Conservation Management

Concrete Sound Mirror, Cinque Ports Training Area
Hythe, Kent

Final Report

Ref: 59340.02

Wessex Archaeology

January 2006

CONCRETE SOUND MIRROR
CINQUE PORTS TRAINING AREA
HYTHE
KENT

Archaeological Recording

Final Report

Prepared for:
Landmarc Support Services Limited
CPTA ATE SE
Building No.23
Hythe Ranges
Dymchurch Road
Hythe
Kent
CT21 6QD

On behalf of :
Defence Estates
Environmental Support Team
Building 147 Westdown Camp
Tilshead
Wiltshire
TN3 4RS

By**:**
Conservation Management
Wessex Archaeology
Portway House
Old Sarum Park
Salisbury
Wiltshire
SP4 6EB

Reference: 59340.02

January 2006

© Wessex Archaeology Limited 2006 all rights reserved
Wessex Archaeology Limited is a Registered Charity No. 287786

Contents

FIGURES

Summary

Conservation Management, a specialist division of Wessex Archaeology, was commissioned by Landmarc Support Services Limited on behalf of Defence Estates to undertake archaeological recording of a sound mirror at Cinque Ports Training Area, Hythe, Kent, with a Study Area of a 1km radius centred on NGR 613621 134459. The aim of the work was to provide a baseline description and condition report of the sound mirror to aid future study and research.

The sound mirror was part of a site known as the Hythe Acoustic Research Station, set up in 1922 to develop early warning systems to defend against enemy aerial attack. The bowl shaped mirror is 30 feet (9.14m) in diameter and is of a unique design, being of an expanded metal mesh covered in concrete and supported by a steel frame. It formed part of a complex of six mirrors covering 18 miles (29km) of the Kent coast, giving warning of approaching aircraft by detecting their engine noise. Aerial photographs taken in the 1940s show that there was a complex of buildings and paths at the Hythe Acoustic Research Station, although the former had disappeared by 1966.

Sound mirrors were rendered obsolete by the advent of radar in the late 1930s. The sound mirror in question has since suffered from frost damage and vandalism. The cement and concrete face of the mirror has been compromised, allowing water ingress, which, in combination with the salts present in the concrete, rusts the metal substructure. The rust causes expansion and further breakdown of the concrete and cement layer.

An extensive photographic record was made of the sound mirror on 15th March 2005. The structure was also fully recorded using laser scanning equipment, and accurately located using a differential GPS.

Acknowledgements

The archaeological recording was commissioned by Landmarc Support Services Limited on behalf of Defence Estates, and Wessex Archaeology is grateful to Martin Brown of that organisation for his assistance. The co-operation of Colin Clark of Landmarc Support Services Limited was gratefully received. Thanks are also due to the staff of the National Monuments Record, Swindon, and to Stuart Cakebread, Sites and Monuments Officer for Kent County Council.

The aerial photographs were reproduced with kind permission from the National Monuments Record in Swindon.

The product was managed for Conservation Management by Paul Falcini MIFA. Charlotte Cutland carried out the documentary research. The laser scan survey was undertaken by Alistair Carty of Archaeoptics Ltd assisted by Doug Murphy, Survey Officer for Wessex Archaeology. The digital images were taken by Bob Davis AIFA. This report was compiled by Charlotte Cutland and the figures were prepared by Gareth Owen and Linda Coleman.

CONCRETE SOUND MIRROR
CINQUE PORTS TRAINING AREA
HYTHE
KENT

Archaeological Recording

Interim Report

1 INTRODUCTION

1.1 Project Background

1.1.1 Wessex Archaeology was commissioned by Landmarc Support Services Limited on behalf of Defence Estates to undertake archaeological recording of a sound mirror at Cinque Ports Training Area, Hythe, Kent, centred on Ordnance Survey National Grid Reference 613621 134459 (hereafter referred to as the Site) (**Figure 1**). The recording work is required to provide a baseline description and condition report of the sound mirror to aid future study and research.

1.2 The Site: Location, Topography and Geology

1.2.1 The sound mirror is located to the west of Hythe, Kent on cliffs known as The Roughs, within the Cinque Ports Training Area. To the south of the cliffs is the disused Royal Military Canal.

1.2.2 The sound mirror is situated at approximately 50m above Ordnance Datum (aOD) on steep cliffs (designated an area of landslip) between the Upper Chalk and Clay Marine Alluvium deposits (Geological Survey of England and Wales, Folkestone & Dover A Sheets 305 and 306, 1974).

1.3 Legislative and Planning Background

National

1.3.1 The principal legislation concerning protection of important archaeological sites comprises the *Ancient Monuments and Archaeological Areas Act* 1979 (as amended). Guidance on the identification and protection of historic buildings, conservation areas, historic parks and gardens and other elements of the historic environment is provided by *Planning Policy Guidance Note 15: Planning and the Historic Environment* (PPG 15) issued by the Department of the Environment in September 1994.

1.3.2 Guidance on the importance, management and safeguarding of the archaeological resource within the planning process is provided by *Planning Policy Guidance Note 16: Archaeology and Planning* (PPG 16) issued by the Department of the Environment in November 1990. The underlying principle of this guidance is that archaeological resources are non-renewable, stating that:

> *where nationally important archaeological remains, whether scheduled or not, are affected by proposed development there should be a presumption in favour of their physical preservation. (Para. 8).*

1.3.3 Paragraph 19 of PPG16 states:

> *In their own interests…prospective developers should in all cases include as part of the research into the development of a site…an initial assessment of whether the site is known or likely to contain archaeological remains.*

1.3.4 Paragraph 22 adds:

> *Local Planning Authorities can expect developers to provide the results of such assessments …as part of their application for sites where there is good reason to believe there are remains of archaeological importance.*

1.3.5 Under the *Hedgerow Regulations* 1997, hedgerows are deemed to be *Important* if they are documented to be of pre-enclosure date, which for the purposes of the *Regulations*, is currently taken (by case law precedent) to mean pre-1845 (the earliest *Act of Enclosure* recorded in the *Small Titles Act* of 1896). Decisions regarding consent or denial for the removal of *Important* hedgerows, or significant parts thereof, is granted by local planning authorities in response to an application.

