

# Generator House, Bawdsey Manor, Ferry Road Bawdsey, Suffolk

Client: Alexanders College, Bawdsey Manor

Date: February 2016

BAW 207 Historic Building Record SACIC Report No. 2016/014 Author: M. Sommers © SACIC



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## **HER Information**

Report Number:	2016/014
Site Name:	Generator House, Bawdsey Manor, Ferry Road, Bawdsey, Suffolk
Planning Application No:	SC/15/1994/FUL
Date of Fieldwork:	8th February 2016
Grid Reference:	TM 3430 3848
Client/Funding Body:	Alexanders College, Bawdsey Manor
Client Reference:	n/a
Curatorial Officer:	Dr. Richard Hoggett
Oasis Reference:	suffolka1-240937
Site Code:	BAW 207

Digital report submitted to Archaeological Data Service: http://ads.ahds.ac.uk/catalogue/library/greylit

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Any opinions expressed in this report about the need for further archaeological work are those of the Field Projects Team alone. Ultimately the need for further work will be determined by the Local Planning Authority and its Archaeological Advisors when a planning application is registered. Suffolk County Council's archaeological contracting services cannot accept responsibility for inconvenience caused to the clients should the Planning Authority take a different view to that expressed in the report.

Prepared By:M. SommersDate:17th February 2016Approved By:Stuart BoulterPosition:Senior Project OfficerDate:Signed:

# Contents

## Summary

1.	Introduction	1
2.	Topography and landscape	3
3.	Archaeology and historical background	4
4.	Methodology	9
5.	Results	15
	The Generator House	15
	General description	15
	Internal Arrangement	20
	Fuel storage area	24
6.	Archive deposition	25
7.	Acknowledgements	26
8.	Plates	27
List	of Figures	
Figu	re 1. Location plan	2
Figu	re 2. 2nd Edition Ordnance Survey map pub. 1903	4
Figu	re 3. Map of the Camp RAF Bawdsey c.1943/45	5
Figu	re 4. Aerial photograph dated 1945	7
Figu	re 5. Aerial photograph of the former ROTOR and SAM site, dated 1991	8
Figu	re 6. General arrangement of the Generator House and surrounding area	11
Figu	re 7. Southwest and northeast Building elevation	12
Figu	re 8. Northwest and southeast Building elevations	13
Figu	re 9. Cross sections	13
Figu	re 10. Basic floor and roof plans	14
Figu	re 11. General arrangement within the Generator House	18

Figure 12. Plan and section of Generator House and fuel store (undated)19

## List of Plates

Plate 1. General view of the Generator House from the northwe	est
showing the security fence and lighting	27
Plate 2. Generator House viewed through the security fence or	the southeast
side of the enclosed area, camera facing north	27
Plate 3. General view of the Generator House, fuel store and w	ater tower
from the southwest	28
Plate 4. Generator House and water tower from the east	28
Plate 5. Generator House and water tower from the northwest	29
Plate 6. Generator House as view from the southwest	29
Plate 7. Generator House, camera facing northeast	30
Plate 8. Generator House, camera facing northwest	30
Plate 9. Generator House, camera facing southwest	31
Plate 10. Southwest gable wall window, external and internal v	iews 31
Plate 11. Generator House, camera facing west	32
Plate 12. Generator House, camera facing north	32
Plate 13. Generator House, camera facing east	33
Plate 14. Generator House, camera facing south	33
Plate 15. External and internal views of the northeastern windo	w in southeast wall 34
Plate 16. Main room window operating mechanism	34
Plate 17. Mechanically operated louvered vent on main room w	vindow, internal view 35
Plate 18. Mechanically operated louvered vent on main room w	vindow, external view 35
Plate 19. Fixed window in southwest wall of store	36
Plate 20. External and internal views of the entrance in southea	ast wall 36
Plate 21. Hinge on main entrance door	37
Plate 22. Sub-station access and northeast entrance to store	37
Plate 23. Internal view of northeastern entrance to store	38
Plate 24. Generator House vents, external and internal views	38
Plate 25. Transformer enclosure on southwest side of Generate	or House 39
Plate 26. Transformer enclosure on southwest side of Generate	or House 39
Plate 27. 'Scar' in brickwork of southwest wall, visible within the	e cooling tower 40
Plate 28. View of the cooling tower, camera facing north	40
Plate 29. View of the cooling tower, camera facing northeast	41
Plate 30. View of the cooling tower, camera facing east	41
Plate 31. View of the cooling tower, camera facing southeast	42

