

14 Cullercoats, Brown's Point, Radio Telegraph Station (HER 5519)

This site started as a civilian telegraph station in 1906-07, owned by the Amalgamated Radio Telegraph Company, one of Lord Armstrong's many business interests. Originally it consisted of a timber shed with nearby radio masts. Its ownership changed twice before the start of World War One in 1914, when the Admiralty took over the running of the station, which they used to intercept German radio traffic. Another brick building was constructed in 1916 to replace the original wooden hut, and is still visible today. In the 1920s, the station grew and so a new brick building was added in 1926 to accommodate the increases in personnel. The buildings were the subject of archaeological recording before recent conversion to residential use (Mabbitt 2002).

One of the two remaining buildings is listed grade 2.

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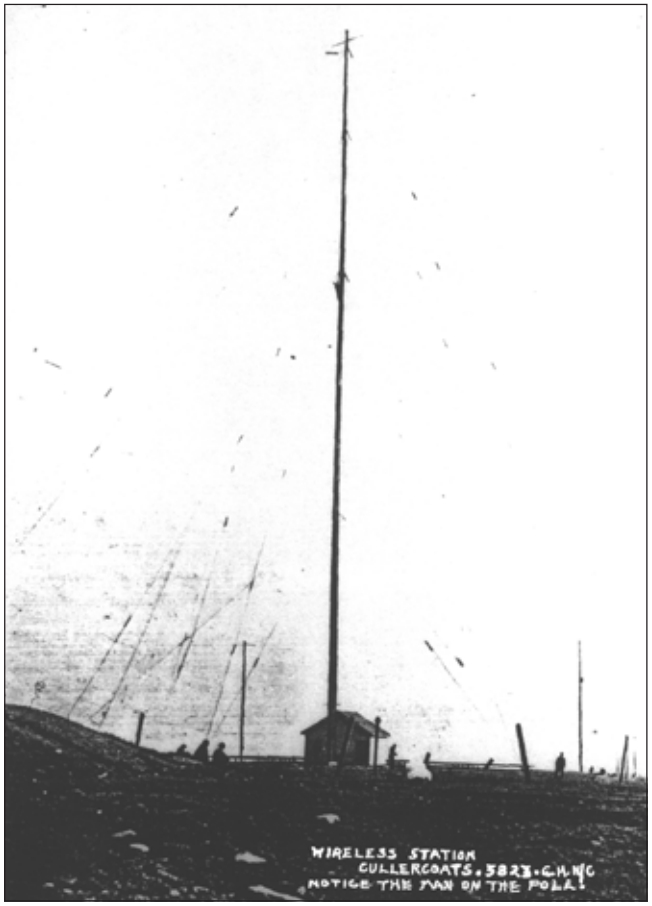


Radio mast at Cullercoats. Reproduced with permission from Newcastle City Library Acc. 46360

Rifle Ranges and Practice Trenches (Fig 1)

Rifle ranges became a common feature of the nineteenth century landscape as the numerous units of the Territorial Army required facilities to develop and hone the marksmanship which became a trademark of the British infantry. Many were constructed on common or marginal land on the edge of built-up areas. The two listed below were First World War additions. Rifle ranges were often constructed with two sets of targets in parallel, as seen for example at Whitburn, Sunderland, perhaps for the purpose of running inter-company shooting competitions. Unit rivalry was believed to be one of the best means of spurring on the troops to achieve high performance.

The First World War was characterised by trench warfare. The Germans first dug trench lines to protect themselves from enemy gunfire, and the Allies soon followed suit. The trench lines soon spread from the North Sea to Switzerland, protected by lines of barbed wire. Allied front line trenches were about 7 feet deep and 6 feet wide. They were dug in a zigzag pattern to prevent the enemy from shooting straight down the line. A “fire step” formed of sandbags was cut into the side of the trench to allow sentries to see over the side of the trench. Communications trenches linked the front line to the reserve trenches. Through these, men, equipment and casualties could be moved. Between the Allies and German trenches was No-Man’s Land which was normally around 250 yards wide (http://www.bbc.co.uk/history/war/wwone/launch_vr_trench.shml)

In Tyne and Wear there were several examples of practice trenches which display the characteristic zigzag pattern. Only those at Cleadon Hills are still visible on the ground, in the right light.

15 Hylton, entrenchments (HER 5481)

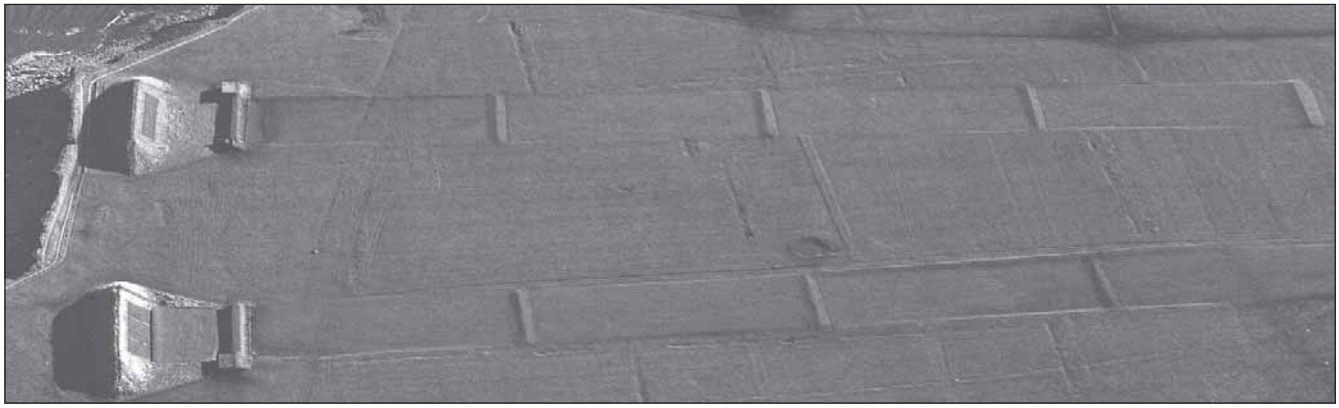
A prehistoric adze was found during the excavation of entrenchments on the brow of the hill above Hylton Castle during World War One (Preston 1929 and Miket 1984).

16 Brunton, World War One Practice trenches (HER 5030)

There were also practice trenches in these fields, now ploughed away (information provided by Mr Fairburn 2002).

17 Whitburn Rifle Ranges and Practice Trenches (HER 2587)

At Whitburn there are five ranges, one 40 yards long for side arms, and four for rifles (one of 600 yards, and three of 500 yards).



Whitburn Rifle Ranges. Photograph by Tim Gates copyright reserved

The facility is still in use by the Ministry of Defence. The ranges are possibly associated with a group of buildings on Mill Lane, which may be barrack blocks. The ranges overlie sections of medieval ridge and furrow earthworks, remnants of the common fields associated with Whitburn medieval village. World War One practice trenches can be seen on aerial photos to the south of the main ranges, laid out in the standard 'zigzag' trench pattern.

18 Kibblesworth Common, Rifle Range (HER 5295)

Showing clearly on the 3rd edition Ordnance Survey map from 1921, which shows firing points set out 200, 500 and 600 yards away from the targets, the range dates from the pre-war period; World War One regulations strictly limited the lengths of firing ranges to 500 yards. The range was probably set up and used by the Beamish Rifle Volunteers, who were absorbed into the Durham Light Infantry in 1910. The range and its associated structures are in a reasonable state of preservation. A large brick lined pit, from which targets could be raised and lowered, exists in the heavily wooded area. In the western side of the pit baulks of wood are probably the remains of a target framework. Behind the pit is a large earthwork or 'stop bank', designed to prevent missed shots from causing damage, in which a .303 bullet was recently found. Also in the wooded area is a small, windowless brick and concrete building with a steel door, probably used as an ammunition hut for the rifle range (Harbottle 1992).

Public Access
NZ 335 549

19 Brunton, World War One horse training area (HER 5031)

This was the site of a horse training and marshalling area for horses before they were posted to the front in France (information provided by Mr Fairburn 2002).

Inter-War period

For fifteen years following the Armistice, the nation pursued a policy of minimum expenditure on the armed forces – what resources were available were focussed on colonial requirements and defence against an expected French threat. Hitler's rise to power and the collapse of the Geneva disarmament talks in 1933 forced the British government to undertake rearmament and re-align to counter a threat from across the North Sea rather than the Channel.

During the Munich Crisis of September 1938, leaders from many of the major European powers met in Munich to discuss Hitler's attempts to gain control of the Czech Sudetenland. Although eventually a decision was reached which managed to avert war (at least until one year later when Hitler invaded Poland), it seemed at the time that a major conflict was both inevitable and imminent. The crisis led to acceleration in defensive preparations, including the construction of anti-aircraft batteries, like the one at Red Barns, South Tyneside (No 33. below), and the hasty refurbishment of the coastal defences. The major technical development was the invention of Radar as an early warning system. By the mid 1930s, moves were underway to integrate airfields, radar stations, anti-aircraft and searchlight batteries, bombing decoys and barrage balloons into a coherent defensive system. The civilian population was mobilised on the eve of war to construct air raid shelters for civil defence, in the event that bombers penetrated the defensive screen (English Heritage 2000).

Red Barns. Reproduced with permission from Archaeological Services Durham University

THE SECOND WORLD WAR

After the defeat of the British Expeditionary Force in France in the summer of 1940, the country braced itself for an expected attack. In the sixteen weeks from May 1940, new coastal batteries were built using naval guns from the scrapped warships of the First World War and existing positions were heavily fortified with anti-tank obstacles. Anti-invasion defences were built to counter the expected German invasion. This was the "coastal crust" of beach defences set up under General Ironside, Commander in Chief of Home Forces and later by Ironside's successor General Brooke. Obstructions and ditches were put in place to hinder the landing and take-off of troop-carrying aircraft, and to protect airfields and factories from attack. Divisional stop-lines of pillboxes, road-blocks, trenches and pits were built to delay a German advance from the coast. From 1941 new anti-tank weapons such as spigot mortars were introduced (English

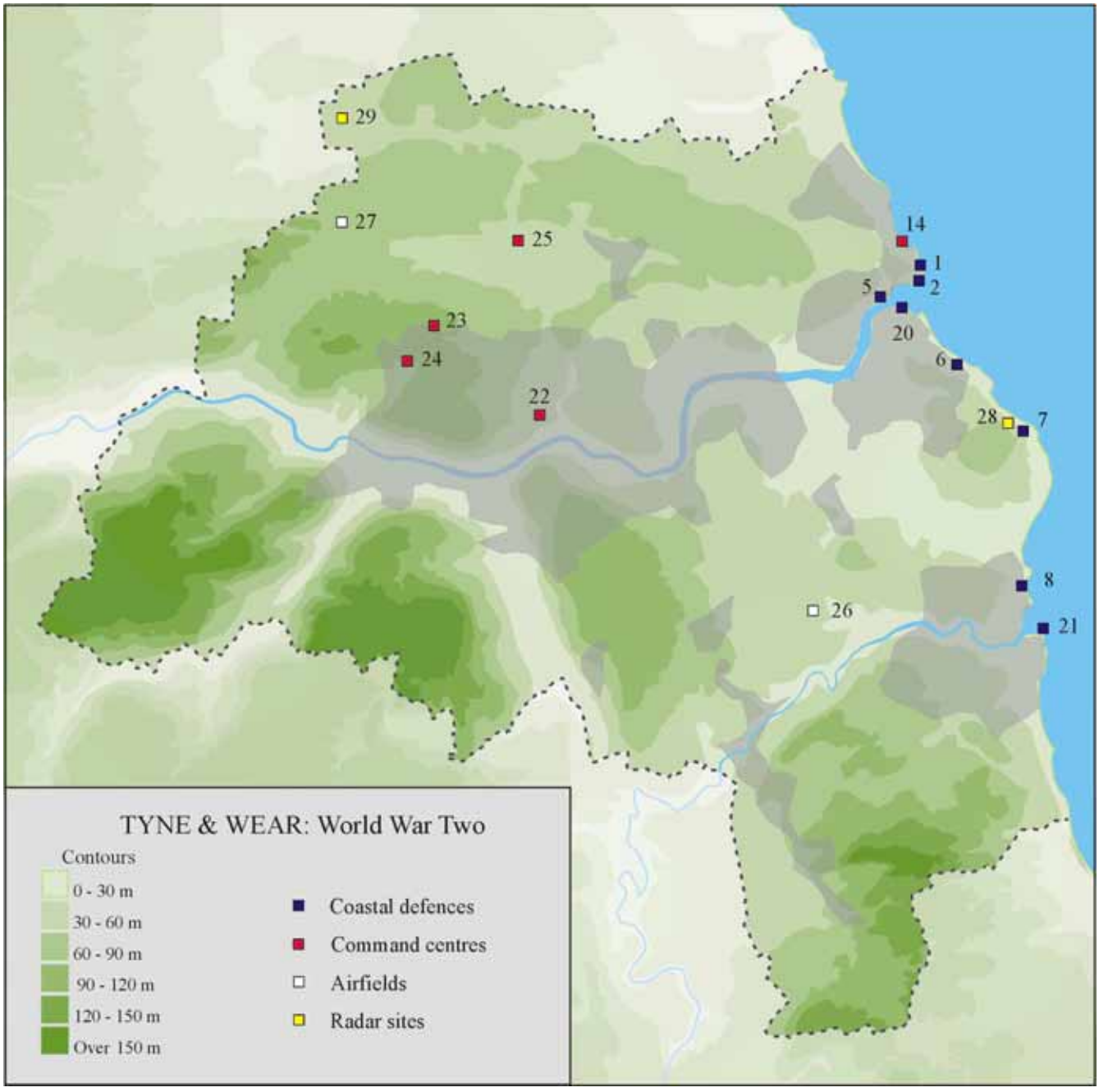


Figure 2

Heritage 2000). Approximately 28,000 pillboxes were constructed, of which fewer than 6,000 still survive. Hundreds of miles of anti-tank ditches and obstacles were set up across Britain.

Coastal Batteries (Fig 2)

1 Tynemouth Castle (HER 135)

The castle was used throughout World War Two, with the defensive array virtually unchanged since 1914. The most notable alteration was the addition of a 4 inch naval gun in 1940, which was mainly intended as a practice weapon, used to train gun crews for armed merchant vessels. In 1943, the demand for regular army gunners overseas meant that the Home Guard took over the operation of the 9.2 inch gun for the rest of the war. It was not until November 1956 that the guns at the Castle were finally cut up and scrapped. Many standing remains from the modern military occupation of the site can still be seen. The gun emplacements themselves have been recently restored, and are in good condition. A 6 inch gun can be seen in position in one of the emplacements.

Although it is not one of the original weapons from this battery itself, it is a genuine 1944 gun (although it has had later additions and restoration). The magazines associated with the batteries are also in a good state of preservation.

Scheduled Ancient Monument
English Heritage Guardianship
Public access with entrance fee
NZ 374 693

2 Tynemouth, Spanish Battery (HER 136)

Photograph by Tim Gates copyright reserved

The two guns were retained as the main armament at the Spanish Battery through both World Wars. The battery was stood down from active duty and placed in care and maintenance in 1943, before the guns were finally removed and the battery dismantled in 1954. However, the remains of the gun emplacements are still clearly visible both on aerial photographs and on the ground just south of the car park as large semi-circular concrete structures, now being used as foundations for park benches (Clarke and Rudd 1988 and 1989 and Foster 2004).

Public Access
NZ 373 690

5 North Shields, Clifford's Fort (HER 150)

There was brief usage of the Fort in World War Two, when it became an emergency coast battery, with two 12pdr guns and searchlights emplaced in the same position as the World War One guns had been.

Artillery emplacements

These emplacements were disguised as sea front buildings. During World War Two, the land to the east of Clifford's Fort was the focus of military activity. Here the road and the "moat" were enclosed with barbed wire and knife rests, and covered with barracks, air-raid shelters, welfare facilities and other temporary buildings. A battery of two covered 12-pounder quick firing guns, facing out to the river entrance, was completed in November 1940 to provide defence against motor torpedo boats, and a Blacker Bombard position (also known as a Spigot Mortar) and balloon barrage were also installed. One iron piquet from the 1939-45 wire entanglement

Turning circle for a gun mount

surrounding the coastal battery survives among the boulders of the foreshore. On 10th April 1941 a German bomber dropped four high explosive bombs on the North Groyne and lifeboat house. The intended target may have been the 12-pounder battery: the first and only time that Clifford's Fort was subjected to enemy action (Northern Counties Archaeological Services 2005). By 1942 the garrison housed 2 officers and 54 men, but one year later the battery's operational role ceased, and in May of 1944 it was dismantled and the guns stored at Tynemouth Castle. After the war, a single gun was emplaced there for Anti-Motor Torpedo Boat (AMTB) defence. Many of the submarine mining buildings and gun emplacements have been demolished.