1.3.6 Although originally framed to identify and preserve pre-enclosure landscapes and boundaries, the established date of 1845 actually post-dates the great majority of parish tithe maps, which in themselves often document fully or predominantly enclosed landscapes. It is therefore possible for hedgerows to be deemed *Important* under the *Hedgerow Regulations* 1997 if they can be demonstrated to exist on the appropriate pre-1845 parish tithe map.

Local

1.3.7 The Shepway Local Plan includes a policy particularly relevant to archaeology:

> *Policy BE7: Planning permission and Listed Building Consent will be refused for schemes which would damage or destroy Scheduled Ancient Monuments or other nationally important archaeological sites or their settings.*
>
> *In respect of proposed developments which are near or on sites thought to contain archaeological remains, applicants for planning permission or Listed Building Consent should submit assessments of the archaeological importance of the site and of the impact of the development on archaeological interests.*

If a proposal would an archaeological site or its setting, in situ preservation will be the preferred solution.

Where development proposals are permitted and in situ preservation of remains would be inappropriate, provision should be made for the excavation and recording of remains. This will be achieved by agreements and/or conditions.

2 METHODOLOGY

2.1 Introduction

2.1.1 This report provides a broad historical discussion of the Site derived from the sources described briefly below. A gazetteer of archaeological sites and findspots from a wider Study Area extending for 1km around the Site (**Figure 1**) is given in **Appendix 1**.

2.1.2 This study has been undertaken in line with best practice, as described in *Management of Archaeological Projects* (English Heritage 1991), and the Institute of Field Archaeologists' *Standard and Guidance for Archaeological Desk-based Assessment* (IFA 1999).

2.2 Sites and Monuments Record

2.2.1 The Kent Sites and Monuments Record (KSMR) is compiled and maintained by Kent County Council at Invicta House, County Hall, Maidstone. The KSMR is a continually updated database of all known archaeological and historical sites and findspots, etc. within Kent.

2.2.2 The KSMR was searched for all information regarding the Study Area. The result of this search is tabulated in **Appendix 1**.

2.2.3 The KSMR data consists of secondary information derived from varied sources. None has been directly examined for the purposes of this study. The assumption is made that this data, as well as that derived from other secondary sources, is reasonably accurate.

2.3 National Monuments Record

2.3.1 The National Monuments Record (NMR) at Swindon is funded and maintained by English Heritage. It is the principal national repository for archaeological and historic environment data, holding descriptive and interpretative information on over 250,000 known archaeological sites in England. The archives of the NMR were searched for data pertaining to the Study Area (NMR Search Reference AR/AP 76338), producing information on eight monuments (see **Appendix 1**).

2.3.2 The NMR also houses the largest reference collection of aerial photographs in England. These collections were consulted for relevant coverage of the Study Area (NMR Search Reference AP 76338), producing 9 photographs from the specialist oblique collection, 12 from the military oblique collection and 56 vertical photographs. The prints were viewed on 5th April 2005. The full list of photographs consulted is listed in **Appendix 2**.

2.4 Statutory and Non-Statutory Designations

Scheduled Monuments

2.4.1 Two sites within the Study Area are afforded statutory protection as Scheduled Monuments (see **Appendix 1**).

Listed Buildings

2.4.2 There are four Listed Buildings within the Study Area (see **Appendix 1**).

Register of Parks and Gardens of Special Historic Interest

2.4.3 There are no Parks or Gardens of Special Historic Interest (as identified by English Heritage) listed within the Site or Study Area.

Register of Historic Battlefields

2.4.4 The English Heritage *Register of Historic Battlefields* was consulted; no historic battlefields are located within the Site or the Study Area.

2.5 Site Visits and Recording

2.5.1 A site visit was made on 15th March 2005.

2.5.2 A full photographic survey of the survey was completed with 105 digital images taken. The photographic record illustrates both the detail and the general context of the Site as a whole. All digital images are currently stored at Wessex Archaeology's Head Office in Salisbury in the Site archive.

2.5.3 A full three-dimensional survey of the sound mirror was achieved using a Trimble Mensi GS200 laser scanner which was undertaken by Archaeoptics Limited. The laser scanner was located using two Leica GX 1230 Geodetic GPS Dual Frequency RTK receivers.

2.5.4 Three spheres, each mounted on a tribrach attached to a survey tripod, were scanned and used to register the laser scans. The spheres were removed and a GPS Antenna and carrier was mounted in its place and located using the Rover in RTK mode logging 100 seconds of readings to give an average coordinate.

2.5.5 Several hours of static observation data were logged using the GPS Base Station. These data were post-processed with the Ordnance Survey (OS) active GPS network RINEX data using Leica Geo Office to give an accurate ETRS89 fix for the location of the GPS Base Station and therefore the spheres located with RTK Rover. All ETRS89 coordinates from both Reference and Rover were then converted to National Grid coordinates and

Newlyn height coordinates using precise OS transformations in Leica Geo Office.

2.5.6 Elevations and cross-sections were taken from the laser scan data using AutoCAD 2004 software and are represented at the end of this report in **Figures 2 and 3**.

3 RESULTS

3.1 Introduction

3.1.1 This section provides a narrative of the Site's land-use and development. Although some of the features have not been formally dated, where possible provisional dates have been assigned to aid in the presentation of the results.

3.1.2 The results from the searches in the KSMR and NMR are presented in **Appendix 1**. All these known archaeological and historic sites and areas, artefact findspots, etc. have been assigned a series of unique numbers (Wessex Archaeology or WA numbers).

3.2 Historical Background

3.2.1 In a prominent position overlooking the English Channel, Hythe has had a long association with defensive works of various kinds. As one of the medieval Cinque Ports, the town was required by the Crown to provide ships and men to defend the country against invasion. In the Napoleonic era (*c.*1789 - 1815) fortifications were built at Hythe by the Royal Engineers, and between 1805 and 1809 the Royal Military Canal was constructed through the town. The Canal was part of defensive system which included coastal guns mounted in a chain of Martello Towers. Barracks in Hythe housed the School of Musketry, later the Small Arms School, and associated firing ranges were established on the coast (Scarth 1999, 69). The British Army maintained their presence in the town until the 1960s, and the Cinque Ports Training Area - part of the Army Training Estate - occupies land between Hythe and Dymchurch to the west.

