

**PEMBREY BURROWS SEA BUCKTHORN
REMOVAL, CARMARTHENSHIRE
ARCHAEOLOGICAL WATCHING BRIEF
SN 38260 01859**



Prepared by DAT Archaeological Services
For: Natural Resources Wales



DYFED ARCHAEOLOGICAL TRUST

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**PEMBREY BURROWS SEA BUCKTHORN REMOVAL
ARCHAEOLOGICAL WATCHING BRIEF
SN3826001859**

By

Menna Bell

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ARCHAEOLOGICAL WATCHING BRIEF**

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Report No	2021/18
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ARCHAEOLOGICAL WATCHING BRIEF**

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**PEMBREY BURROWS SEA BUCKTHORN REMOVAL
ARCHAEOLOGICAL WATCHING BRIEF****EXECUTIVE SUMMARY**

DAT Archaeological Services were commissioned to undertake an archaeological watching brief in February 2021 during the mechanical removal of sea buckthorn in an archaeological sensitive area of Pembrey Burrows (centred on SN38260 01859) northeast of Pembrey Country Park in Carmarthenshire.

The clearance was centred around the probable location of the former Second World War Bombing Range Control and its supporting infrastructure. Aside from the presence of superficial debris comprising concrete blocks, red bricks and terracotta electricity cable cover tiles, no in situ evidence for archaeology was identified during this watching brief.

CRYNODEB GWEITHEREDOL

Comisiynwyd Gwasanaethau Archeolegol YAD i ymgymryd brîff gwylio archeolegol ym mis Chwefror 2021 yn ystod symudiad mecanyddol o helygen y môr mewn ardal sensitif archeolegol ym Dwyini Tywod Pen-bre (wedi'i ganoli ar SN38260 01859) i'r gogledd-ddwyrain o Barc Gwledig Pen-bre yn Sir Gaerfyrddin.

Roedd y cliriad wedi'i ganoli o amgylch lleoliad tebygol yr hen Gorsaf Rhes Bomio o'r Ail Ryfel Byd a'i isadeiledd ategu. Ar wahân i bresenoldeb rwbel arwynebol yn cynnwys blociau concrit, briciau coch a theils gorchudd cebl trydan terracotta, ni nodwyd unrhyw dystiolaeth yn y lle yn ystod y brîff gwylio hwn.

1 INTRODUCTION

1.1 Project Proposals and Commission

- 1.1.1 DAT Archaeological Services were commissioned by Natural Resources Wales to provide an archaeological watching brief during the removal of the non-native invasive shrub sea buckthorn (*Hippophae rhamnoides*) at Pembrey Burrows (centred on SN38260 01859) which forms the southwestern fringe of Pembrey Country Park in Carmarthenshire (Figure 1). A swathe of sea buckthorn has colonised the entire dune system running parallel with Cefn Sidan Sands. NRW intends to removal the sea buckthorn to enable a regeneration of the dunes to a grassland habitat. This work forms part of the HLF funded Dynamic Dunescapes project.
- 1.1.2 Following discussions with the archaeological curators at Dyfed Archaeological Trust's Heritage Management section, it has been recommended that an archaeological watching brief is carried out during the sea buckthorn removal, as the proposed clearance areas are located with archaeologically sensitive areas of the Burrows.

1.2 Scope of the Project

- 1.2.1 A written scheme of investigation (WSI) for a watching brief was prepared by DAT Archaeological Services prior to the commencement of the works, which was approved by Dyfed Archaeological Trust – Heritage Management (DAT-HM) in their capacity as advisors to the local authority, prior to the commencement of the works (Appendix I). The project objectives were:
- Provision of a written scheme of investigation to outline the methodology by which DAT Archaeological Services will undertake the watching brief.
 - To monitor ground works in order to identify the presence/absence of any archaeological deposits.
 - To establish the character, extent and date range for any archaeological deposits to be affected by the proposed groundworks.
 - To appropriately investigate and record any archaeological deposits to be affected by the groundworks.
 - To produce an archive and report of any results.
- 1.2.2 The overall work was summarised as: *"Archaeological attendance and recording during the mechanical removal of sea buckthorn at Pembrey Burrows, Pembrey, Carmarthenshire. Appropriate investigation and recording of any such remains will be undertaken if revealed. A report and archive of the results of the works will be prepared."*

1.3 Report Outline

- 1.3.1 This report describes the location of the development works along with its archaeological background, and provides a summary and discussion of the archaeological watching brief and its results.

1.4 Abbreviations

- 1.4.1 Sites recorded on the regional Historic Environment Record (HER) are identified by their Primary Record Number (PRN) and located by their National Grid Reference (NGR). Sites recorded on the National Monument Record (NMR) held by the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) are identified by their National Primary Record Number (NPRN). Scheduled Monument (SM). Altitude is expressed to Ordnance Datum (OD). References to cartographic and documentary evidence and published sources will be given in brackets throughout the text, with full details listed in the sources section at the rear of the report.

1.5 Illustrations

- 1.5.1 Photographic images are to be found within the report. Printed map extracts are not necessarily reproduced to their original scale.

1.6 Timeline

- 1.6.1 The following timeline is used within this report to give date ranges for the various archaeological periods that may be mentioned within the text.

Period	Approximate date	
Palaeolithic –	c.450,000 – 10,000 BC	Prehistoric
Mesolithic –	c. 10,000 – 4400 BC	
Neolithic –	c.4400 – 2300 BC	
Bronze Age –	c.2300 – 700 BC	
Iron Age –	c.700 BC – AD 43	
Roman (Romano-British) Period –	AD 43 – c. AD 410	Historic
Post-Roman / Early Medieval Period –	c. AD 410 – AD 1086	
medieval Period –	1086 – 1536	
post-medieval Period ¹ –	1536 – 1750	
Industrial Period –	1750 – 1899	
modern –	20 th century onwards	

Table 1: Archaeological and historical timeline for Wales

¹ The post-medieval and industrial periods are combined as the post-medieval period on the Regional Historic Environment Record as held by Dyfed Archaeological Trust



Figure 1: Location map showing assessment area (outlined in red) at Pembrey Burrows in the Gwendraeth Estuary.

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2 SITE LOCATION AND TOPOGRAPHY

- 2.1 Pembrey Burrows are located at the southern side of the Gwendraeth Estuary In the eastern part of Carmarthen Bay. The Pembrey Burrows dune system commences in the north at Tywyn Point and extends southwards along the coast before terminating at the town of Burry Port. Pembrey Airfield is located around 2km to the east of the Burrows with Pembrey Forest located immediately adjacent and Pembrey Country Park located at the southern end of the dunes. A swathe of sea buckthorn has colonised the entire dune system running parallel with Cefn Sidan Sands (Figure 2). NRW intends to remove the sea buckthorn to enable a regeneration of the dunes to a grassland habitat. This work forms part of the HLF funded Dynamic Dunescapes project.
- 2.2 Pembrey forest is owned and managed by Natural Resources Wales and is bordered by the MOD Pembrey Sands Firing Range in the northwest and the Country Park at its southern end. The sand dunes at this end fall within the ownership of Carmarthenshire County Council.
- 2.3 Pembrey Burrows encompasses an area of archaeological and historically significant Second World War anti-invasion defences along with later infrastructure relating to the Air Weapons Range located at the northern most extent of the burrows at Tywyn Point. The archaeological significance of the area was highlighted in an unpublished PhD thesis undertaken by Jonathon Berry, Senior Inspector at Cadw in 2016 (Berry, 2016) and in subsequent archaeological assessments undertaken by Dyfed Archaeological Trust in 2016 (Bell, 2016) and specifically of the Burrows in 2020 (Bell, 2020), which demonstrated that the dune system at Pembrey were densely defended and constituted an integral part of the Carmarthen Stop Line. This stop line was one of a number established throughout the Western Command and comprised co-ordinated anti-invasion defences stretching between the Ceredigion and Carmarthenshire coastlines.
- 2.4 The northern and southern most ends of Pembrey Burrows dune system fall within the Carmarthen Bay Dunes Special Area of Conservation (SAC) and the entire system is encompassed by the Pembrey Coast SSSI (ref 509). In 2014 Pembrey Burrows were subject to a geomorphological appraisal undertaken on behalf of Natural Resources Wales (Pye and Blott 2014). The morphology of the beach at Tywyn Point and at the south-eastern end of the Pembrey dunes has been closely monitored since 1998. The monitoring data shows that there has been up to 170m of frontal dune erosion at Tywyn Point and no net change near the control tower between the years 1998 and 2013. However, the study states that there has been around 40m of dune erosion immediately south of the rock armour at the control tower since 1998. Furthermore, the study notes the vulnerability of the dunes to storm erosion citing between 5m and 15m of erosion of the dune frontage and consequent dune cliffing following the winter storms of 2013/14.



Figure 2: The study area (outlined in red) encompassing the sea buckthorn which has colonised the dune system at Pembrey Burrows.

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- 2.5 The underlying solid geology of this area is the Bishopstone Mudstone Formation—comprised of mudstone, siltstone and sandstone; sedimentary bedrock formed approximately 313 to 326 million years ago during the Carboniferous period. The superficial geology is one of windblown sand. Geological information has been obtained through the British Geological Survey mapping portal. The geomorphological assessment undertaken by Pye and Blott (*ibid*), states that the Pembrey Dune system formed over the last 12,000 years during the Late Flandrian (Post-glacial) period. Furthermore, the main part of the dune system is less than 500 years old whilst the major dune-capped barrier spits at either end of the system have developed within the past 130 years.
- 2.6 Following late nineteenth-century efforts to control blowing sand and dune migration, large scale planting of conifers on the dunes was initiated by the Forestry Commission during the middle twentieth-century. This planting began in 1929 and continued until 1954. The conifers largely occupy the centre of the dune

system, namely Pembrey Forest, whilst the northern and southern ends of the dune system have largely experienced encroachment by scrub, grasses and sea buckthorn. Where active sand accretion exists largely at the terminal ends of the dune system it is possible to find areas of bare sand and mobile dunes (Pye and Blott *ibid*). In general, the area of the dunes subject to this phase of sea buckthorn clearance are thought to be relatively stable but have recently experienced sudden sheer cliff falls following recent storm events (NRW, 2021 *pers com*).