Plate 32.	Cooling tower tanks, camera facing north	42
Plate 33.	Double doors in southeast wall of cooling tower	43
Plate 34.	Doors into cooling tower showing detail of closing mechanisms	43
Plate 35.	Bricked up opening high in southeast wall of cooling tower	44
Plate 36.	View through large opening in southwest wall of cooling tower showing	
	hinges for a former door mounted on the northwest edge. Also visible is	
	the opening in the northwest wall	44
Plate 37.	View into the cooling tower showing pipes etc. on the northeast wall	45
Plate 38.	Water pipe with valve in western corner of the cooling tower	45
Plate 39.	Curving revetment wall to the southeast of the Generator House	46
Plate 40.	Inserted door between store and main room, as viewed from the store	46
Plate 41.	Sub-station switchgear	47
Plate 42.	Electrical heater as fixed to inserted wall within store	47
Plate 43.	Probable writing shelf fixed to southeast wall of store	48
Plate 44.	Inserted wall within store showing one of the two windows	48
Plate 45.	General view of the southeast end of the main room	49
Plate 46.	General view of the northwest end of the main room	49
Plate 47.	View of the king post timber roof truss and the gantry crane.	
	Also visible is the large water tank and its supporting girders	50
Plate 48.	End of roof truss resting on ?concrete block built into brickwork	50
Plate 49.	General view of the northwest wall within the main room showing	
	the glazed and unglazed brickwork with remnants of later white paint	51
Plate 50.	Floor surface within the main room showing the use of different colour tiles	51
Plate 51.	Engine bed (distant) and generator mount (foreground)	52
Plate 52.	Generator mount with an additional mount for the external exciter	52
Plate 53.	Covered service ducts in southern corner of main room	53
Plate 54.	Covered service ducts in vicinity of northeast doorway	53
Plate 55.	Electrical boxes and switchgear on the northwest wall of the main room	54
Plate 56.	Southeast wall of the Generator House showing the bricked up	
	central window with probable exhaust exit and adjacent brackets	54
Plate 57.	Site of Lister diesel compressor, eastern corner of main room	55
Plate 58.	Instructions regarding use of the compressor	55
Plate 59.	Weight limit sign relating to the overhead gantry crane	56
Plate 60.	The gantry crane hoist trolley	56
Plate 61.	Crane truck, at the southwest end of the bridging girders	57

Plate 62.	View of the hoist	57
Plate 63.	Example of a turbo-charged English Electric 16 cylinder diesel engine	58
Plate 64.	Warning sign, southwest wall	58
Plate 65.	Telephone equipment on the northwest wall	59
Plate 66.	Fuel tank status diagram, also a gantry crane weight limit sign	59
Plate 67.	Southwest wall (southeast section)	60
Plate 68.	Southwest wall (northwest section)	60
Plate 69.	Northeast wall (northwest section)	61
Plate 70.	Northeast wall (southeast section)	61
Plate 71.	The fuel storage area, camera facing west	62
Plate 72.	The fuel storage area, camera facing east	62
Plate 73.	The fuel storage area, camera facing northeast	63
Plate 74.	Concrete 'beams' and 'T'-section iron uprights within the fuel storage area	63
Plate 75.	Sump and hand pump within fuel storage area, camera facing northeast	64
Plate 76.	Fuel storage area, external pipe and valve, camera facing southeast	64
Plate 77.	Sump and hand pump within fuel storage area, camera facing northwest	65
Plate 78.	Cast iron stopcock location signs close to the eastern corner	65