3.3 Early Acoustic Detection

3.3.1 Before the First World War, Britain's first line of defence was the naval fleet and coastal gun batteries. From about 1910, defence planners became increasingly aware of the threat from the air, and anti-aircraft guns were installed around London, Portsmouth, Barrow and the Tyne in spring 1914, just before the outbreak of war. In January 1915 the first German Zeppelin raids began over Britain, and the anti-aircraft defences were extended, fighter aircraft interception techniques were refined, and the need for an early warning system was identified (Dobinson 2000, 8). Acoustic detection – long-distance listening for approaching aircraft – was the perceived solution.

3.3.2 Early British experiments in acoustic detection were carried out at the Royal Aircraft Factory (later the Royal Aircraft Establishment) at Farnborough in the summer of 1915. The tests used parabolic concrete sound reflectors with stethoscopes to listen to the sounds concentrated at the focal point. Results showed that the larger 'sound mirrors' were most successful, being able to detect an approaching aircraft at a range twice normal earshot (Dobinson 2000, 9). Reflectors of a diameter between 20 – 30 feet were recommended.

3.3.3 The positions needed for the reflectors were also refined during the early experiments:

> *'The position chosen for a reflector should be the flat top of a low hill since such a position is fairly free from local sounds. An absence of trees is also an advantage since the rustling of the leaves interferes with the hearing.*
>
> *If mounted near the coast, say on cliffs, the reflector should be kept back say two or three hundred yards from the edge of the cliffs so as to eliminate the noise of the waves.'*

3.3.4 Development of the sound mirrors proceeded throughout WWI and into the 1920s at several locations from Sunderland down to Portsmouth, but the science of sound detection remained rudimentary (Dobinson 2000,13).

3.3.5 In the inter-war period, RAF Biggin Hill was home to the Royal Aircraft Establishment Instrument Design Section, which, alongside the Acoustics Section of the Signals Experimental Establishment, developed a system of horizontal 'sound discs' to track aircraft over land, once they had passed the coastal sound mirrors (Dobinson 2000,14).

3.3.6 In the early 1920s, expansion of the RAF's air defence arm was authorised, and the orientation of these new developments was towards the perceived potential enemy, France. Acoustic research work shifted towards the south coast (Dobinson 2000,14). By late 1922 a new Acoustic Research Station was in the process of being established at The Roughs, Hythe.

3.4 Hythe Acoustic Research Station

3.4.1 The Hythe Acoustic Research Station (ARS) was to consist of several single storey huts arranged on the hillside at The Roughs, with associated access paths, a small complex of buildings on the hill top, and a perimeter fence, all of which are visible in aerial photographs of the 1940s.

3.4.2 One of the reasons for establishing the ARS at Hythe was Lympne aerodrome, just north of the Site, on the top of the escarpment. The airfield was frequently used as a turning point for commercial aircraft setting course across the Channel for France, and was also used by military aircraft: *'for this reason, the Hythe Acoustical Station occupies its present position, and*

the axis of the mirror is made parallel to the main air route' (Scarth 1999, 73).

3.4.3 A report of December 1922 states that '*the 20 foot [diameter] concrete mirror and the living quarter for Mr Player [the site caretaker] are nearing completion, while one laboratory in the hut next to the mirror has been finished…*'. This sound mirror was a vertical block of concrete with the mirror bowl hollowed out of the front face.

3.4.4 A Signals Experimental Establishment report of 28 February 1923 describes the construction of the first sound mirror (Scarth 1999, 72):

> *'The mirror was built up against a steep bank… It consists of concrete with an umbrella shaped reinforcement of iron rod. Great care was taken to face the mirror with a smooth cement surface. The listener is accommodated on a platform about six feet above the ground, and the sound reaches his ears by means of stethoscopes.'*

The face of the mirror was covered with a grid indicating the altitude and bearing of the source of the sound, which was detected through a sound collecting trumpet and stethoscope. Later, electrical microphones were employed in listening experiments (Scarth 1999, 73). The mirror and concrete pillar which supported the listening platform survived until the 1980s, when a landslip caused the mirror to fall onto its face, burying the pillar below it.

3.4.5 The success of the Hythe 20 foot mirror led to proposals for a chain of them along the coast. In 1928, two additional mirrors were built at a cost of approximately £650 each (including a corrugated iron hut and enclosure fencing) at Abbot's Cliff (to the east of Hythe) and at Denge (to the south west) (Scarth 1999, 75). These three mirrors (and additions made to the sites) became known as the Hythe system.

3.4.6 Trials of the two new mirrors took place in the summer of 1928, and although the results were not outstanding, plans for two new 30 foot mirrors and a 200 foot strip mirror went ahead (Dobinson 2000, 17).

3.4.7 The 30 foot mirror at Hythe was completed in August 1929 to a new, more deeply dished 'bowl' design, rendering the original 20 foot mirror obsolete (**Figures 5 - 8**). The new mirror was situated in open ground, and its high visibility from the air was noted by a Royal Engineers report of 1932, which recommended it be colour washed to better camouflage it (Scarth 1999, 165).

3.4.8 Uniquely, the 30 foot mirror at Hythe is made of an expanded metal mesh covered in concrete with a cement face, supported by a steel frame (**Figures 5 – 7**); the other 30 foot bowl mirror at Denge is of thick reinforced concrete with buttresses, while the WWI mirrors and original three Hythe system mirrors are of a vertical slab design. The 30 foot mirrors gave a larger field of operation, covering a horizontal angle of 120 degrees, rather than the 80 – 100 degrees taken in by earlier types. The elevated axis of the dish also

meant more coverage in the vertical plane, while the deeper dish afforded the listening equipment more protection from wind and other noises (Scarth 1999, 169).

3.4.9 The sound collector was located at the focal point of the mirror on the end of a horizontal arm, which in turn connected to a vertical column, which passed down through the bottom of the mirror to the listening chamber below. The rusty remains of the lower part of the sound collector survive.

3.4.10 Unlike the earlier sound mirrors, the 'listener' was protected from external noise by working inside a chamber. A steering wheel and pedals allowed the listener to control the position of the trumpet arm on the face of the mirror, readings relating to the loudness of the sounds were made, and the corresponding bearings passed to the control room by telephone (Scarth 1999, 169). The steps down to the chamber are still visible, although the lower portion of the mirror above is collapsing into it.