- 2.7 This first phase of removal includes clearance areas equating to around 3 hectares in total. Areas 1 and 2 are located towards the centre of the burrows, either side of the concrete track which allows access on to Cefn Sidan sands and are located within the vicinity of the former Bombing Range Control Tower and its associated searchlight platforms and observations posts. (Figure 3).
- 2.8 The scrub clearance in Area 1 consists of mainly mature sea buckthorn and blackthorn in dense stands, whilst clearance Area 2 consists of low-lying sea buckthorn of less density and with some scattered young growth.

2.2.2.1 Clearance Areas 1 and 2

The scrub in clearance area 1 consists of mainly of mature sea buckthorn and blackthorn in dense stands, whilst clearance area 2 consists of low-lying sea buckthorn of less density and with some scattered young growth. Clearance areas 1 and 3 are detailed in *Figure 2.2.2.1* below.



Figure 2.2.2.1: Clearance Areas 1 and 2 (NRW)

Figure 3: The clearances areas for the sea buckthorn removal.

3. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

3.1 Historical Background

(After Bell, 2020)

- 3.1.1 Work began on the construction of the RAF Pembrey Airfield and Pembrey Sands Air Weapons Range in 1937. The Range opened as the "No. 1 Bombing and Gunnery School" in 1939 before being succeeded in 1941 by the "No.1 Air Gunnery School". During the outbreak of the Second World War the Range became integrated into the Carmarthen Stop Line and several anti-invasion defences were constructed along the coastline and further inland in defence of the airfield. The wartime boundary of the range extended from the north at Tywyn Point to approximately 2.5km south of the present southern border and accommodated numerous structures and targets along the length of the coast. These included Wing Marker Shelters, Searchlight platforms and the location of the Original Bombing Range Control Tower (Pyper and Page 2014).
- 3.1.2 Following the Second World War, operations at RAF Pembrey ceased in 1957. In 1966 the Pembrey Sands Air Weapons Range was established and operated by the RAF. The RAF continued operations until 2006 when the Range was taken over by the Defence Training Estate (*ibid.*). It is currently owned by the Ministry of Defence and managed by the Defence Infrastructure Organization and is used as a training estate for air-to-ground bombing, strafing practice and Temporary Landing Zones in a beach environment.

3.2 Recorded Archaeological Sites

- 3.2.1 Pembrey Burrows encompasses an area of archaeological and historically significant Second World War anti-invasion defences along with later infrastructure relating to the RAF air weapons range located at the northern most extent of the burrows at Tywyn Point. The dune system at Pembrey was densely defended and constituted an integral part of the Carmarthen Stop Line. This stop line was one of a number established throughout the Western Command and comprised co-ordinated anti-invasion defences stretching between the Ceredigion and Carmarthenshire coastlines. Whilst the archaeological significance of this area has long been acknowledged, the true extent and nature of the archaeology remains somewhat ambiguous and underrepresented in the regional Historic Environment Record (HER) held at Dyfed Archaeological Trust, and the RCAHMW National Monument Record.
- 3.2.2 Jonathan Berry's (Cadw Senior Inspector) 2016 unpublished thesis on the study of Second World War anti-invasion defences in south and southwest Wales revealed a significant number of sites within the Pembrey area, the majority of which were previously unrecorded sites. At present the remains highlighted by Berry are not yet recorded on the Dyfed Historic Environment Record or the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) National Monument Record (NMR).
- 3.2.3 Consultation of various documentary sources, particularly historic photography, during the 2020 archaeological assessment (Bell, 2020) identified several features of archaeological interest within the clearance areas (Figure 4). However, despite some general concordance between these sources there remained significant ambiguity regarding the distribution and nature of the archaeology, particularly regarding the precise locations and consequently features were often attributed with multiple grid references. Much of the study area was inaccessible owing to the density of the sea buckthorn and therefore areas of archaeological

interest could not be verified. Conversely, previously unrecorded archaeological structures were discovered in more accessible areas.

- 3.2.4 The Burrows study area was quantified into areas of archaeological potential based on the confidence value assigned to the identified sites of archaeological interest. Extant, previously recorded and visited sites were allocated the highest confidence ranking and sites tentatively identified from documentary sources were allocated the lowest values. Areas of archaeological potential were classified as low (green), medium (amber), high (red) and certain (magenta).
- 3.2.5 Clearance areas 1 & 2 are located within an area of medium archaeological potential and contain, or are in close proximity to known and/or potential sites of archaeological interest. These sites are presented in Table 2 and shown in Figure 5. None of the assets within the clearance areas have designated status.
- 3.2.6 Clearance Areas 1 & 2 are situated with the region of the former Bombing Range Control and its supporting infrastructure including a Motor Generator House, Ambulance Station, two searchlight platforms, gun emplacements and quadrant shelter observations posts. There are multiple candidate NGRs for these sites which could not be evidenced during the assessment survey (Bell, 2020). A previously unrecorded triangular concrete platform (PRN118047) not identified from documentary sources and likely related to the post-war activities of the site, was discovered in this area. Located to the east of the clearance areas, but worthy of note, are the approximate locations of two decommissioned minefields (PRN118048 and PRN11849) (See Figure 6).

Table 2: Archaeological assets within and in the vicinity of the clearance areas (shown in Figures 5).

PRN	NPRN	REF	NAME	TYPE	SUMMARY	EVIDENCE	CONFIDENCE	NGR	EASTING	NORTHING
31376			Pembrey Forest	GUN EMPLACEMENT	Two concrete pads, 1m x 1m, no other features visible. Pads in the sand in between two hollows. The hollow to the west has the appearance of having had modifications, although it is too overgrown to investigate.	Extant not visited	5	SN37740262	237740	202620
		MWO_017	Bombing Range Searchlight Platform	SEARCHLIGHT EMPLACEMENT	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photo and "Air Firing & Bombing Range" plan. Also J Berry site	Plotted from documentary sources; not confident	1	SN3768202481	237682	202481
		J Berry 2016	Bombing Range Control	OBSERVATION POST		J Berry Site; Arch	4	SN3773502482	237735	202482
	91230		UNKNOWN (PEMBREY BURROWS)	GUN EMPLACEMENT	A WWII reinforced concrete defence post protecting part of Pembrey Air Field. Long axis 340 degrees, open front facing sea with enfiling openings off N and S sides, 6.5 paces wide internally, one entry point. Interesting surviving contemporary instructions painted on walls, including a semi-circular pelorus recording bearings of landmarks (including two shipwrecks) and information on case-shot and half charges. Site now difficult to approach. Visited TA & HJ James 18.1.99 (TAJ 18.1.1999). See PRN 112369 Identified as J Berry (2016) as a searchlight platform.	Extant not visited	5	SN37830238	237830	202380
112369		J Berry 2016	Bombing Range Searchlight Platform	SEARCHLIGHT EMPLACEMENT	Unknown military structure recorded on OS mapping, but access in 2019 impossible due to thick sea buckthorn. Visited, A Pyper 2019 Visible on satellite imagery. Identified as searchlight platform by Jon Berry (2016). M Bell 2020 Likely NPRN 91230 visited and identified by T and H James in 1999 as a gun emplacement.	Extant not visited	5	SN3783402366	237834	202366
		MWO_017	Quadrant Shelter No. 2	QUADRANT SHELTER	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photos D6 to D9 and "Air Firing & Bombing Range" plan	Plotted from documentary sources; not confident	1	SN3788202279	237882	202279
		MWO_017	Practice Bombing Signal No.1	PRACTICE BOMBING SIGNAL	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photo D8 & D9 and "Air Firing & Bombing Range" plan	Plotted from secondary source; not confident	1	SN3793102258	237931	202258
		MWO_017	Bombing Range Control	OBSERVATION POST	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photos D6 to D9 and "Air Firing & Bombing Range" plan. Also J Berry site	Visited not visible	2	SN3764802557	237648	202557
		MWO_017	Ambulance Station	AMBULANCE STATION	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photo and "Air Firing & Bombing Range" plan	Visited not visible	2	SN3769702558	237697	202558
		MWO_017	Motor Generator House	MOTOR GENERATOR HOUSE	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photo and "Air Firing & Bombing Range" plan. Possible earthwork visible on LANDSTAT 2009.	Visited not visible	2	SN3768902573	237689	202573
		MWO_017	Bombing Range Searchlight Platform	SEARCHLIGHT EMPLACEMENT	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photo D7 and "Air Firing & Bombing Range" plan. Also J Berry site	Plotted from documentary sources; not confident	1	SN3758902601	237589	202601
		MWO_017	Bombing Range Searchlight Platform	SEARCHLIGHT EMPLACEMENT	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photo and "Air Firing & Bombing Range" plan. Also J Berry site	Plotted from documentary sources; not confident	1	SN3783402366	237834	202366

PRN	NPRN	REF	NAME	TYPE	SUMMARY	EVIDENCE	CONFIDENCE	NGR	EASTING	NORTHING
118046				STRUCTURE	Possible quadrant shelter like structure identified on 1946 vertical photo and D8 MWO_017 oblique photographs. Berry "Bombing Range Searchlight Platform". Mature Cypress tree in large hollow in which two concrete block (not insitu) were found. The largest of the two measured 0.59m2 and 0.34m deep and was embedded with the remains of a wooden post of approx. 0.13m2. Very dense thickets of brambles, bind weed and other vegetation along with pockets of young sea buckthorn. M Bell 2020	Extant visited	6	SN3762802617	237628	202617
118047				STRUCTURE	Partially exposed shutter concrete platform; possibly triangular in shape although northeastern side is completely buried by dune and vegetation. Surrounded by dense bramble thicket. West facing opening c.3.9m wide and similar void exposed facing east but inaccessible. Two square ends (like a gear cog) measuring 0.65m x 0.75m were exposed. The southeastern end had a rectangular slot measuring 0.20m x 0.12m. Feature located immediately north of where possible Ambulance station identified on aerial vertical and oblique photographs. M Bell 2020	Extant visited	6	SN3770302573	237703	202573
118048		MWO_017	Pembrey Forest Minefield 6	MINEFIELD	Decommissioned minefield identified on 1946 RAF vertical photographs	Plotted from secondary source; confident	3	SN3771902643	237719	202643
118049		MWO_017	Pembrey Forest Minefield 7	MINEFIELD	Decommissioned minefield identified on 1946 RAF vertical photographs	Plotted from secondary source; confident	3	SN3781602602	237816	202602
	270661		MINEFIELD, PEMBREY	MINEFIELD	Plotted off aerial photographs. Record derived from Defence of Britain Project (Record Number 11556)	Plotted from secondary source; confident	3	SN37780265	237780	202650
	270664		MINEFIELD, PEMBREY	MINEFIELD	Plotted off aerial photographs. Record derived from Defence of Britain Project (Record Number 11556)	Plotted from secondary source; confident	3	SN37860255	237860	202550