# List of Appendices

Appendix 2. OASIS form

#### Summary

An English Heritage Level 2 building recording was undertaken of the 'Old Generator House' located on the Bawdsey Manor Estate, Bawdsey, Suffolk, prior to its conversion into a two storey domestic residence. The building is situated within the former area of RAF Bawdsey, a radar base that was in use from 1937 until 1972. Part of the base later became a surface-to-air missile (SAM) site which was in operational from 1979 through to final closure in 1991. RAF Bawdsey is important in the history of the development of radar in the UK as it is a site of early research and was also the first of the 'Chain Home radar stations' to be established. The Old Generator House, as its name suggests, originally housed a large diesel powered generator. This has since been removed although significant evidence of its installation was still extant at the time of the survey.

The building basically consists of a tall single storey structure built of brick with a single apex roof. A lean-to that runs the full width of the building is located at the north end and a rectangular extension supporting water tanks is at the southern end of the west wall. The external wall surfaces are painted green, presumably to provide a degree of camouflage; the external brickwork was originally red. A large section of the western wall of the main structure is also cement rendered. The roof is clad in corrugated asbestos sheets whilst the lean-to is roofed with clay tiles. The interior of the building comprises one main space in which the generator set was located, the mountings for which can be seen running along the central axis. On overhead gantry crane for servicing the generator and the diesel engine runs the full length of the space and remnants of associated equipment and signage is affixed to the walls. Running below the tiled floor are a series of services ducts covered by steel sheets. The lean-to houses modern transformers which appear to still be in service. The date of the building's construction is unclear. It is believed to be part of the original Chain Home radar installation and therefore it probably dates from around 1937. It can be clearly seen on aerial photograph of 1945 indicating it was built before then.

To the west of the main building a concrete slab surrounded by a low brick and blockwork wall was extant. This enclosed area once held a series of fuel tanks and comprised the fuel store for the generator.

## 1. Introduction

An English Heritage Level 2 Building Recording was carried out on a structure known as 'The Old Generator House', located within the estate of Bawdsey Manor in Suffolk. As its name suggests, it once housed an electrical generator powered by a large diesel engine and was a component of a radar base, known as RAF Bawdsey, which became operational in 1937. It is not clear if the generator house was one of the original buildings or was later addition to the site. It was in existence in 1945 as it can be clearly seen on an aerial photograph taken just after the Second World War.

RAF Bawdsey comprised the estate and house of Bawdsey Manor, a late 19th century house and gardens situated on the Suffolk coast. It was purchased by the Air Ministry in the mid-1930s for the development of radar before becoming a fully operational radar base and later an air defence unit. The estate was sold back into public ownership in the 1990s and is now the home of the private boarding school, Alexanders College.

The survey was undertaken on the 8th February 2016 as a result of a condition attached to planning consent for the building's conversion to a domestic residence (application no. DC/15/1994/FUL). Although conversion will secure the future of the structure, which is otherwise redundant, it will result in the loss of some evidence relating to its previous use. The main aim of the survey was to create a photographic record of the structure in order to preserve this evidence.

The Suffolk Archaeology Community Interest Company (SACIC) were commissioned by present owners, Alexanders College, to undertake the survey. The survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by SACIC (Appendix 1). The WSI was approved by Dr Richard Hoggett of the Conservation Team, the issuer of the Brief upon which it was based.

The Generator House is located close to the northeastern edge of the Bawdsey Manor Estate, Ferry Road, Bawdsey. The estate forms a relatively narrow park along a *c*.1.4km stretch of the Suffolk coast immediately northeast of the mouth of the River Deben. The National Grid reference for the approximate centre of the Generator House is TM 3430 3848. See Figure 1 for a location plan.



Figure 1. Location plan

# 2. Topography and landscape

The local topography consists of gently undulating slopes that form the edge of the Deben Valley and run alongside an area of low-lying and level floodplain. The Bawdsey Manor Estate is located on the Suffolk coast but is separated from the shingle beaches by Bawdsey Cliff, which in the vicinity of the Generator House, stands *c*.20m high, some 90m to the southeast. The underlying geology of the estate consists of Red Crag which is occasionally overlain by superficial deposits of sand and gravel (BGS 2016).