3.4.11 All four sound mirrors in the Hythe system (Hythe 30 foot, Abbot's Cliff 20 foot, Denge 30 foot and 200 foot) were controlled from the ARS at Hythe, and in total covered a 16 mile stretch of coastline. A control room was situated in one of the buildings near the old 20 foot mirror, while other buildings contained workshops and laboratories. There was also an electricity generator (Scarth 1999, 237). Concrete blocks adjacent to the site of the 20 foot mirror may be remnants of the buildings, or could be mountings for specialist experimental equipment (Scarth 1999, 238). Apart from the original account of a living quarter for the caretaker (see para 3.4.3), there does not appear to have been any domestic accommodation at the Site, the staff involved living in the surrounding neighbourhood (Scarth 1999, 237). A bunker just to the south east of the 30 foot mirror is thought to be a relic of WWII (Scarth 1999, 162).

3.4.12 Testing and experiments at the Hythe system continued, with steadily improving results (Dobinson 2000, 19), but time was running out. Plans to extend the system across the coastline from Swanage to the Wash were shelved in favour of six more mirrors as an 'extended experiment' in the Thames Estuary (Dobinson 2000, 18).

3.4.13 Development pressures in the area proposed for the Thames system scuppered the provisional plans; eight weeks after a site at Clacton was identified, suburban growth and the associated noise of roads and people had rendered the site too noisy for the sound mirrors to operate (Dobinson 2000, 19). Rapid development was also encroaching into the listening abilities of the Hythe system. A 1932 report (Scarth 1999, 163) stated that although the Hythe 30 foot mirror was sheltered from the wind, it *'suffered from continuous noises from the town of Hythe to the east, and from the Hythe to New Romney road'*.

3.4.14 By 1936 the Air Ministry was questioning the necessity of sound mirrors at all: *'the view prevailing at the moment…is that such mirrors will form no part of the air defence scheme'* (Scarth 1999, 234). The development of radar was progressing well, and new, faster aircraft caused severe difficulties for

acoustic detection, as the aircraft was already in sight by the time it had been detected acoustically. A number of specialists in the field of acoustic detection transferred to work on radar (Scarth 1999, 238).

3.4.15 In May 1939 a letter from the Royal Engineers Board to the Air Defence Experimental Establishment stated *'it is now as good as settled that the Hythe – Denge sound mirror system should be wound up'* (Scarth 1999, 246). On the brink of WWII, the sound mirror system was finally abandoned.

3.4.16 Aerial photographs of 1946 and 1966 show that between these dates the site was dismantled, with only two building and the two sound mirrors remaining by 1966. Remains of the access tracks and paths, and concrete structures possibly related to the laboratories or experiments survive on the site, along with the base for the 20 foot mirror, and the substantial but decaying 30 foot mirror.

4 CONCLUSIONS

4.1.1 The Acoustic Research Station at Hythe was the centre of an innovative programme of development for the defence of Britain from aerial attack. In 1922, following acoustic detection experiments in the WWI and inter-war periods, research work shifted towards the south coast, and the purpose-built ARS was established at Hythe.

4.1.2 The success of the initial research at Hythe led to the construction of the 30 foot sound mirror in August 1929. The 30 foot mirror was of a new and unique design, of expanded metal covered in concrete, supported on a steel frame and with an integrated underground listening chamber. The greater size of the mirror and its tilted angle meant that it could collect sounds from a larger field than previous designs. The deep bowl shape also protected the listening equipment from interference.

4.1.3 While the sound mirror became obsolete in 1939, the developments which took place whilst using the equipment and those of the greater Hythe system, made an important contribution to early warning coastal defence. Many of the techniques of control and reporting developed at Hythe were taken on to the new radar technology.

4.1.4 The 30 foot (9.15m) mirror at Hythe is an important survival, even though it is just a remnant of what actually took place on the site. It forms part of a complex with the sound mirrors at Denge and Abbots' Cliff, and was, quite literally, at the centre of acoustic research in the 1920s and 1930s.

4.1.5 Unfortunately the sound mirror is now in a state of severe decline, suffering from frost damage and vandalism. The cement and concrete face of the mirror has been compromised, allowing water ingress, which in turn rusts the metal substructure (**Figure 7**). The rust then causes expansion and further breakdown of the concrete and cement layer.

BIBLIOGRAPHY

Dobinson, C.S., 2000. *Twentieth Century Fortifications in England, Volume II 1: Acoustics & Radar.* York: Council for British Archaeology

Dobinson, C.S., 2001. *AA Command: Britain's Anti-Aircraft Defences of the Second World War.* London: Methuen

Scarth, R.N., 1995. *Mirrors by the sea: an account of the Hythe Sound Mirror System based on contemporary letters and reports.* Hythe Civic Society

Scarth, R.N., 1999. *Echoes from the sky: a story of acoustic defence.* Hythe Civic Society

APPENDIX 1: GAZETTEER OF ARCHAEOLOGICAL SITES

WA No.	SMR/NMR No.	Period	NGR		Description
1	**SMR:** TR13SW48 KE 15955	Prehistoric, Roman and medieval	613900	134400	Prehistoric, Roman and medieval pottery collected from the Roughs above Burmarsh Road, Hythe, 'close to WW2 structures'. No details given of type, dates or exact location. Source also refers to 'possible banks', perhaps earthworks.
2	**NMR:** Linear 348	Roman			Roman road running from Maidstone to Dover via Lympne
3	**SMR:** TR13SW35 KE 15956	Medieval	613500	134200	Situated on ridge overlooking Military Canal 'Saxo-Norman' and medieval pottery, animal bone and tile finds along with possible 'surface indications of house platforms'
4	**SMR:** TR13SW9 KE4328 **NMR:** TR13 SW9 **Scheduled Monument** KE147 **Grade II Listed**	Medieval	612760	134260	Remains of St Mary's church - mainly C14th Norman details C12th Nave, lengthened in C14th. Built of rubble with stone dressings. Pointed arched doorway. Burned down in 1620
5	**SMR:** TQ92NW18 KE 17366 **NMR:** Linear 38 **Scheduled Monument** KE 396	Post-medieval			Royal Military Canal: Disused defensive canal built during the Napoleonic Wars though tolls were charged for civilian traffic along the road and commercial barges charged by the load. The canal was sold off in sections in the late C19th, but was taken over by the military in both WW1 and WW2. In both wars gun emplacements were sighted in virtually the same places as the original eighteen pound cannon sites.
6	**SMR:** TR13SW43 KE 17370 **Grade II Listed**	Post-medieval	612960	134670	Grade II Listed C18th Headstone, Church of St. Stephen, Castle Close, Lympne Castle. Monument to Cathrin Knatchbull and son.
7	**SMR:** TR13NW58 KE 17378 **Grade II Listed**	Post-medieval	614104	135214	Grade II Listed Building: Pedlinge Court, C18th with possible Medieval core
8	**SMR:** TR13NW59 KE17379 **Grade II Listed**	Post-medieval	614047	135205	Grade II Listed Building: Pedlinge Court Cottage, late C16th or early C17th. Timber-framed.
9	**SMR:** TR13SW22 KE4341 **NMR:** TR13 SW22	Post-medieval	614100	134000	Fort Moncrieff Battery 1798 – a self contained triangular fort. Undermined by the sea by 1870 and washed away.

