

**WINTER SEA BUCKTHORN REMOVAL
PEMBREY BURROWS, PEMBREY,
CARMARTHENSHIRE
ARCHAEOLOGICAL WATCHING BRIEF
2023**



Prepared by The Trust for Welsh
Archaeology – Dyfed Region
Archaeological Services

For: The National Trust



DYFED ARCHAEOLOGY



ARCHAEOLEG DYFED

THE TRUST FOR WELSH ARCHAEOLOGY – DYFED REGION

EVENT RECORD NO:130158

REPORT NO: 2023-53

December 2023

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by

Jessica Domiczew

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ARCHAEOLOGICAL WATCHING BRIEF 2023

Client	Natural Resources Wales
Event Record No	130158
Report No	2023-53
Project Code	FS23-029
Report Prepared by	Jessica Domiczew
Fieldwork Directed by	Jessica Domiczew
Illustrated by	Jessica Domiczew
Report Approved by	Fran Murphy

Rev Number	Description	Undertaken	Edited/Approved	Date
_V1	Draft	JD	CK	
_V2	Draft	CK	FM	12/01/2024
_V3	Final	JD	FM	15/02/2024

WINTER SEA BUCKTHORN REMOVAL
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ARCHAEOLOGICAL WATCHING BRIEF 2023

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EXECUTIVE SUMMARY

The Trust for Welsh Archaeology – Dyfed Region Archaeological Services were commissioned by Natural Resources Wales to undertake an archaeological watching brief during the removal of sea buckthorn in two areas of Pembrey Burrows.

Whilst the archaeological potential of Area 1 had been considered low, removal of the sea buckthorn revealed several archaeological remains associated with the site's use during World Wars I and II. Remains from defensive structures and the HMF munition factory boundary fence were uncovered.

Area 2 had medium potential for archaeological remains relating to World War II, as it was known to contain several historic assets of that date. The removal of sea buckthorn revealed sections of fencing dating to World War II and possible trenches and impact craters from training during this period. Modern training bullets and a training grenade were also found during the watching brief.

CRYNODEB GWEITHREDOL

Comisiynwyd Ymddiriedolaeth Archaeoleg Cymru – Gwasanaethau Archeolegol Rhanbarth Dyfed gan Cyfoeth Naturiol Cymru i gynnal brîff gwyllo archaeolegol yn ystod y broses o gael gwared ar helygen y môr mewn dwy ardal yn Nhwyni Pen-bre

Er bod potensial archeolegol Ardal 1 wedi'i ystyried yn isel, datgelodd cael gwared ar helygen y môr sawl olion archaeolegol yn gysylltiedig â defnydd y safle yn ystod y Rhyfel Byd Cyntaf a'r Ail Ryfel Byd. Darganfuwyd olion o strwythurau amddiffynnol a ffens ffin ffatri arfau HMF Pen-bre.

Roedd gan Ardal 2 botensial canolig ar gyfer olion archeolegol yn ymwneud â'r Ail Ryfel Byd, gan y gwyddys ei bod yn cynnwys nifer o asedau hanesyddol o'r dyddiad hwnnw. Datgelodd tynnu helygen y môr ddarnau o ffens yn dyddio o'r Ail Ryfel Byd a ffosydd posibl a chraterau trawiad o hyfforddiant yn ystod y cyfnod hwn. Darganfuwyd bwledi hyfforddi a grenâd hyfforddi modern yn ystod y brîff gwyllo hefyd.

1 INTRODUCTION

1.1 Project Commission

- 1.1.1 The Trust for Welsh Archaeology-Dyfed Region Archaeological Services (TWA-DR AS) 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 two locations (Figs 1, 2 and 3):
- Area 1 was within the limits of Pembrey Country Park, Carmarthenshire centred on SS 4127 9972.
 - Area 2 was on Pembrey Burrows on the southwestern fringe of Pembrey Forest, Carmarthenshire, centred on SN 3656 0422.
- 1.1.2 These areas are dune grassland habitats which have been overtaken by the non-native invasive shrub, sea buckthorn. Clearing the shrub would enable the dunes to recover and return to their natural state. Area 1 contained mature sea buckthorn and Area 2 contained younger and less dense sea buckthorn.
- 1.1.3 Following discussions with the archaeological curators at TWA-Dyfed Region's - Heritage Management (TWA-DR-HM) section, it was recommended that an archaeological watching brief be carried out during the sea buckthorn removal, as the proposed clearance areas are located within 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 TWA-DR-AS before the commencement of the works and was approved by TWA-DR-HM in their capacity as advisors to the local authority, before the commencement of the works (Appendix I). The project objectives were:
- Provision of a written scheme of investigation to outline the methodology by which TWA-DR-AS will undertake the archaeological watching brief.
 - To monitor groundworks 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.*

1.3 Report Outline

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

1.4 Abbreviations

- 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.

Table 1: Archaeological and historical timeline for Wales.

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)	AD 43 – c. AD 410	Historic
Post-Roman / early medieval	c. AD 410 – AD 1086	
Medieval	1086 – 1536	
Post-medieval	1536 – 1750	
Industrial	1750 – 1899	
Modern	20 th century onwards	

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

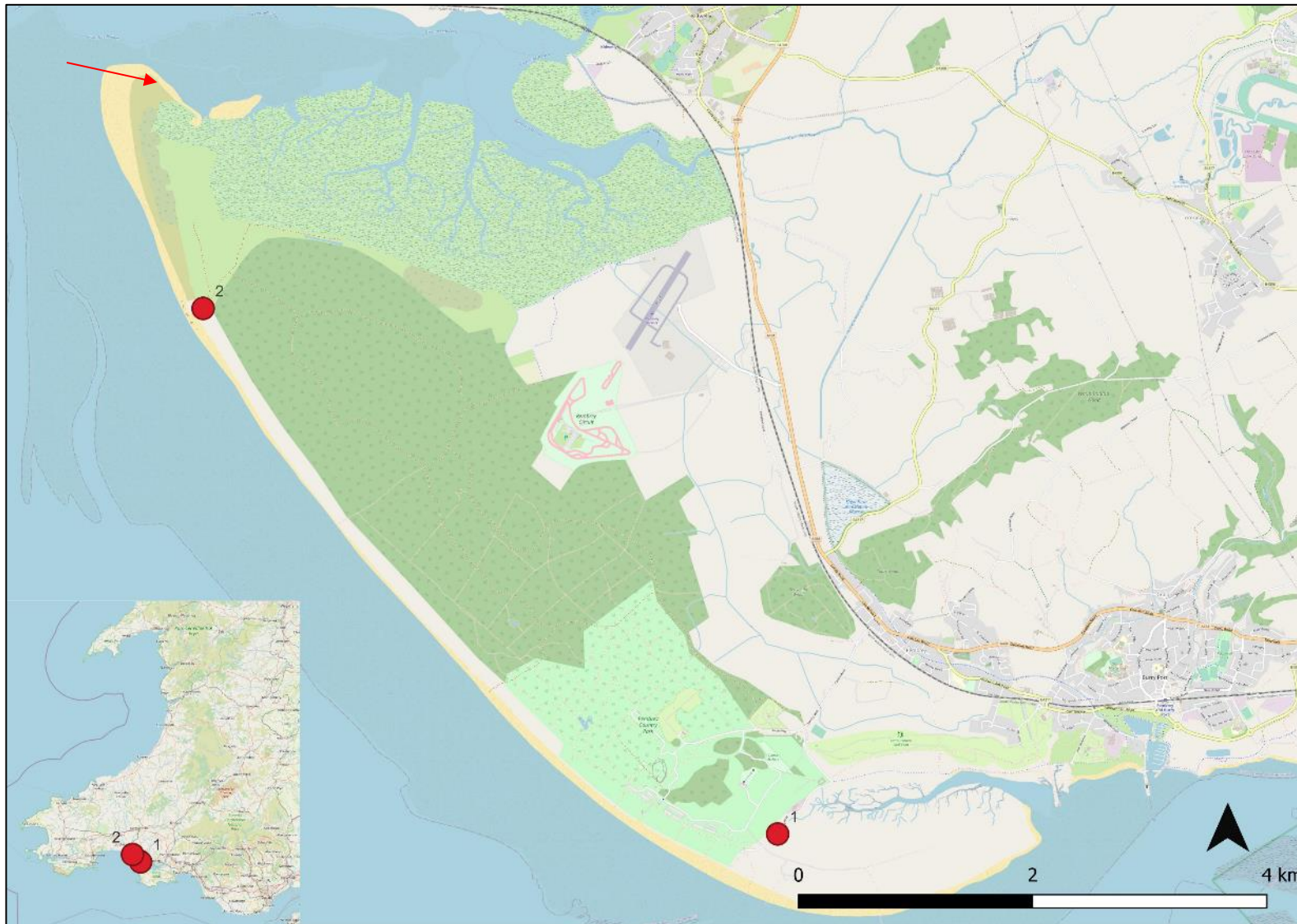


Figure 1: Location map showing the two areas proposed for sea buckthorn removal (red circle).
Location of Tywyn Point (red arrow). *OpenStreetMap2023.*