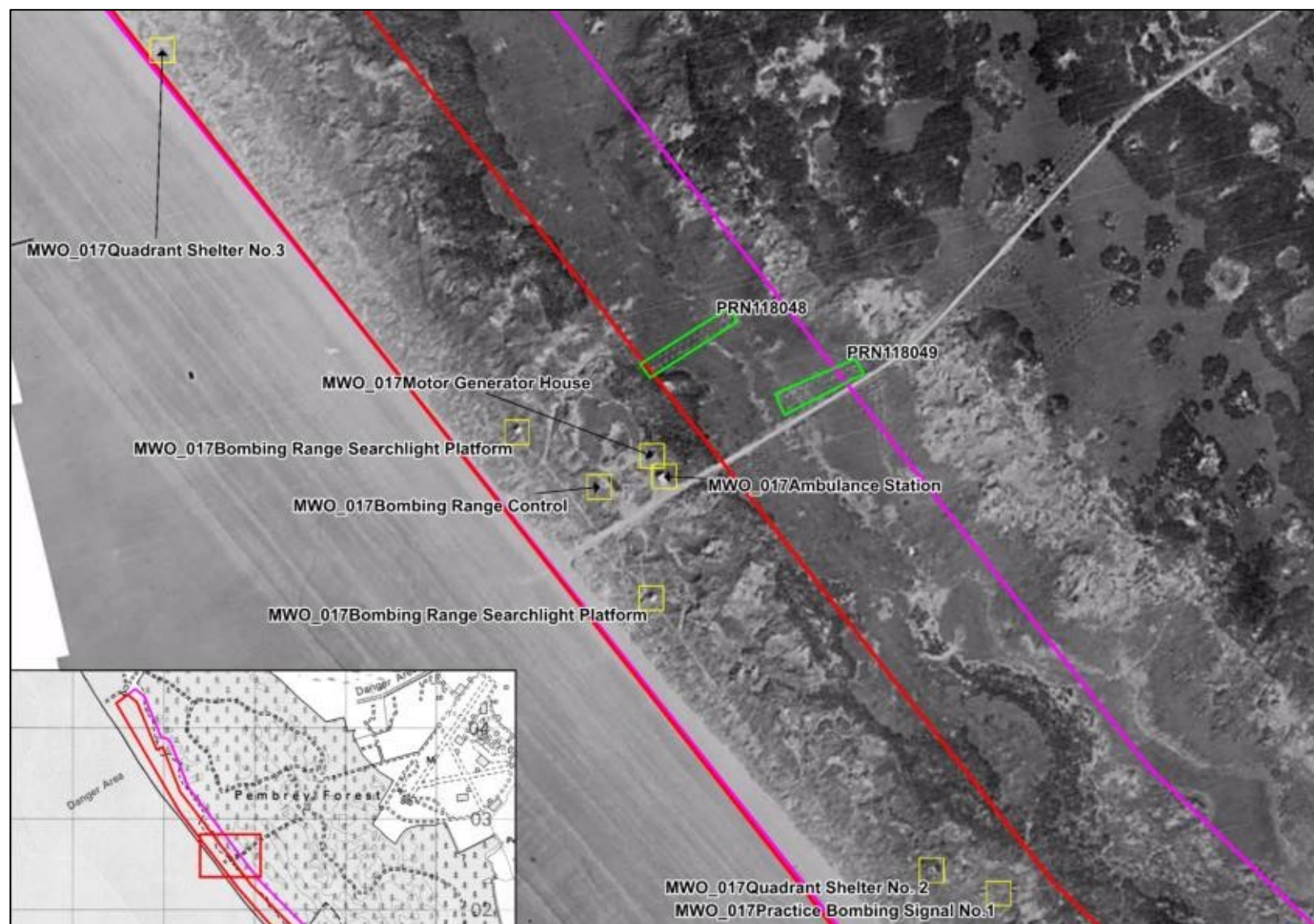


Figure 4: An extract of the 1946 RAF vertical aerial photograph showing the density of sites and features associated with the bombing range and anti-invasion defences within the survey area (outlined in red) and 100m buffer (outlined in pink). The green polygons map the extent of the minefields within the search area. Note the additional north-eastern minefields aligned parallel to the track (After Bell, 2020).



Figure 5. Map showing the distribution of sites from all sources and their confidence classes at the hub area of the former bombing range control within the sea buckthorn removal area and 100m buffer. Map data ©2020 Google (After Bell, 2020)

3.3 Historic Mapping

1953 National Grid series Ordnance Survey Map, 1:10,560 (6")

- 3.3.1 The 6 inch OS map published in 1953 shows three rectangular structures located at the end of the track which provides access to the beach at the northwestern extent of Pembrey Burrows (Figure 6). The structures are drawn with bold, continuous lines but their plans are not infilled meaning that these were extant structures greater than 1ft in height but no longer in use or devoid of a roof. The northwestern structure is annotated as "Tower (disused)" and a larger, rectangular structure situated to its southeast, roughly corresponds to the location of the Ambulance Station. The third building is shown as a small square, situated parallel, but some distance south east of the Tower, on the dune front. This is likely to be the surviving searchlight platform.

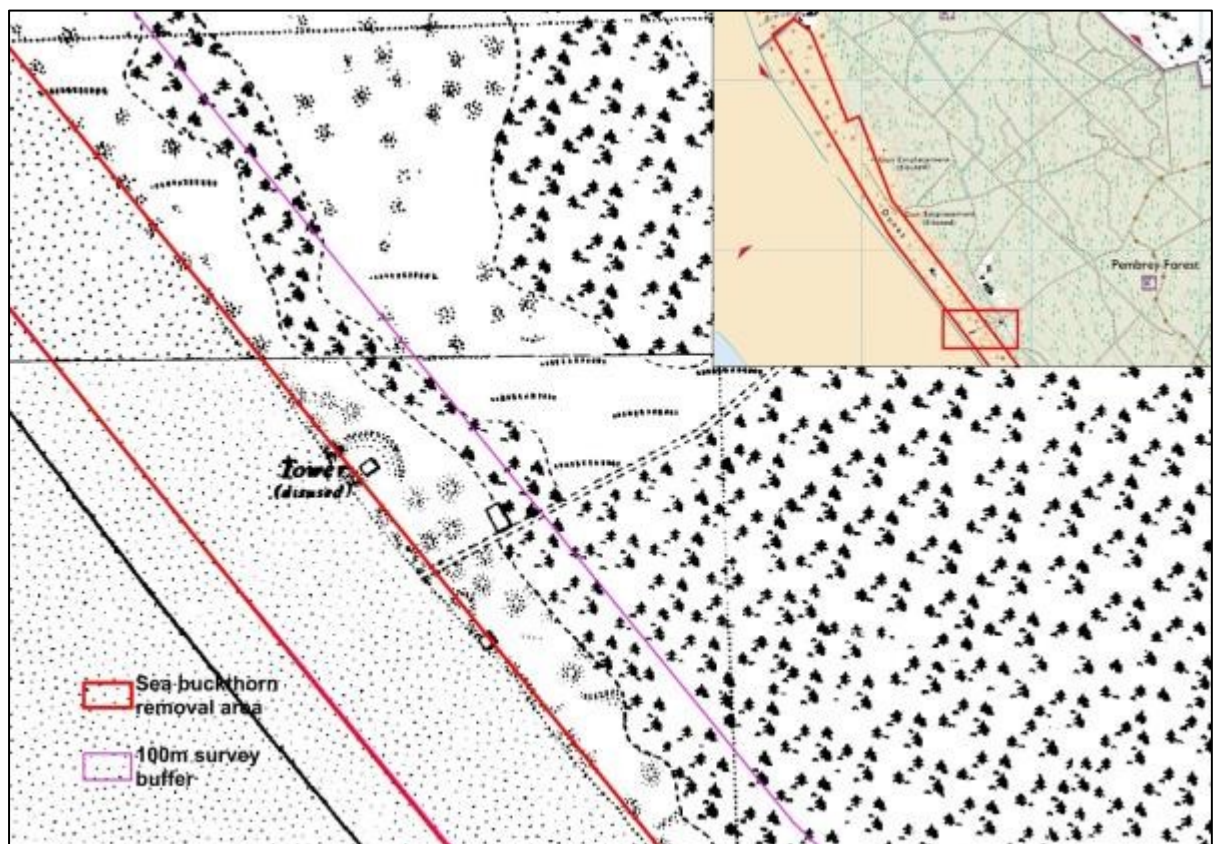


Figure 6: The 1:10560 (6 inch) map of 1953 showing 3 structures located at the end of a track of the former Bombing Range Control.

4 WATCHING BRIEF METHODOLOGY

4.1 Fieldwork

- 4.1.1 The watching brief was undertaken in accordance with the Chartered Institute of Archaeologists' (CIfA) *Standard and Guidance for an Archaeological Watching Brief* (2014).
- 4.1.2 A written scheme of investigation was prepared by DAT Archaeological Services detailing the proposed archaeological works, which was approved by DAT-HM in their capacity as advisors to the local planning authority.