Large sections of walls and gun embrasures from previous stages of occupation of the fort can be seen, although some are masked by modern fish processing units. Recently, the earliest artillery positions, bricked up in the 1880s, have been reopened and consolidated for display (Clarke and Rudd 1988 and 1989, North East Civic Trust 2001, Foster 2004, Northern Counties Archaeological Services 2003, 2004 and 2005, Northern Archaeological Associates 2005).

Listed grade 2* and a Scheduled Ancient Monument
Public Access
NZ 363 685

6 South Shields, Frenchman's Point Battery (HER 869)

One year after World War Two began, the original battery location was requisitioned, and two 6 inch naval guns were mounted in the old emplacements, manned by the 348th Coast Battery of the Royal Artillery. Temporary huts were built to support the site, and were camouflaged to look like existing sea front buildings. In March 1941, these guns were again removed and taken to Park

Battery. Frenchman's Point was re-equipped with three long-range 7.5 inch guns taken from HMS Effingham, giving it a gun layout which was not seen anywhere else in the country. However, technical difficulties meant that the battery was not operational until early 1943. After this, it was only in use for five months before the weapons were sold off in July 1943. The site is now in bad condition, although the aprons for the Coast Artillery Searchlight (CASL) to the north of the battery still remain. The site of these is on the headland known as Trow Point, and is

Searchlight at Trow Point

visible as two circular concrete bases with metal mounting points attached. These are very close to another item of interest, the site of an 1887 experiment into a 'disappearing gun': a gun which could be lowered into a pit while being loaded, giving protection to the crew, before being raised into firing position

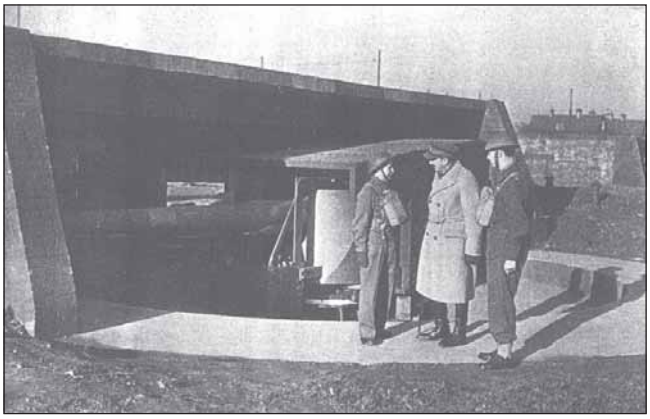
Replica disappearing gun

by hydraulics. However, this prototype proved far too slow for effective use, and no more were ever commissioned. A replica of the disappearing gun still stands on Trow Point today, 10 metres away from the CASL (Clarke and Rudd 1989 and Foster 2004).

Trow Point – public access
NZ 383 666

8 Sunderland, Roker Battery (HER 86)

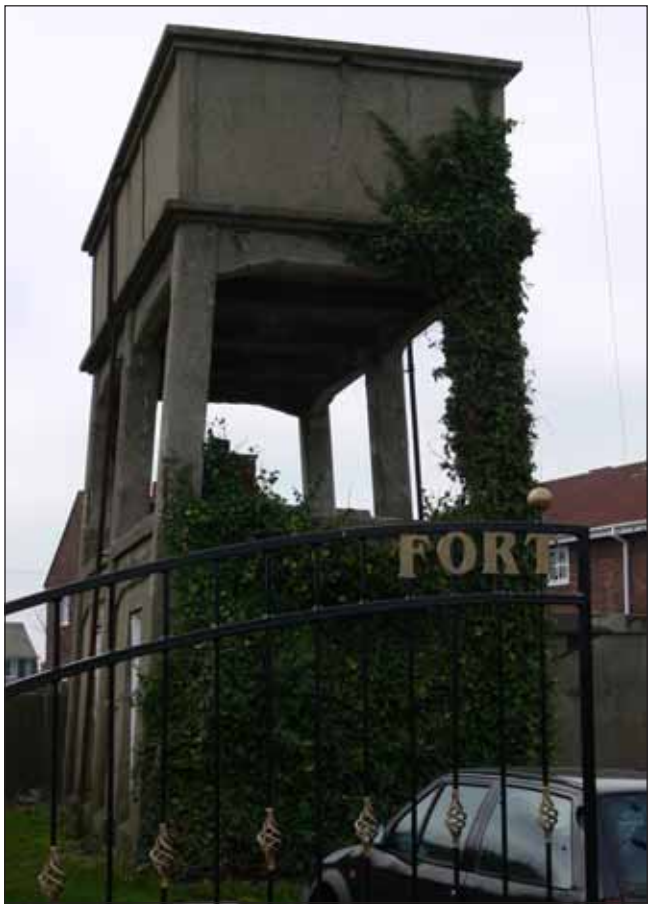
This remained unarmed until September 1939, when a group from the Royal Marine Special Gun Mounting Party arrived at Sunderland, and emplaced two 6 inch guns, along with two searchlights. Of all the World War One buildings, only the magazine and the Battery Observation Post (BOP) were reused, the latter refurbished in August 1940. To camouflage the true position of the battery, it is reported that the BOP was disguised as a pub! As part of the dual role anti-aircraft/coastal defence programme of 1942 (see entry on Park Battery) it was suggested that Roker should be equipped with 5.25 inch dual role guns, although nothing ever came of this. In 1944, the battery was placed in care and maintenance, before finally being decommissioned in 1951 (Clarke and Rudd 1988 and 1989 and Foster 2004).



General Alan-Brooke inspects Roker Battery 1940 – courtesy of the Imperial War Museum, London H5791

7 Marsden, Kitchener Battery (HER 4616)

The battery site saw some use in World War Two, when the underground complex was refurbished and used as an ammunition store. However, despite a proposal to add three 9.2 inch radar guided guns there, Kitchener Battery would never again be used to mount weapons. A command tower for the



Water tower at Fort House. Reproduced with permission from Colin Anderson

Kitchener Battery and its sister site at Hartley was built behind 47 Percy Gardens in Tynemouth (see entry on 47a Percy Gardens). Sadly, Kitchener battery has now been entirely quarried away, although a few scattered remains can be seen at its identical sister site, Roberts Battery in Northumberland. Near to Roberts Battery stands Fort House, which is listed grade 2, where the gun crews were billeted. Fort

Roberts Battery. Reproduced with permission from Colin Anderson

House contained all the domestic facilities needed by the gun crews, including showers and dormitories. It was defended by an outside wall, and is also equipped with a rare example of a World War One pillbox in the corner of the compound (Clarke and Rudd 1989, Foster 2004, Hogg 1984, Sockett 1993/4).

20 South Shields, Park Battery (HER 966)

Unlike most of the coastal defence sites in Tyne and Wear, this position, near North Marine Park in South Shields, had never been used to mount guns before World War Two. Construction work began in May 1940, when a group of Royal Marines arrived to man the site, bringing two 6 inch guns with them. In March 1941 the Marines were posted abroad and so control of the site was taken over by the 348 Coast Battery, who replaced Park Battery's weapons with a different model of 6 inch gun brought from the battery at Frenchman's Point. In January 1943, the 6 inch guns were removed altogether, leaving only a solitary searchlight still operating in the Park. Meanwhile, a national plan drawn up in 1942 proposed that, in order to economise on arms production, separate batteries for anti-aircraft and coastal defence should be replaced by a number of dual role 5.25 inch gun sites

which could be used against either ships or aircraft. Three 5.25 inch guns were accordingly mounted at South Shields in July 1943, but by December of the same year it had been decided to abandon the dual role plan altogether. By this point, Park Battery was the only site in the country to have been fully converted, making it a unique site in the history of Britain's Second World War defences. The battery remained in use for some time after the peace of 1945, although in 1951 its dual role ceased, and control was given over entirely to Anti-Aircraft Command. Five years later, the guns and their mountings were removed, and the site was returned to the South Shields Corporation. Landscaping of the area means that nothing remains of the battery above ground. However, the layout of the site and emplacements can occasionally be seen from the air as parch marks in the grass (Clarke and Rudd 1988 and 1989 and Foster 2004).

Public Access
NZ 367 678

21 Barron's Battery (HER 85)

To improve the defence of the Wear, an emergency battery was added at the mouth of the river in August 1940. Two 12 pounder Quick Firing guns were emplaced, one on the north pier, the other on the south. Searchlights were added later in the same year. This dispersed set-up made command of the battery very difficult, as a detour through Sunderland was necessary to get from one gun to the other. The battery was praised in a 1941 inspection report, although the emplacements lacked a command post or overhead covers (most batteries had these during World War Two due to the increased threat of aerial attack). The site was placed in care and maintenance in April 1944 before being completely abandoned by the end of the year (Clarke and Rudd 1988 and 1989).

Anti-Aircraft defences (Fig 2)

Command Centres

The reorganisation of Britain's air defences between 1937 and 1940 was known as the 'Dowding System' (after Sir Hugh Dowding, the chief of Fighter Command). This was the first truly integrated air defence system, which used information from radar stations, the Royal Observer Corps and other sources to control the response from anti-aircraft batteries and sector airfields. The country was divided into four control groups, each with an operations room supported by a filter room to prevent operations rooms being swamped by information. Filter rooms received reports on enemy raids and reconciled any conflicting details before passing them on to the operations room, from where the defences would be controlled. When the Dowding system began, every radar report in the country was sent to a central filter room at HQ Fighter command in Stanmore. The reports were then passed down to the relevant Group Operations Room. In the case of 13 Group in Northern England and Scotland, this was Kenton Bar bunker. However, by the end of the Battle of Britain, the filter room at Stanmore was so overloaded with information that it was decided in December 1940 to create separate filter rooms for each of the Group Operations Rooms (Lowry 1996).

22 Jesmond, Royal Grammar School, Regional War Room

The Regional War Room of the Regional Commissioner was located at the Royal Grammar School. Staff and pupils had been evacuated to Penrith (Ripley and Pears 1994-2000, D1858). The location of the first bombs to fall in a district was always reported to Region, who then reported to

Fighter Command. The important status of the school explains why it was provided with substantial air raid shelters (see No. 70, below) .

23 Kenton Bar, RAF 13 Group Headquarters (HER 5035)

In 1939, work was started on an underground operations room at Kenton Bar for 13 Group, which covered the area between the Humber and the Shetland Islands. It came into use on March 13 1940. The Operations Room contained a huge map showing the whole area covered by 13 Group, allowing the positions of all the enemy and friendly aircraft squadrons in the north to be plotted accurately. Around the edges of this room was the viewing gallery, from which staff such as the Anti- Aircraft Liaison Officer and the Commanding Officer himself could monitor the progress of the battle on the map table below them, and act accordingly.

Viewing gallery

On the afternoon of August 15 1940, the Kenton bunker had to coordinate the response to a massive daylight Luftwaffe attack, in which around 140 aircraft based in Norway simultaneously attacked airfields in the north of England, including RAF Usworth near Sunderland. Faulty German intelligence had predicted that the north's defences had been depleted, with many aircraft redeployed further south. This was not the case, however, and the Kenton Bar operations room directed Spitfires from RAF Acklington in Northumberland to intercept the main formation over the Farne Islands. The German aircraft split up, with one group heading for Tyneside, and the other moving further south. Fighting continued as squadrons were called up from RAF Usworth and RAF Catterick, and less than two hours later it became clear that the British forces had won a convincing victory. Seven enemy fighters and eight Heinkel 111 bombers were shot down by 13 Group, while official sources claim that there was "no damage of military importance" to the defending forces. This was clearly a very successful day for the forces controlled from Kenton Bar, and it led to a complete change in German tactics: a large daylight raid was never attempted again in the north.

Kenton Bar remained the headquarters for air defences north of the Humber for the next three years, although its responsibilities were reduced when 14 Group was created in October 1940 to control Scotland. In 1943, the air defence network was again reorganised, and, on July 15, 13 Group was disbanded, and Kenton Bar (by now known as RAF Blakelaw) was downgraded to a Sector Operations Room under the control of 12 Group.

The western entrance to the underground command centre is a single storey concrete and brick built structure, and the eastern

Western entrance

Blast walls of generator house

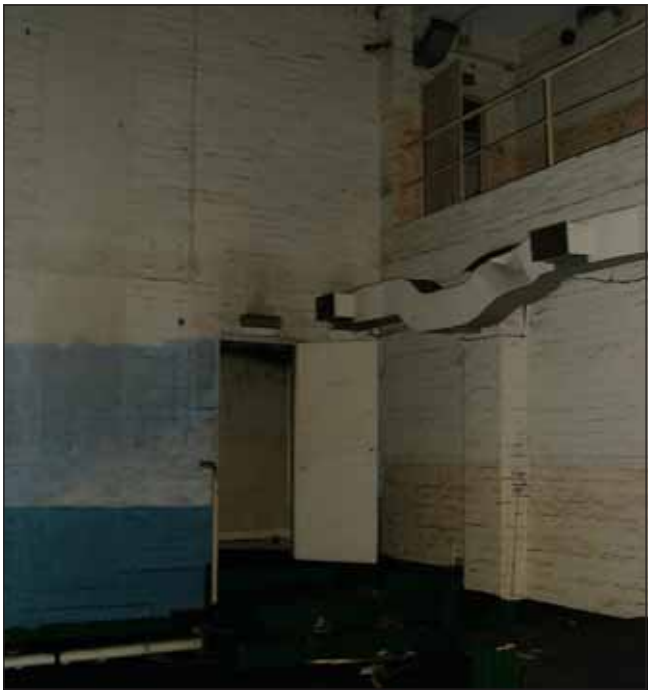
entrance, a small brick and concrete building with a steel door and shuttered windows. There are also a variety of ventilation shafts around the site, as well as several large concrete pyramids arranged in groups, which would have been used to support radio masts. Nearby was (demolished 2004 but recorded beforehand) a single storey brick generator building, with a thick blast wall (Kenton Local History Society 1989, Hunter 1995 and 2002 and Mabbitt 2003 and 2004).

Kenton Bunker is listed grade 2.

Mast bases

24 Blakelaw, Filter Room (HER 5034)

In 1940 a new underground filter room was built at the site of the Blakelaw Quarry. This was smaller than the bunker at Kenton Bar, but was built to a similar pattern. After 13 Group was disbanded, the filter room was passed on to 321 Squadron, part of 22 Group. In 1952, the bunker was bought by the council, who fitted it out to act as the Civil Defence Control Centre Headquarters. It continued in this capacity until at least 1968, when central funding for Civil Defence was ended. From 1980 until around 1996, the bunker was used as a training centre for



local Sea Cadets, known as the TS Nelson, at which time many of the internal features were changed and updated.

The Bunker itself is still in good condition, although it has undergone some alterations. The surface of the site is covered with concrete, surrounded by a small brick wall. There were two entrances to the bunker above ground, as well as various other structures, such as ventilation shafts and piping. Inside, the bunker is built on two

levels and is in good structural condition, although most of the fittings, such as the electricity system, probably date from its use as a Civil Defence installation, and later as a training base for the Sea Cadets. Many original features have been removed altogether, such as the filtration plant and the anti-gas units.

In a response to anti-social behaviour on the site, the bunker is being buried to ensure its preservation for future generations and the site converted into a garden. It was archaeologically recorded beforehand (Parker 2004 and Mabbitt 2003 and 2004).

25 Gosforth, Melton Park, Command Post (HER 5571)

Low Gosforth House. Reproduced with permission of Northumberland County Archives Service NRO 2294/79

This anti-aircraft gun operations room was based in Low Gosforth House in Melton Park, which was rebuilt after a fire in 1878. As the house was never designed with military use in mind, it would have been a very vulnerable target in the event of a surprise commando raid. To prepare for its new role, the house was equipped with two pillboxes. Low Gosforth House was demolished in the early 1970s (information provided by Alan Rudd).

14 Cullercoats, Brown's Point, Radio Telegraph Station (HER 5519)

The station remained in use as a communications station into World War Two, when the staff were recruited into the Home Guard. Eyewitness reports claim that the buildings suffered from some bomb damage when a German parachute mine landed on some nearby rocks. After the war, the station continued in its communications role, and was used as part of the Coast Radio Station service until 1999. The site remains in good condition, and the basic structure of both buildings is little changed, although their fittings have been removed. The site is now converted to residential use (Mabbitt 2002).

One of the two remaining buildings is listed grade 2.