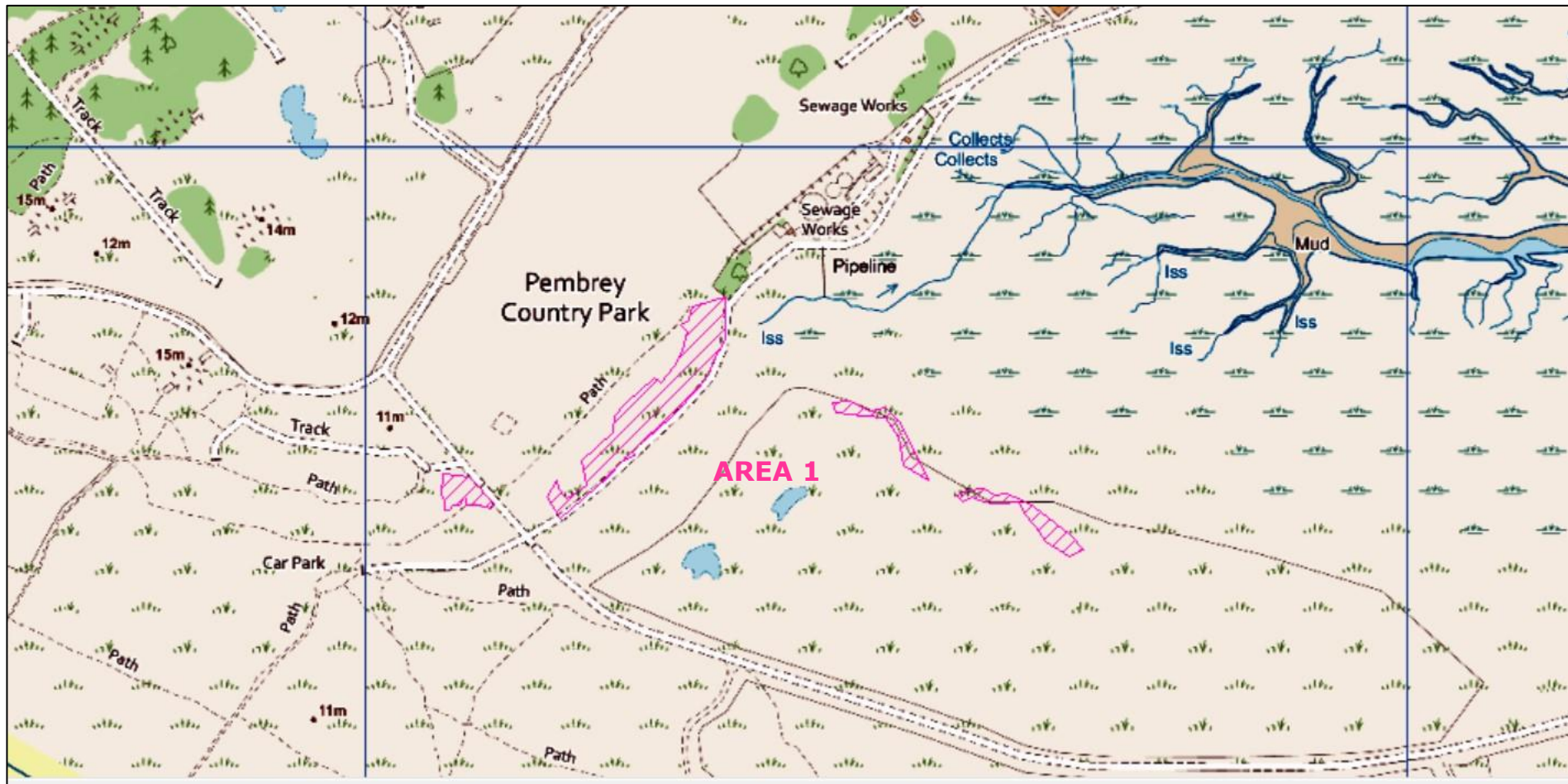


Figure 2: Location of Area 1: removal of sea buckthorn that has colonised the dune system (outlined in pink). Map supplied by client.

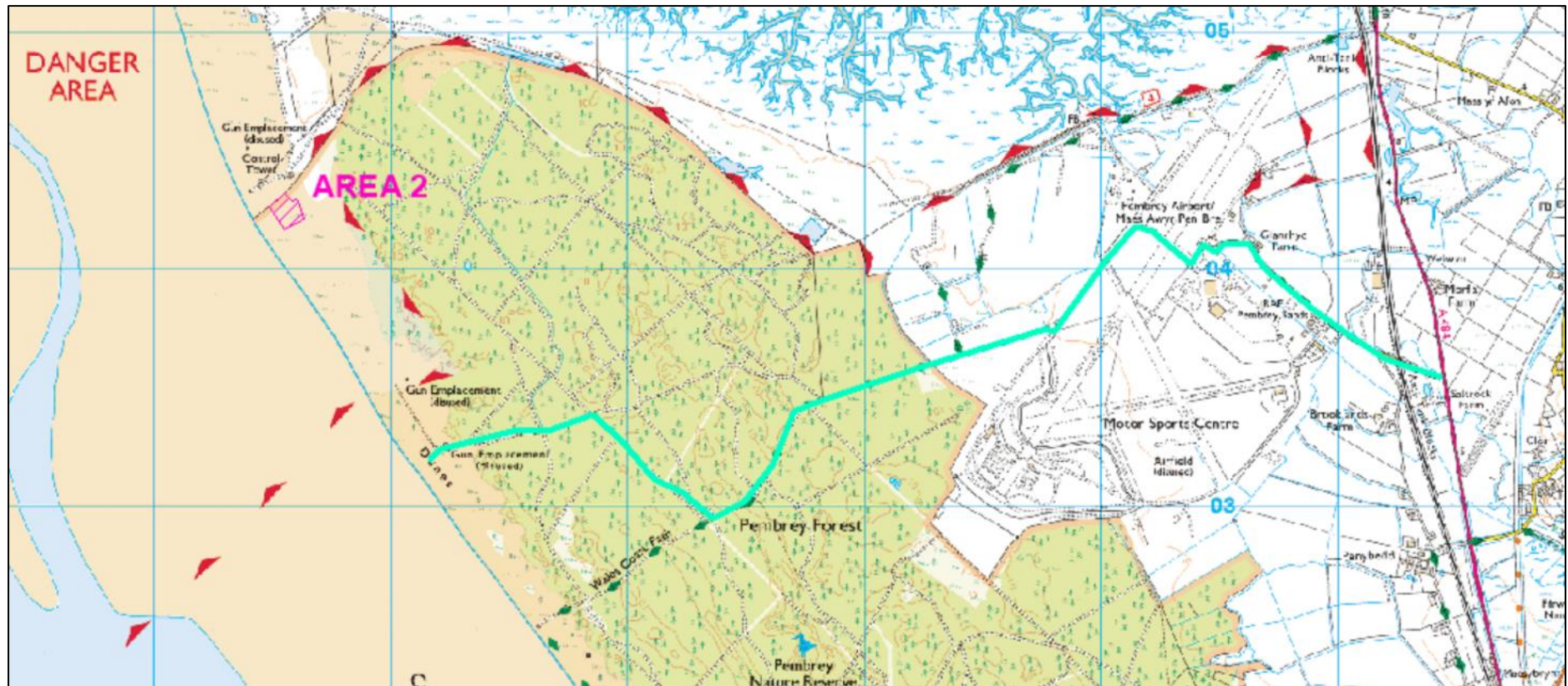


Figure 3: Location of Area 2: removal of sea buckthorn that has colonised the dune system (outlined in pink). Map supplied by client.

2 SITE LOCATION AND TOPOGRAPHY

- 2.1 The Pembrey Burrows dune system (Area 2) is located at the southern side of the Gwendraeth Estuary in the eastern part of Carmarthen Bay. The dunes commence in the north at Tywyn Point (Fig 1) and extend c.1.25km southwards along the coast, terminating at the town of Burry Port. Pembrey Airfield (opened in March 1939) is located approximately 2km to the east of the Burrows. Pembrey Forest is immediately south-west of the airfield while Pembrey Country Park (Area 1) is at the south-eastern end of the dunes.
- 2.2 Pembrey Forest is owned and managed by Natural Resources Wales and is bordered to the north-west by the MOD Pembrey Sands Firing Range and to the south-east by Pembrey Country Park. The dunes in the latter area are owned by Carmarthenshire County Council.
- 2.3 The northern and southernmost ends of the 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 was 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 the south-eastern end of the Pembrey Dunes has been closely monitored since 1998. The monitoring data have revealed up to 170m of frontal dune erosion between 1998 and 2013 at Tywyn Point but no net change near the Air Weapons Range control tower (close to Area 2). However, the study has also revealed 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 (Pye and Blott 2014, 7–8).
- 2.4 The underlying geology of the area is the Bishopstone Mudstone Formation; sedimentary mudstone, siltstone and sandstone bedrock formed approximately 313 to 326 million years ago during the Carboniferous period. The superficial geology is windblown sand (BGS online). The recent geomorphological assessment notes that the Pembrey Dune system formed over the last 12,000 years, during the Late Flandrian (Post-glacial) period. However, the core area 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 (Pye and Blott 2014, 5–8).
- 2.5 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. Planting began in 1929 and continued until 1954. The conifers (Pembrey Forest) occupy the centre of the dune system whilst its northern and southern ends have experienced encroachment by scrub, grasses and sea buckthorn, the latter also introduced by the Forestry Commission. 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 2014, 8–11).

3. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

3.1 Historical Background

- 3.1.1 A historical background was put together by Shiner 2022 using information from Bell 2016. Shiner's (2022) summary is given below:
- 3.1.2 *The area of Pembrey Burrows occupies that part of Pembrey (or 'Towyn') Burrows which is not planted with coniferous forest, i.e., a narrow strip averaging c.150m wide on the seaward side of Pembrey Forest. The Burrows developed at the mouth of the 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 dune system at The Burrows has developed since at least the 17th century, but is not thought to date from earlier than the medieval period. Its seaward development continues. The area was incorporated into the system of Second World War defences around Pembrey Airfield and Ordnance Factory.*
- 3.1.3 *Work on the construction of the RAF Pembrey Airfield and Pembrey Sands Air Weapons Range began 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". Upon 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 original Bombing Range Control Tower.*

3.2 Recorded Archaeological Sites

- 3.2.1 An archaeological background was put together by Shiner in 2022. Sections 3.2.2-3.2.4 are quoted from Shiner 2022:
- 3.2.2 *Pembrey Burrows is an area with archaeologically and historically significant Second World War anti-invasion defences along with later infrastructure relating to an RAF air weapons range located 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 coordinated 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 both the regional Historic Environment Record (HER) and the National Monument Record (NMR).*
- 3.2.3 *Jonathan Berry's unpublished PhD thesis on Second World War anti-invasion defences in south and south-west Wales revealed a significant number of sites within the Pembrey area, the majority of which were previously unrecorded (Berry 2016). At present, not all the remains highlighted by Berry are recorded on the Dyfed Historic Environment Record nor the National Monument Record.*
- 3.2.4 *Consultation of various documentary sources, particularly historic photography, during a recent archaeological assessment identified several features of archaeological interest within the Pembrey Burrows area (Bell, 2020). 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 multiple grid references between sources. 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.

- 3.2.5 Area 1 of the present study was in an area with low archaeological potential. Two remains from a World War II defensive structure PRN 129713 and PRN 129714 were identified by Shiner 2022 whilst monitoring the removal of sea buckthorn.
- 3.2.6 Area 2 was located within an area of medium archaeological potential with known sites of archaeological interest nearby, all of which have been the subject of recent observation (Pyper 2013; Berry 2016; Bell 2020; Enright 2021; Shiner 2022). None of these sites have any designated status. Site details are presented in Table 2, and site locations mapped in Figure 4.

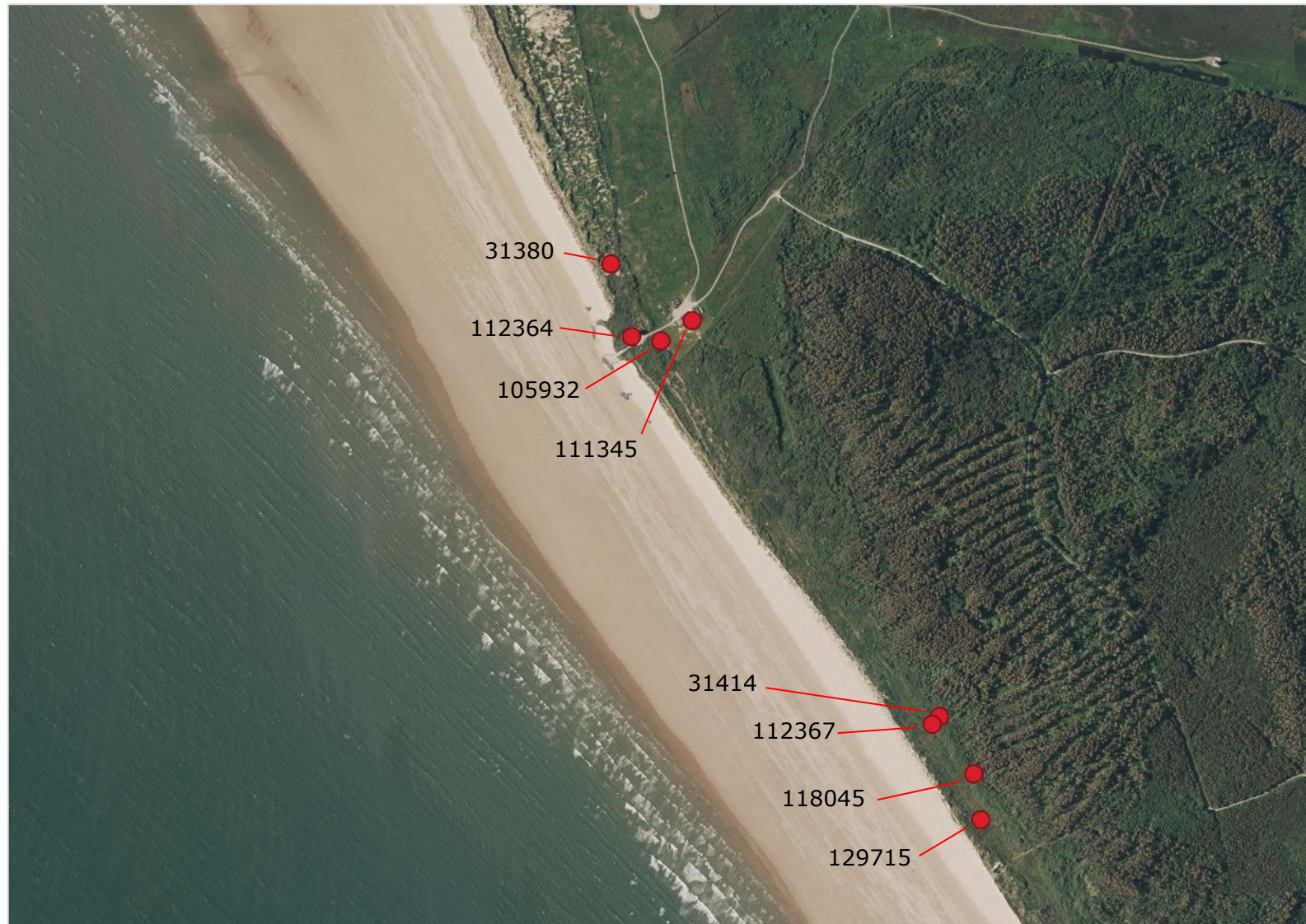


Figure 4: Known archaeological assets near to Area 2 (red dot) - see Table 2 below.

Table 2: Historic assets close to Area 2.

PRN	REF	NAME	TYPE	SUMMARY	EVIDENCE	NGR
31414		Wing Marker Shelter No 2	Wing marker shelter	Wing Marker Shelter No 2. A small concrete rectangular plan shelter with a turf covered concrete roof.	A. Pyper site visit	SN 37053 03516
31380			Gun emplacement	A Second World War gun emplacement overlooking Cefn Sidan beach.	A. Pyper site visit	SN 36401 04508
105932			Pillbox	Turf covered, brick-built pillbox.	A. Pyper site visit	SN 36502 04351
111345			Military depot	Service compound.	A. Pyper site visit	SN 36571 04400
112364			Modern tower	The current range tower for air to ground bombing training.	A. Pyper site visit	SN 36450 04370
112367			Gun emplacement	A Second World War gun emplacement overlooking Cefn Sidan beach.	A. Pyper site visit	SN 37069 03532
118045			Pillbox (variant)	A pillbox constructed in brick with a shuttered concrete roof.	A. Pyper site visit	SN 37138 03408
129715			Modern fence	Seventeen concrete fence posts parallel with shoreline. Possibly associated with nearby World War II bombing range.	M. Shiner watching brief	SN 37150331
	J. Berry 2016	Wing Marker Shelter No 2	Wing marker shelter	Duplication of PRN 31414.	J. Berry site visit	

PRN	REF	NAME	TYPE	SUMMARY	EVIDENCE	NGR
	J. Berry 2016	Tywyn Burrows 4 inch beach defence gun house	Gun emplacement	Duplication of PRN 112367.	J. Berry site visit	SN 37068 03531
	J. Berry 2016	Military structure	Coastal defences	Duplication of PRN 118045.	J. Berry site visit	SN 37139 03404
	J. Berry 2016	6-pdr Gun emplacement	Gun emplacement		J. Berry site visit	SN 36955 03492
	J. Berry 2016	Pembrey anti- landing obstacle	Anti-landing obstacle		J. Berry site visit	SN 36531 04028

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* (CIfA 2014). The work took place over 5 days between December 11th and 15th 2023. The weather was dry, mostly sunny and mild.
- 4.1.2 A WSI (Appendix I) was prepared by TWA-DR-AS detailing the proposed archaeological works.
- 4.1.3 Recording of all archaeological features or deposits conformed to best current professional practice and was carried out following the Recording Manual used by TWA-Dyfed Region Archaeological Services (adopted from the Recording Manual developed by English Heritage Centre for Archaeology, a copy is always available on-site for inspection if required). A photographic record was maintained throughout this watching brief, a summary of which is presented in the Project Archive.
- 4.1.4 An Unexploded Ordnance (UXO) Risk Assessment undertaken by RPS concluded that the risk of UXO at Pembrey Burrows was sufficient to necessitate that the archaeological watching brief was undertaken under the conditions of a UXO watching brief (RPS, 2020). 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; and
 - Marine Migrated Ordnance.
- 4.1.5 Cutting of sea buckthorn took place at ground level with no ground penetration due to UXO risk. In Area 1, large dense stands of buckthorn were removed using nine tonne, 360° mechanical excavators, each equipped with a tree shear attachment. The shears cut the plant at ground level leaving the roots and stump. Once removed, the plants were mulched into the trailer of an articulated lorry for removal from the site. In Area 2, the low-lying/medium to smaller stands were mulched using a nine tonne, 360° mechanical excavator with mulching attachment. In both areas, the stumps were subsequently sprayed to prevent regrowth.