WA No.	SMR/NMR No.	Period	NGR		Description
10	**SMR:** TR13NW72 KE18300	Modern	614420	135023	Aircraft disposal pen, Lympne airfield. Overgrown remains of aircraft dispersal pen located close to main road. Unclear what the state of preservation is. From aerial photographs it is close to the remains of a second pen
11	**SMR:** TR12SW19 KE4338 **NMR:** TR13SW19	Modern	613820	134430	Anti aircraft detection installation – Hythe Acoustical Research Station opened 1922
12	**NMR:** Linear 820	Modern			Hythe & Dymchurch Light Railway –opened in 1927, extended in 1929.
13	**SMR:** TR13SW44 KE17381	Undated	612900	134800	Possible enclosure and ditches found during Geophysical survey. Roman finds have been reported from this field.
14	**NMR:** TR13 SW36	Undated	613660	134880	Small circular feature, probably a ring ditch, plus associated linear boundaries, identified in air photographs taken July 16 2001.

APPENDIX 2: AERIAL PHOTOGRAPHS CONSULTED

Specialist prints

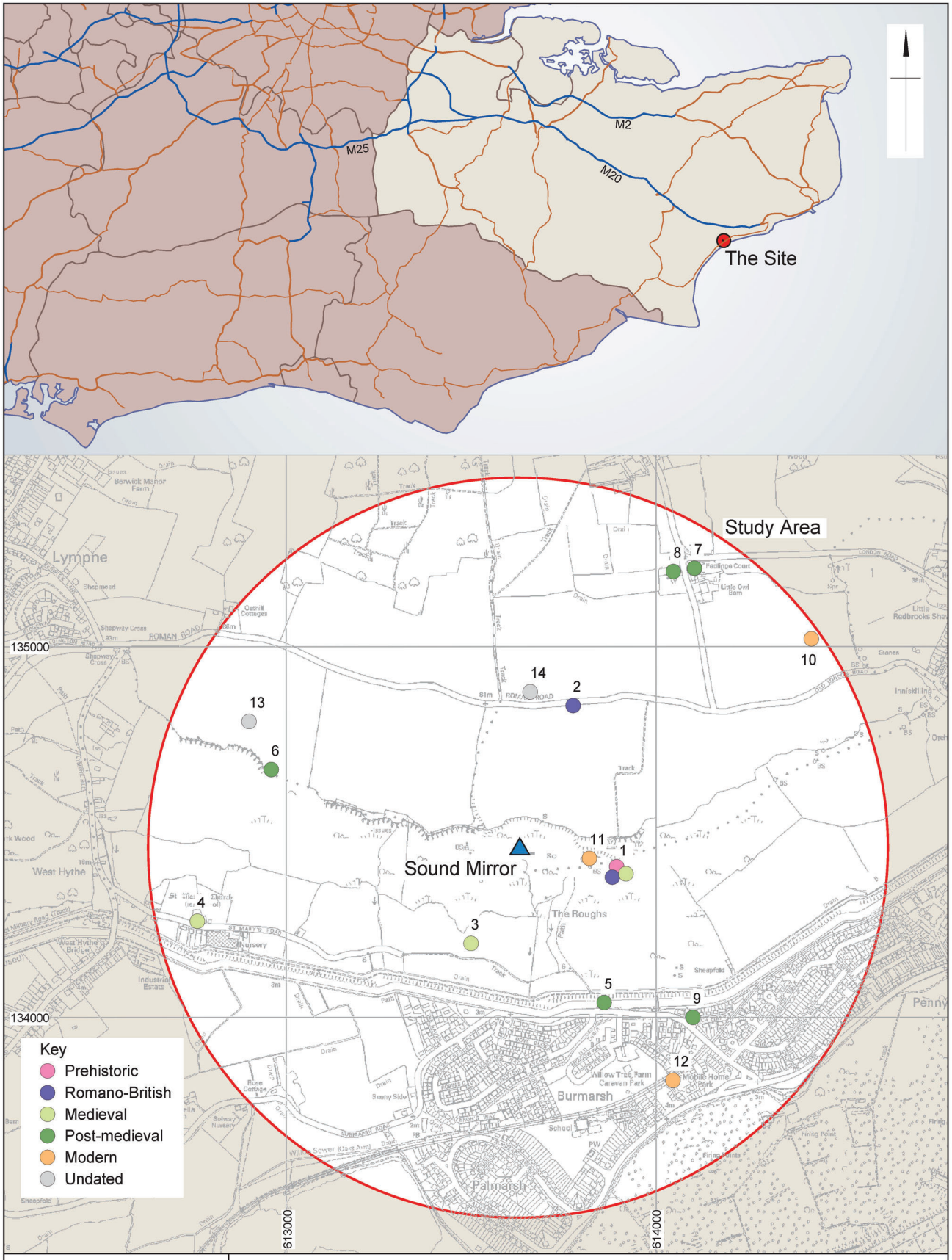
NGR Index Number	Frame
TR1234/1	27-28
TR1234/2	29
TR1334/3	07
TR1334/4	08
TR1334/5	09
TR1334/6	23
TR1334/7	24
TR1335/1	21
TR1335/2	22

Military Oblique prints

NGR Index Number	Frame
TR1434/1	PO-04583
TR1434/2	PO-04584
TR1334/1	PO-04585
TR1334/2	PO-04586
TR1434/3	PO-04588
TR1434/4	PO-04589
TR1434/5	PO-04590
TR1434/6	PO-04591
TR1434/7	PO-04592
TR1434/8	PO-04593
TR1434/9	PO-04594
TR1234/3	PO-24