Radio mast bases

Reproduced with permission from Tyne & Wear Museums Archaeology Department

Military Airfields

At the end of the First World War there were about 300 airfields in the UK; by 1945 the figure had risen to over 6,000. Only two significant bases were located in our area, both of which found roles in post-war civilian aviation.

26 RAF Usworth (HER 1824)

Aircraft were first flown from the West Town Moor or Hylton site that would later become RAF Usworth in October 1916, when it was a station for one of the flights in No. 36 Squadron, who were located here in response to the recent Zeppelin raids on the area. For most of the 1920s, the airfield was left largely unused, although the fabric of the base was added to when the construction of a large 'Lamella' hanger began in 1929, based on a German design. This would appear to have been in preparation for the reactivation of the base in March 1930 as a home for the new day bomber squadron, No. 607 (County of Durham), part of the Royal Auxiliary Air Force. However, no personnel or aircraft from the squadron actually arrived until September 1932. In 1937, the regular 103 (B) Squadron moved in, although they relocated south to Abingdon in September 1939.

At the start of World War Two, Usworth was redesignated as a Sector Fighter Station under the Dowding System [see entry on Kenton Bar Bunker], and, as part of 13 Group, was placed under the control of the new Group Operations Room at the Kenton Bar bunker. In 13 Group's most famous action, the defeat of a massive Luftwaffe raid on the north of England on August 15, 1940, Usworth played an important role. Flawed German intelligence had mistakenly identified Usworth as a major fighter base, and designated it as one of the primary targets for the raid. A massive, co-ordinated response managed to repel the raid with very little loss, and 607 Squadron (based at Usworth at the time) shot down four German Heinkel aircraft while defending their home base. This attack saw the end of large scale aerial fighting over the North East, and from then on Usworth was used mostly as a training base. From around 1943 onwards, flying from Usworth seems to have dwindled to almost nothing, partly due to the establishment of a number of barrage balloon sites nearby, which made any flying, and especially the training of inexperienced pilots, very hazardous. After the war, the airfield began to be used more, and in 1962 was bought from the RAF by Sunderland Corporation, becoming Sunderland Airport, catering mainly for light aircraft.

The construction of the A19 and the massive Nissan car plant development that began in 1986 has destroyed much of the original airfield. Originally, it had three different types of hangar, two runways, and eight dispersal points. These dispersals would each house aircraft, scattering them around the airfield, and making them less susceptible to air attack. Aircraft pens at some of the dispersal points show up on aerial photos taken in 1956, and seem to be of a classic design, in

Pickett Hamilton fort

which earth was piled up in the shape of a letter E, giving two bays that would each harbour one fighter, affording them some protection against a bomb blast. The site also had substantial defences against ground attack, and was guarded by three Pickett Hamilton forts (see below), several other pillboxes, at least one Bren gun emplacement, and a Battle HQ - an underground bunker with a concrete observation cupola attached, from where the airfield's ground based defences would be controlled. Almost all of the airfield and its ancillary buildings have now been destroyed by recent developments, and the 1929 Lamella hanger was removed recently, leaving only two blast mounds and a Pickett Hamilton fort still intact. The North East Aircraft Museum is now housed at the site (Smith 1983 and history by D. Charles on http://www.neam.co.uk/usworth2.html, Ripley and Pears 1994-2006).

Public Access to Sunderland Aircraft Museum
NZ 340 590

27 RAF Woolsington (Newcastle Airport) (HER 4928)

The establishment of an airfield in Newcastle was first proposed in 1929, prompted by the Air Ministry. After various sites were considered, including the Town Moor, work started in 1934 near Woolsington, and the airfield was opened in July 1935. Although it was primarily for civilian use, there was some military involvement before the war: both the RAF Volunteer reserve and the Civil Air Guard (who in times of emergency would be used to ferry goods and aircraft) used the airfield. When war broke out in 1939, the Air Ministry took over the entire running of the site, renaming it RAF Woolsington, and established it as a satellite station of RAF Acklington and Ouston. Many support and training units were based at Woolsington through its history. In July 1940, 83 Maintenance Unit was set up, and tasked with salvaging crashed aircraft throughout the north of England, once even removing the wreckage of a "Flying Fortress" bomber from the slopes of Skiddaw, one of the highest of the Lakeland fells. Also stationed at Woolsington were No. 281 Squadron, who helped with Air-Sea rescue, and some members of Training Unit 62, which trained radar operators for night fighters. There were also some fighting squadrons who operated from Woolsington. From 1939-1940, No. 72 Squadron were based in Acklington, but kept some detachments at Newcastle to mount night patrols. One 72 Squadron Spitfire, flying from Woolsington, managed to shoot down a German Junker aircraft, one of the few times that a Spitfire claimed a victory at night. A World War Two era RAF Bellman hanger built on the site can still be seen today, although due to the airport's security arrangements it is not possible to get close to it (Smith 1983, Sleight 1993 and Ripley and Pears 1994-2006).

Pickett Hamilton Forts

These forts were a type of pillbox unique to airfields, and were often placed down the very centre of the runway. The design involved a short concrete cylinder with firing holes or 'embrasures' in the side. This cylinder could be raised or lowered by a pneumatic jack so that in normal conditions the pillbox roof would lie completely flush with the ground, allowing easy take off and landing for aircraft. Should the airfield be attacked, the jack would raise up the pillbox by 2 ft in just fifteen seconds, allowing a two man crew to man the post, and fire out of the embrasures. The fort itself would also act as a physical obstruction, preventing any enemy aircraft from landing on the runway (Lowry 1996, 124). The design for these pillboxes was first registered in June 1940, and by the end of the year three had been installed at Usworth, although shortages of pneumatic

Pickett Hamilton fort, Usworth

jacks meant that they were not yet operational. RAF Woolsington, now Newcastle Airport, was also equipped with three of these forts. One can still be seen at the former site of RAF Usworth, resited from the runway, standing on a grass verge just inside the gates of the North East Aircraft Museum (Lowry 1996).

Public Access to Sunderland Aircraft Museum
NZ 340 590

Radar system (Fig 2)

The development of the radar system from 1935 onwards gradually rendered acoustic mirrors obsolete (see entry on Fulwell acoustical mirror). At the start of World War Two, radar detection had been provided solely by the network of stations codenamed "Chain Home", which had begun development in 1935. Although Chain Home could detect objects at high altitudes effectively, it performed poorly against low flying aircraft. Therefore a new system known as "Chain Home Low" began to be installed from October 1939 onwards, giving improved low level cover. Another low level radar system, Coastal Defence/Chain Home Low, began trials in late 1940, initially developed by the army as anti-shipping radar, intended to give early warning of an approaching invasion fleet. It was later agreed that, instead of being solely operated by the army, the Coastal Defence/Chain Home Low system would link up with the RAF's existing Chain Home Low system to give integrated low level coverage, reducing the need for new radar stations to be built. Between July 1942 and the end of 1943, all of the army Coastal Defence/Chain Home Low stations were handed over to RAF control (Lowry 1996, 36).

28 Marsden, Radar Station (HER 5523 and 5887)

Some time before February 1942, a Coastal Defence/Chain Home Low set was established at Marsden, and codenamed station M-39. Later that year, the low cover radar chain was again remodelled, after the development of 'centimetric radar', a type of radar that used a much shorter wavelength than previous types. This radar gave even better results at low level than standard Chain Home Low sets, and became known as Chain Home Extra Low. Stations which operated it were designated as K-Stations. Station M-39 at Marsden was allocated a Mk 5 Coastal Defence radar, one of the earliest

Chain Home Extra Low sets, in July of 1942, and this came into use by the end of the year. The equipment would have taken the form of a parabolic aerial receiver mounted on the roof of a building. This particular type of equipment was a static design, unlike some other radar sets which were able to be dismounted and transported easily. Some time between January 1943 and January 1944, the Coastal Defence/Chain Home Low station at Marsden was shut down. The nearby Chain Home Extra Low may have remained open until the overhaul of the radar system in 1947, when it was decided that all Chain Home Low and Extra Low sites outside of the 'defended area' (principally the south east coast of England) should be dismantled (Lowry 1996 and Dobinson 2000).

29 Dinnington, Ground Controlled Interception Station (HER 5888)

Codenamed station 14G, this was used for guiding night fighters onto attacking bombers. The earliest stations were "mobile" - they had equipment on wheeled caravans and temporary wooden hutting. "Intermediate" stations had aerial arrays mounted above and below a metal gantry, with separate operations huts. "Final" stations built from 1942 onwards had a brick operations block, known as a "Happidrome", with a single rotating aerial array, with the equipment housed in a well underneath (Lowry 1996 and Dobinson 2000). The Dinnington GCI Station was in operation by April 1941.

Anti-aircraft batteries (Fig 3)

Light anti-aircraft batteries used smaller, faster-firing weapons, such as standard machine guns like the Lewis and Bren guns, to target low flying aircraft.

30 Usworth, Bren Gun site (HER 5402)

This was a light anti-aircraft battery, positioned to defend the approach to the airfield.

31 Earsdon, weapons pit and pillbox (HER 5366)

A weapons pit was typically a position cut into the ground for the protection of artillery or machine gun, with an adjacent pillbox.

Heavy anti-aircraft (HAA) batteries typically used large calibre ordinance, suitable for targeting high flying aircraft. Until late 1940 virtually all HAA sites were temporary, consisting of earthwork gun pits and tented accommodation. Guns were generally mobile. By the middle of the war, static HAA batteries were constructed on an industrial scale, with extensive supporting infra-structure. They utilised a number of different types of weapon, ranging from a 3 inch 20 cwt gun (the standard HAA weapon during WW1 and used well into WW2), which could fire a shell to a height of 23,500 ft, up to a 5.25 inch Mk 2 gun, which could fire a shell up to 43,000 ft. Some of the first 5.25 inch batteries were positioned on the coast and had a dual coastal defence/anti-aircraft role. A typical HAA gun site consisted of a command post (rectangular concrete or brick semi-sunken structure often protected by earth banks), and was usually located at the centre of a 39.6m radius semi-circle of gun pits. There would also be one or two shelters, one for gun maintenance (limber gunner's shelter) and the other for the gun detachment. Ammunition was stored in magazines. Instruments and spare parts were kept in the gun store. Domestic HAA sites also had Nissen and timber huts, workshops and garages and often a sewage treatment plant. A concrete service road led from the main gate via the magazine around the command post, with offshoots to each gun pit. In plan this gave the site a "four leaf clover" shape (Lowry 1996, 48-59).

Anti-aircraft batteries were concentrated around the "Vulnerable Points" that attracted enemy attack, but were sited away from heavily built-up areas to give a good field of view, and to be clear of urban smog which often accumulated above the coal-fired houses of Tyneside (Fig 2). They operated in close collaboration with the searchlight units, which were spread across the countryside, so as not to reveal the presence of the towns and industrial centres which were hidden by the black-out; searchlights were visible for many tens of miles.

Brian Pears' "When Bombs Fell on Rowlands Gill" records that on 1 May 1942 the Fellside Road battery could be heard firing at enemy aircraft with a "Big Bertha" gun. Terrifyingly the "ground shook and windows rattled four miles away when her 50lb shell thundered into the night sky" (Ripley and Pears, diary reference N971). On the same day the Hillheads Road battery was also in action, firing on enemy raiders "silhouetted against the moon. Shrapnel from the bursting AA shells pattered down, damaging the roofs in Norman Terrace, Rowlands Gill" (Ripley and Pears 1994-2006, N971).

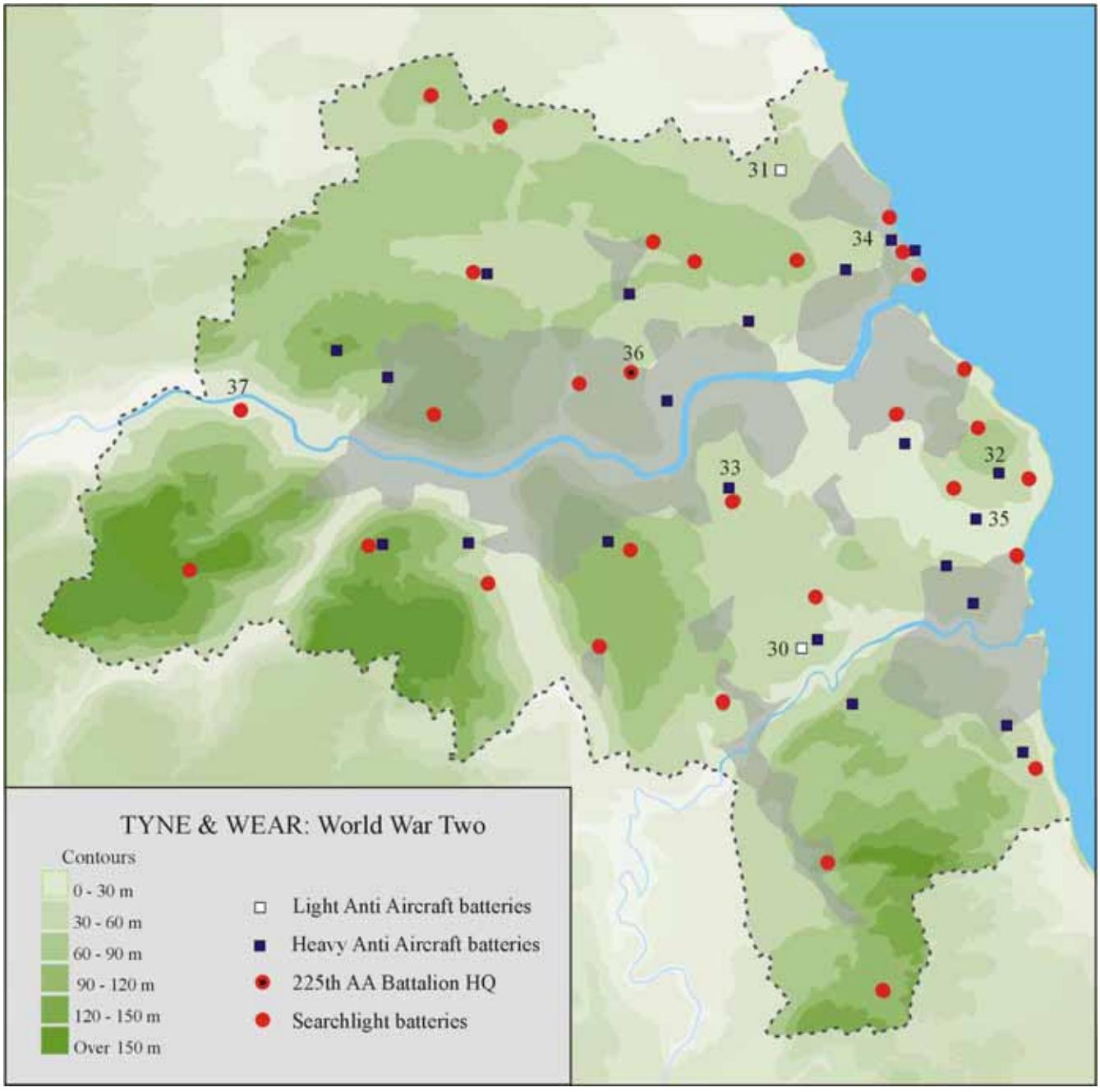


Figure 3

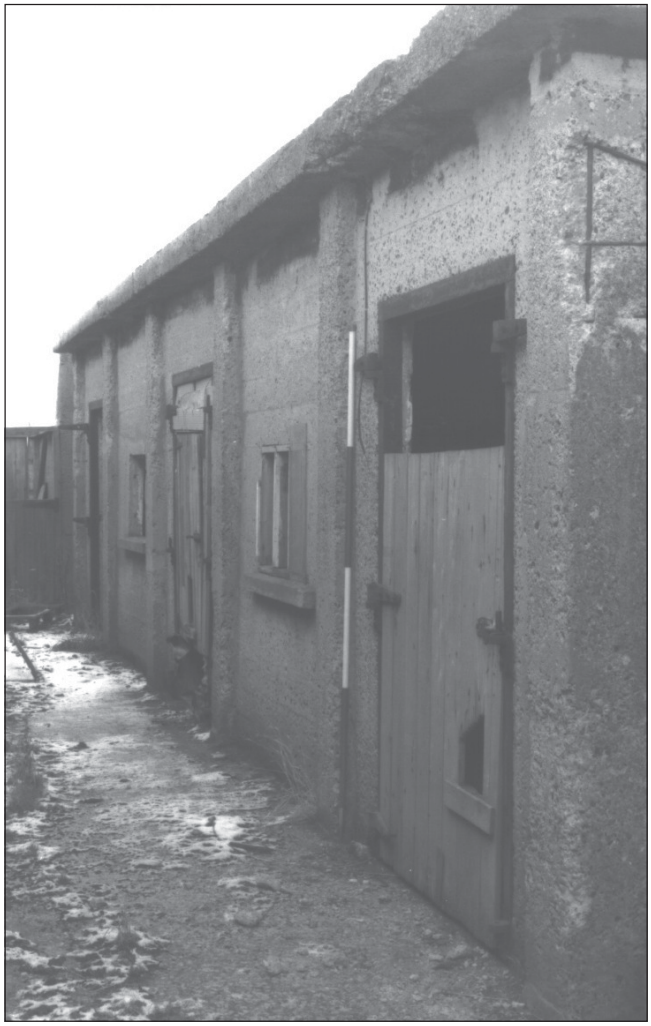
32 Whitburn, Lizard Lane, Heavy Anti-Aircraft Battery Tyne S (HER 1795)

This Heavy Anti-Aircraft site was established some time during World War Two. It was armed with four 3.7 inch static guns, which were the standard HAA weapon of the time, and remained in use until the late 1950s. Such weapons could fire to a maximum height of 32,000ft, and were designed to shoot down high flying bombers. The site also had two Bofors guns (quick firing weapons, used against faster aircraft flying

below 5,000 feet), and two rocket batteries (see below). The Home Guard operated this battery from 1941 until the end of the war in 1945. It still exists on private land (information provided by Alan Rudd, Roger J.C. Thomas and Timescape Archaeological Surveys 1999) .