- 4.1.3 Recording of all archaeological features or deposits conformed to best current professional practice and was carried out in accordance with the Recording Manual² used by DAT Archaeological Services. A written and photographic record was maintained throughout this watching brief, a summary of which is presented in the Project Archive.
- 4.1.4 This watching brief monitored the removal of sea buckthorn in two areas equating to approximately 3.6ha in total (See Figure 7). Mechanical removal of the mature sea buckthorn in Area 1 was undertaken but two tracked excavators equipped with grabbers, whilst the young sea buckthorn and scrubby vegetation was cut back using tracked, remotely controlled mowers.
- 4.1.5 An Unexploded Ordnance (UXO) Risk Assessment undertaken by RPS (RPS, 2020), concluded that the risk of UXO at Pembrey Burrows was sufficient to necessitate that archaeological watching brief was undertaken under the conditions of an UXO watching brief. The risk assessment concluded that the main sources of UXO contamination at Pembrey Burrows are:
- Ordnance associated with the Ministry of Supply Pen-clawdd Experimental Testing and Proofing Area,
 - Ordnance associated with the First World War His Majesty's Explosive Factory/Royal Ordnance Factory Pembrey and the associated National Filling Factory 18.
 - Ordnance associated with Pembrey Air Weapons Range,
 - Marine Migrated Ordnance.
- 4.1.6 The watching brief was preceded by a UXO "toolbox talk" provided by the attending UXO Consultant who acted as a banksman to the tracked vehicles and inspected areas prior to and after clearance. Subsequently it was only possible to monitor the clearance following approval from the UXO Consultant. No UXO were encountered during the watching brief.

4.2 Timetabling of Fieldwork

- 4.2.1 This watching brief took place on the 1st to 3rd February 2021 during variable weather conditions.

4.3 Post-Fieldwork Reporting and Archiving

- 4.3.1 All data recovered during the fieldwork will be collated into a site archive structured in accordance with specifications in *Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation* (Brown 2011), and the procedures recommended by the National Monuments Record, Aberystwyth.
- 4.3.2 The results of the fieldwork have been assessed in local, regional and wider contexts. The report includes a desk-based research element to ensure that the site is placed within its wider archaeological context.

² DAT Archaeological Services have adopted the Recording Manual developed by English Heritage Centre for Archaeology. A copy will be available on-site for inspection if required.

5 RESULTS AND DISCUSSION

- 5.1 Clearance began in Area 1 on the southern side of the extant concrete track. Here, the sea buckthorn was extremely dense and initial inroads were made opposite the small area of hardstanding east of the triangular concrete platform (PRN 118047) and the candidate location for the original Bombing Range Control Tower, Ambulance station and motor generator house (See Figure 7). Although not strictly within the clearance areas, the opportunity was taken to inspect this area for any evidence of the former.
- 5.2 A number of blocks of cemented red brick and concrete were found on the surface or protruding out from tussocks in the dunes immediately east and south of the triangular platform (PRN 118047) (Photo 1). Several broken, terracotta tiles stamped with the words "DANGER ELECTRICITY" were also found (Photo 2). These tiles would have once overlain buried electricity cables and were also stamped with the manufacturer's name: Baldwin. Established in 1936, H. J Baldwin Brickworks was located in Bunny, in Northamptonshire and closed in 1994^{3,4,5}. Whilst it was not possible to precisely date these tiles it would be reasonable to assume that they are indeed contemporary with the former Bombing Range and would have covered the live services which provided power to the various components from the motor generator house. Elsewhere in this area, an iron frame was found protruding out from the vegetated dunes and entwined by a thicket of brambles (Photo 3).
- 5.3 As demonstrated by the previous assessment (Bell, 2020), no further evidence of these former structures was found. The historic mapping indicates that extant buildings survived in the vicinity to at least 1953. However, sometime after, and most likely before the start of operations at the new Pembrey Sands Air Weapons Range in 1966, these buildings were dismantled, services and plant salvaged and the area was razed to remove any visible buildings or infrastructure which may have confused pilots using the new weapons range.
- 5.4 During the clearance in Area 1 two machines working roughly 70m apart, progressed in swathes in a south easterly direction (Photos 4 & 5). Area 1 included the candidate sites for the bombing range searchlight platform and Jon Berry's location for the Bombing Range Control Tower (Figure 7). The topography of the dunes in this area undulated dramatically, with significant peaks and troughs in places making it quite difficult terrain to navigate at times. The grabbers pulled out the mature buckthorn, including the roots system, one by one, in a systematic manner and collated the debris into piles which were later to be burned onsite (Photo 6).
- 5.5 The two candidate site locations were carefully approached and walked over extensively once cleared. The UXO consultant also scanned these areas with a metal detector. No evidence of either possible structures was visible (Photos 7 & 8).

³ <https://findswhitecliffs.wordpress.com/2020/06/17/baldwin-electrical-cable-tile/>

⁴ <https://www.britainfromabove.org.uk/image/epw061981>

⁵ <https://www.scottishbrickhistory.co.uk/baldwin-electric-cable-covers/>



Figure 7: The extent of the sea buckthorn clearance during the watching brief (outlined in blue) and the distribution of recorded assets (prefixed by PRN) and conjectured assets.

- 5.6 In Area 2, the young sea buckthorn and scrub was cut back using industrial mowers (Photo 9). This area was walked over after clearance and areas previously inaccessible during the 2020 assessment were inspected carefully. There was no evidence of the northern searchlight platform or the Bombing Range Control tower. However, two displaced bricks were found on the surface at SN3762502567, some 25m north-east of the supposed location of the Control Tower (Photo 10). The UXO consultant did not detect any UXO in this area either and the full extent of the cleared area was inspected (Photos 11 & 12). The grid reference for Berry's barbed wire entanglement was inspected but no evidence of such an obstacle was found here. However, two upright, perforated upright iron posts were found some 100 north of the site at SN3743702838 and beyond the clearance area (Photo 13).

6 CONCLUSIONS

- 6.1. This watching brief monitored the removal of sea buckthorn in two areas of Pembrey Dunes equating to approximately 3.6 ha in total. The clearance areas were located within the vicinity of the former Second World War Bombing Range Control and its supporting structures and infrastructure. These areas were subject to an archaeological assessment which concluded that there was a high archaeological potential for these features to remain but owing to the density of the sea buckthorn and other vegetation, these locations were inaccessible and not verified.
- 6.2 This watching brief, conducted under the conditions of a UXO watching brief, carefully monitored the clearance in these sensitive areas which were previously inaccessible. Clearance Area 1 encompassed a roughly square area measuring roughly 1.2ha located immediately south of the concrete track which previously serviced the Bombing Range. It included the possible location for the southernmost searchlight platform and Jon Berry's candidate location for the Bombing Range Control Tower based on his doctoral thesis (Berry, 2016). No evidence for either of these structures or any other features of archaeological interest, were identified during this watching brief. Neither was there any indication of any UXO. Here, the clearance revealed the undulating topography of the dunes which rose and fell steeply in places. Whilst this result could be considered disappointing it does reduce the ambiguity of the archaeological potential in this area and provides reassurances that should any features survive, that they are not superficial and have not been damaged during the removal.
- 6.3 Clearance Area 2 encompassed a L-Shaped area measuring approximately 2.4ha in total, and ran northwards, parallel to the most probable location of the Bombing Range Control Tower, Ambulance Station, and Motor Generator House as well as the extant, concrete triangular platform (PRN 118047). The clearance area included the candidate locations for the northern most searchlight platform and a barbed wire entanglement identified by Berry (ibid). Neither of these features were identified during this watching brief.
- 6.4 However, a small number of concrete blocks, cemented red bricks and fragmented terracotta electricity cable tiles found on the surface of the dunes within the vicinity of the former Bombing Range Control Tower, provides the most tangible evidence for archaeology at this site. The dunes in this area, particularly around the patch of hardstanding at the

end of the concrete track show evidence of disturbance. It seems likely that prior to the commencement of operations of the Pembrey Sands RAF Weapons Range at Twywn Point, at the northern end of the dunes, the former Bombing Range Control and its infrastructure were demolished and razed and reburied.

- 6.5 The archaeological potential in this area therefore remains high and vulnerable to any invasive works in this area of the dunes. Presently however, the removal of the sea buckthorn has not impacted this resource but they may become vulnerable to the longer term impacts of the restoration to grassland habitat and the remobilisation of the dunes.

7. PHOTOS



Photo 1: Debris of concrete and cemented redbrick found near the surface of the vegetated dunes in the vicinity of the former Bombing range Control.



Photo 2: Fragmented, Baldwins terracotta electricity cable tiles.



Photo 3: Iron framework protruding the dunes immediately south of the triangular concrete platform PRN118047



Photo 4: Machine 1 beginning of clearance at the north-western end of Area 1



Photo 5: Machine 2 beginning clearance at the north-eastern end of Area 1.



Photo 6: Removal of the sea buckthorn in Area 1



Photo 7: Overview of the cleared area in the vicinity of the candidate location for the searchlight platform. The UXO consultant (central figure in orange) double checks the area for UXO.



Photo 8: Overview of the final extent of the clearance in Area 1.



Photo 9: Overview of the start of the cutting in Area 2, looking north-west along the dunes.



Photo 10: Two displaced red bricks found on the surface of the dunes in Area 2, some 25m North-east of the supposed location of the Bombing Range Control Tower.



Photo 11: The cleared area in the vicinity of the candidate site for the northern searchlight platform in Area 2.



Photo 12: The cleared area in the north-eastern extent of Area 2



Photo 13: The iron posts found beyond the Area 2 clearance area and some 100m north of Jon Berry's candidate location for a barbed wire entanglement.

8. ACKNOWLEDGEMENTS

- 7.1 The author would like to thank AJ Butler and his colleagues for their cooperation and meticulously careful work during this watching brief. The author is also grateful to John Rose, the UXO Consultant from RPS that ensured the areas were safe to monitor.