Vertical prints

Sortie number	Start frame	End frame
RAF/106G/UK/1112	3099	3101
RAF/106G/UK1449	3345	3346
RAF/106G/UK/1449	4344	4346
RAF/106G/UK/1443	3460	3462
RAF/CPE/UK/1829	3015	3017
RAF/82/1006	45	47
RAF/58/2942	19	20
RAF/58/2778	115	117
RAF/58/2778	115	117
RAF/58/7170	29	31
HSL/UK/72/74	4176	4176
RAF/106G/UK/1376	5248	5250
RAF/106G/UK/541	3069	3070
RAF/106G/UK/448	2035	2036
US/7PH/GP/LOC286	6001	5002
MAL/79020	175	175
MAL/79030	211	211
MAL/79030	212	212
MAL/79030	213	213
RAF/HLA/568	6030	6030
OS/71153	396	399
OS/71153	402	404
OS/69435	25	28
MAL/80022	102	102



Reproduced from the 1997 Ordnance Survey 1:25 000 Explorer ® map with the permission of the controller of Her Majesty's Stationary Office © Crown copyright, Wessex Archaeology, Portway House, Old Sarum Park, Salisbury, Wiltshire. SP4 6EB. Licence Number:AL 100006861.
Digital Map Data © (2005) XYZ Digital Map Company
This material is for client report only © Wessex Archaeology. No unauthorised reproduction.

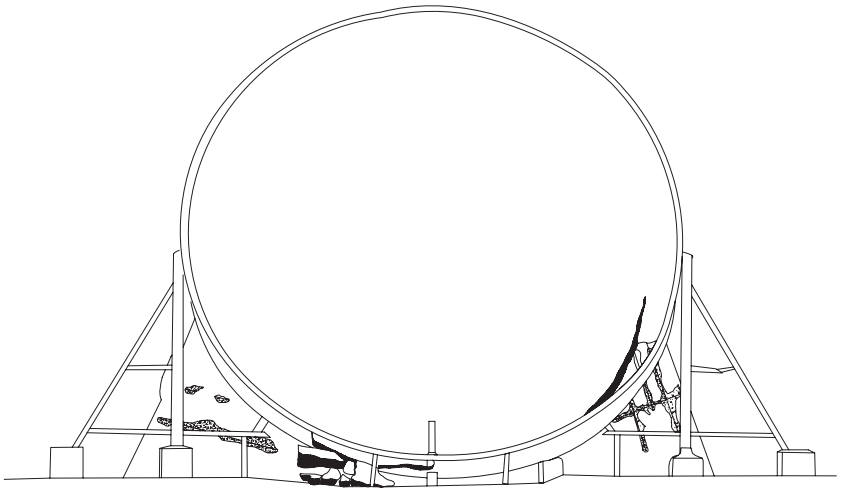
Conservation Management

Wessex Archaeology

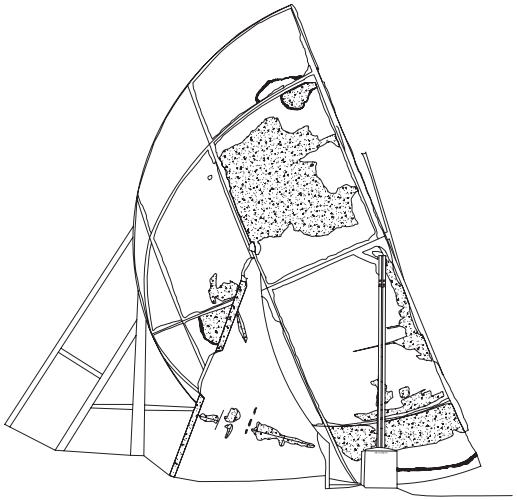
Date:	20/10/05	Revision Number:	0
Scale:	1:15 000 @ A4	Illustrator:	LJC
Path:	X:\PROJECTS\59340\Drawing Office\Report Figures\Archae Recording\05_10_20\set up.dwg		

Location plan showing SMR data

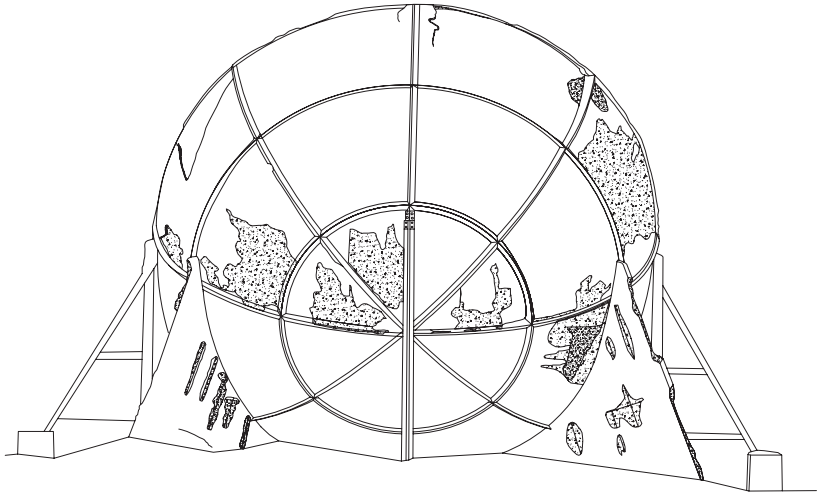
Figure 1



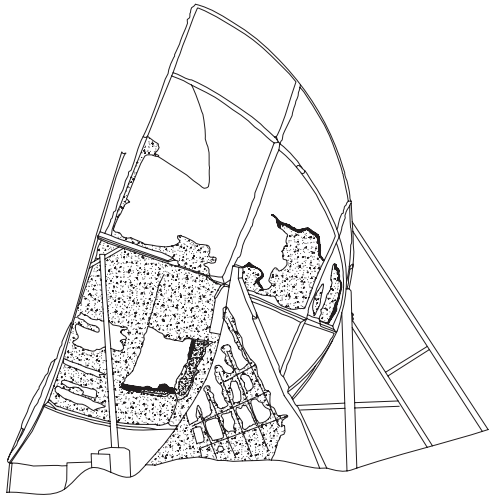
Front Elevation, South Facing)



Right Elevation, (West Facing)



Rear Elevation, (North Facing)



Left Elevation, (East Facing)