33 Fellgate, Red Barns Farm, Heavy Anti-Aircraft Battery (HER 1796)

An important site, one of the few “Munich Crisis” batteries to survive, it was designated “Tyne D”. Sir Thomas Inskip’s 1937



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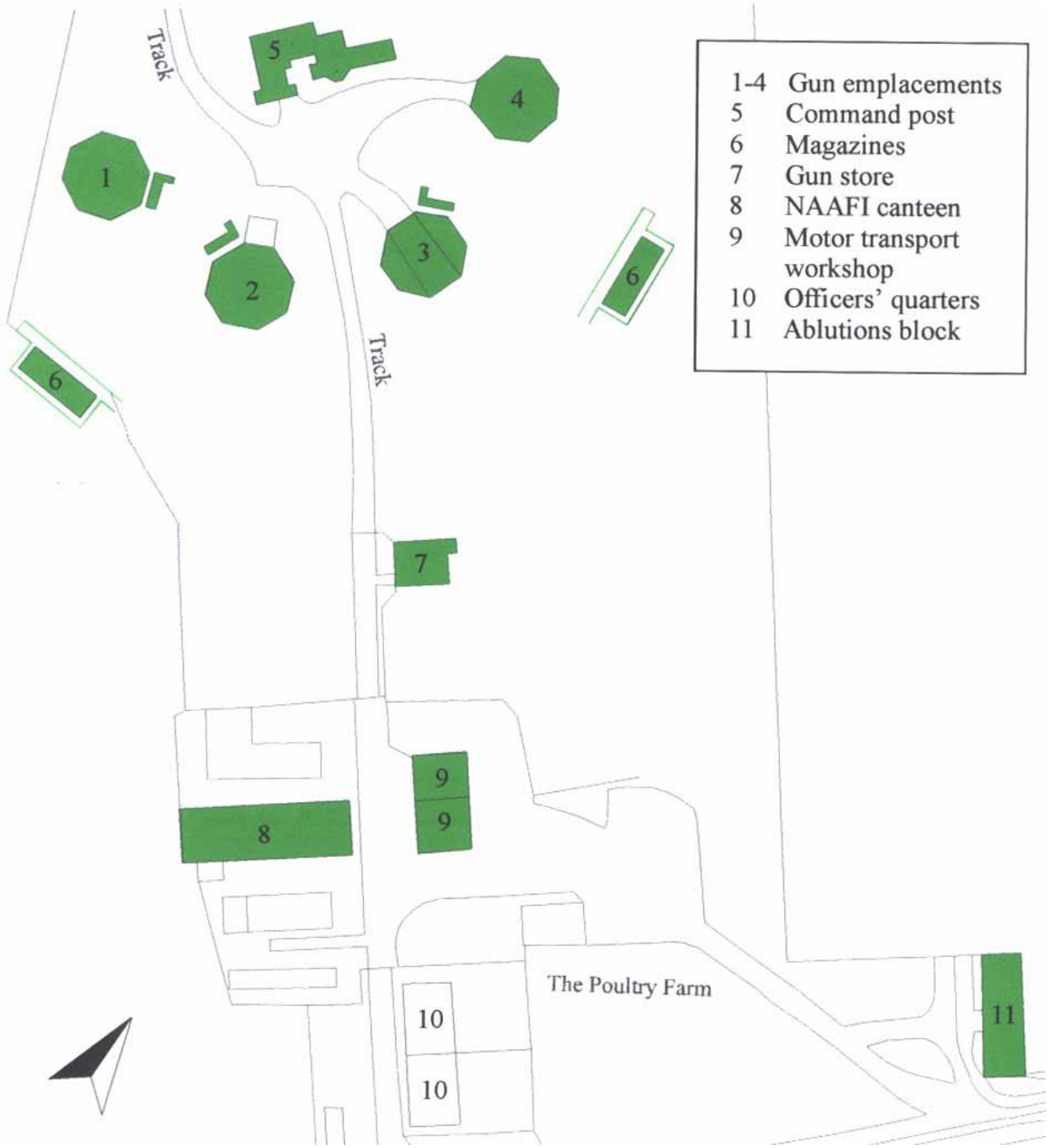

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defensive plan located an anti-aircraft (AA) site here, along with a total of 64 AA guns to protect the coast between the Tyne and the Tees. However, by the time of general mobilisation on the 24th August 1939, there were only nine anti-aircraft guns defending the Tyne, four of which were at Red Barns Farm.

The armaments at Red Barns Farm changed and developed throughout the war. It was originally equipped with four 3.7 inch guns. In 1942 these were replaced with 4.5 inch guns, although these were changed back to 3.7 inch after a brief period. At its largest, in 1944, the site had four 3.7 inch guns, two

40mm Bofors quick firing guns, and a searchlight. There were also a number of ancillary buildings supporting the site, such as a command post, two magazines, a gun store, a canteen, shower block, garage and a motor transport workshop. This site was decommissioned at the end of the war.

Most batteries built before 1939 are of significantly higher quality than those constructed under the pressures of wartime. This held true for Red Barns, which until recently had survived much better than many other battery sites. Also, as it was not reused or upgraded after the war, Red Barns showed excellent survival of its original form. Until very recently, Red Barns Farm was regarded one of the very best preserved Heavy Anti-Aircraft batteries in the country, and probably the best surviving pre-war example. However, recent site preparation works in advance of mineral extraction have meant that many of the buildings have been demolished (information provided by Alan Rudd and Roger J.C. Thomas of English Heritage, and Dobinson 2001, Archaeological Services University of Durham 2002).

34 Tynemouth, Broadway, Heavy Anti-Aircraft Battery (HER 1919)

The Broadway is the site of a former 4.5 inch heavy anti-aircraft battery (designated Tyne A), which once had four concrete gun positions with ready-use ammunitions stores. A command post, with predictor (spotting telescope and computer to predict the target) was situated at the rear and close by to the right was a GL2 radar installation which was originally surrounded by an octagonal fenced enclosure. This site appears on old aerial photographs, but is now destroyed and has been built over (Dobinson 2001 and Stevenson 1998).

35 Cleadon, Heavy Anti-Aircraft Battery (HER 4912)

This site, designated as Tyne O, is shown on the 1:10,560 scale OS map of 1951 although not in detail, perhaps for security reasons. It is also shown on the 1:10,000 scale OS map of 1968. Aerial photographs held by the National Monuments Record, Swindon show that it was derelict by 1956, with some demolition of buildings on the western portion of the complex having taken place. By 1965 most buildings in the western part had been removed, although those on the eastern side remained. Roger JC Thomas of English Heritage interprets the site as a heavy anti-aircraft battery that was manned by territorial units of the Royal Artillery. The battery operated between February 1940 and January 1946. It was a “fixed site” which included anti-aircraft guns, a gun-laying radar, machine gun posts around the site, a magazine, canteen, guardroom, pillbox, gun store, barracks and a Bofors gun pit. All were within a barbed wire perimeter. The site was downgraded in the early 1950s to an unmanned unit ready for rapid response. The site was finally stood down in 1956 and was probably returned to the landowner by the early 1960s. The site is now occupied by Sunderland Association Football Club’s training academy (information provided by RPS Consultants 2000, Roger J.C. Thomas and Dobinson 2001).

Other HAA batteries

Blakelaw Tyne Y (HER 5513)
Carley Hill Tyne U (HER 5509)
Castletown Tyne W (HER 5511)
Fellside Road Tyne G (HER 5497)
Gosforth Tyne J (HER 5499)
Grindon Tyne R (HER 5507)
Heworth Tyne E (HER 5495)
Harton Tyne C (HER 5494)
Howdon Tyne L (HER 5501)
Lobley Hill Tyne F (HER 5496)
Longbenton Tyne K (HER 5500)

Ryhope Tyne Q (HER 5506)
South Shields, Horsley Hill Tyne B (HER 5493)
Southwick Tyne V (HER 5510)
Tunstall Tyne P (HER 5505)
Tynemouth Tyne A and Z (HER 5514)
Walker Tyne N (HER 5503)
Westerhope Tyne H (HER 5498)
Whitley Bay Tyne T (HER 5508)

Rocket Batteries (Fig 3)

34 Tynemouth, The Broadway, Rocket Battery (HER 5492)

Rocket batteries, or Z batteries, were introduced in 1940 as an addition to the anti-aircraft defence array. They consisted of simple launchers and projectiles, which made them easy to use, but gave a very low level of accuracy. Their effectiveness relied on firing very large numbers of explosives at an enemy in the hope that one would hit. At the site in Tynemouth there were 64 separate launchers, each operated by a two man crew. An individual launcher would have had two barrels, with one rocket in each. Sites would usually have some form of support buildings, such as Nissen huts and troop shelters, but they were often notably less developed than conventional Light and Heavy Anti-Aircraft sites. There were some buildings unique to ZAA sites, such as Troop Control Posts. These gave cover to the commander of each troop of launchers as he controlled the firing of his men. There was no universal design for these posts, which could be wooden huts, sandbagged emplacements, Nissen huts or trenches (Lowry 1996, 61). It is unclear what form they took at Tynemouth, but there would have been four in total, with each one responsible for 16 launchers.

There were also Rocket Batteries at Harton (HER 5502) and Seaburn (HER 5512), each with 64 projectiles (information provided by Alan Rudd).

Searchlight Batteries (Fig 3)

Searchlights in the Tyneside area were manned by men of the Royal Artillery attached to the Northumberland Fusiliers, under the control of fighter command. When the Royal Artillery were posted on the south coast in advance of the D-Day invasion, the 225th Anti Aircraft Artillery (Searchlight Batallion) USA took over. Their headquarters was at Debdon Gardens in Newcastle (HER 5559). Many of the searchlight sites were used as low security POW camps after the American troops left, accommodating the prisoners who were working on local farms. The use of searchlights as anti-aircraft defences began in World War One and despite the introduction of Radar technology before World War Two, searchlights were still very necessary, used to guide anti- aircraft fire and to direct interceptors at night, as well as forcing enemy bombers to fly higher, reducing bombing accuracy. They could also be used to help friendly fighters back to base. Most searchlight sites consisted of a circular earthwork, usually 10m in diameter for a 90cm light. There would have been a number of ancillary huts on site, such as domestic buildings and generators (Lowry 1996, 63 and http://www.skylighters.org).

36 Heaton, Debdon Gardens, Drill Hall (HER 5559)

This was the headquarters for ‘A’ battery of the 225th Anti-Aircraft Artillery (Searchlight Battalion) USA, an American unit who were based in the North East in early 1944. They left the North East four days before D-Day, and landed on Juno Beach as part of the Normandy invasion. After the war, the drill hall became home to the Tyne Electrical Engineers (TA), one of the first Territorial Army searchlight units to be formed, and it is still used as a TA centre today. The main building survives, heavily modified and modernised, but still recognisable from its

Debdon Gardens Drill Hall

wartime days. The other buildings on the site have mostly been demolished, although the original garage block is still in use. Just next to the main gate a solitary searchlight stands as a monument to the history of the base. http://www.skylighters.org

37 Ryton, Searchlight Battery (HER 5530)

On this site, the accommodation hut still stands. In Spring 1944 this site, along with most others in the area, was manned by the American 225th Anti-Aircraft Artillery (Searchlight Battalion), (information provided by Alan Rudd and http://www.skylighters.org).

Other Searchlight batteries

Benwell TT141 (HER 5529)
Biddick TT233 (HER 5533)
Billy Mill TT134 (HER 5527)
Birtley (HER 5563)
Brenkley TT125 (HER 5561)
Cleadon TT216 (HER 5541)
Cullercoats, Smuggler's Cave TT132 (HER 5558)
Easington Lane TT223 (HER 5566)
Fellside TT245 (HER 5535)
Gosforth TT136 (HER 5528)
Harton TT211 (HER 5537)
Heaton, Armstrong Park TT135 (HER 5562)
Hebburn TT217 (HER 5542)
High Spen (Bone Hill) TT244 (HER 5564)

Holystone (HER 5524)
Houghton-le-Spring TT224 (HER 5567)
Marsden Hall (HER 5565)
Palmersville TT131 (HER 5525)
Ravensworth TT246 (HER 5536)
Ryhope TT226 (HER 5568)
Ryton TT142 (HER 5530)
Seaburn TT215 (HER 5540)
Seaton Burn TT124 (HER 5560)
South Shields, Frenchman's Bay TT213 (HER 5538)
Springwell TT231 (HER 5532)
Tynemouth Pier (HER 1572)
Tynemouth, Sharpness Point TT133 (HER 5526)
Usworth TT237 (HER 5534)
Whitburn TT214 (HER 5539)
Woolsington TT146 (HER 5531

Searchlight at Debdon Gardens

Royal Observer Corps Posts (Fig 4)

Originally formed in 1925 to report and plot enemy aircraft, the first observers were initially enrolled as special constables. Observer Corps (OC) posts were usually very simple in design, often consisting of nothing more than a dug-out reinforced with sandbags. A simple wheel was used to plot the bearings of an enemy aircraft. By 1938 there was a network of observation posts spaced about ten miles apart, with up to four posts in a cluster, linked by telephone to their district centre. The simple wheel device was replaced by a "Post Instrument", an optical device which would give the bearing, grid position and approximate height of an aircraft. Although improvements in Radar technology meant that aircraft could be plotted without having to rely on human observers, the OC was still an essential part of the air defence network, and fed information directly into the filter rooms as part of the Dowding System. OC posts were especially important given that, before the advent of the Ground Controlled Interception radar stations (which were placed inland), all Chain Home radar sites [see entry on Marsden Radar Station] were placed facing out to sea, to give early warning of raids. The OC was therefore the only effective way of plotting aircraft overland. In April 1941 it was granted the official title of "Royal Observer Corps". In September 1941 women were accepted as observers. In October 1942 ROC posts were equipped with an electric projector which could fire a flare to warn of a low flying enemy aircraft. By 1944 they were equipped with radar. The ROC disbanded in May 1945. There had been some 32,000 observers and over 1,000 observation posts (Lowry 1996, Ripley and Pears 1994-2006).