4.2 Post-Fieldwork Reporting and Archiving

- 4.2.1 All data recovered during the fieldwork were collated into a site archive structured following specifications in *Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation* (Brown 2011), and procedures recommended by the National Monuments Record, Aberystwyth.
- 4.2.2 The results of the fieldwork have been assessed in their 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.

5. RESULTS

5.1 Area 1

- 5.1.1 The density of sea buckthorn in Area 1 made it difficult to carry out a thorough walkover survey before the mechanical excavators moved in (Photo 1).
- 5.1.2 The buckthorn was removed using mechanical excavators equipped with a tree shear attachment (Photo 2). The plants were cut at ground level leaving the roots and stumps. The debris was removed to a nearby car park for mulching using a tracked telehandler with a grabbing attachment.
- 5.1.3 As areas were cleared of buckthorn it was possible to carry out a walkover survey. Although some debris, brambles and other plants obscured the ground (Photo 3) any upstanding archaeological remains should have been visible.
- 5.1.4 Across Area 1, archaeological evidence dating to the early twentieth century was noted in the form of ten rectangular concrete blocks with evidence of iron fixings and one concrete gate post with metal attachments (Photos 4, 5, 6 and 7). These remains are from World War II defensive structures and were found in isolation or pairs which suggests they are not in-situ. Aerial photographs and maps do not show archaeological features in this location, indicating these remains have been deliberately deposited from elsewhere.
- 5.1.5 Area 1 extended northeast up to the boundary fence of the current sewage works (Fig 2). Around 4m southwest from the fence, a concentration of large concrete blocks, some with metal fittings, was revealed over an area of around 4m wide and 6m long (Photos 8, 9 and 10). Most of the blocks were nearly 0.5m wide and 1.0m long. The feature was densely covered in brambles and plants making it hard to distinguish, and aerial photographs and maps do not show any structures in this location. These blocks are therefore not in-situ but have been deliberately deposited from elsewhere. They may be from a World War II pillbox, gun emplacement or other defensive structure nearby. The remains have had a record created on the regional HER (PRN 130303).
- 5.1.6 1m northwest of the concentration of blocks was a distinct large rectangular concrete block with a rectangular void in the top (Photos 11 and 12). It measured 0.75m wide, 0.90m long and 0.96m deep. The void measured 0.23m wide, 0.30m long and 0.85m deep. The remains are likely to be from a World War II defensive structure which was located nearby. These remains were not seen in-situ on aerial photographs or maps.
- 5.1.7 Immediately to the west of the concentration of stone blocks was a raised linear bank of earth and smaller concrete blocks (Photo 13 and 14) which measured roughly 0.35m wide, 0.5m long and 0.15m deep. Aerial photographs and maps show no feature in this location, suggesting the material was deposited from a World War II structure elsewhere.
- 5.1.8 Around 10m southwest of the sewage works fence were four large concrete blocks running north-south (Photo 15). The blocks measured roughly 1.50m long, 0.97m wide and 0.40m deep and had evidence of metal fittings. They may have been part of a World War II roadblock or anti-invasion structure and were not seen in-situ on aerial photographs or maps, again suggesting deliberate deposition from elsewhere.
- 5.1.9 Below ground, the UXO engineer uncovered sunken concrete blocks with metal fittings and the remnants of a fence. Metal posts and barbed wire were found at equal intervals running northeast-southwest for c. 220m (Photos 16 and 17). Once the sea buckthorn was removed, it was observed that the fence was situated on an earthen bank which also ran northeast-southwest (Photo 18). The fence is recorded on the 1917 munitions factory map (Fig 5) and is shown to be the outer boundary

of HMF Pembrey which was in use between 1914 and 1919. The fence is not present on the later munition factory map of 1961, nor in aerial photos from the 1940s onwards, which suggests the boundary fell out of use. The remains of the earthen mound remained visible in aerial photographs throughout the twentieth century (Fig 6). A record for the fence has been created on the regional HER (130304)

- 5.1.10 To prevent the public from parking on the areas cleared of sea buckthorn, a bank was constructed via machine using material from the side of the road (Photo 19). To the northeast of Area 1 where the concentration of blocks was found, a shallow ditch was excavated to prevent disturbing the archaeological remains (Photo 20).



Photo 1: Removal of dense sea buckthorn in Area 1.



Photo 2: Machine with tree shear attachment.



Photo 3: Vegetation obscuring view of ground.



Photo 4: Remains from a World War II defensive structure. 1x1.0m scale.



Photo 5: Remains from a World War II defensive structure. 1x1.0m scale.



Photo 6: Remains from a World War II defensive structure. 1x1.0m scale.



Photo 7: Broken concrete gatepost with metal fittings. 1x1.0m scale.



Photo 8: Southwest facing view of concentration of large concrete blocks. 1x1.0m scale.



Photo 9: East facing view of concrete blocks. 1x1.0m scale.



Photo 10: Northeast facing view of concrete blocks. 1x1.0m scale.



Photo 11: East facing view of large concrete block with rectangular void in top.
Concentration of concrete blocks in distance. 1x1.0m scale.



Photo 12: Void in top of concrete block. 1x0.5m scale.



Photo 13: Earth and concrete block linear bank running east- west. 1x1.0m scale.



Photo 14: Small blocks of concrete amongst earth making a linear bank.



Photo 15: West facing image of row of large concrete blocks. 1x1.0m scale.



Photo 16: Piece of barbed wire from World War I fence.



Photo 17: Metal stake from World War I fence.



Photo 18: Earthen bank World War I fence sits upon. 1x1.0m scale.



Photo 19: Sand bank to prevent public parking on cleared area. 1x1.0m scale.