The Generator House itself is situated on a northwest facing slope into which a terrace has been formed to enable its construction and that of an adjacent fuel store. This has resulted in a steeply sloping area immediately to the southeast of the building and the fuel store. This is largely self-supporting although an area adjacent the Generator House is retained by a low, curving brick wall that creates a small 'amphitheatre' to the southeast of the building's main entrance (see Fig. 6 and plate 39). Other than the areas of concrete hardstanding immediately adjacent the building, all areas are grassed with clumps of bramble and occasional small self-seeded trees.

The building and adjacent fuel store are isolated from the other extant structures associated with radar base. The closest building is a large water tower which is situated on higher ground to the east (plates 3, 4 and 5). The Generator House, the fuel store and the water tower are enclosed in an irregular shaped area surrounded by high wire mesh fencing on concrete posts and topped with barbed wire (plate 1). The fence line along the southeastern side of the enclosure is also bolstered with large coils of barbed wire (plate 2). The Generator House and fuel storage area is accessed via a tarmacked and concrete roadway that runs up from the main drive to Bawdsey Manor, which is accessed off Ferry Road and through a security gate into the fenced enclosure. The roadway runs to the southeastern end of the building and to the fuel store to the southwest, and in so doing forms a circular area to the northeast of the Generator House (plate 5). The southeastern roadway also forks to form an access to a post-Second World War extension to the site (the ROTOR site). This roadway can clearly be seen to be a later addition to the existing road.



# 3. Archaeology and historical background

Figure 2. 2nd Edition Ordnance Survey map pub. 1903 (rescaled extract – future site of the Generator House is marked in red)

Bawdsey Manor was established in the late 19th century in what was formerly open farmland as a holiday residence for Sir Cuthbert Quilter before becoming the Quilter family's principle home in the 1890s. Further land was acquired during the late 19th and early 20th century to create a 3200ha estate (Fig. 2). An existing trackway was retained as a park drive and the line of the present Ferry Road was created along the northern border of the estate. In 1911 Sir Cuthbert was succeeded by his son, William Quilter and in 1937 he sold the house and grounds to the Air Ministry who used it as a research station working on the development of radar, designated Air Ministry Experimental Station (AMES) 24.

Following on from the early radar experiments the first Chain Home radar station was developed at Bawdsey (Chain Home was the one of the codenames given to the coastal early warning systems). The site then fell under the jurisdiction of the Royal Air



Figure 3. Map of the Camp RAF Bawdsey c.1943/45 (http://www.bawdseyradar.org.uk/wp-content/uploads/2013/01/Robert-Jones-Lores-map-OS-copyright-1024.jpg)

Force and was designated RAF Bawdsey. Bawdsey continued to be involved in the development of radar with additional systems being deployed resulting in it becoming the only site in the UK to be fitted with three types of radar (Chain Home, Chain Home Low and Coastal Defence, later changed to Chain Home Extra Low). These gave RAF Bawdsey the additional ability to detect aircraft flying at low levels and were in operation during the Second World War. In the later stages of the war the radar at Bawdsey was used to monitor V2 rocket launches. Although the rockets could not be stopped once launched it was possible to provide the locations of the launch sites to Bomber Command and so enable them to be targeted.

A 'Map of the Camp RAF Bawdsey' (Fig. 3) is available on the Bawdsey Radar Trust website. It comprises a plan of the site compiled by Corporal Robert Jones, who served at RAF Bawdsey in 1944. It is based on the 1926 Ordnance Survey map and includes the locations of buildings present in the later years of the Second World War. The map shows the vast array of buildings that comprised the camp. The principle structures being the Transmitter Block (building 25) that sits centrally in a line of the four 350' steel masts (marked as 19 to 22), which would have transmitted powerful radio waves, and the receiver block (building 45) with four associated wooden 240' masts, which together would have received the radar signatures reflected by targets. Both the Transmitter Block and the Receiver Block were duplicated by below ground structures known as the buried reserves. A large number of other structures are marked which consist of the accommodation buildings, auxiliary structures and other buildings, such as the stables and the dairy, that were components of the original estate.