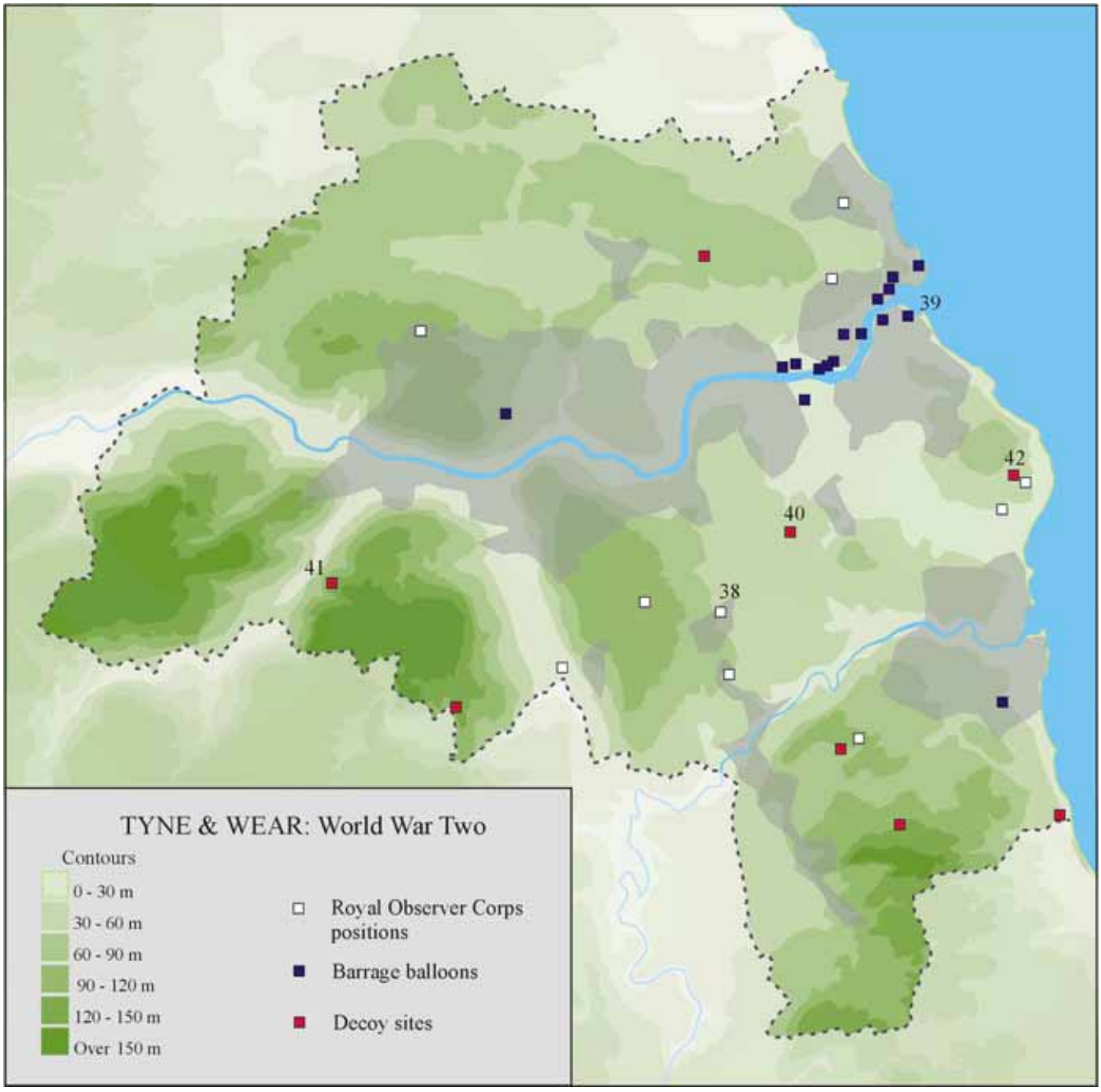

Figure 4

38 Washington/Hastings Hill, Royal Observer Corps Post (HER 5881)

This post, designated No. 2 of E Cluster, was part of 30 Group, based in County Durham. It came into use in December 1936 near Washington, but was moved further north in or before April 1943. It remained in this position for the rest of the War. In or before December 1949, this post moved further south to Hastings Hill (Dobinson 2000, Lowry 1996, Wood 1992 and http://subbrit.org.uk).

Other ROC posts
Birtley (HER 5878)
Kenton (HER 7070)
Springwell (HER 5879)
Sunderland (HER 5882)
Tynemouth (HER 5885)
Washington (HER 5880, 5883 and 5884)
Whitley Bay (HER 5886)

Barrage Balloons (Fig 4)

These were first used in World War One and throughout World War Two. They forced enemy aircraft to fly high, so they did not become entangled in the balloon's tethering cable, thus providing an easier target for fighters and anti-aircrafts gunners and reducing the accuracy of bombing. Unfortunately some of our own aircraft occasionally collided with balloon cables. There were also frequent reports of balloons working loose and causing damage to buildings. For instance, Ripley and Pears record that on 14 October 1941, St. George's Church in Cullercoats was damaged by a drifting balloon (diary reference D773) and on 16 October 1942 a barrage balloon in City Road, Newcastle caught fire. Barrage balloons were either positioned around the perimeter of large vulnerable points or were "field sited" - moored over a circular area. They were an RAF responsibility. Equipment was usually mobile and based on lorries. When inflated they measured 66 feet long and needed 20,000 cubic feet of hydrogen to fill them. Today the main evidence of their location on the ground will be a ring of cylindrical concrete tethering blocks. Regional Balloon Centres, which acted as headquarters for the balloon units and storage depots had two unique buildings - a balloon shed or balloon hangar, where the balloons could be test inflated, and the balloon storage shed with gantries over each of its four doors. The Benton Balloon Barrage Station (HER 5673) was responsible for collecting the remains of destroyed balloons and their cable. This building was photographed in 1992, surrounded by timber huts, not long before it was demolished. There was a complex of pillboxes in this area (HER 5433, 5434 and 5436), which would have offered protection for the site (Lowry 1996, 63 and Ripley and Pears 1994-2006)

39 South Shields, North Foreshore, Barrage Balloon (HER 5546)

A German mine-laying Heinkel bomber hit a barrage balloon cable on the North Foreshore in February 1941, crashing into Beach Road in South Shields, killing all of

Benton Barrage Balloon Station

the crew. Twenty minutes after the crash an unexploded mine among the wreckage detonated, with a blast was so large that it was heard in central Newcastle, and the resultant flames were used by other enemy bombers as a target, resulting in extensive bomb-damage on neighbouring Broderick Street. (Ripley and Pears 1994-2006)

Beach Road, South Shields. Reproduced with permission from South Shields Central Library No.5.07

Other barrage balloon sites
Byker, St Michael's Road
Denton, Western Avenue
Dunston
Elswick/Rye Hill
Howdon (HER 5549 and 5550)
Jarrow (HER 5549)
Jesmond, Oakland Road
Newcastle, City Road and Leazes Park
North Shields (HER 5544, 5545, 5548, 5551-5554)
Ouseburn Tip
Pelaw
South Shields (HER 5546, 5555 and 5556)
Sunderland (HER 5557)
Tynemouth (HER 5543 and 5547)
Westerhope – The Balloon Public House recalls its presence

Bombing decoys (Fig 4)

In World War One, there had been some attempts to confuse enemy bombers by establishing dummy airfields in France. In October 1939 a similar idea was begun, but on a much larger scale, involving numerous airfield decoys all over Britain, equipped with fake aircraft and buildings. By the end of the war, a number of different types of decoy existed, such as the so-called "Q sites" which used an array of lights to make themselves look like airfields operating at night. The next generation of decoys exploited standard German night time bombing procedures. The Luftwaffe's strategy for bombing missions involved sending a first wave of path-finder aircraft to mark out the targets with incendiary bombs. A second wave would follow up, and use the fires as their targets, dropping high explosives on them. To mislead this second wave of bombers, decoys code-named "QF sites" began to be developed from June 1940. These decoy sites were built in unoccupied areas, where fires would be lit in the hope that the second wave of bombers would mistake these for their real targets. QF decoys were followed in late 1940 by the more sophisticated SF (Special Fire) sites, which used different types of fire and special effects to give a more realistic impression from the air that buildings were ablaze – such as wooden baskets and metal braziers full of burning coal or impressive pyrotechnics. To give the impression of a blaze at an industrial site, a "boiling oil fire" would be used, which would mix water and vaporised oil. SF arrays were lit by electrical ignition from a control shelter.

QL sites used lights and other tricks to simulate an industrial or urban area. For example, signal lights would be placed in rows to imitate a railway line, and trays of soil with red electric lights above would be used to duplicate the glow of an industrial furnace. As Britain observed an almost total blackout during the air war, it would be obvious that any fully lit complex was a decoy. Therefore, specially designed lights were used at QL sites, designed to look like a factory which had been blacked out, but badly. Light boxes were designed that would allow a small crack of light to shine through, giving the impression from the air of a blacked out

building with one door left ajar, while other models would imitate a partially blacked out skylight. Although shipyards and other industrial sites worked around the clock to supply the war effort, when an air raid warning was issued the lights at real factories would be entirely switched off. The dummy lights at QL sites would then be lit, and would stay on just long enough for the enemy bombers to spot them, before themselves being turned off, to make the effect more realistic.

The construction of SF sites (often referred to as 'Starfish' sites) began nationally in December 1940, allocated to industrial cities like Newcastle, whose entire Starfish system was in place by the end of January 1941, making it the fifteenth city to be equipped with SF sites. They remained in place until February 1944. Throughout the war, decoys nationally managed to attract a total of 674 enemy attacks, while the Air Historical Branch calculated that 2221 tonnes of bombs were diverted away from their real targets by decoys. Although these figures may not be entirely accurate, it is clear that the decoy system was indeed successful in drawing raids away from cities, shipyards, and factories. How many lives were saved as a result will never be known (Lowry 1996, 64, Dobinson 2000).

40 Scaffold Hill Bombing Decoy SF15a (HER 1827)

It would appear that the Starfish site at Scaffold Hill was sufficiently realistic from the air to convince enemy air crews, for it was bombed at least once during World War Two (information from Alan Rudd and Dobinson 2000).

41 Whickham Bombing Decoy QF/QL12d (HER 5518)

The bombing decoy in Whickham seems to have had a dual role as both a QF and QL site. On private land (information provided by Alan Rudd, Lowry 1996 and Dobinson 2000).

42 Whitburn, Wellands Farm Bombing Decoy (HER 5515)

This was a Starfish site, like that at Scaffold Hill, and was designated SF15e. However, it seems to have had some extra pieces of equipment, such as dummy lighting and industrial paraphernalia more commonly seen at QL sites (such as the one at Whickham). Fred Pippet, an RAF officer from Tyneside, had responsibility for all of the decoys between Scarborough and Berwick on the east coast, and between Workington and Dumfries on the west. He kept detailed notes about all the sites under his command, and recorded that this Starfish had fake "dock lighting, factory lighting and glow from locomotives". To make the site look more authentic from the air, they added "sparks, fire and smoke - the lot". The crew room from which the decoys were controlled is of a classic design for Starfish control shelters: a rectangular brick area for the crew, and two large concrete blast walls protecting the door. These designs often had soil piled up around them for protection and camouflage.
Whether this was the case here is uncertain; there is no trace of an earth mound now.
Wellands Farm was bombed on Tuesday 8 April 1941 (Owen 1990, Ripley and Pears 1994-2006, N583). On private land.

Other bombing decoy sites
Kibblesworth QL12b and SF15b (HER 5517)
Ryhope QL12f and SF15d (HER 5934) – a decoy for Sunderland Docks
Silksworth QL12g (HER 5520) – a decoy for Silksworth Coke Ovens and marshalling yard

Springwell QL12b (HER 5516) – a decoy for the north bank of the Tyne and naval yards
West Boldon QL12i and SF15c (HER 5522) – decoy for Tyneside Docks
West Herrington QL12h (HER 5521) – a decoy for Sunderland Forge

Inland defences or "defence in depth"

Strategic points such as road junctions and bridges were protected by anti-tank obstacles and ditches, pillboxes, weapons pits and trenches. Open spaces were protected from the landing or taking off of troop-carrying aircraft by trenches or posts. Heavily defended Stop Lines were created to delay or stop the enemy. In the north the first Stop Line followed the River Coquet, the second the River Wansbeck, the third the Tyne and the fourth the Derwent. In the event of an invasion many bridges on the Tyne would be blown up or mined and approach roads would be cratered. The battle headquarters would be Beaufront Castle in Northumberland. (English Heritage 2000).

Pillboxes (Fig 5)

Pillboxes are sometimes referred to as defence posts, blockhouses or police posts. Concrete pillboxes were first used by the Russians in the Russo-Japanese War. The idea was copied by the Germans in World War One and later by the British. Some pillboxes were sited to defend coastal batteries, airfields, radar stations and factories, others were part of stop lines. More than 18,000 were built during 1940. There were a dozen standard pillbox designs, but in fact many more designs were used. The Defence of Britain Handbook describes them as "a basic squat, heavily constructed building, usually flat-roofed, no more than 1.98m high and quadrilateral, polygonal or circular in plan. There were one or two entrances, sometimes protected by a porch or wall. They all have a series of horizontal slits (firing loops, loopholes or embrasures) to provide interlocking fields of fire over the anticipated direction of attack". Most pillboxes were designed for rifles or light machine guns. More heavily armed examples had Vickers machine guns, anti-tank guns or Hotchkiss guns. Pillbox walls are almost always of concrete, sometimes with brick shuttering or stone facing (Lowry 1996, 79-82). The threat of an invasion was lessened in 1941 when Hitler invaded the Soviet Union. No more pillboxes were built after February 1942.

43 St Mary's Island, Pillbox (HER 1791)

This is a concrete pillbox on the south-western side of the island, which can be seen to the left of the causeway while walking towards the lighthouse. It is 2.3m high, making it taller than the majority of pillboxes, which rarely stood at more than 2m. As the pillbox is built very close up against the rocks that the lighthouse stands on, making the rear inaccessible, it has a number of unusual design features. Whereas most pillboxes have embrasures all the way around, this example has just three, all facing away from the centre of the island. Also, the entrance is to the front. Overall, despite some vandalism on the inside, the pillbox is in good condition.

Visible from causeway
NZ 352 754

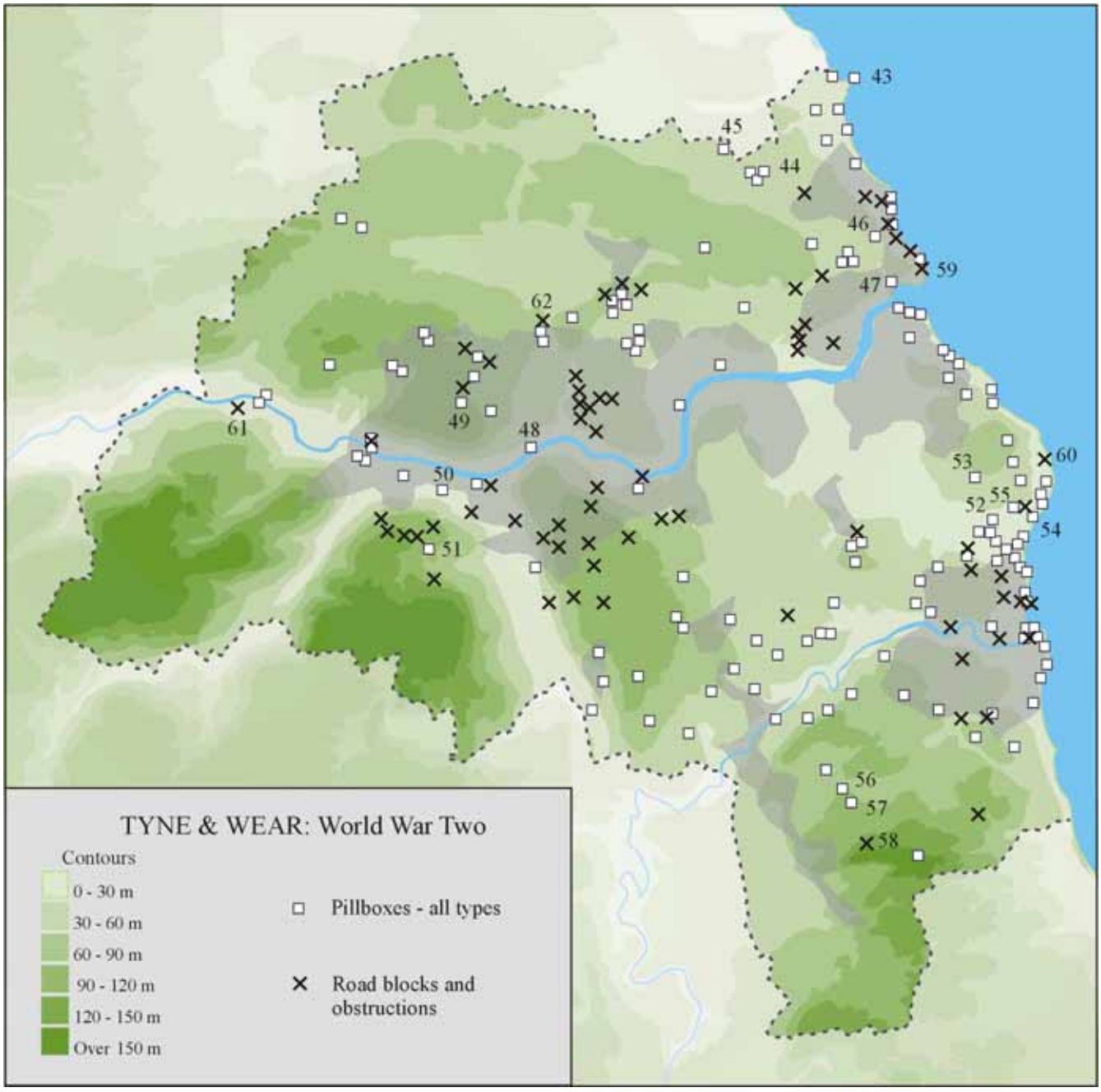

Figure 5

44 West Allotment, Pillbox (HER 1788)

This pillbox is of a regular hexagonal shape, with a large gun embrasure on each side except for the one containing the door, which has a smaller loophole. This is a classic example of a Type 22 pillbox, one of the most common types. Inside is a Y-shaped brick 'anti-ricochet wall', designed to stop rebounding bullets inside the pillbox from causing harm to its occupants. Earth has

been piled up around the front, almost to the level of the embrasures, which would help camouflage the pillbox and give it greater protection against enemy fire.