Conservation Management

Wessex Archaeology

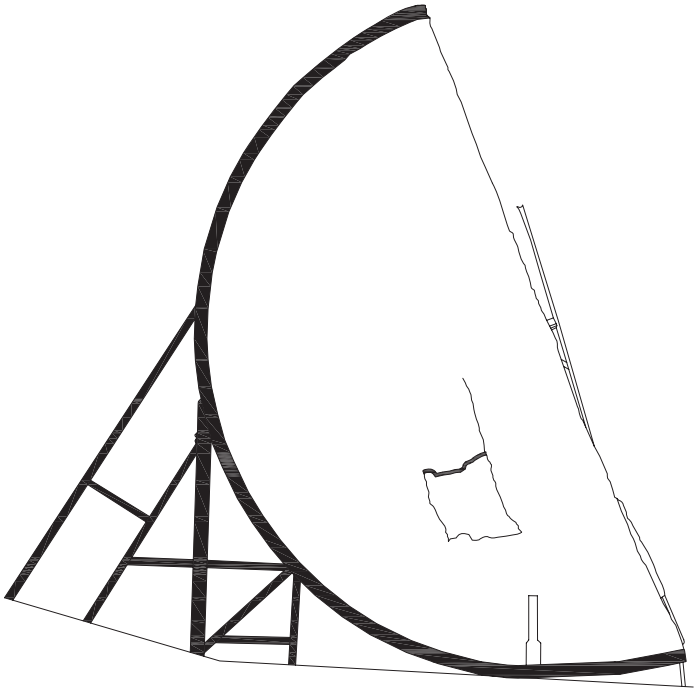
Do not scale from this drawing
This material is for client report only © Wessex Archaeology.
No unauthorised reproduction.

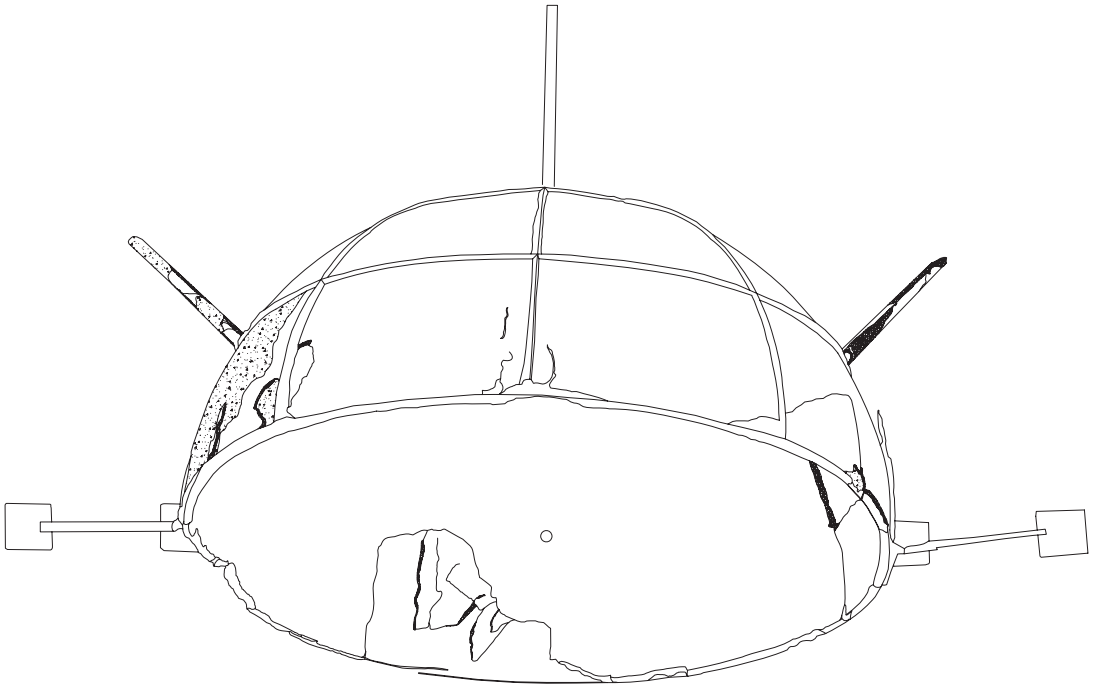
Revision Number:	1
Illustrator:	GDO
Date:	11/01/06
Scale:	1:100
Path:	X:\PROJECTS\59340\D...O..\

Rep..s \Archae Recording\05_10_20\SoundM Views.dwg

Sound Mirror elevation drawings

Figure 2





Conservation Management

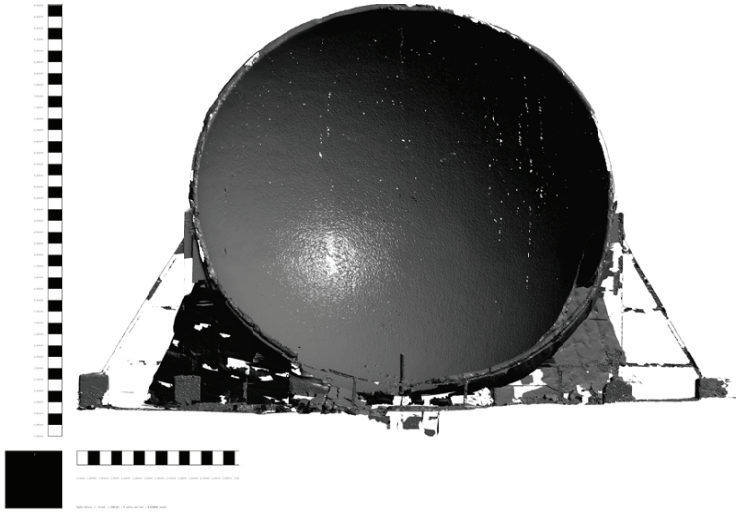
Wessex Archaeology

This material is for client report only © Wessex Archaeology. No unauthorised reproduction.