It has not been possible to accurately date the Generator House but it is probably related to the first Chain Home radar system that dates from around 1937. It does not appear to be on Corporal Jones' 'Map of the Camp', which could suggest it was built after he left the camp although there is a pair of structures marked close to the Lodge in the northwest corner of the estate (buildings 3 and 4) which are labelled as 'Standby Powerhouse' and 'Powerhouse Water Tank'. It is highly likely these in fact refer to the extant Generator House and nearby water tower and that a small locational error has crept in (one assumes the map has been drawn from memory). An aerial photograph taken in 1945 (Fig. 4) clearly shows the Generator House, the adjacent fuel store and nearby water tower were in place at the end of the Second World War and it is unlikely they would have been added to the camp at such a late stage of the war.



Figure 4. Aerial photograph dated 1945

The Generator House or, as described by Jones, Standby Powerhouse, was purpose built solely for the generation of electricity. Building 26, adjacent to Ferry Road on the north side of the site, is marked as Sub-Station, which would indicate a mains supply for the camp was in place. The description, Standby Powerhouse, would imply it acted as a backup (along with building 17 that Jones also describes as a Standby Powerhouse) to the mains supply should it fail rather than a continuous power source for the camp.

Following the Second World War radar sites around the country were generally run down as the perceived need for early warning diminished, although Bawdsey itself was still listed as operational in 1948. In the late 1940s and early 1950s in order to counter the threat of nuclear bombers from the Soviet Union the ROTOR programme was implemented. This comprised an overhaul and improvement of the UK's air defences and entailed a compete upgrade of the best existing radar sites, such as Bawdsey. At Bawdsey a new control bunker was built on land immediately to the northeast of the

existing site along with numerous other installations for the mounting and maintaining of the new systems. Much of the old site was left unused although the Generator House (described as the Stand-by Set House) was incorporated into the ROTOR site where it continued to act as a backup power supply. Bawdsey remained in use as a radar base until the mid 1970s before closure in 1975, followed by the partial demolition of the ROTOR site in 1977.



Figure 5. Aerial photograph of the former ROTOR and SAM site, dated 1991

The site remained unused until August 1979 when it reopened as a Bloodhound Mk 2, surface to air missile (SAM) site. It comprised two missile sections, each equipped with six launchers and a fire control radar (Fig. 5). The below ground ROTOR bunker and some of the remaining above ground buildings were modified for re-use within the missile site. The Generator House was also retained and presumably continued in its role as a back-up power supply. The SAM base remained until the late 1980s before final closure of the base and the ending of all military operations on the site in 1991.

Subsequently the estate was purchased by the present owner (2000) who moved his international language school here in 1994 from Harlow in Essex. Apart from a handful of individual cottages, the estate remains in single ownership and is used as a base for the private Alexander's language school. The former ROTOR and SAM site to the northeast is separately owned.

Some alterations to the structure of the Generator House are evident and these probably relate to overhauling or more likely, the complete replacement of the original generating set. This was probably undertaken in relation to the ROTOR programme although further updating and refurbishment may have been carried out in relation to the later SAM base.

The security fences around the Generator House and water tower probably date back to the ROTOR period but may have been refurbished or replaced when the SAM site was established. It is likely that the hardstanding around the around the Generator House was also altered and refurbished during these later phases as suggested by the installation of curbing in the vicinity of the fuel storage area.

## 4. Methodology

To carry out the survey of the structure a series of photographs were taken with 16 and 18 megapixel digital cameras that stored the images in a compressed format (jpg). Photographs were taken of all exterior elevations and of the building's general setting. Photographs were then taken of each space within the structures and of all pertinent features or objects located within each space. The interior of the building was relatively

dim necessitating the occasional use of the camera's built in flash, although this was generally avoided if possible.

A series of plans and elevations of the structure produced by the client's architect, Tim Buxbaum, have been used during the survey and in this report.