Public Access
NZ 305 701

45 Holywell Grange Farm Pillbox (HER 5220)

In a field near to the farm at Holywell Grange stands a hexagonal concrete pillbox. It is seemingly of a standard design, and can be seen from a public footpath, although it cannot be accessed directly by members of the public.

Holywell Grange

Preston Village pillbox

46 Preston, Loopholed Wall (HER 4650)

This is in the middle of Preston Village in North Tyneside and is constructed of concrete and clay bricks. It is built into the corner of a garden wall in a raised position. Some of the outer wall has been demolished, but a large portion is still visible. The large square firing holes are also still present.

47 North Shields ferry landing

Many factories and major civilian installations, like docks, gas works and railway depots, devised their own defensive positions, in conjunction with the military, which were later taken over by regular units (Osborne 2004, 85). This armoured firing position seems to fall into that category. It is located next to the ferry landing, and although now very exposed, would have been camouflaged to blend into the busy dock-side landscape.

North Shields

48 High Level Bridge, Loopholed Wall (HER 5349)

Just above Queen's Lane can be seen a slot cut high up into the stone of the High Level Bridge. This loophole would give cover to a gunner on the bridge, who could fire on any enemy using Queen's Lane to move up and down from Newcastle Quayside.

Visible from Queen's Lane
NZ 250 637

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49 Fenham Barracks, Loopholed Wall (HER 1797)

A high stone wall surrounds the Fenham Barrack complex, which housed 2,100 fusiliers during the war, and is still in use as a military installation today. Into one corner of the wall is cut a large loophole from where defenders could fire, although it has now been bricked up. The firing hole is in a perfect vantage point, looking down the length of Barrack Road towards the city centre.
Public Access
NZ 238 649

50 Dunston, Pillbox (HER 1832)

This large, rectangular pillbox lies at the intersection of the road and railway line to the east of the MetroCentre. The basic structure is concrete, although brick partition walls subdivide the pillbox into two rooms and a narrow corridor behind. Each room has a concrete gun platform, and a large embrasure measuring 1.1 x 0.3m. It is possible to get very close to the site by following the short footpath that begins near to the railway bridge, although the pillbox itself is fenced off for safety reasons.

Partial Public Access
NZ 222 624

51 Whickham, Washingwell Lane, Loopholed Wall (HER 5662)

During World War Two, Whickham was apparently identified as a possible site for an airborne invasion of the North East. As part of the defences, an existing stone wall was converted to defensive use by providing it with embrasures, giving cover to gunners positioned on the other side. The wall is still easy to see, being right next to a public bridleway.

Public Access
NZ 217 604

52 Cleadon, Pillbox (HER 1786)

This is a small pillbox, built into a hedge row. It is in the middle of a private field, so it is not possible to get close enough to examine it. It can be seen from the road, although its shape is largely disguised by the hedges and fence that surround it.

53 Cleadon Hills, Pillboxes (HER 4652)

Two pillboxes of seemingly identical design can be seen built into the side of the Cleadon Hills, within a few hundred metres of each other. Each has two gun embrasures and is constructed out of bricks and concrete. They are both in sound structural condition. Although overgrown, and comparatively difficult to spot, they are just metres away from a public footpath, and easily accessed.

Public Access
NZ 392 628

54 Whitburn Bents Road, Gun Emplacement (HER 1785)

This large emplacement stands near the road, in a commanding position overlooking Whitburn Sands, making it a perfect place from which to repel any enemy attempting to land on the beach. Since the war, this vantage point has been reused as a viewing platform. A 6pdr gun, taken from a First World War tank, was emplaced here in the late summer or early autumn of 1940. It was manned by soldiers recently returned from Dunkirk, who had been reorganised into the Local Defence Regiment.

Public Access
NZ 408 611

Bents Road Gun Emplacement

55 Whitburn, Pillbox (HER 1793)

This fine example is built into a garden wall. Private land.

Whitburn pillbox

56 New Herrington, Pillbox (HER 1780)

This pillbox is of a 'lozenge shape' design, characterised by an hexagonal plan with long front and back walls, and shorter sides. Here, the front wall is 3.8m long, with two pairs of side walls each 2.2m long. There are ten embrasures or gun holes of various sizes arranged around the six sides, and inside there is a thick concrete blast wall, presumably of similar function to the anti-ricochet wall in the West Allotment pillbox.

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57 Stony Gate Pillbox (HER 1781)

This is another lozenge shaped pillbox, seemingly part of the same stop line as the New Herrington site. This one is 700m away to the south, and, although it is in the middle of a ploughed field and therefore inaccessible, it can be easily seen from the nearby public footpath.

Stony Gate

58 Middle Haining, Pillbox (HER 4640)

The pillbox here is now used as part of a transmitter aerial array. The original form is easy to make out, despite the many modern alterations. It is of the same lozenge pattern as the pillbox at New Herrington, built to almost exactly the same dimensions, and is probably part of the same stop-line.

Middle Haining

Other pillboxes

Benton (HER 5372 and 5434)
Birtley (HER 5373, 5374, 5384)
Blaydon (HER 5380, 5381)
Boldon (HER 5380)
Carley Hill (HER 4662)
Cleadon (HER 5371)
Cox Green (HER 5365)
Cullercoats (HER 4670, 5360, 5359)
Dunston (HER 1832, 5418, 5347)
Earsdon (HER 5343, 5344)
East Denton (HER 5382, 5403)
East Holywell (HER 5220)
Fatfield (HER 5387)
Fulwell (HER 4661)
Harton (HER 6835)
Hendon (HER 5375, 5431)
Heworth (HER 5437)
High Level Bridge (HER 5349)
Howdon (HER 5432)
Jesmond (HER 1954 and 5421)
Kenton (HER 5378, 5377, 5376)
Longbenton (HER 5433, 5435, 5436)
Marden (HER 1844)
Marsden (HER 5337 - 5339, 5357, 4653)

Trow Rock

Monkwearmouth (HER 4664)
Newburn (HER 1850, 1851, 5440)
Newcastle Airport (HER 5379)
Nuns Moor (HER 1852, 5889, 5890)
North Hylton (HER 5386)
Offerton (HER 1847, 5439)
Pennywell (HER 5423, 5438)
Preston (HER 1789, 1846, 5367)
Roker (HER 1853, 1855, 5334)
Ryhope (HER 5363, 5369)
Scotswood (HER 1848, 1849)

Trow Point

Seaburn (HER 1834, 1854, 1856, 1857, 4667, 5364)
Souter Point (HER 5350)
South Bents (HER 5354)
South Hylton (HER 5422)
South Shields (HER 5383, 5362, 1845, 1843)
Southwick (HER 4665, 4666)
Springwell (HER 5397)
Sunderland (HER 1783, 5426, 5335, 5413 - 5417)
Team Valley (HER 1778)
Trow Point (HER 1792)
Trow Rock (HER 5356)
Tunstall (HER 5370, 5424)
Tynemouth (HER 4671)
Usworth (HER 5400, 5399, 5401, 5404 - 5406)

Trow Rock

Walker (HER 1787)
Wallsend (HER 5336, 5341, 5340, 5342, 1830)
Warden Law (HER 1782)
Washington (HER 5388, 5398, 5392 - 5396, 5348)
West Boldon (HER 5425, 1784)
West Denton (HER 5368)
West Herrington (HER 1779)
Whitburn (HER 5355, 1794, 1833, 4668, 5351 - 5353, 5427)
Whitley Bay (HER 5345, 1790, 1831, 4669, 5346, 5358)
Wickerwack (HER 4663)
Woolsington (HER 4924, 5430)

Spigot Mortar Emplacements

29mm Spigot Mortars, also known as “Blacker Bombards”, only started to be introduced into defensive planning in the summer of 1941. Before this time, anti-invasion measures had been based around static lines of pillboxes. Even as early as 1941 many had questioned the utility of such inflexible defences. In February 1942 Home Forces declared that recent experience ‘points most strongly to the fact that the pillbox is not a suitable type of fortification for either coastal or nodal point defence’. The new defensive arrangement focused much more on earthworks and more flexible defences than on conventional fortifications. The Spigot Mortar fitted into this system perfectly. These mortars were very simple devices, and were issued to the Home Guard to use against enemy vehicles. They were set up in 4ft deep dug-outs, with a ‘pedestal mounting’ - a large concrete pillar with a steel pin in the top, to which the mortar could be attached. Each mortar would be issued with four kits for making emplacements, meaning that four alternate positions could be provided for each weapon, giving much more flexibility of deployment than under previous defence arrangements. These mortars were given priority in coastal regions, but were also often placed near bridges and road junctions, and wherever an ambush would be most effective. Only two Spigot Mortar sites are known in Tyne and Wear, one in Whitley Bay (HER 5419) and another in Earsdon (HER 5420), but there would have been many more than this originally. 5790 mortars were issued to Northern Command (which controlled the east side of England between the Wash and the Scottish borders) and, as each would have been provided with kits for four emplacements, there would have been a theoretical maximum of 23160 mortar sites in Northern Command alone (Lowry 1996 88-91 and Ripley and Pears 1994-2006)

Anti-tank blocks (Fig 5)

The most common anti-tank blocks were concrete cubes, with sides of either 3 feet 6 inches or 5 feet. Other designs included “coffins”, pyramidal “pimples” and cylinders. They were designed to stop the progress of a tank, often in conjunction with pillboxes, traps, or other defences, so that the stationary tank was in the field of fire of anti-tank weapons. Should that tank attempt to mount the obstacle, it would expose the unarmoured underside of the chassis (Lowry 1996, 85-7).

59 Tynemouth, Priory Haven, Anti-Tank Block (HER 4654)

Priory Haven is a sheltered, sandy bay, lying between the guns of Spanish Battery and Tynemouth Castle, making it a prime strategic target for any seaborne invasion of the North East. To defend against this perceived threat, a single line of anti-tank blocks was constructed across the Haven in 1940 or ’41. The anti-tank blocks have now been destroyed, but can be made out on a slightly blurred 1941 RAF aerial photograph, seen as a line of black cubes stretching across the bay (Defence of Britain Project S0007105).

Anti tank ditches

Built to a range of standard specifications, in profile they were either V-shaped, square-sided or asymmetrical. They were designed to trap the tank and had steep un-climbable vertical faces. Standard dimensions were laid down – for example the V-shaped variant was 5.49m wide and 3.35m deep. Almost all of these ephemeral features have been backfilled, but they may show on aerial photographs (Lowry 1996, 87), quite possibly being mistaken for prehistoric features if encountered on archaeological sites lacking datable finds!

Glider obstructions (Fig 5)

It was assumed that in the event of an invasion there would be landings by parachute, gliders or sea-planes. Thus obstructions were put in place on sites deemed suitable for landing. The process of protecting Britain against aircraft landing began in May 1940, when various different types of obstructions, including wrecked cars from scrapyards and old ploughs, were placed in open fields near to vulnerable points, such as ports and airfields. It was hoped that this would prevent airborne forces landing right next to strategically important areas. However, the obstructions were not intended to completely destroy any aircraft that attempted to land: this would require such a huge expenditure of manpower that it would be totally impractical. Instead, the emphasis was placed on constructing obstacles that would discourage planes from landing in the first place, or, if they did try to, would prevent them from ever taking off again. It was thought unlikely that the Germans had a sufficiently large force of single-use gliders to carry a whole army to Britain, meaning that they would have to rely on motorised transport aircraft making repeated journeys. If obstructions could prevent these planes from taking off again after they had landed, it would greatly restrict the number of troops that could be deployed as part of an airborne invasion. Aircraft trench and mound obstructions were typically 3 feet deep trenches with a mound of spoil either side. The aircraft would topple or pivot on the mounds, and fell into the trenches. (Lowry 1996 and Ripley and Pears 1994-2006)

58 Ryton Willows, Glider Obstructions (HER 1904)

During World War Two, two parallel rows of earthworks were dug running north- south in a field in Ryton Willows, designed to prevent enemy aircraft from using it as a landing

ground. Each row contains a number of pits, with spoil heaped next to them as an extra obstruction. The standard plan for trench layouts was for them to be constructed in a grid layout of 150 yard squares, with pits at least 2 feet 6 inches deep and preferably 4 feet wide. The obstructions at Ryton Willows do not follow this system, as they are not arranged in a grid, but instead are formed into two lines, 191m apart. A grid arrangement was probably not used in this case as the field was too narrow for aircraft to land in a north-south direction, making another row of obstructions unnecessary. The obstructions are very readily accessible from the public footpath which leads through the Ryton Willows Nature Reserve, and can be seen well preserved both on the ground and in aerial photographs.

Public Access
NZ 156 650

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60 Souter, Anti-aircraft obstructions

Here there was a complex of concrete posts, 1 feet ½ inch wide, to prevent gliders landing elite troops on the cliff top.

Road Blocks (Fig 5)

Again, these were part of a plan which would be put in place in the event of an invasion. Road blocks comprised of concrete cylinders or blocks, sometimes entwined with barbed wire and filled with explosives. Some were moveable – for example vertical bars set between concrete blocks. Some roads were mined. In the event of an invasion other measures may have included cutting electricity, disabling locomotives, docks would be blocked up and fuel stores destroyed. The Shields ferry landings would be destroyed and ammunition dumps blown up (the store at Lemington had railway tracks into the river so the ammunition could be disposed of if necessary). There were small ammunition stores at Manors Railway Station, Royal Grammar School, Jesmond Cemetery and the Co-op on Newgate Street. The Tyne was to be blocked by sinking two steamers across the harbour area. The Albert Edward Dock at North Shields was to be blocked. Explosives were hidden in the Rising Sun Pit at Wallsend. Thankfully none of these measures were needed. (Ripley and Pears 1994-2006)

62 Gosforth, Grandstand Road, roadblock (HER 5809)

Next to the Town Moor there is a long series of concrete blocks, jutting out of the grass verge on the western side of Grandstand Road. During World War Two, these were used as vehicle obstructions, part of a ‘stop line’ designed to defend Newcastle from the north. The stop line was reinforced by two pillboxes, in keeping with standard procedures of the time, which demanded that, wherever possible, obstacles should be defended by gun positions, and preferably reinforced with traps, such as mines and flame traps. This would mean that enemy vehicles and troops could be attacked while crossing obstacles, and therefore while at their most vulnerable. Over 60 concrete

blocks can still be seen by the side of the Grandstand Road, although many are almost totally buried. Most are of a regular size, with sides approximately 2 by 4 feet. The pillboxes no longer remain, but can be seen on aerial photographs from 1946 (RCHME 1995, 39).