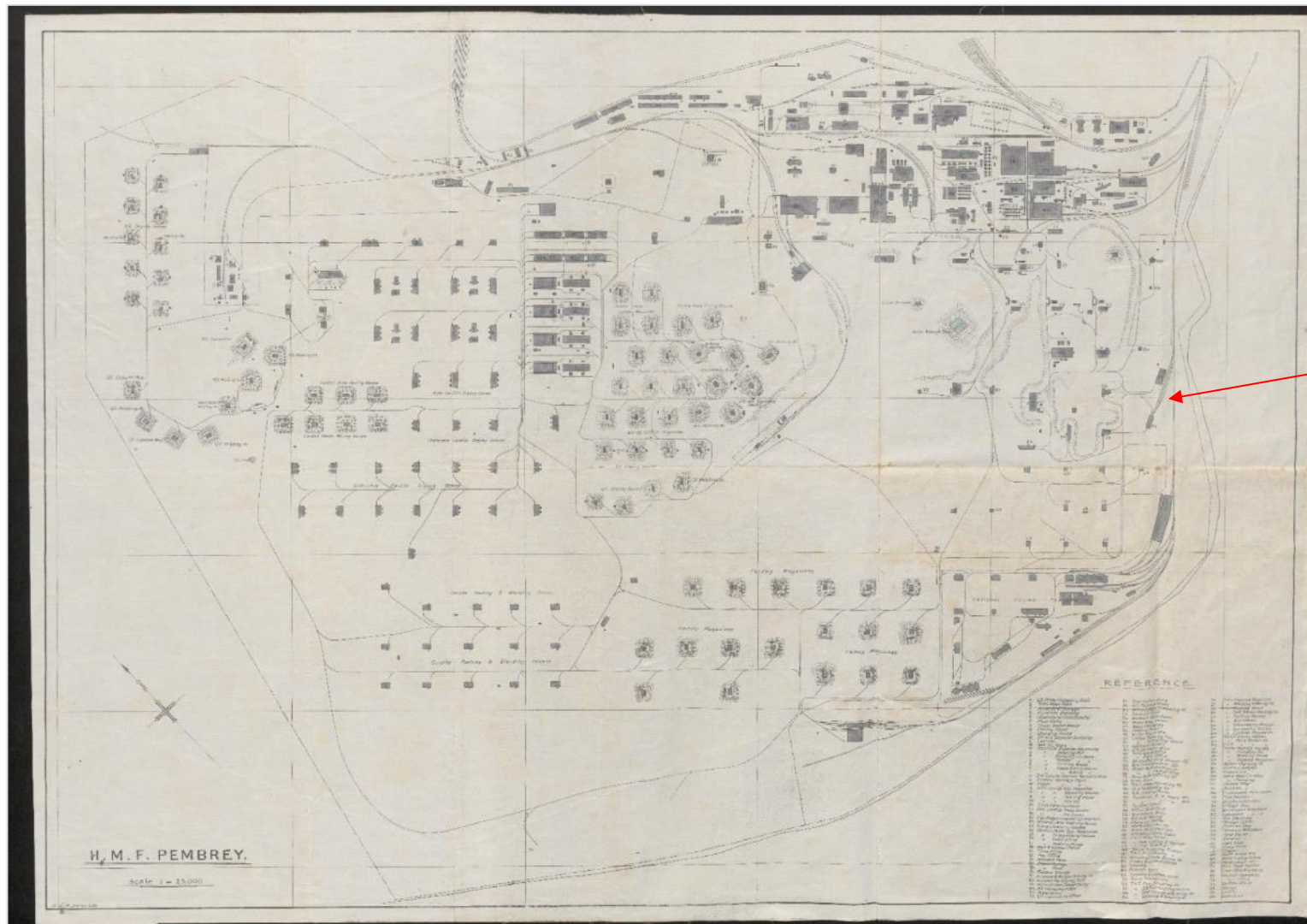


Figure 5: Map of HMF Pembrey showing fence boundary (red arrow) (*National Archives*).



Figure 6: RAF aerial photograph 1954 of Area 1 showing earthen mound (red arrow). (*Welsh Government RAF 1954 image 019*).



Photo 20: Shallow ditch excavated to prevent public parking and to protect archaeological features. 1x1.0m scale.

5.2 Area 2

- 5.2.1 Area 2 was located near the current MOD firing range (Fig 3). Outside of Area 2 but within sight were PRNs 111345, 105932, 112364 and 31380 (Photo 21). It was not possible to get close to these features but all looked to be in a stable condition.
- 5.2.2 During sea buckthorn removal, evidence of activity during World War II and the twenty first century was revealed.
- 5.2.3 Above ground, remaining vegetation made archaeological features hard to distinguish however, craters from target training in World War II were identified across the site (Photo 22). There were also indications of a possible trench running northwest-southeast for hundreds of meters and smaller rectangular cut trenches for training troops on the ground (Photos 23 and 24). These could not be identified in aerial photographs and therefore whether these date to World War II or are modern is unclear.
- 5.2.4 Two concrete fence posts were identified on either side of the track that goes through the sand dunes (Photo 25). These were also identified by Shiner in 2022 who created a record on the regional HER (PRN 129715). These were two of 17 posts which ran northwest-southeast either side of the track (Fig 7).
- 5.2.5 Underground, the UXO engineer identified fragments of barbed wire and metal stakes close to the current MOD fence (Photo 26). The material and style of these remains suggest they date to World War II.
- 5.2.6 In Area 2, there was a lot of remains from the site's recent use. Located close to the MOD fence was a military vehicle now used for training (Photo 27) and across the site, the UXO engineer identified training bullets and a used training grenade (Photo 28).



Photo 21: Known archaeological assets outside of Area 2.



Photo 22: Crater from target practice during World War II. 1x1.0m scale.



Photo 23: Possible trench running parallel to beach (red arrow). 1x1.0m scale.



Photo 24: Possible rectangular cut trench. 1x1.0m scale.



Photo 25: Two concrete fence posts. 1x1.0m scale



Photo 26: Metal fence piece from World War II.



Figure 7: Showing the locations of fence posts (blue dots) observed following removal of buckthorn in Area 2 (red outline) (aerial photography © Google).



Photo 27: Military vehicle used for training. 1x1.0m scale.



Photo 28: Modern training bullets and grenade found during watching brief.

6. CONCLUSIONS

- 6.1 The watching brief monitored the removal of sea buckthorn in two areas of Pembrey Burrows.
- 6.2 Area 1 had been considered to have a low archaeological potential with only two features previously recorded in the area (PRNs 129713 and 120714). There was limited access to the site before the buckthorn removal but afterwards, a large quantity of archaeological remains dating to World Wars I and II were exposed. Due to the remaining brambles and other plant coverage, it was difficult to ascertain the exact extent and nature of these features.
- 6.3 Across Area 1 there were many concrete blocks above and below ground with metal attachments and a concrete gate post with metal fittings. It was established that these remains were not in-situ as they were found in isolation or pairs and no structures in this location were identified in the aerial photographs and maps. The remains are from World War II defensive structures and have been deliberately deposited from elsewhere, but where the material comes from is unclear.
- 6.4 At the northeastern end of Area 1 on the edge of the sewage works, a concentration of large concrete blocks was uncovered and again, these remains are not in-situ. Although the vegetation covered much of the remains, no foundation or flooring could be seen. There is also no evidence of a structure in this location on the aerial photographs or maps. These remains are therefore a deliberate deposit from a World War II defensive structure, possibly a pillbox or gun emplacement, that originally stood elsewhere. A record of these remains has been created on the regional HER (PRN 130303).
- 6.5 Located around the concentration of blocks were additional concrete blocks of various sizes, some with metal fittings. These are all deliberate deposits and were part of World War II defensive structures from somewhere else but again, where they came from is unclear.
- 6.6 Whilst checking the site was safe, the UXO engineer discovered the remnants of a fence. Metal posts and barbed wire were observed at equal intervals on top of an earthen bank running northeast-southwest. The fence dates to World War I and was the boundary around the HMF Pembrey factory. It is recorded on the 1917 map of the site but does not appear on later maps or aerial photographs, suggesting it went out of use during the remodelling of the factory for World War II. A record of the fence has been created on the regional HER (PRN 130304).
- 6.7 In Area 2, sea buckthorn removal revealed remains from World War II and modern MOD activity. Although outside of the work area, PRN's 111345, 105932, 112364 and 31380 could be seen and appeared to be in a stable condition.
- 6.8 Above ground, craters from firing practice during World War II could be seen. There was also a possible trench stretching hundreds of meters parallel to the beach and scatters of smaller rectangular trenches for possible on ground training. These were not seen on aerial photographs however, their straight, sharp edges do not suggest they are natural. If they are trenches for training, it is unclear whether they are from the early twentieth century or are modern.
- 6.9 On either side of the track which runs through the dunes, two concrete fence posts were found. These were identified by Shiner in 2022 and given the PRN 300076. Shiner also found fifteen additional posts which were part of a fence, or two fences, running northwest-southeast that were probably intended to prevent access to the bombing range from the beach.
- 6.10 Below ground, the UXO engineer came across metal remains including barbed wire and metal stakes dating to World War II.

- 6.11 Whilst checking over the area, the UXO engineer discovered multiple modern training bullets and a used training grenade. A World War II military vehicle was located within Area 2 which is used for modern training.
- 6.12 The removal of the invasive species sea buckthorn has uncovered forgotten features relating to World Wars I and II, and modern military activities. These features were not impacted by the sea buckthorn removal and newly discovered remains have had a record created on the regional HER (PRN 130303 and PRN 130304). Images have been sent to specialists on the site and period to investigate these features further.

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

APPENDIX I:

WINTER SEA BUCKTHORN WORK (SAND DUNE BERF PROJECT), PEMBREY, ARCHAEOLOGICAL WATCHING BRIEF 2023 - WRITTEN SCHEME OF INVESTIGATION

1 INTRODUCTION

- 1.1 This Written Scheme of Investigation (WSI or specification) has been prepared by TWA-Dyfed Region 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*) within two areas at Pembrey Burrows centred on Area 1) SS 4127 9972 and Area 2) SN 3656 0422 (Figures 1, 2 and 3) which forms the southwestern fringe of Pembrey Country Park in Carmarthenshire. This WSI has been commissioned by Natural Resources Wales.
- 1.2 These areas have dune grassland habitat; however, this has now become shaded out by sea buckthorn and scrub. Dune grassland habitat should recover if the sea buckthorn and scrub is cleared and arisings are collected and disposed of offsite.
- 1.3 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.
- 1.4 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.
- 1.5 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 2016¹ and in subsequent archaeological assessments undertaken by Dyfed Archaeological Trust in 2016² and specifically of the Burrows in 2020³, and demonstrated that the dune systems at Pembrey were densely defended and constituted an

¹ Berry, J. 2016: Second World War anti-invasion defences in south and south-west Wales: A comparative case study area based approach.

² Bell, M. 2016: *Pembrey Sands Air Weapons Range: Archaeological Survey in Advance of Sea Buckthorn Removal*. Dyfed Archaeological Trust

³ Bell, M. 2020: *Pembrey Burrows: Archaeological Survey in Advance of Sea Buckthorn Removal*. Dyfed Archaeological Trust

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.