The Generator House is marked on modern Ordnance Survey maps and this data has been used to provide a record of its location.

Research into the background and history of the building has been primarily based on information from the following websites:

Bawdsey Radar Trust website (http://www.bawdseyradar.org.uk/) Accessed 11th February 2016.

Historic England List Entry for Bawdsey Manor (https://historicengland.org.uk/listing/the-list/listentry/1001465) Accessed 10th February 2016

Subterranea Britannica: RAF Bawdsey Chain Home Radar Station (http://www.subbrit.org.uk/sbsites/sites/b/bawdsey\_radar/) and RAF Bawdsey' ('PKD') R3 GCI ROTOR Radar Station (http://www.subbrit.org.uk/rsg/sites/b/bawdsey/index.html) Both accessed 5th February 2016

The Bawdsey Radar Trust runs a small museum based in the former Transmitter Block at RAF Bawdsey. Its aim is to conserve the Transmitter Block and create a unique exhibition, educational facility and visitor attraction, to explain how Radar was developed (for which they have recently been awarded a substantial Heritage Lottery Fund grant). Their website also provides access to a library of oral history recordings, along with written descriptions and photographs, provided by former servicemen and women who served at RAF Bawdsey. No specific references to the Generator House were discovered.

Historic England is the holder of the national archive of architectural and archaeological records (formerly held by English Heritage).

Subterranea Britannica is a UK based society for all those interested in man-made and man-used underground structures and space. Founded in 1974, its interests cover all manner of underground sites, from Neolithic flint mines to nuclear bunkers. The results of their many surveys, often backed up with comprehensive research, are documented on their website.



Figure 6. General arrangement of the Generator House and surrounding area (Tim Buxbaum)



Figure 7. Southwest and northeast Building elevations (Tim Buxbaum)



NORTH WEST ELEVATION EXISTING

SOUTH EAST ELEVATION EXISTING





Figure 9. Cross sections (Tim Buxbaum)



Figure 10. Basic floor and roof plans (Tim Buxbaum)

## 5. Results

Figure 6 shows the general arrangement of the site and the relationship between the Generator House, the fuel storage area (marked as 'low enclosure'), the water tower and the existing road and fence lines. Figures 7 and 8 are the elevations of the Generator House, and Figure 9 is the cross sections. A basic floor and roof plan is presented Fig. 10; Fig. 11 comprises a more detailed floor plan with information relating to some of the equipment formerly fitted in the building (the source and date of the information is not indicated). All plans and elevations are by the architect, Tim Buxbaum (as downloaded from the Suffolk Coastal District planning website).

### **The Generator House**

### General description

The building comprised a single storey structure, rectangular in plan with a full width lean-to to the northwest and a rectangular block supporting a water tank (described as a cooling tower) adjacent the southern corner (see plates 7 to 14 for elevations and threequarter views). The main block measured approximately 16.5m by 8.2m (including the lean-to), whilst the cooling tower measured 4.1m in width and protruded from the main part of the building by 3.4m. The main block was covered by a single apex roof running longitudinally with plain wooden barges boards, with eaves at a height of c.6.1m and the ridge at c.9.7m. Some detailing formed of red tiles was present at the soffit level on the eastern corner but this was not present elsewhere. The roof was formed of profiled sheets of a material that is probably a mix of cement and asbestos that are presumably laid on horizontal timbers fixed to rafters but this could not be determined as the inner face is clad in white boarding. The lean-to roof was a single slope covered in red clay tiles on battens fixed to the rafters. This roof started just below the eaves of the main block and ran down to a height of c.2.3m. The cooling tower was approximately 7.9m at its highest point, which was an area of flat concrete roof over the northwest half of the tower.

The greater part of the external wall surfaces of the structure comprised red brick laid in an English bond which had been painted green, presumably an attempt to camouflage the building, although this did not extend to the roof surfaces. In variation, the external southwest wall of the main space, except for a small triangular area on the upper left corner, was covered in a cement render. The main walls of the structure are approximately 41cm thick (16 inches).