9. SOURCES

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RPS, 2020. UXO Mitigation Report (Stage 3) Dynamic Dunescapes – Pembrey Burrows. RPS Explosive Engineering Services

Cartographic

1953 National Grid series Ordnance Survey Map, Carmarthenshire, 1:10,560

Database

Dyfed Archaeological Trust Historic Environment Record, housed with Dyfed Archaeological Trust in The Corner House, Llandeilo, Carmarthenshire, SA19 6AE

RCAHMW Coflein Database: - <http://www.coflein.gov.uk/>

Cof Cymru - National Historic Assets
of Wales: <http://cadw.gov.wales/historicenvironment/recordsv1/cof-cymru/?lang=en>

Historic Wales: - <http://historicwales.gov.uk>

10. PROJECT ARCHIVE

Project Number: FS20-075

ERN: 125660

3 x Watching Brief Form

89 Digital photographs; JPEGs

2 x MapInfo GIS tables: FS20_075_Clearance_Area, FS20_075_photos

APPENDIX I

PEMBREY BURROWS SEA BUCKTHORN REMOVAL, ARCHAEOLOGICAL WATCHING BRIEF 2021 WRITTEN SCHEME OF INVESTIGATION

1. INTRODUCTION

- 1.1 This Written Scheme of Investigation (WSI or specification) has been prepared by DAT Archaeological Services (the contracting arm of Dyfed Archaeological Trust) to provide a methodology for an archaeological watching brief during the removal of the non-native invasive shrub sea buckthorn (*Hippophae rhamnoides*) at Pembrey Burrows (centred on SN38260 01859) which forms the southwestern fringe of Pembrey Country Park in Carmarthenshire. This WSI has been commissioned by Natural Resources Wales.
- 1.2 Pembrey Burrows are located at the southern side of the Gwendraeth Estuary in the eastern part of Carmarthen Bay. The Pembrey Burrows dune system commences in the north at Tywyn Point and extends southwards along the coast before terminating at the town of Burry Port. Pembrey Airfield is located around 2km to the east of the Burrows with Pembrey Forest located immediately adjacent and Pembrey Country Park located at the southern end of the dunes. A swathe of sea buckthorn has colonised the entire dune system running parallel with Cefn Sidan Sands. NRW intends to remove the sea buckthorn to enable a regeneration of the dunes to a grassland habitat. This work forms part of the HLF funded Dynamic Dunescape project.
- 1.3 Pembrey forest is owned and managed by Natural Resources Wales and is bordered by the MOD Pembrey Sands Firing Range in the northwest and the Country Park at its southern end. The sand dunes at this end fall within the ownership of Carmarthenshire County Council.
- 1.4 Pembrey Burrows encompasses an area of archaeological and historically significant Second World War anti-invasion defences along with later infrastructure relating to the Air Weapons Range located at the northern most extent of the burrows at Tywyn Point. The archaeological significance of the area was highlighted in an unpublished PhD thesis undertaken by Jonathon Berry, Senior Inspector at Cadw in 2016⁶ and in subsequent archaeological assessments undertaken by Dyfed Archaeological Trust in 2016⁷ and specifically of the Burrows in 2020⁸, and demonstrated that the dune system at Pembrey were densely defended and constituted an integral part of the Carmarthen Stop Line. This stop line was one of a number established throughout the Western Command and comprised co-ordinated anti-invasion defences stretching between the Ceredigion and Carmarthenshire coastlines.

⁶ Berry, J. 2016: Second World War anti-invasion defences in south and south-west Wales: A comparative case study area based approach.

⁷ Bell, M. 2016: *Pembrey Sands Air Weapons Range: Archaeological Survey in Advance of Sea Buckthorn Removal*. Dyfed Archaeological Trust

⁸ Bell, M. 2020: *Pembrey Burrows: Archaeological Survey in Advance of Sea Buckthorn Removal*. Dyfed Archaeological Trust

- 1.5 This first phase of removal includes 2 areas of clearance equating to around 3 hectares in total. These areas are located within the vicinity of the former Bombing Range Control Tower and its associated searchlight platforms and observations posts. The clearance will be undertaken under the conditions of an Unexploded Ordnance (UXO) watching brief following the findings of a detailed UXO Risk Assessment undertaken by RSP. The assessment concluded that the main sources of UXO contamination at Pembrey Burrows are:
- Ordnance associated with the Ministry of Supply Pen-clawdd Experimental Testing and Proofing Area,
 - Ordnance associated with the First World War His Majesty's Explosive Factory/Royal Ordnance Factory Pembrey and the associated National Filling Factory 18.
 - Ordnance associated with Pembrey Air Weapons Range,
 - Marine Migrated Ordnance.
- 1.6 The UXO risk mitigation strategy is detailed in the "UXO Mitigation Report (Stage 3) Dynamic Dunescapes – Pembrey Burrows⁹" prepared by RPS for NRW.
- 1.7 Following discussions with the archaeological curators at Dyfed Archaeological Trust's Heritage Management section, it has been recommended that an archaeological watching brief is carried out during the sea buckthorn removal, as the proposed clearance areas are located with archaeologically sensitive areas of the Burrows.
- 1.8 The following written scheme of investigation outlines the methodology through which DAT Archaeological Services will undertake an archaeological watching brief, in accordance with the conditions of the UXO mitigation constraints, during the removal of the sea buckthorn which may potentially expose, damage or destroy archaeological remains. Should any significant archaeological features be revealed, then a programme of further mitigation can be formulated and potentially implemented prior to any further clearance.
- 1.9 This written scheme of investigation (WSI) has been prepared in accordance with the Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Archaeological Watching Briefs (CIfA 2014). A copy will be sent to the archaeological curator for their approval.
- 1.10 DAT Archaeological Services has considerable experience of this type of project and always operates to best professional practice. DAT Archaeological Services is the contractual arm of Dyfed Archaeological Trust that has its own Health and Safety Policy, and all works are covered

⁹ RPS, 2020. *UXO Mitigation Report (Stage 3) Dynamic Dunescapes – Pembrey Burrows. Report Number EES1135 R-10-02. RPS Explosives Engineering Services*

by appropriate Employer's Liability and Public Liability Insurances. Copies of all are available on request.

1.11 Dyfed Archaeological Trust is a CIfA Registered Organisation and all permanent staff are CSCS registered.

2 HISTORICAL BACKGROUND

(After Bell 2016)

- 2.1 The area of Pembrey Burrows occupies that part of Pembrey (or 'Towyn') Burrows which is not planted with coniferous forest, ie. a narrow strip averaging some 150 m wide on the seaward side of Pembrey Forest. The Burrows developed at the mouth of the River Gwendraeth Fawr over a long period, alongside a series of reclamations around an initial nucleus formed by a tongue of dry land at the foot of Mynydd Penbre. The Burrows have developed since the 17th century at least but, are not thought to be earlier than the Medieval period. Their seaward development continues, and that part occupied by this area has only developed since 1830. The area was incorporated into the system of Second World War defences around Pembrey Airfield and Ordnance Factory.
- 2.2 Work began on the construction of the RAF Pembrey Airfield and Pembrey Sands Air Weapons Range in 1937. The Range opened as the "No. 1 Bombing and Gunnery School" in 1939 before being succeeded in 1941 by the "No.1 Air Gunnery School". During the outbreak of the Second World War the Range became integrated into the Carmarthen Stop Line and a number of anti-invasion defenses were constructed along the coastline and further inland in defence of the airfield. The wartime boundary of the range extended from the north at Tywyn Point to approximately 2.5km south of the present southern border and accommodated numerous structures and targets along the length of the coast. These included Wing Marker Shelters, Searchlight platforms and the location of the Original Bombing Range Control Tower.

3 SEA BUCKTHORN REMOVAL AND UXO WATCHING BRIEF

- 4.1 The removal of the sea buckthorn will be undertaken by A J Butler Contracting (AJB) and the UXO watching brief is being conducted by RPS Explosives Engineering Services.
- 4.2 This first phase of removal includes clearance areas equating to around 3 hectares in total. Areas 1 and 2 are located towards the centre of the burrows, either side of the concrete track which allows access on to Cefn Sidan sands and are located within the vicinity of the former Bombing Range Control Tower and its associated searchlight platforms and observations posts. (Figure 3).
- 4.3 The scrub clearance in Area 1 consists of mainly mature sea buckthorn and blackthorn in dense stands, whilst clearance Area 2 consists of low-lying sea buckthorn of less density and with some scattered young growth.
- 4.4 The UXO contractors RPS has stated that all persons involved in the project should attend a toolbox talk prior to the commencement of any works and that they ought to be aware of the emergency procedures in the event of encountering a suspected item of UXO.
- 4.5 RPS recommends that an UXO Consultant is present during any excavation work which exceeds 1m in depth, to act as a UXO banksman and conducts a watching brief of these invasive scrub removal. The UXO consultant will conduct an enhanced visual inspection, with a magnetometer, prior to each removal and

confirm the identity of any suspicious objects noted during the clearance. The Consultant will maintain a visual overwatch of the clearance as detailed in Figure 4, for the duration of the work.

4.6 NRW have stipulated the following method of clearance following the consultation with the UXO and clearance contractors:

- *Low lying/smaller stands that should be mulched using tracked machine and arisings to be collected. The arisings and chippings, if large enough, will be taken off site for biomass. Any remaining stems will require herbicide treatment.*
- *Larger dense stands must be removed using a mechanical excavator grab, that will remove the scrub and roots. The excavated scrub should be removed to a site of lower value habitat (or hardstanding if possible) and burned or chipped and removed from site. A matt of arisings must be avoided as this will impede new dune grassland growth and add unwanted nutrients to the habitat.*
- *2 small areas 10m x 10m will be manually cut with chainsaws in areas of significant archaeology. This material will be removed to the hard standing (processing area) and processed into biomass. The remaining stems will be treated with herbicide by a qualified member of staff.*

2.2.2.1 Clearance Areas 1 and 2

The scrub in clearance area 1 consists of mainly of mature sea buckthorn and blackthorn in dense stands, whilst clearance area 2 consists of low-lying sea buckthorn of less density and with some scattered young growth. Clearance areas 1 and 3 are detailed in Figure 2.2.2.1 below.



Figure 2.2.2.1: Clearance Areas 1 and 2 (NRW)

Figure 3: The clearances areas for the sea buckthorn removal.