Public Access
NZ 235 664

Other roadblock sites
Billy Mill (HER 4659)
Byker (HER 5802 and 5803)
Carley Hill (HER 5778)
Chowdene (HER 5831)
Cullercoats (HER 4655, 5817)
Dunston (HER 5808)
Earsdon (HER 5826)
Fawdon (HER 5788)
Felling Shore (HER 5835)
Felling (HER 5836, 5837)
Fenham (HER 5773)
Fulwell (HER 5810, 5811, 5814)
Gateshead (HER 5807, 5806)
Gosforth (HER 5789, 5790, 5791)
Harlow Green (HER 5830)
Heaton (HER 5799, 5795, 5800, 5801)
Heworth (HER 5833)
Howdon (HER 4658, 4660)
Jesmond (HER 5798, 5796)
Kenton (HER 5786)
Kingston Park (HER 5787)
Longbenton (HER 5785, 5784, 5783)
Low Fell (5839, 5840)
Low Southwick (HER 5777)
Monkseaton (HER 5824)
Monkwearmouth (HER 5775, 5776)
North Shields (HER 5825, 5821)
Pelaw (HER 5834)
Percy Main (HER 5818, 5819)
Preston (HER 5816)
Roker (HER 5774, 5812, 5813)
Ryhope (HER 5779)
Scotswood (HER 5772)
Sheriff Hill (HER 5838, 5804)
South Gosforth (HER 5794, 5792, 5793)
South Shields (HER 4651)
Streetgate (HER 5828)
Sunderland (HER 5781, 5780, 5782, 5797)
Teams (HER 5827)
Tynemouth (HER 5815, 4656, 4657, 5855)
Usworth (HER 5851)
West Boldon (HER 5850)
Whickham (HER 5845, 5843, 5841, 5829, 5842, 5844)
Whitburn (HER 5849, 5848, 5847)
Whitley Bay (HER 5822, 5823)
Windy Nook (HER 5832)
Wrekenton (HER 5805)

Civil Defence (Air Raid Precautions or ARP)

ARP centres received reports from RAF Fighter Command and the emergency services. Measures put in place for civilian defence included air raid shelters, emergency water supply, gas decontamination centres, first-aid party depots, ambulance stations, fire stations and warden's posts. Newcastle's ARP were

controlled from Jesmond Dene House (see below). Three main police stations, including Pilgrim Street, formed the sub-control, and then there was a complex of ARP premises, which included garages, schools, church halls etc. There were eight First Aid Posts, including Central School at Pendower and the public baths at Wharrier Street. Local hospitals provided casualty reception beds where needed. Decontamination centres included Condercum Road and Welbeck Road. Twenty three sirens were located across the city. Emergency water supplies were provided in the form of dams or steel tanks (for example a dam at the Cremona Toffee Works on Benton Road and a steel tank at Carliol Square). Local schools primarily provided emergency canteen facilities – such as Church High School and Muscott Grove School. Schools and church halls provided emergency rest and feeding facilities. Members of the ARP distributed gas masks to civilians. In Gateshead the ARP control centre was South Dene Tower at Saltwell Park. Roy Ripley and Brian Pears' website has full lists of ARP sites in Newcastle, Gateshead and Sunderland. Their diary accounts demonstrate how the system worked. For instance on 27 January 1941 Walker Naval Yard was bombed. Workmen working on a jetty were injured when two high explosive bombs were dropped, creating a crater 25 feet in diameter. There were also injuries from broken glass to those working in the anglesmiths shop. Thirty one people were treated by the yard's First Aid party, but two had to be sent to the Royal Victoria Infirmary, twelve to Walker Hospital and two to the Wharrier Street First Aid post (Ripley and Pears 1994-2006).

This aspect of the Home Front has left almost no trace on the landscape today. The buildings requisitioned as ARP centres reverted to previous use and the many thousands of Wardens and Special Constables resumed their civilian occupations. Occasionally, the painted letters "EWS" can be seen, denoting an Emergency Water Supply, as at the Claremont Road entrance to Exhibition Park, where the boating lake was to be used in the event of a loss through bomb damage of the mains supply. At Panama Gardens, Whitley Bay, there is a memorial to a local primary school teacher, Doris Ewbank, killed driving an ambulance during an air raid in 1941.

Panama Gardens, Whitley Bay

Memorial to Doris Ewbank

63 Jesmond Dene House, ARP and Home Guard Headquarters (HER 1953)

In 1940, Jesmond Dene House was used as the Headquarters for the 80 men of No. 2 Company of the 12th Batallion Northumberland Home Guard, where volunteers would be trained in the tactics they would use in the event of an invasion. However, the house soon proved unsuitable for training, and so the Home Guard HQ was

transferred to Heaton Secondary School. The house had another wartime role, as the headquarters and control room for the Air Raid Precautions (ARP) network in Newcastle. It would have been here that the police, RAF Fighter Command, and ARP wardens' posts would send reports about bomb damage during a raid.

Attached to the house is a series of tunnels, with one entrance inside the main building, and three others at the bottom of a cliff to the north in Jesmond Dene. Each tunnel entrance is marked by either one or two decorated stone pillars, all of identical design. The tunnels, exits and marker posts seem to have been constructed at the same time as the house, in the early 19th century, presumably as cold stores or cellars or servant's entrances. However, the interior of the tunnels have a distinctly 20th century appearance, being reinforced with concrete. It is no surprise that while the house was in use during the War, the Home Guard or more likely the ARP made use of the tunnels, which were ideal as air raid shelters and control rooms.

Tunnels under Jesmond Dene House

Near the tunnel entrances is a small, square, brick hut with a heavy concrete roof, described as a pillbox by the Ordnance Survey. Although it does not have as many 'embrasures' or firing holes as a normal pillbox, there is one hole on the eastern side which has now been bricked up. It is possibly better described as a warden's post. Also nearby is a concrete structure, almost totally buried, with a slit in the front, possibly a firing window. It is thought that this may have been a sentry box or similar. Both structures were positioned to defend the tunnel entrances. Jesmond Dene House is listed grade 2 and has been converted into a hotel (Browne 1946, Nolan 2004).

Public Access to pillbox (but not tunnels) in Jesmond Dene
NZ 254 672

64 Houghton-le-Spring, Rough Dene, Home Guard Bunker (HER 5504)

The concrete remains of a bunker survive, half-buried, in the wooded dene. Local residents recall the Home Guard volunteers practising manoeuvres here.

Air Raid Shelters

There were a number of different types – trench shelters, which were merely a trench revetted with sandbags, steel plating, timber, brick or stone; covered trench shelters which were trench shelters which had been lined and roofed with concrete, steel or timber; surface shelters (e.g. Anderson shelters) which were brick or concrete with a concrete roof; semi-sunken shelters; basement shelters and underground shelters (Lowry 1996, 67-73).

Anderson Shelters (HER 5569 and 5458)

After the Munich Crisis of 1938, it became clear that, although military preparations were well advanced, air raid precautions were falling a long way behind. Sir John Anderson, the Lord Privy Seal, was given responsibility for the Home Office Air Raid Precautions Department, which had been formed in 1935. Dr David A. Anderson of this Department designed a new Air Raid shelter, issued free to less well off families, which first became available from February 1939. These 'Anderson Shelters' were initially designed for indoor use, but were later recommended to be sited in gardens. Although they could be built on the surface, the shelter could be substantially improved by half burying it, and piling the resultant spoil onto the roof, giving an extra layer of protection. Anderson shelters were originally designed to house 4 people, although 6 could use one if absolutely necessary. They were 6 feet 6 inches long and 6 feet high, and made of corrugated steel, with a simple design so that two people could construct one with no training. By the outbreak of war in 1939, 1.5 million Andersons had been built, and by September of the following year, there was space for nearly 13 million people in shelters provided by the Government. Although Andersons offered protection against blasts, falling debris, and shrapnel, they were not bombproof, and could not withstand a direct hit (Ripley and Pears 1994-2006).

Morrison shelters

Families with no Anderson Shelter were often provided with a Morrison shelter which was installed inside the house on the ground floor. A Morrison shelter was built like a steel table, 6 feet 6 inches long, 4 feet wide and about 3 feet 6 inches high, with removable wire mesh sides. Ripley and Pears record that in October 1942 a Morrison shelter in a house in Monkseaton was buried when a 1000 kg bomb was dropped. Remarkably the occupant was uninjured (Ripley and Pears 1994-2006, N1135).

Communal and public shelters

Communal and public shelters were built in the streets or on waste ground, generally about 30 feet long by six feet high and six feet wide. They could accommodate up to 50 people. They sometimes had toilet facilities. In Gateshead there were public shelters in Blaydon, Winlaton, High Spen, Rowlands Gill, Chopwell and Blackhall Mill (Ripley and Pears 1994-2006).

65 Wallsend, Park Road

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Two air raid shelters have been archaeologically recorded to the rear of No. 205 Park Road. They were built of brick with reinforced concrete roofs. The shelters would have been able to accommodate about 100 people. Facilities were minimal, but included Elsan type chemical toilets. Stencils of “MEN” and “WOMEN” still survived. Alongside the shelters was a former ARP Post. Built in the same materials as the shelters, the ARP Post was different in plan. It was accessed via a low concrete ramp and unlike the shelters it had windows (Simon 2005).

66 Wilkinson’s Shelter, North Shields (HER 7675)

There was a large shelter under Wilkinson’s lemonade factory. It could hold up to 210 people and was frequently used by families living in nearby streets. The shelter had three rooms, one of which was a smoking room, and each was equipped with bunk beds. Critically the ceiling was not reinforced and so at 11.12pm on Saturday May 3rd 1941, when a single bomb directly hit the shelter, 105 people were killed, 41 of whom were children. However, Ellen Lee, the ARP warden for the shelter bravely rescued 32 people from the explosion, despite having been badly burnt herself. It was the worst bombing incident in this part of the country during World War Two.
www.gatesheadgrid.org/westallswar

67 Newcastle, Victoria Tunnel (HER 4091)

This tunnel, built in 1839-1842, was originally designed to allow coal to be carried from the Spital Tongues colliery to the banks of the Tyne. Although it fell out of use in the 1860s, the tunnel was reused in World War Two as an air raid shelter, whitewashed, fitted out with blast walls, lighting, benches and bunks. Seven extra entrances were constructed, allowing the 9000-person capacity to be filled quickly in the event of a raid. The whole construction cost £37,000. The tunnel is still in good condition, although most of the

Blast walls in Victoria Tunnel

Remains of wartime seating

fittings have been removed (sections of seating survive and visitors can see where the bunk beds and toilets were located), and all but one of the entrances have been bricked up. Some graffiti dating from the 1940s can be seen throughout the tunnel. Members of the public are able to visit the tunnel by special arrangement and during certain restricted periods such as Heritage Open Days (Ripley and Pears 1994-2006, Ayris and Linsley 1995, Rowe 1971, Tyne

Wartime graffiti

and Wear Industrial Monuments Trust and Mike Greatbatch, pers. comm.).

Listed grade 2
Please contact the Ouseburn Business Development Centre 0191 2755601

68 Ouseburn Culvert (HER 5046)

As the Ouseburn leaves Jesmond Vale it disappears underground and re-emerges below Byker Bridge. Within an underground chamber it passes under Newington Road, Warwick Street and beneath the City Stadium. The culvert is 2,150 feet (third of a mile) long. It was built in two stages in the early years of the twentieth century. Before its construction, the Ouseburn cut a deep ravine through this part of the town, making access from the town to eastern suburbs difficult. The valley was more than 100 feet deep and steep sided. Therefore the stream was enveloped inside a ferro-concrete conduit and the valley was then infilled (mostly with industrial waste) so gradually ground level rose, creating new land for housing and roads. In fact the land was never built upon because by the time the valley had been totally infilled (it was estimated that it would take ten years to fill the valley but tipping was still taking place in the 1940s), laws had changed and it was no longer permitted to build on land fill sites. The "City Stadium" was created here instead. The culvert was built in an elliptical shape, 30 feet wide by 20 feet high. The walls are only 8 inches thick at the top of the arch, because ferro-concrete is so strong. Building

Jesmond Vale terminus of culvert

work started in 1907 and was completed in 1911. It cost £23,000 to build. Workers broke into a lagoon of gravel which had to be scraped out and filled with concrete before the construction of the culvert could be continued. While the culvert was under construction the burn was diverted into millraces. When the culvert was finished the burn was diverted back through it. It was used as air raid shelter in WW2. It could seat up to 3000 people and had its own sick bay. A copy of the Council's Air Raid Precaution plan, including information on the use of the culvert and the Victoria Tunnel, survives in Tyne and Wear Archives. In the 1970s the wartime entrance to the culvert was boarded over to create an outdoor riding arena. Today the culvert still carries the Ouseburn and part of the sewer system (Ayris and Linsley 1995 and Ouseburn Heritage magazine).

69 Newcastle, The Side (HER 7679)

A two-storey air raid shelter was archaeologically recorded in 1998. The exterior walls were stone and brick built, with a concrete render on the roadside elevation. The floor and roof were of reinforced concrete. The shelter was supplied with a louvred ventilator (Bill Hopper Design 1997 and Northern Counties Archaeological Services 1998).

70 Newcastle, Melbourne Street, Manors Tramway Generating Station (HER 1911)

The Tramways Offices and Power Station were designed by Benjamin Simpson and constructed between 1901 and 1904. A well-preserved Second World War air-raid shelter of brick with steel blast doors and internal hatches survives in the basement. The depot was recorded before being converted into the City Church (Northern Counties Archaeological Services 2001). There are similar shelters in the Bruce Store at the Museum of Antiquities, University of Newcastle upon Tyne.

71 Newcastle, Charlotte Square (HER 7071)

A watching brief during the restoration of Charlotte Square revealed the partially demolished remains of a Second World War air raid shelter. It was typical of the Covered Trench Shelter design of 1939 - constructed of prefabricated concrete panels which linked together at the base, sides and roof, to form a concrete oblong box. It was accessed by a flight of steps from the surface (Garrett 2004).

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72 Newcastle, Gallowgate (HER 6436)

In 1939 two narrow blocks of air-raid shelters were built against the eastern side of the bus depot and in the narrow space between the buildings and the town wall, presumably taking advantage of the blast protection offered by the medieval masonry. The shelters had 12 inch thick reinforced concrete walls and roof and external blast

doors (Northern Counties Archaeological Services 1999 and Pyper 2001).

Reproduced with permission from Northern Archaeological Associates

73 Jesmond, Royal Grammar School

Three air raid shelters were recorded before demolition at the Royal Grammar School. Each was built as a brick rectangular block, with a reinforced concrete floor slab and roof. There were only two openings in each long wall originally, although windows had since been added. The shelters had inner and outer blast walls. Short dog-leg passages led into the shelters. The original steel blast doors had long since been removed, the doors had been widened, and the roofs covered with bitumen felt. A brightly painted concrete figure of a lion had been placed on a plinth on the roof of one shelter. The Jesmond shelters probably had little in the way of internal fittings, probably no water or sanitation, and possibly no electricity. They would have offered little protection from even an indirect hit. They must therefore be viewed as temporary refuges for Civil Defence staff during air-raid alerts, offering psychological security rather than physical safety (Northern Counties Archaeological Services 2001).

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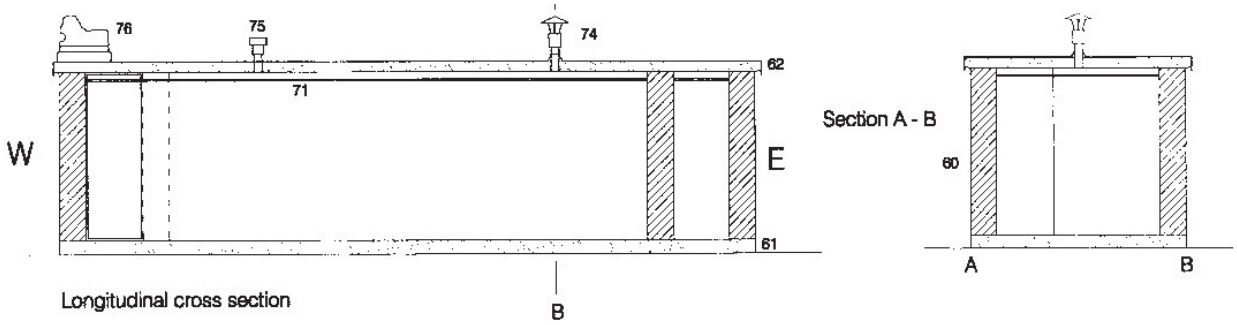
74 Benwell, Pendower School (HER 7678)

The school acted as ARP premises. There was a First Aid Post at the central school, and a dam provided an emergency water supply. The former open air school was used as an emergency rest and feeding centre, able to provide breakfast and tea and hot mid-day meals. It is therefore little surprise that the schools were equipped with air raid shelters. A plan of April 1940, deposited with the Northumberland Record Office by Mauchlen and Weightman of Saville Row, Newcastle, shows sixteen proposed shelters, of two types, with 9 inch thick walls and 6 inch thick reinforced concrete roof. Each shelter could accommodate 45 children.



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Type B shelter could be converted into a cycle shed. A similar plan shows eight proposed shelters at Heaton School, which could accommodate 60 children (Ripley and Pears 1994-2006, Mauchlen and Weightman April 1940, Pendower Elementary and Central Schools, Newcastle – Proposed Air Raid Shelters for 720 children, NRO 4720/B/256, Northumberland Record Office).

75 Byker, St Lawrence Ropery (HER 7075)

A covered trench shelter was recorded during an archaeological evaluation at St. Lawrence Ropery (HER 5142). The shelter was 13.6m in length, 1.60m in width and 2m in height. It was built of pre-fabricated concrete panels, which self-linked together at the base, sides and roof, to form a rectangular concrete structure. It was accessed by an entrance at its north-western end, which linked to the interior of the ropery building or to the footpath (Mabbitt 2004).