- 1.6 Cutting in Area 1 and 2 will only be at ground level with no ground penetration due to UXO risk. 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 RPS Explosives Engineering Services (RPS). That 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.
- 1.7 The UXO risk mitigation strategy is detailed in the "UXO Mitigation Report (Stage 3) Dynamic Dunescapes – Pembrey Burrows⁴" prepared by RPS for NRW.
- 1.8 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 within an archaeologically sensitive areas of the Burrows.
- 1.9 The following written scheme of investigation outlines the methodology through which TWA-Dyfed Region 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.
- 1.10 This written scheme of investigation (WSI) has been prepared in accordance with the Chartered Institute for Archaeologists (CIfA) *Standard and guidance for an archaeological watching brief* (CIfA 2014). A copy will be sent to the archaeological curator for their approval.
- 1.11 TWA-Dyfed Region Archaeological Services has considerable experience of this type of project and always operates to best professional practice. TWA-Dyfed Region Archaeological Services is the contractual arm of Dyfed Archaeological Trust that has its own Health and Safety Policy, and all works are covered by appropriate Employer's Liability and Public Liability Insurances. Copies of all are available on request.
- 1.12 **Dyfed Archaeological Trust is a CIfA Registered Organisation and all permanent staff are CSCS registered.**

⁴ RPS, 2020. *UXO Mitigation Report (Stage 3) Dynamic Dunescapes – Pembrey Burrows. Report Number EES1135 R-10-02. RPS Explosives Engineering Services*

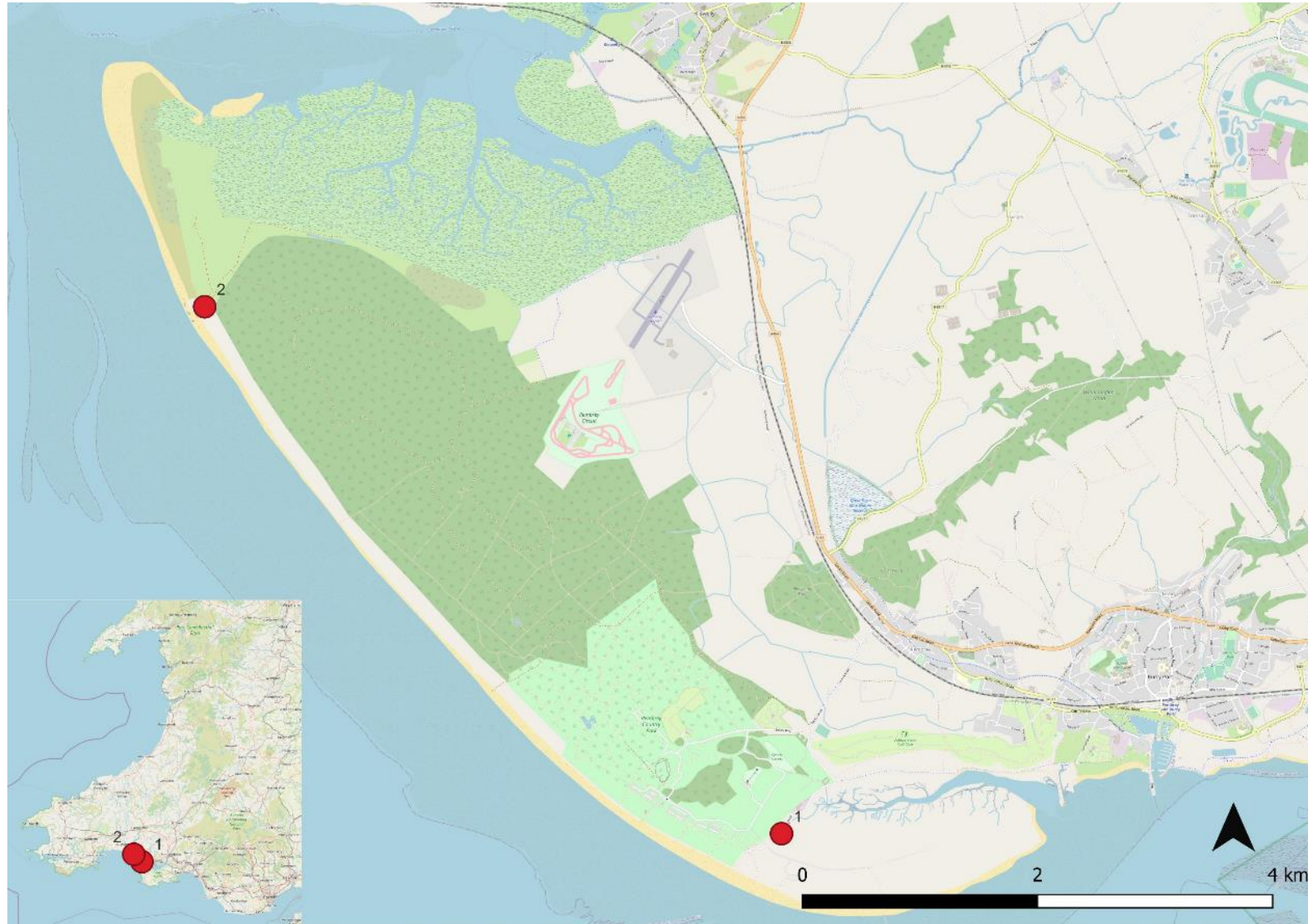


Figure 1: Location of Areas 1 and 2 for sea buckthorn clearance. *OpenStreetMap2023*

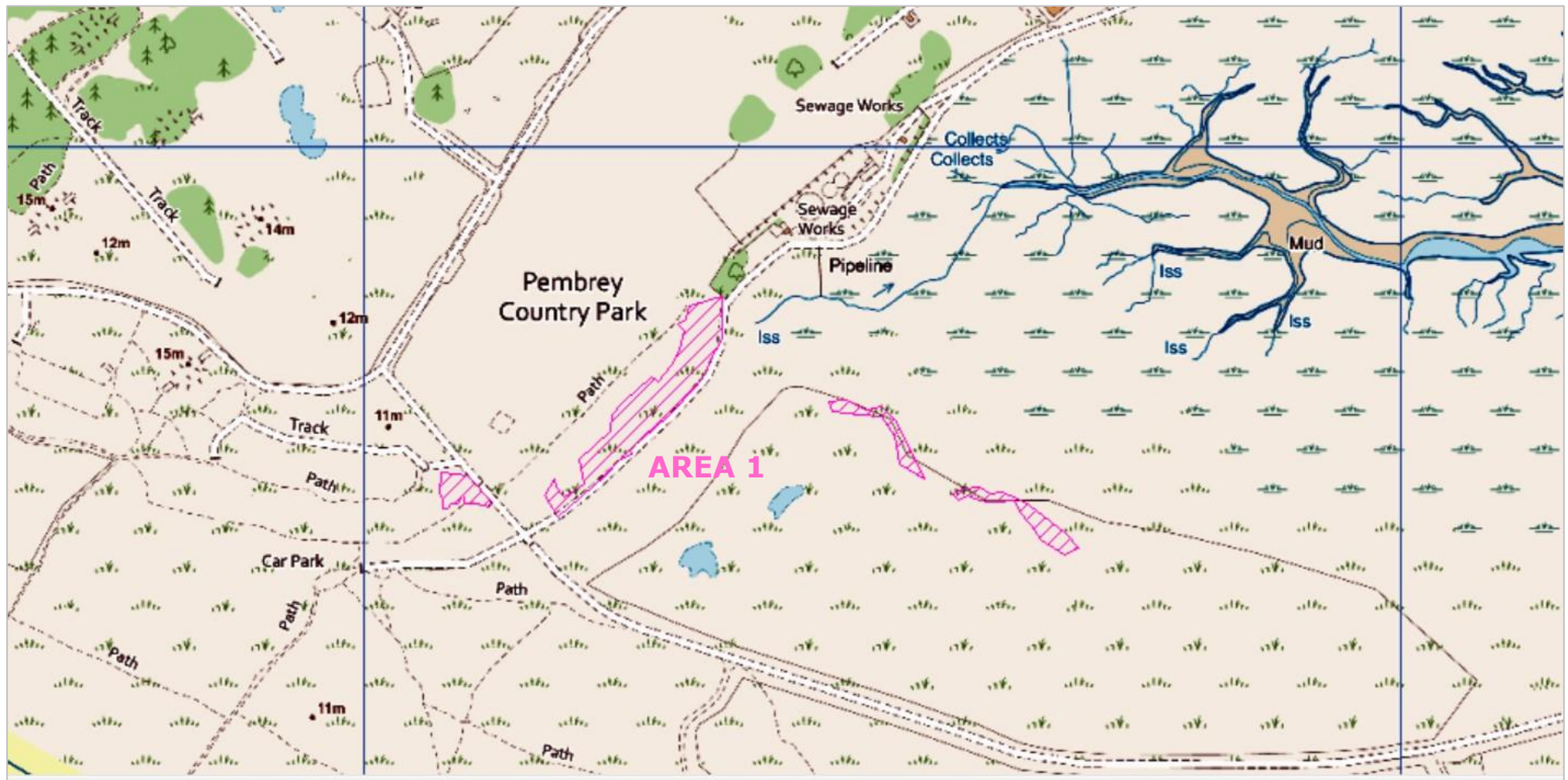


Figure 2: Location of Area 1, where it is proposed to remove sea buckthorn that has colonised the dune system (outlined in pink). Map supplied by client.