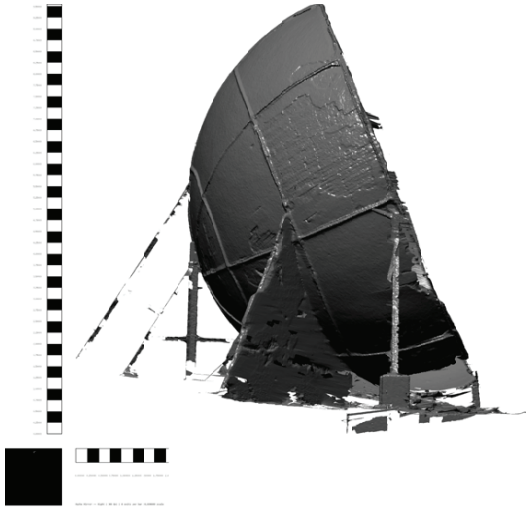
Date:	11/01/06	Revision Number:	1	Checked by:	MJR
Scale:	1:100	Drawn by:	GDO		
Path:	X:\PROJECTS\59340\Drawing Office\Report Figures\Archae Recording\05_10_20\SM Xsec_Lasers.dwg				

Cross section and plan view of Hythe Sound Mirror

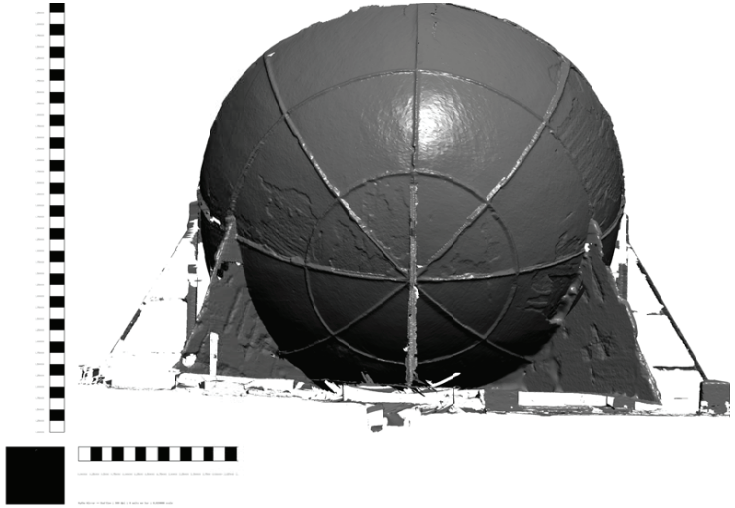
Figure 3



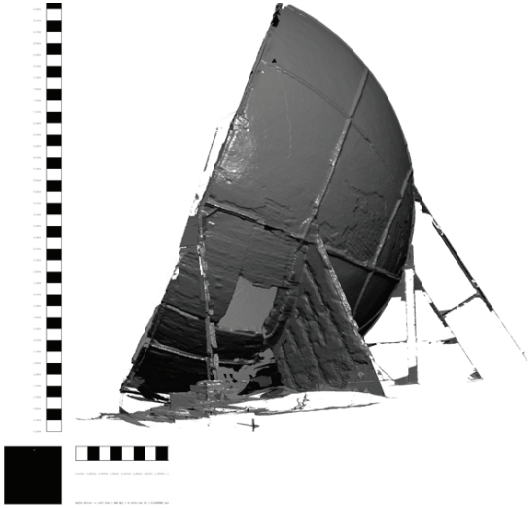
Front Elevation, (South Facing)



Right Elevation, (West Facing)



Rear Elevation, (North Facing)



Left Elevation, (East Facing)

Conservation Management

Wessex Archaeology

This material is for client report only © Wessex Archaeology.
No unauthorised reproduction.

Revision Number:	0
Illustrator:	GDO
Date:	19/10/05
Scale:	Not to scale
Path:	X:\PROJECTS\59340\D..O..\

Rep Figs\Archae Recording\05_10_20\SM Xsec_Lasers.dwg

Laser scanning detail of Sound Mirror

Figure 4

Front Elevation, (South Facing)

Right Elevation, (West Facing)

Rear Elevation, (North Facing)

Left Elevation, (East Facing)

Conservation Management

Wessex Archaeology

This material is for client report only © Wessex Archaeology.
No unauthorised reproduction.

Revision Number:	0
Illustrator:	MJR
Date:	19/0/05
Scale:	Not to scale
Path:	X:\PROJECTS\59340\D...O..\

Rep Figs\Archae Recording\05_10_20\SM photos.dwg

Photographs showing the Hythe Sound Mirror elevations

Figure 5

View from NW with Hythe in the background

View from the SE with associated bunker/listening post

View of inside of Sound Mirror showing damage and decay

View of Sound Mirror from the SW

Conservation Management

Wessex Archaeology

This material is for client report only © Wessex Archaeology.
No unauthorised reproduction.

Revision Number:	0
Illustrator:	MJR
Date:	19/0/05
Scale:	Not to scale
Path:	X:\PROJECTS\59340\D...O..\

Rep Figs\Archae Recording\05_10_20\SM photos.dwg

Photographs showing the Hythe Sound Mirror in its setting

Figure 6

View of base of Sound Mirror from W

View of internal iron mesh of Sound Mirror from W

View of of internal iron mesh of Sound Mirror at base of E side

View of service pit at base of Sound mirror

Conservation Management

Wessex Archaeology

This material is for client report only © Wessex Archaeology.
No unauthorised reproduction.

Revision Number:	0
Illustrator:	MJR
Date:	19/0/05
Scale:	Not to scale
Path:	X:\PROJECTS\59340\D...O..\

Rep Figs\Archae Recording\05_10_20\SM photos.dwg

Photographs of structural details of Hythe Sound Mirror

Figure 7

© English Heritage (NMR Ref: MSO 31107, PO-04585)

© English Heritage (NMR Ref: MSO 31107, PO-04588)

Aerial photographs of Hythe Research Station showing position of Sound Mirror and associated buildings in June 1941

Figure 8

Conservation Management

Wessex Archaeology

This material is for client report only © Wessex Archaeology.
No unauthorised reproduction.

Revision Number:	0
Illustrator:	LJC
Date:	19/0/05
Scale:	Not to scale
Path:	X:\PROJECTS\59340\D...O..\

Rep Figs\Archae Recording\05_10_20\SM photos.dwg

WESSEX ARCHAEOLOGY LTD.
Head Office: Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB.
Tel: 01722 326867 Fax: 01722 337562 info@wessexarch.co.uk www.wessexarch.co.uk
London Office: Unit 701, The Chandlery, 50 Westminster Bridge Road, London SE1 7QY.
Tel: 020 7953 7494 Fax: 020 7953 7499 london-info@wessexarch.co.uk www.wessexarch.co.uk

Registered Charity No. 287786. A company with limited liability registered in England No. 1712772.