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76 Throckley Middle School, Air Raid Shelter (HER 5478)

This World War Two air raid shelter was built to the north east of the late-nineteenth century school. Originally, there would have been a series of similar shelters on the northern edge of the school yard, but all the others have now been demolished. The shelter was a simple rectangular shape, with brick walls and a heavy concrete roof. The shelter is approximately 2.6m high, 6m long, and 3.5m wide, and is very similar in design to the communal brick and concrete surface shelters first authorised in August 1939, although public shelters were larger, being designed to hold 50 people. Like Anderson shelters, these brick and concrete constructions were not designed to withstand a direct hit from a bomb, since protecting them this heavily would have been prohibitively expensive. Instead, they were intended to offer protection against the secondary effects of bombs falling nearby, such as falling rubble and shrapnel. Although such shelters undoubtedly saved many lives, there were occasional tragedies caused by the lack of total bomb protection: when the Lodge Terrace shelter in Sunderland (of a similar brick and concrete construction to the one in Throckley) received a direct hit from a 250kg bomb, it collapsed, killing twelve and injuring ten more. The Throckley example has been converted into an electricity substation (Telford 2003).

Reproduced with permission from Pre-Construct Archaeology

77 Sunderland, Durham Road, Children's Centre, Air Raid Shelter (HER 5292)

There is a surviving semi subterranean air raid shelter in grounds of the Children's Centre on Durham Road. It is half built into an earthen bank.

Reproduced with permission from Colin Anderson

78 Sunderland, Galley Gill shelter (HER 7680)

This shelter was partially hit when the Farringdon Row/Ayres Quay Road area was bombed on 3rd March 1941. Thankfully the shelter was unoccupied (Ripley and Pears 1994-2006, N548).

Bomb Craters

Rare examples of surviving bomb craters are now the sole reminder of air raid attacks during the Battle of Britain. There is a crater in a field at Hag Hill between the A694 and the Derwent Walk. This bomb was dropped at 3.30am Double Summer Time, on Friday 1st May 1942. There were some 40 fatalities in the region that night and widespread damage. The crater is visible from the road. There are three craters in Chopwell Woods at NZ 129 572 and NZ 130 572. These bombs fell at 11.36pm BST on Sunday 12th October 1941. As there were no raids on the North-East that night, it is assumed that they were dumped by a plane returning from a raid elsewhere. The craters provide a unique wildlife habitat and the woods are protected by law as a Site of Nature Conservation Importance (SNCI). Information kindly provided by Brian Pears.

Reproduced with permission from Brian Pears

Infrastructure

A sound infrastructure is the basis of successful defence. During the War there were various levels of command, from the Cabinet War Rooms in Whitehall to local police stations doubling-up as ARP centres. Munitions and aircraft factories were extended. Supply depots were created and hundreds of camps were built - barracks for soldiers and secure camps for prisoners of war (English Heritage 2000).

79 Killingworth Anti-Aircraft Supply Depot (HER 1828)

This was an anti-aircraft and barrage balloon depot, one of two to serve the Tyne and Wear area, both of which survive. This one served Tyneside. The depot is inside a compound still owned by the Ministry of Defence, meaning that access to it is impossible. Near to the depot is a large area of flat, concrete slabs, possibly of wartime origin, which appear to have been used as a marshalling yard for the buildings in the compound.

80 Dinnington, Foxcover Woods, World War Two Camp (HER 4852)

A wartime camp used to be present in these woods. Today only the air raid shelters remain. The woods can only be reached by a private road, preventing public access to the site. The close proximity of the camp to Newcastle Airport (known during the war as RAF Woolsington) possibly implies some association.

81 Newcastle, Nuns Moor Park, Prisoner of War (POW) Camp (HER 5891)

A World War Two prisoner of war camp used to occupy the eastern half of Nuns Moor Park, situated on the green to the north of Studley Terrace. It can be seen on aerial photographs from 1944, and was used to house Italian prisoners who were deemed to require a very low level of security. Prisoners were let out to do menial work in the town, such as road sweeping. The camp appears to have been defended by trenches to the west, which can be clearly seen on 1947 aerial photographs. These were constructed in a zigzag pattern, which was the standard construction method throughout both World Wars. The camp was demolished in 1959. To the south of the camp there are a series of rectangular earthworks, each 16 x 10m, and up to 30cm deep. These could be another type of ditch, or could possibly be a platform for Nissen huts or similar temporary buildings. They can be seen under construction in 1946 aerial photos (RCHME 1995).

82 Newcastle, Nuns Moor Park, Nissen hut platforms (HER 5892)

At the southern edge of the POW camp (HER 5891) are four rectangular earthwork

Killingworth Supply Depot. Reproduced with permission from Colin Anderson

features, consisting of a series of conjoined ditches that form rectangles, measuring 16m x 10m up to 0.30m deep. The upcast of the ditch was used to create four raised platforms. The earthworks can be seen on the 1946 aerial photograph in process of construction, five in one row and four in another parallel row. They may have been another type of trench, or the footings for temporary buildings such as Nissen huts (RCHME 1995).

83 Newcastle, Castle Leazes, Nissen hut platforms (HER 5893)

A series of seven raised platforms dug parallel to one another along their long axis. They measure 20m x 7.7m with the ditches surrounding them measuring 1.8m wide and 0.3m deep. Two are subdivided along their long axis and have no ditch surrounding their shorter ends. There are another five raised platforms at NZ 2329 6484 (RCHME 1995).

84 East Boldon Anti- Aircraft Supply Depot (HER 1829)

This is the sister site of the anti-aircraft depot in Killingworth, and supplied Sunderland. Ruined buildings are still in-situ, but this is a private site so access is not possible.

85 West Boldon, Downhill Quarry, POW Camp (HER 5852)

In West Boldon was the site of a Second World War prisoner of war camp, although the precise location has not been identified. Nothing is visible on immediate post-war aerial photographs. Each POW camp was allocated an official number during World War Two within a prescribed numerical sequence, ranging from Camp 1 (Grizedale Hall, Ambleside) to Camp 1026 (Raynes Park, Wimbledon). The West Boldon camp was Camp 605. Not all of the sites were true Prisoner of War camps, many were hostels situated some distance away from the parent site or base camp. It is not known what category West Boldon Camp was. During the early part of the war there was no standard design of camp, but following the success of the 8th Army's North African Campaign against the Italian Army, during which a substantial number of prisoners were taken, many prisoners were eventually brought to Britain and held in purpose built 'standard' camps, many of which were built by the prisoners themselves (Thomas 2003).

86 High Spen, POW Camp (HER 7682)

This camp was situated on Rogues Lane between the drift mine and sewage site. It was known as "Squatter's Camp". No trace survives (information provided by Mr. P Smith).

East Boldon Supply Depot

THE COLD WAR

This period of confrontation between the United States and the Soviet Union, which lasted from 1946 to 1989, riddled the landscape with yet more structures built of earth, steel and concrete. The Cold War was marked by the use of new technology and complex machines. Radar stations (from 1950 “Rotor” radar stations helped operate the Air Defence Scheme) and anti-aircraft batteries were re-equipped. The Civil Defence Corps and Home Guard were re-established. New early warning systems included the “golfballs” at Fylingdales on the North York moors. The Royal Observer Corps now had underground monitoring posts. New weapon developments included rockets and nuclear arms. By 1958 the jet bombers of the V-force were in operation, carrying the first British atomic bomb “Blue Danube”. The first British guided weapons

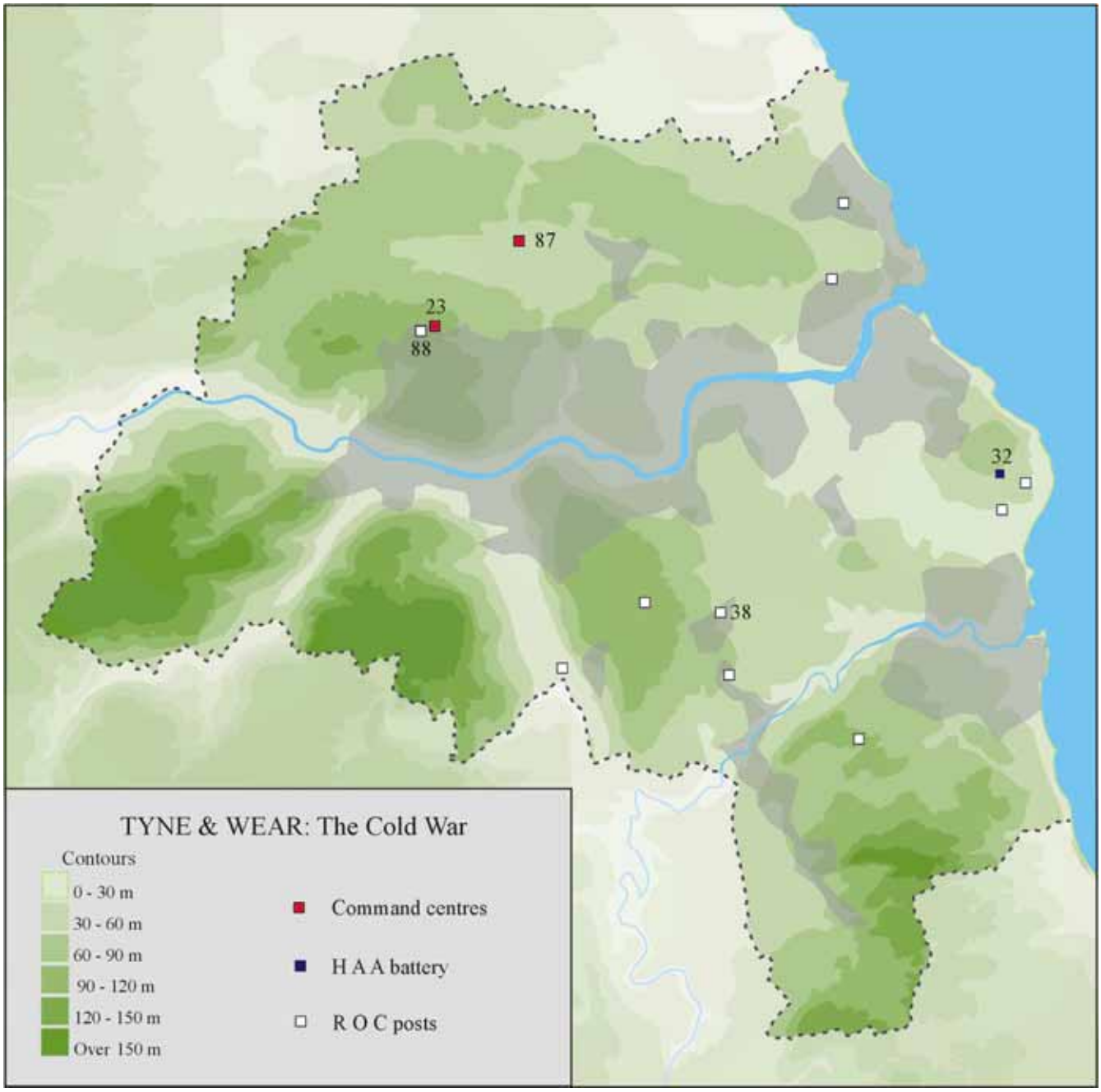

Figure 6

included the surface-to-air missile "Bloodhound" and the air-to-air missile "Firestreak". This was the era of Mutally Assured Destruction – the threat of a Soviet attack on the west was to be deterred by the threat of nuclear retaliation. By the 1970s new structures which could withstand nuclear, chemical or biological attack were required because Western policy now agreed that any Soviet threat would be met in kind. The best known structures of this period are the cruise missile shelters at Greenham Common, which are now protected as a Scheduled Ancient Monument (Cocroft 2003, 40-42).

23 Kenton Bunker (HER 5035)

The bunker remained in use into the Cold War, when it was designated as a Regional War Room. This meant that, in the event of a major conventional or even nuclear attack, the bunker would be used as a base from which to control civil defence in the region, and would maintain communications between regional and national government. However, the increasing proliferation of atomic weapons by the mid 1950s changed

Battery room

official thinking about future conflicts. It now seemed that, in the event of nuclear war with the Soviet Union, central government could disintegrate altogether. Therefore, a new command structure was created, centred around autonomous Regional Seats of Government, which would exercise complete control over their regions in the event of a major attack. Many Regional War Rooms were upgraded to become Seats of Government, but seemingly not Kenton Bar, as it appears to have been too small to accommodate all the extra staff necessary. However, the Regional War Rooms were not finally disbanded until 1968, and many artefacts have been found in the bunker dating from the late 1960s, including batteries dated as being serviced in 1968. This implies that Kenton Bar remained in use in some role even after Regional Seats of Government were established, although the exact date of closure of the bunker is unclear (Mabbitt 2003 and 2004).

32 Lizard Farm, Heavy Anti-Aircraft Site (HER 1795)

Lizard Farm was one of the very few anti-aircraft sites in the region to be retained into the Cold War, designed to defend against Soviet jets, and was controlled by the command post at Melton Park in Gosforth. When Britain's air defences were reorganised in 1950 under the Igloo system there was a proposal to mount advanced radar guided guns at this site, although nothing seems to have come of this. The site was eventually abandoned in or around

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1954. Many of the original gun emplacements are still in good condition, and can be seen both on the ground and on aerial photos (information provided by Roger JC Thomas).

87 Gosforth, Melton Park, Command Post (HER 5571)

A bomb-proof concrete structure was built in 1951 to replace the operations room in Low Gosforth House (which was demolished in the early 1970s). Melton Park was still the command centre for Lizard Farm Heavy Anti-Aircraft Battery well into the 1950s, which was the only anti-aircraft site in the area to be kept in operation during the Cold War.

From 1962 it has been in use as Northumberland County Record Office. The building is a vast strong-room, partially sunk into the ground and walled, roofed and floored in reinforced concrete. The large central room, where the operations table was located, was once surrounded by a viewing gallery, later used as an exhibitions space by the Record Office (Northumberland County Council 1969 and Cocroft 2003).

Royal Observer Corps Posts

In 1947 the Royal Observer Corps was reformed with a nuclear reporting role. These posts were intended to be manned during times of tension, to monitor the location and power of nuclear detonations and the progress of radioactive fallout, so that the population could be warned, and Civil Defence measures effectively managed. They operated in clusters of three posts linked by telephone and radio cables, meaning that readings could be triangulated independently from the peace-time telephone system. The posts were manned by observers. A bunk-bed and basic toilet facilities were provided. Food had to be prepared in the post. No air filtration system was installed. Half of the ROC posts, including Kenton, were abandoned after the 1968 defence cuts. Some however remained in use until 1991 when the ROC was finally disbanded (Lowry 1996, 127, Osborne 2004, 191-2).

35 Washington/Hastings Hill, Royal Observer Corps Post (HER 5881)

After the war, the ROC remained in existence, and in 1950 Operation Rotor was launched, a large-scale overhaul of Britain's air defence control and reporting. Although Rotor primarily concerned itself with the radar network, it also reorganised the ROC. In or before December 1952, the post moved back to its original position in Washington, but returned to Hastings Hill some time after 1952, when it was equipped with an Orlit post. These were concrete observation posts, with an open topped observation area,

attached to a roofed room for the crew. Some posts were raised up on stilts, but in this case it was built at ground level. It was equipped with the standard ROC Post Instrument. The Washington/Hastings Hill ROC post moved into an underground bunker some time in or before June 1959. It is last mentioned in records in 1968, when it was still operating, and in the same location (at Hastings Hill). It is hard to say with any certainty when the post finally closed, but it is thought probably to have gone out of operation in 1975. Sadly, it has now been completely demolished (Dobinson 2000, Wood 1992 and http://subbrit.org.uk).

88 Kenton, Royal Observer Corps Post (HER 7070)

This post was built in 1960. As with other Cold War examples, it was to be manned during times of tension and to monitor the location and power of nuclear detonations and the progress of radioactive fallout, in order that Civil Defence measures could be put in place. The posts were manned by three observers. The Kenton ROC post has been archaeologically recorded in advance of a residential development on the site. The entrance was via a concrete shaft 1m square, sealed with a counterweighted steel hatch. To the east of the entrance was a 55cm square mount for a warning siren, a ventilator with timber louvred shutters and two sensor masts. The interior was accessed by a ladder. The main room contained a table, a bunk bed and a cupboard and would have had a chemical toilet. Above the table was a mount for the bomb-power indicator and the telephone connections. The main room was only 4.5m by 2.26m, which would have meant quite cramped claustrophobic conditions for the observers (Mabbitt 2004).

Other Cold War ROC posts
Birtley (HER 5878)
Kenton (HER 7070)
Springwell (HER 5879)
Sunderland (HER 5882)
Tynemouth (HER 5885)
Washington (HER 5880-1 and 5883-4)
Whitley Bay (HER 5886)

Kenton ROC Post

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