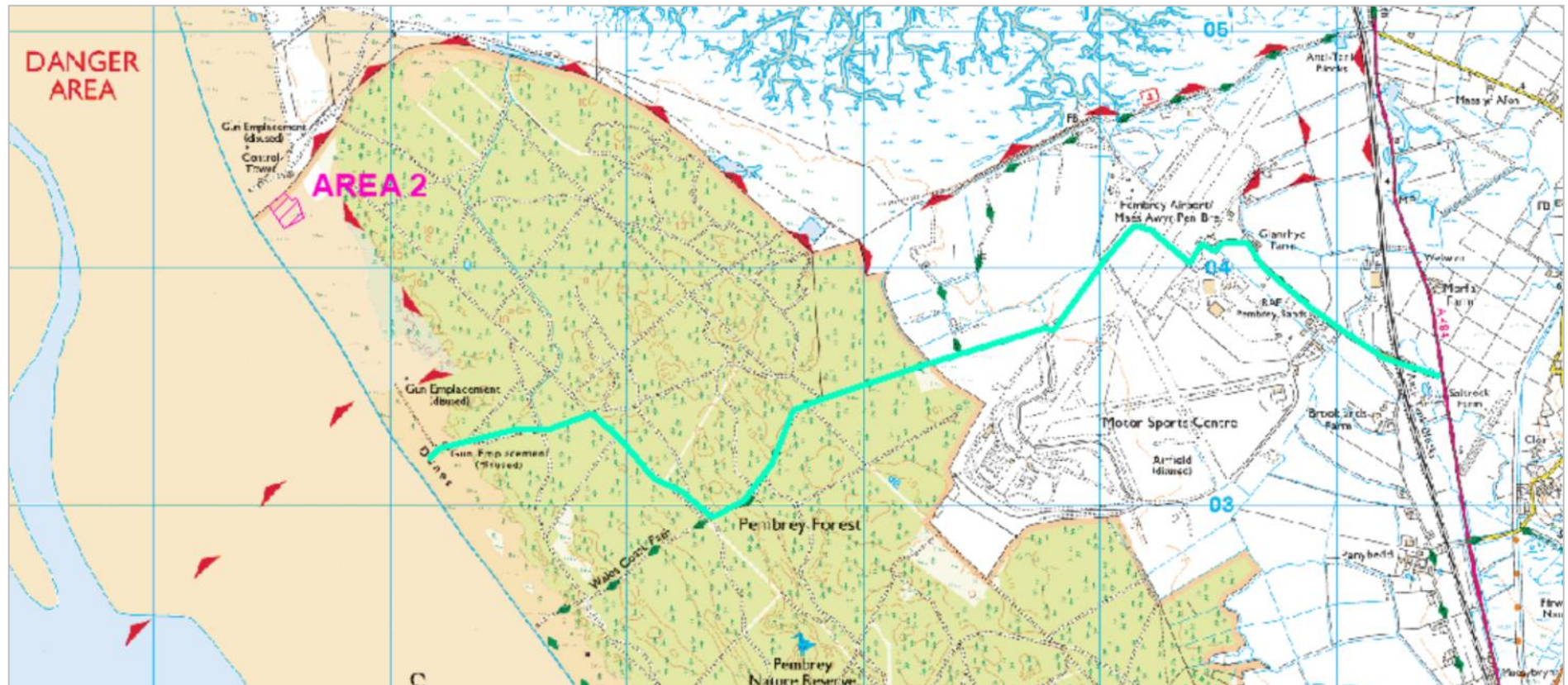


Figure 3: Location of Area 2, where it is proposed to remove sea buckthorn that has colonised the dune system (outlined in pink) Map supplied by client.

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, i.e. 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

- 3.1 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.
- 3.2 AJB have previously prepared a method statement for the sea buckthorn clearance (09/09/2021). That states:

These areas have dune grassland habitat; however, this has now become shaded out by sea buckthorn and scrub. Dune grassland habitat should recover if the sea buckthorn and scrub is cleared, and arisings are collected and disposed of offsite.

The ground conditions consist of undulating sand dunes and sometimes steep gradients and drops, particularly near the beach.

It is our understanding that the following method of clearance has been outlined by the clearance contractors AJB:

- **AREA 1** - Larger dense stands must be removed using a mechanical excavator equipped with a tree shear attachment, the shear will cut the plant at ground level leaving the roots and stump remaining. The arisings will be removed with a telehandler and grab to the old fisherman's car park for processing. The material will be chipped directly into a walking floor lorry and removed from site and delivered to western Bioenergy in Margam. A matt of arisings must be avoided as this will impede new dune grassland growth and add unwanted nutrients to the habitat.

- Due to this area being very close to public rights of way and public eye in general, it is proposed that a circa 10metre swath of scrub is left next to the car park which will act as a natural screen. A single point of entry from the car park will be used to access the work area. The excavators will work towards the sea in a narrow strip (circa 10 metres). Once at the far end of the work area they will work backwards in small blocks using the scrub as a natural screen/barrier with heras fencing/banksman bolstering security at the car park end of the site.
 - **AREA 2** - Low-lying/medium to smaller stands will be mulched using a tracked tractor and mulching attachment and remote controlled mower (for steeper or reduced access situations). On smaller scrub a heavy duty mower collector will be used which will be more efficient. The arisings are to be raked into piles with an excavator, transported with a tracked dumper or telehandler and placed in a chosen sacrificial area or buried as agreed with NRW representatives
- 3.3 The UXO contractor 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.
- 3.4 RPS recommends that an UXO consultant is present during any excavation work, to act as a UXO banksman. 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 UXO consultant will maintain a visual overwatch of the clearance as detailed in Figure 4, for the duration of the work.

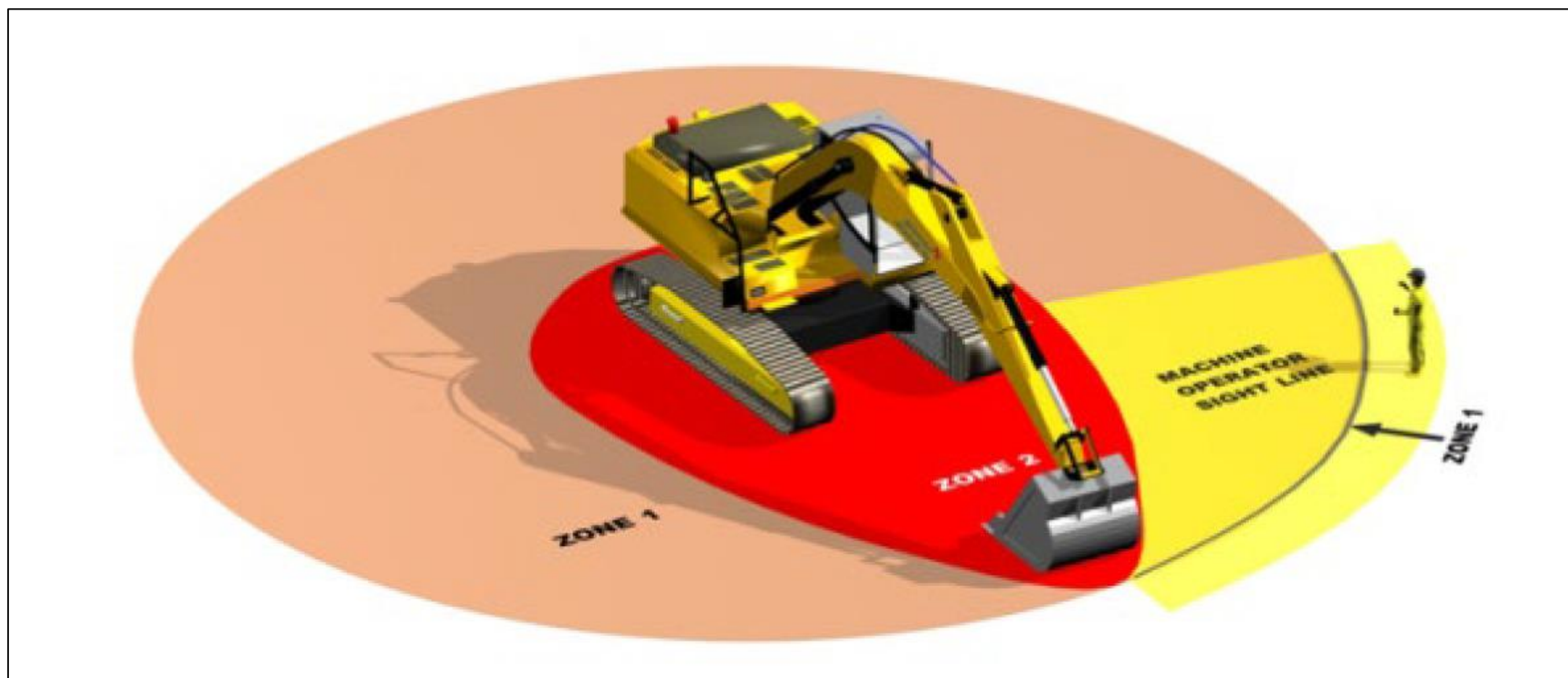


Figure 4: Hazard Zones when conducting UXO banksman duties.