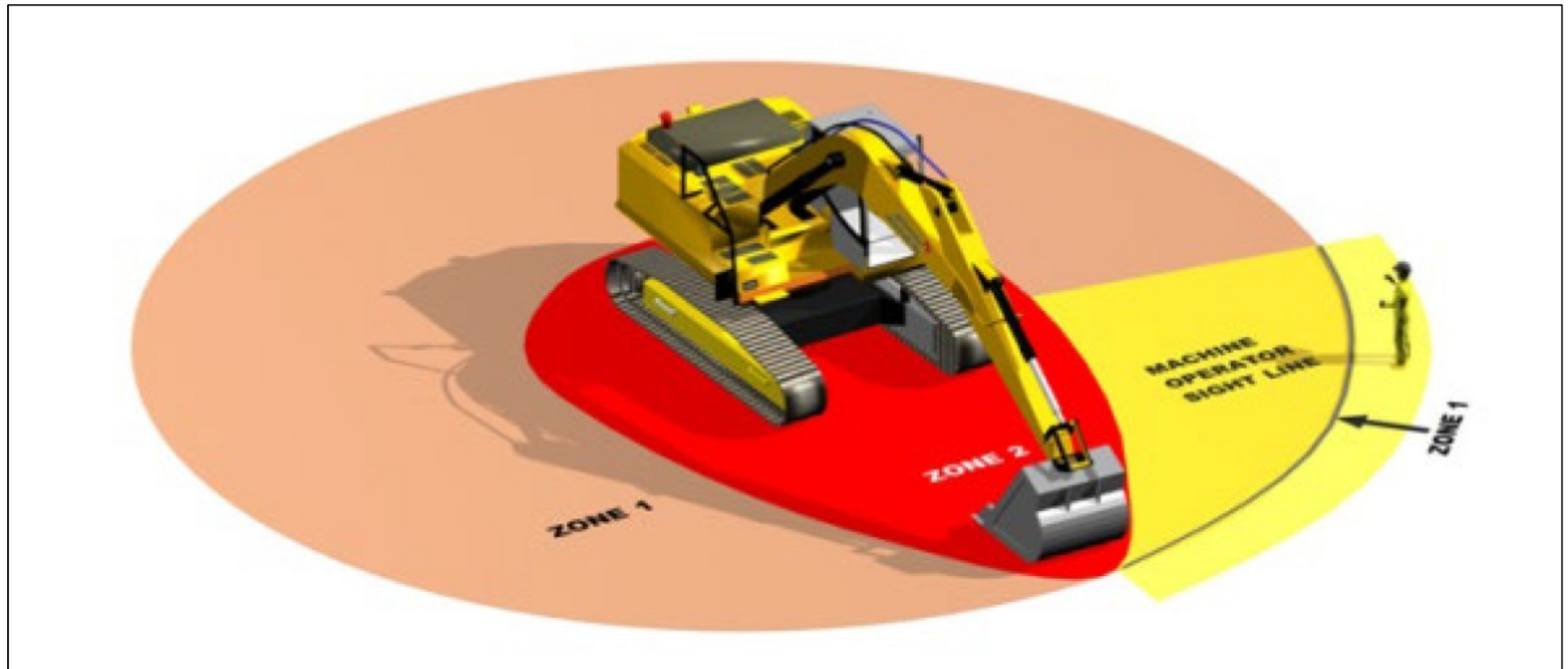


Figure 4: Hazard Zones when conducting UXO banksman duties.

4. RECORDED ARCHAEOLOGICAL SITES

- 4.1 Pembrey Burrows encompasses an area of archaeological and historically significant Second World War anti-invasion defences along with later infrastructure relating to the RAF air weapons range located at the northern most extent of the burrows at Tywyn Point. The dune system at Pembrey was densely defended and constituted an integral part of the Carmarthen Stop Line. This stop line was one of a number established throughout the Western Command and comprised co-ordinated anti-invasion defences stretching between the Ceredigion and Carmarthenshire coastlines. Whilst the archaeological significance of this area has long been acknowledged, the true extent and nature of the archaeology remains somewhat ambiguous and underrepresented in the regional Historic Environment Record (HER) held at Dyfed Archaeological Trust, and the RCAHMW National Monument Record.
- 4.2 Jonathan Berry's (Cadw Senior Inspector) 2016 unpublished thesis on the study of Second World War anti-invasion defences in south and southwest Wales revealed a significant number of sites within the Pembrey area, the majority of which were previously unrecorded sites. At present the remains highlighted by Berry are not yet recorded on the Dyfed Historic Environment Record or the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) National Monument Record (NMR).
- 4.3 Consultation of various documentary sources, particularly historic photography, during the 2020 archaeological assessment (Bell, 2020) identified several features of archaeological interest within the clearance areas (Figure 5). However, despite some general concordance between these sources there remained significant ambiguity regarding the distribution and nature of the archaeology, particularly regarding the precise locations and consequently features were often attributed with multiple grid references. Much of the study area was inaccessible owing to the density of the sea buckthorn and therefore areas of archaeological interest could not be verified. Conversely, previously unrecorded archaeological structures were discovered in more accessible areas.
- 4.4 The Burrows study area was quantified into areas of archaeological potential based on the confidence value assigned to the identified sites of archaeological interest. Extant, previously recorded and visited sites were allocated the highest confidence ranking and sites tentatively identified from documentary sources were allocated the lowest values. Areas of archaeological potential were classified as low (green), medium (amber), high (red) and certain (magenta) (Figure 6).
- 4.5 Clearance areas 1 & 2 are located within an area of medium archaeological potential and contain or are in close proximity to known and/or potential sites of archaeological interest. These sites are presented in Table 1 and shown in Figures 7 and 8.. None of the assets within the clearance areas have designated status.
- 4.6 Clearance Areas 1 & 2 are situated with the region of the former Bombing Range Control and its supporting infrastructure including a Motor Generator House, Ambulance Station, two searchlight platforms, gun emplacements and quadrant shelter observations posts. There are multiple candidate NGRs for these sites which could not be evidenced

during the assessment survey. A previously unrecorded triangular concrete platform (PRN118047) not identified from documentary sources and likely related to the post-war activities of the site, was discovered in this area. Located to the east of the clearance areas, but worthy of note, are the approximate locations of two decommissioned minefields (PRN118048 and PRN11849).

Table 1: Archaeological assets within and in the vicinity of the clearance areas (shown in Figures 7 & 8).

PRN	NPRN	REF	NAME	TYPE	SUMMARY	EVIDENCE	CONFIDENCE	NGR	EASTING	NORTHING
31376			Pembrey Forest	GUN EMPLACEMENT	Two concrete pads, 1m x 1m, no other features visible. Pads in the sand in between two hollows. The hollow to the west has the appearance of having had modifications, although it is too overgrown to investigate.	Extant not visited	5	SN37740262	237740	202620
		MWO_017	Bombing Range Searchlight Platform	SEARCHLIGHT EMPLACEMENT	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photo and "Air Firing & Bombing Range" plan. Also J Berry site	Plotted from documentary sources; not confident	1	SN3768202481	237682	202481
		J Berry 2016	Bombing Range Control	OBSERVATION POST		J Berry Site; Arch	4	SN3773502482	237735	202482
	91230		UNKNOWN (PEMBREY BURROWS)	GUN EMPLACEMENT	A WWII reinforced concrete defence post protecting part of Pembrey Air Field. Long axis 340 degrees, open front facing sea with enfilading openings off N and S sides, 6.5 paces wide internally, one entry point. Interesting surviving contemporary instructions painted on walls, including a semi-circular pelorus recording bearings of landmarks (including two shipwrecks) and information on case-shot and half charges. Site now difficult to approach. Visited TA & HJ James 18.1.99 (TAJ 18.1.1999). See PRN 112369 Identified as J Berry (2016) as a searchlight platform.	Extant not visited	5	SN37830238	237830	202380
112369		J Berry 2016	Bombing Range Searchlight Platform	SEARCHLIGHT EMPLACEMENT	Unknown military structure recorded on OS mapping, but access in 2019 impossible due to thick sea buckthorn. Visited, A Pyper 2019 Visible on satellite imagery. Identified as searchlight platform by Jon Berry (2016). M Bell 2020 Likely NPRN 91230 visited and identified by T and H James in 1999 as a gun emplacement.	Extant not visited	5	SN3783402366	237834	202366
		MWO_017	Quadrant Shelter No. 2	QUADRANT SHELTER	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photos D6 to D9 and "Air Firing & Bombing Range" plan	Plotted from documentary sources; not confident	1	SN3788202279	237882	202279
		MWO_017	Practice Bombing Signal No.1	PRACTICE BOMBING SIGNAL	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photo D8 & D9 and "Air Firing & Bombing Range" plan	Plotted from secondary source; not confident	1	SN3793102258	237931	202258
		MWO_017	Bombing Range Control	OBSERVATION POST	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photos D6 to D9 and "Air Firing & Bombing Range" plan. Also J Berry site	Visited not visible	2	SN3764802557	237648	202557

PRN	NPRN	REF	NAME	TYPE	SUMMARY	EVIDENCE	CONFIDENCE	NGR	EASTING	NORTHING
		MWO_017	Ambulance Station	AMBULANCE STATION	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photo and "Air Firing & Bombing Range" plan	Visited not visible	2	SN3769702558	237697	202558
		MWO_017	Motor Generator House	MOTOR GENERATOR HOUSE	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photo and "Air Firing & Bombing Range" plan. Possible earthwork visible on LANDSTAT 2009.	Visited not visible	2	SN3768902573	237689	202573
		MWO_017	Bombing Range Searchlight Platform	SEARCHLIGHT EMPLACEMENT	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photo D7 and "Air Firing & Bombing Range" plan. Also J Berry site	Plotted from documentary sources; not confident	1	SN3758902601	237589	202601
		MWO_017	Bombing Range Searchlight Platform	SEARCHLIGHT EMPLACEMENT	Visible on RAF Medmenham 01/07/1940 MWO17 aerial photo and "Air Firing & Bombing Range" plan. Also J Berry site	Plotted from documentary sources; not confident	1	SN3783402366	237834	202366
118046				STRUCTURE	Possible quadrant shelter like structure identified on 1946 vertical photo and D8 MWO_017 oblique photographs. Berry "Bombing Range Searchlight Platform". Mature Cypress tree in large hollow in which two concrete block (not insitu) were found. The largest of the two measured 0.59m2 and 0.34m deep and was embedded with the remains of a wooden post of approx. 0.13m2. Very dense thickets of brambles, bind weed and other vegetation along with pockets of young sea buckthorn. M Bell 2020	Extant visited	6	SN3762802617	237628	202617
118047				STRUCTURE	Partially exposed shutter concrete platform; possibly triangular in shape although northeastern side is completely buried by dune and vegetation. Surrounded by dense bramble thicket. West facing opening c.3.9m wide and similar void exposed facing east but inaccessible. Two square ends (like a gear cog) measuring 0.65m x 0.75m were exposed. The southeastern end had a rectangular slot measuring 0.20m x 0.12m. Feature located immediately north of where possible Ambulance station identified on aerial vertical and oblique photographs. M Bell 2020	Extant visited	6	SN3770302573	237703	202573
118048		MWO_017	Pembrey Forest Minefield 6	MINEFIELD	Decommissioned minefield identified on 1946 RAF vertical photographs	Plotted from secondary source; confident	3	SN3771902643	237719	202643
118049		MWO_017	Pembrey Forest Minefield 7	MINEFIELD	Decommissioned minefield identified on 1946 RAF vertical photographs	Plotted from secondary source; confident	3	SN3781602602	237816	202602

PRN	NPRN	REF	NAME	TYPE	SUMMARY	EVIDENCE	CONFIDENCE	NGR	EASTING	NORTHING
	270661		MINEFIELD, PEMBREY	MINEFIELD	Plotted off aerial photographs. Record derived from Defence of Britain Project (Record Number 11556)	Plotted from secondary source; confident	3	SN37780265	237780	202650
	270664		MINEFIELD, PEMBREY	MINEFIELD	Plotted off aerial photographs. Record derived from Defence of Britain Project (Record Number 11556)	Plotted from secondary source; confident	3	SN37860255	237860	202550

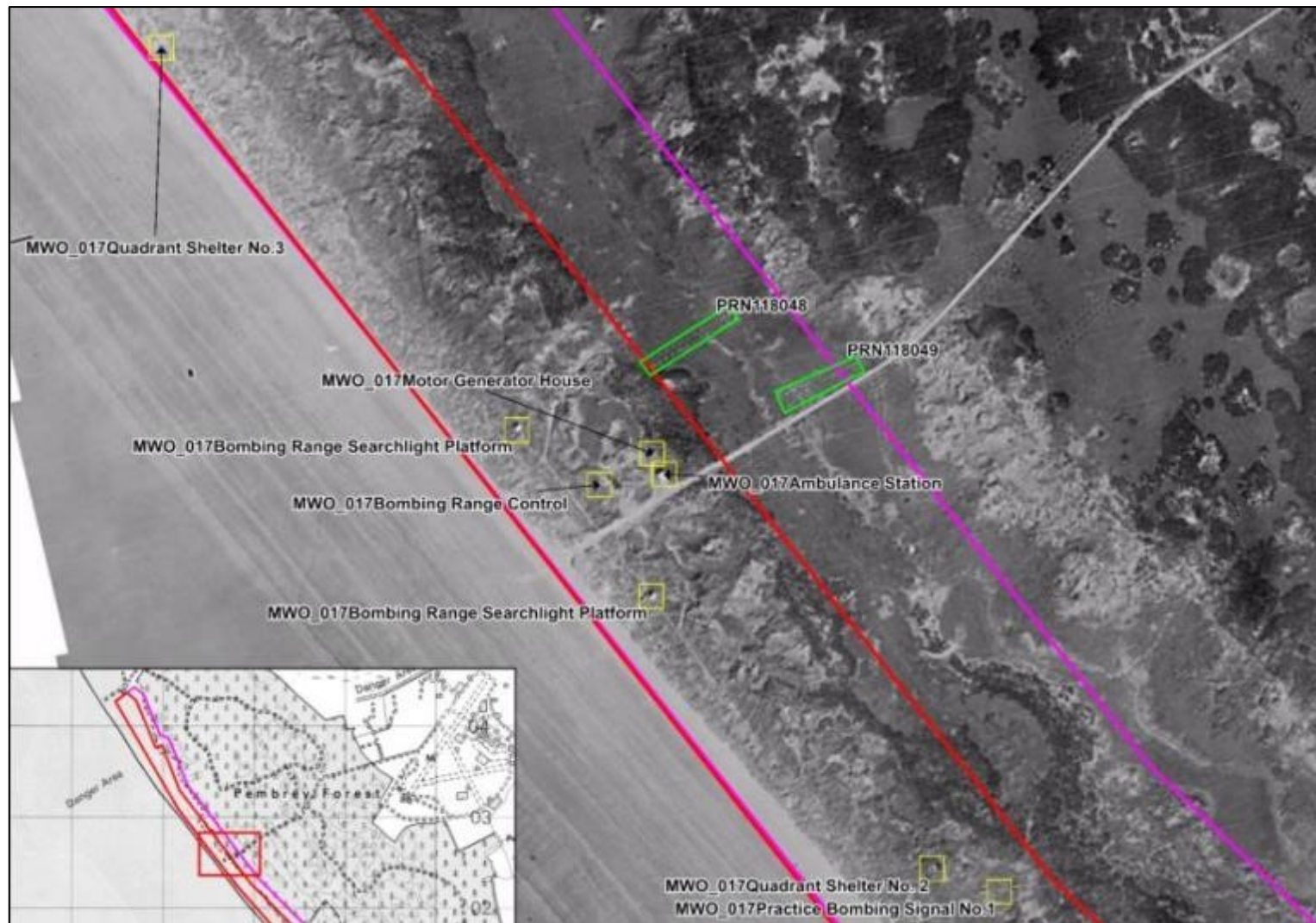


Figure 5: An extract of the 1946 RAF vertical aerial photograph showing the density of sites and features associated with the bombing range and anti-invasion defences with the survey area (outlined in red) and 100m buffer (outlined in pink). The green polygons map the extent of the minefields within the search area. Note the additional north-eastern minefields aligned parallel to the track (After Bell, 2020).

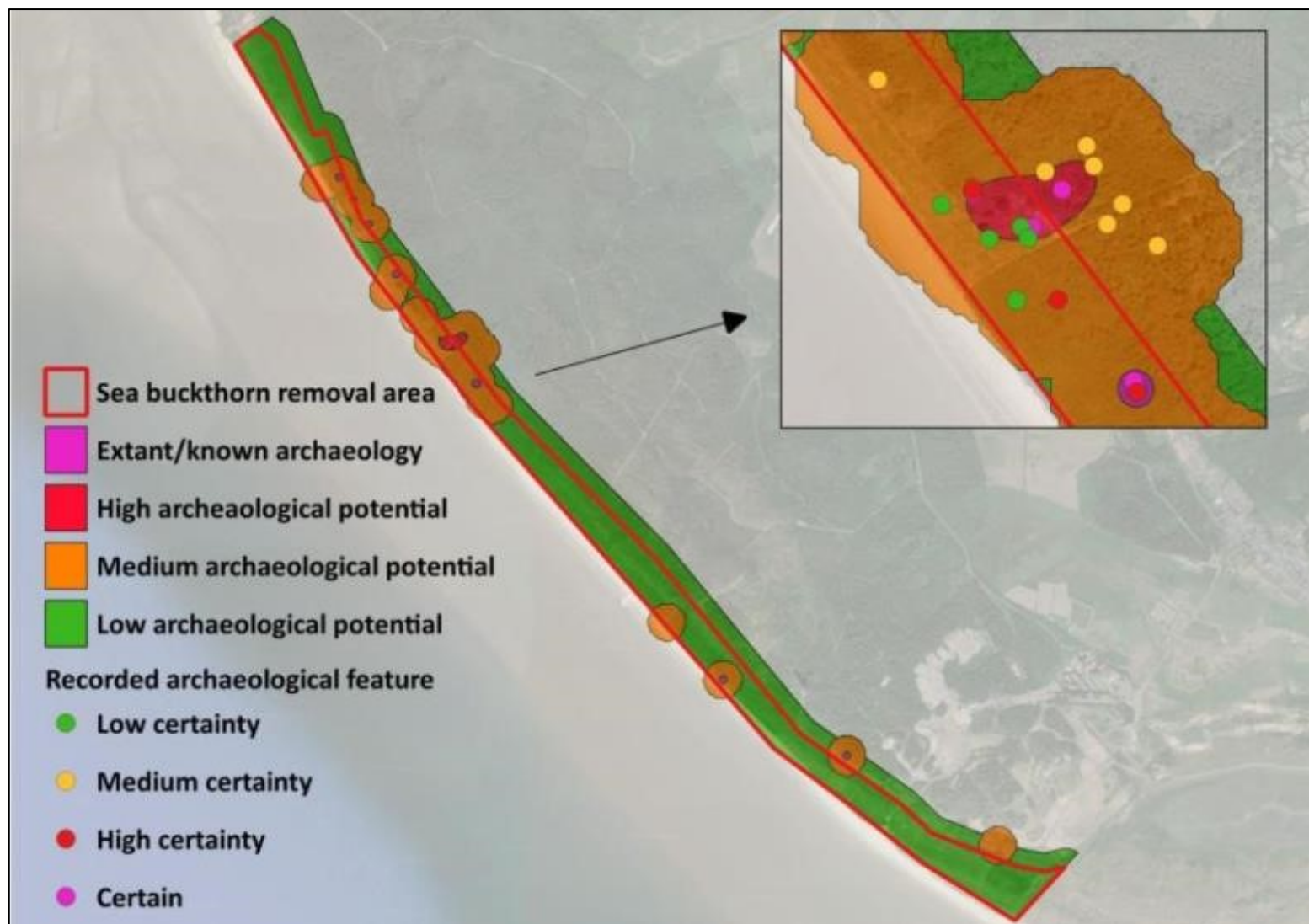


Figure 6: Map showing the areas of “Extant/known archaeology”, “High archaeological potential”, “Medium archaeological potential” and “Low archaeological potential” in the sea buckthorn removal area and 100m buffer. Map data ©2020 Google (After Bell, 2020)



Figure 7. Map showing the distribution of sites from all sources and their confidence classes at the hub area of the former bombing range control within the sea buckthorn removal area and 100m buffer. Map data ©2020 Google (After Bell, 2020)



Figure 8. Map showing the distribution of sites from all sources and their confidence classes in the area immediately south-east of the centre of the sea buckthorn removal area and 100m buffer. Map data ©2020 Google (After Bell, 2020)
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5. WATCHING BRIEF

- 5.1 The definition of archaeological watching brief, taken from the Chartered Institute for Archaeologists Standards and Guidance: for Archaeological Watching Briefs (CIfA S&G: AWB 2014) is a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.
- 5.2 The purpose of a watching brief, as laid down in the CIfA S&G AWB is:
to allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works;
to provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment.
- 5.1 This document provides a scheme of works for:
Archaeological attendance and recording during the mechanical removal of sea buckthorn at Pembrey Burrows, Pembrey, Carmarthenshire.