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 Pembrey Burrows area. 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 Area 2 is located within an area of medium archaeological potential and contains known archaeological sites of interest. None of the sites within Area 2 have designated status. These sites are presented in Table 1 and shown in Figure 5. Area 1 is situated within an area of less archaeological potential. The only records in the area are a pair of rectangular concrete blocks (PRN 129713) and a pair of iron bars set into concrete plinths (PRN 129714), possibly from a World War II defensive structure. These were recorded during sea buckthorn removal in 2022 (Shiner 2022).

Table 1: Known archaeological assets within and in the vicinity of the Area 2 (locations shown in Figure 5).

PRN	REF	NAME	TYPE	SUMMARY	EVIDENCE	NGR
31414		Wing Marker Shelter No 2.	Wing marker shelter	Wing Marker Shelter No 2. A small concrete rectangular plan shelter with a turf covered concrete roof.	A Pyper site visit.	SN 37053 03516
31380			Gun emplacement	A Second World War gun emplacement overlooking Cefn Sidan beach.	A Pyper site visit.	SN 36401 04508
105932			Pillbox	Turf covered, brick-built pillbox.	A Pyper site visit.	SN 36502 04351
111345			Military Depot	Service compound.	A Pyper site visit.	SN 36571 04400
112364			Modern Tower	The current range tower for air to ground bombing training.	A Pyper site visit.	SN 36450 04370
112367			Gun emplacement	A Second World War gun emplacement overlooking Cefn Sidan beach.	A Pyper site visit.	SN 37069 03532
118045			Pillbox (variant)	A pillbox constructed in brick with a shuttered concrete roof.	A Pyper site visit.	SN 37138 03408
129715			Modern fence	Seventeen concrete fence posts parallel with shoreline. Possibly associated with nearby World War II bombing range.	M.Shiner watching brief.	SN 37150 331
	J Berry 2016	Wing Marker Shelter No 2.	Wing marker shelter	Duplication of PRN 31414	J Berry site visit	
	J Berry 2016	Tywyn Burrows 4 inch beach defence gun house	Gun emplacement	Duplication of PRN 112367	J Berry site visit	SN 37068 03531
	J Berry 2016	Military structure	Coastal defences	Duplication of PRN 118045	J Berry site visit	SN 37139 03404
	J Berry 2016	6-pdr Gun emplacement	Gun emplacement		J Berry site visit	SN 36955 03492
	J Berry 2016	Pembrey anti-landing obstacle	Anti-landing obstacle		J Berry site visit	SN 36531 04028



Figure 5: Known archaeological assets within or near Area 2 (red dot).

5 WATCHING BRIEF

- 5.1 The definition of archaeological watching brief, taken from the Chartered Institute for Archaeologists' *Standard and guidance for an archaeological watching brief* (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.
- 5.3 This document provides a scheme of works for:

Archaeological attendance and recording during the mechanical removal of sea buckthorn at Pembrey Burrows and Pembrey Country Park, Pembrey, Carmarthenshire.

6 PROJECT OBJECTIVES

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

7 ARCHAEOLOGICAL WATCHING BRIEF METHODOLOGY

- 7.1 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.
- 7.2 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.
- 7.3 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.
- 7.4 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.
- 7.5 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.
- 7.6 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.

- 7.7 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.
- 7.8 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 TWA-Dyfed Region 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 TWA-DR-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 TWA-DR-HM.

8.9 Appropriate specialists to be used by TWA-Dyfed Region 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 TWA-Dyfed Region Archaeological Services.
- 9.2 The on-site works will be undertaken by experienced archaeologists, from TWA-Dyfed Region Archaeological Services.

10 QUALITY ASSURANCE

- 10.1 TWA-Dyfed Region 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 TWA-Dyfed Region 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 TWA-Dyfed Region 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 TWA-Dyfed Region Archaeological Services staff are CSCS⁵ registered.
- 12.2 TWA-Dyfed Region 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 any current Welsh Government guidelines on working practices during the Covid-19 outbreaks, and guidance issued by CIfA.
- 12.5 The project risk assessment details the precautions put in place to reduce the spread of Covid-19 Coronavirus during fieldwork.
- 12.6 All site inductions, H&S procedures and site rules of the site contractor will be made known to TWA-Dyfed Region 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.
- 12.7 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 PPE⁶ 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.
- 12.8 TWA-Dyfed Region Archaeological Services staff must ensure that their presence on site is communicated to all relevant site staff, especially machine operators.
- 12.9 **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.

⁵ *Construction Skills Certification Scheme (Health and Safety Tested)*

⁶ *Personal Protection Equipment*

APPENDIX II

DATA MANAGEMENT PLAN

This Data Management Plan (DMP) is produced in accordance with the *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives* (Chartered Institute for Archaeologists 2014, updated 2020). The table below is based on the Work Digital / Think Archive guidance for digital archives prepared by DigVentures, on behalf of Archaeological Archives Forum and in partnership with the Chartered Institute for Archaeologists. The project was funded by Historic England (Project No. 7796).

Section 1: Project Administration

Project Ref. No and name
FS23-029 Winter Sea Buckthorn Work (Sand Dune BERF Project)
ERN (if known)
130158
Project Type
Watching Brief
Client
Natural Resources Wales (NRW)
Project Manager / Data Contact
Fran Murphy
Principal Archaeologist on site
Jessica Domiczew
Date DMP created
17/11/23
Date DMP last updated
06/12/23
Related data management policies
Written Scheme of Investigation Chartered Institute for Archaeologists (CIfA) <i>Standards & Guidance</i> Dyfed Archaeological Trust, 2018, archive retention policy Brown 2011, Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation NPAAW, 2017, The National Standard and Guidance to Best Practice for Collecting and Depositing Archaeological Archives in Wales 2017 RCAHMLW, 2015, RCAHMLW guidelines for Digital Archives, Version 1 WAT, 2018, Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)

Section 2: Data Collection

Data Type (Delete as appropriate)
Documents Written Scheme of Investigation, Risk Assessment – Word doc & PDFs Context sheets, site registers, site notes - paper copies, scanned and saved as PDFs. Site plans – permatrace, scanned and saved as PDFs. Final report – Word doc & PDF Illustrations – Adobe Illustrator/Affinity Designer files, PDFs Specialist assessments (Finds, Environmental etc) – Word doc, PDF, Excel Spreadsheet
Images Site photographs – Jpeg & Tiff (for archive) Other collected data (scans, archive material, social media images etc) – Jpegs
Survey In house surveys - .dxf files, GIS files (see below) External surveys – Dependent on external contractor, eg .dxf, .dwg, .rwv etc
GIS Mapinfo files, Esri Shapefiles.

Data acquisition
All data will be collected as per the methodologies and guidance stated in the WSI (Fieldwork / Methodology).

Section 3: Documentation and metadata

Documentation and metadata accompanying the data
All data recovered will be archived in accordance with the guidance stated in the WSI (Post Fieldwork Reporting & Archiving)

Section 4: Ethics and legal compliance

Management of any ethical, copyright and Intellectual Property Rights (IPR) issues
All personal data collected during the course of the project will be handled in accordance with Dyfed Archaeological Trust's <i>Personal Data Protection Policy</i> (2018, revised 2020) and current <i>Code of Practice</i> . Licence agreements will be established, and Copyright permissions will be sought as appropriate (eg reproduced mapping extracts, archive material, specialist reports) prior to the submission of the data and/or inclusion in the publication of the project results.

Section 5: Data Security: Storage and Backup

Data storage, accessibility, and safety during research
All site-produced data will be stored digitally at the first available opportunity. All digital information is stored on the TWA-DR server, accessible by members of the staff. This will be checked regularly by the Project Manager. All digital data on the server is backed-up at regular intervals. The server contains ample capacity for all anticipated site data, and appropriate protocols are in place to manage any potential digital malfunction or cyber attack.

Section 6: Selection and Preservation

Data retention, sharing, and preservation
Data will be retained as per Dyfed Archaeological Trust <i>Archive Retention Policy</i> (2018).
Long-term preservation plan for the dataset
<p>The digital archive relating to the project will be deposited with the NMR, held and maintained by the RCAHMS, Aberystwyth and will be created in accordance with their practices.</p> <p>The final report will be submitted to the regional Historic Environment Record in PDF format, along with any additional information they require.</p> <p>If a different digital repository to the NMR is used, their own procedures will be established at the outset of a project and followed.</p> <p>If a project includes artefacts to be deposited at a museum, arrangements will be made prior to the commencement of the project, and a copy of the digital archive will be sent with the artefacts.</p> <p>Archiving costs are included within the project budget.</p>

Section 7: Data Sharing

Sharing and accessibility
The dissemination of data is detailed in the WSI (Post-Fieldwork Report and Archiving).

Section 8: Responsibilities

Responsibilities
Data collection, storage and manipulation will be carried out by the site team. The Project Manager will be responsible for the implementation of the data management plan.