6. PROJECT OBJECTIVES

- 6.1 Provision of a written scheme of investigation to outline the methodology by which DAT Archaeological Services will undertake the archaeological watching brief.
- 6.2 To monitor groundworks in order to identify the presence/absence of any archaeological deposits.
- 5.2 To establish the character, extent and date range for any archaeological deposits to be affected by the proposed groundworks.
- 5.3 To appropriately investigate and record any archaeological deposits to be affected by the groundworks.
- 5.4 To produce an archive and report of any results.

7. ARCHAEOLOGICAL WATCHING BRIEF METHODOLOGY

- 5.5 The watching brief will entail an archaeologist being present during all stages of the sea buckthorn removal where there is a potential for archaeological remains to be exposed, damaged or destroyed.
- 5.6 It is essential that coordination between the site contractors and archaeologist is established at the outset to avoid any potential disturbance to the monument without an archaeologist being present, or unnecessary visits to the site when works are being carried out that do not require the presence of an archaeologist.

- 5.7 Adequate time must be made available to the visiting archaeologist to ensure that appropriate recording can be undertaken of any archaeological features or deposits exposed during ground works.
- 5.8 Recording of all archaeological features or deposits will conform to best current professional practice. Significant archaeological features or deposits will be drawn at a suitable scale (no less than 1:20) and photographed in an appropriate format.
- 5.9 All archaeologically significant finds (if found) will be retained and, where possible, related to the contexts from which they derived. All finds, except those deemed to be Treasure, will remain the property of the landowner.
- 5.10 Under the 1996 Treasure Act, "treasure" can be summarised as:
- Any object other than a coin containing at least 10% gold or silver and at least 300 years old;
 - Any prehistoric assemblage of base metal;
 - Coins found together which contain 10% gold or silver (but no single coins) and groups of at least 10 coins of other metals, provided they are at least 300 years old;
 - Any object found associated with treasure except unworked natural objects; and
 - Any object which would have been Treasure Trove before the 1996 Act but not covered above.
- 7.10 In the event that unforeseen archaeological discoveries are made during the development, or that archaeological remains of high significance are exposed, the appointed Archaeological Contractor shall have the power to halt any ground works and shall inform the site agent/project manager and prepare a written statement with plan detailing the archaeological evidence. Following assessment of the archaeological remains and consultation the archaeological curator at Dyfed Archaeological Trust's Heritage Management section, the appointed Archaeological Contractor shall, if required, implement on behalf of the Client a contingency scheme for salvage excavation of affected archaeological features.
- 7.11 In the very unlikely event that human remains are encountered, the District Coroner's Office and the Police will be notified immediately. All human remains will, where possible, be left *in situ*. If preservation *in situ* is not possible all statutory permissions will be obtained in writing before removal begins.

8 POST-FIELDWORK REPORTING AND ARCHIVING

- 8.1 An archive will be prepared if it meets the requirements of the Dyfed Archaeological Trust archive retention policy (2018). If it does, then data recovered during the evaluation will be collated into a site archive structured in accordance with the specifications in Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation (Brown 2011), and the procedures recommended by the National Monuments Record, Aberystwyth. The National Standards for Wales for Collecting and Depositing Archaeological Archives produced by the Federation of Museums and Art Galleries of Wales will also be adhered to. Digital archives will be collated using the Royal Commission on the Ancient and Historical Monuments of Wales systems (2015) and deposited with the RCAHMW. The Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs) shall be followed.
- 8.2 The results of the fieldwork will be assessed in local, regional and wider contexts.
- 8.3 The results will be used to inform subsequent design considerations of the proposed development so that they can aim to avoid impacts upon any archaeological remains or that further archaeological mitigation can be implemented before such remains are disturbed.
- 8.4 The project archive, including all significant artefacts and ecofacts (excepting those which may be deemed to be Treasure) will be deposited with an appropriate body following agreement with the landowner (if retained and containing more than just digital information).
- 8.5 DAT Archaeological Services will arrange for the deposition of finds, and ascertain the costs of storage and deposition, with an approved body before the project commences and inform DAT-HM of the arrangement which has been made.
- 8.6 A summary of the project results, excluding any confidential information, may be prepared for wider dissemination (e.g. Archaeology in Wales and special interest and period-specific journals).
- 8.7 The report will be prepared to follow the Standard and Guidance for Archaeological Watching Briefs (CIfA S&G: AWB 2014).
- 8.8 Digital copies of the report will be provided to the client, as well as the regional HER and DAT-HM.
- 8.9 Appropriate specialists to be used by DAT Archaeological Services include:
 - **Industrial Archaeology** –Jennifer Protheroe-Jones, Principal Curator – Industry, National Waterfront Museum, Swansea
 - **Post-medieval / medieval pottery** – Dee Brennan (local independent specialist)
 - **Prehistoric Pottery** – Dr Alex Gibson (formerly of University of Bradford / now Independent pottery specialist)
 - **Prehistoric Flint** – Dr Andrew David (formerly of English Heritage, now independent lithics specialist)
 - **Radiocarbon dating** - Beta Analytic
 - **Animal Bones** – Worcester Archaeology

- **Fish bones** – Jennifer Browning (University of Leicester Archaeological Services)
- **Environmental / Pollen analysis** – Worcester Archaeology

9. STAFF

- 9.1 The project will be managed by Fran Murphy, Head of DAT Archaeological Services.
- 9.2 The on-site works will be undertaken by experienced archaeologists, from DAT Archaeological Services.

10. QUALITY ASSURANCE

- 10.1 DAT Archaeological Services has considerable experience of undertaking all categories of archaeological fieldwork and always operates to best professional practice; adhering to CIfA guidelines where appropriate. The Trust is a Registered Organisation with CIfA and all staff abide by their code of conduct and adhere to their relevant standards and guidance.
- 10.2 DAT Archaeological Services operate robust internal monitoring procedures that ensure that the standard of each project is maintained from commencement to completion.

11. MONITORING

- 11.1 The watching brief may require monitoring by the archaeological curator at Dyfed Archaeological Trust's Heritage Management, section who should be told of the commencement of the works. The fieldwork may also need to be monitored by the Head of DAT Archaeological Services.
- 11.2 All parties should be provided with free access to the site at any time during the watching brief works.

12. HEALTH AND SAFETY

- 12.1 All permanent DAT Archaeological Services staff are CSCS¹⁰ registered.
- 12.2 DAT Archaeological Services will carry out a health and safety risk assessment to ensure that all potential risks are minimised. The Watching Brief will be undertaken in accordance with the safety constraints of the UXO mitigation strategy.
- 12.3 All known health and safety risk and the presence of any services etc must be made known to the attending archaeologist at the start of any ground works by the client/site contractor.
- 12.4 All relevant health and safety regulations must be followed, including compliance with Welsh Government guidelines on working practices during the current Covid-19 Pandemic, and guidance issued by CIfA.
- 12.5 CIfA advise that Registered Organisations should ensure they are familiar with the latest *Site Operating Procedures*, published by the Construction Leadership Council (Version 4, updated 18th May 2020)

¹⁰ *Construction Skills Certification Scheme (Health and Safety Tested)*

and the latest *Covid-19 Working Advice Ver.1.1*, published by Prospect (5th May 2020), which addresses potential issues relating to archaeological site work. These procedures will be attached to the project risk assessment. If the site cannot operate in line with this guidance then the project archaeologist will not be allowed to attend.

- 12.6 The project risk assessment details the precautions put in place to reduce the spread of Covid-19 Coronavirus during fieldwork.
- 12.7 All site inductions, H&S procedures and site rules of the site contractor will be made known to DAT Archaeological Services staff prior to them commencing work on-site. **The attending archaeologist will also attend a toolbox talk with the UXO and removal contractors on the 1st February 2021.**
- 12.8 Safety helmets, high visibility vests and boots are to be used by all site personnel as necessary. The site contractors will make all archaeological staff aware of any other PPE¹¹ that may be required and provide them. Archaeological staff must not enter any area where there is a considered to be a health and safety risk that has not or is not being appropriately mitigated against.
- 12.9 DAT Archaeological Services staff must ensure that their presence on site is communicated to all relevant site staff, especially machine operators.
- 12.10 **Working with machinery:** all staff must ensure that their presence on site is communicated to all relevant site contractor staff, especially the machine operator. The archaeologist observing the excavation of trenches by machine will establish a safe working procedure with the machine operator at the start of work. This will include explaining the purpose of the works itself and the method by which the trenches shall be machined. This will include ensuring that the machine driver is aware that topsoil is stripped carefully to avoid disturbing archaeology. This will also include discussing the methodology for safe working, ensuring that no machining is done without an archaeologist being present.

13. ARBITRATION

- 13.1 Any dispute or disagreement arising out of a contract in relation to this work shall be referred for a decision to the Chartered Institute of Archaeologist's arbitration scheme.

¹¹ *Personal Protection Equipment*