Windows opening into the main space were present in the southeast gable and the northeast wall only. The openings contain wooden framed windows with top and bottom opening casements with fixed central lights (plate 15) actuated via rope driven mechanisms (plate 16), although the lower half of a window in the northeast wall has been replaced by a large louvered window shutter (plates 17 and 18). A single window was present on the southwest side of the lean-to with a wooden frame and a fixed light (plate 19).

A large double-width door was centrally placed in the southeast wall that opened into the main space (plate 20). The northeastern door of the pair is a modern replacement. The original door is hung on three cast iron hinges bearing the manufactures name 'Charles Collinge, Lambeth' (plate 21). A second door was present on the northeast wall (visible in plates 9, 69 and 70). Doors opened into each side of the lean-to with an additional pair of doors that gave access a smaller chamber, currently housing an electric substation, which was present in the northeast wall (plates 22 and 23). All surviving doors, except those accessing the substation, were built of framed vertical timbers and were set into wooden door frames. All window and door lintels were formed of concrete beams or slabs. Externally, these were hidden behind brickwork, except for main doors in the southeast wall and the southwest door into the lean-to, both of which had exposed lintels (visible in plates 19 and 20). This variation suggests that these entrances are later alterations to the original structure; they have either been enlarged or are wholly new entrances.

External signage is restricted to the modern signs on the sub-station doors (plate 22) and two cast signs denoted stopcock locations close to the bottom edge of the northeast wall, adjacent to the eastern corner of the building (plate 78).

A series of vents are present in the external walls, eight on the northeast wall (three high and two low for the main space and two high and one low for the lean-to), one low down on the northwest wall, two on the southwest wall (one low for the lean-to and one high for the main space, which actually vents into the area of the cooling tower) and one

high and central in the southeast gable wall. Externally, there are formed off red clay tiles which on the inside are covered with ?brass grills (plate 24) that can be closed if required (although a ladder would be required to adjust the high level vents).

A series of brick walls, of ?fletton type bricks and standing approximately 0.5m high, are present adjacent to the southwest wall of the Generator House (plate 25). They comprise a rectangular enclosure, the interior of which partially filled with earth and rubble, measuring 3.75m wide by 4.4m long with a 1.6m wide entrance in its northwest wall. In the detailed floor plan (Fig. 11) this area is described as the site of an electrical transformer (32kV to 11kV). The top of this wall is finished with bricks laid on edge. At the point where they meet the southwest wall of the Generator House, which in this area is rendered, there are slightly less worn, cleaner sections of paint that suggests the presence of an earlier phase of walls, that appear to be slightly wider than those now present, once continued up to a height of around 2.5m. With close observation it was possible to identify a large area of slightly less worn paint with clear vertical and horizontal boundaries that ran nearly the full width of the rendered section (visible in plate 25). The start of this area was coincidental with the northeast limit of the low walled enclosure and although the position of the southeast wall can be discerned this variation in the condition of the paint continues beyond it. This area of differing paint is itself divided into two horizontal sections with a lower, slightly yellower zone that is delineated by a boundary approximately 0.7m high. This lower section appears to continue to the cooling tower and is also visible within (plate 37). The variations in the condition of the paintwork in this area suggests at least two differing phases of an earlier structure originally stood in this area. A 'scar' in the brickwork in the southwest wall of the main building, visible within the cooling tower (plate 26) is also probably the result an earlier structure with an apex roof perpendicular to the Generator House having stood in this location.

**The Cooling Tower:** Situated at the southern corner of the Generator House (plates 28 to 31). It has clearly been subjected to a number of significant alterations and a degree of rebuilding. Given the evidence for an earlier structure having once stood on this side of the Generator House, it must be assumed that this tower is a later addition, although it possibly incorporated parts of a previous building. An undated plan and section of the Generator House and fuel store, submitted as part of the planning application (Fig. 12), refers to a 'cooler room' and depicts just a single storey extension to the main building, which would seem to confirm the tower is a later addition.



Figure 11. General arrangement within the Generator House



Figure 12. Plan and section of Generator House and fuel store (undated)

Access to the top of the cooling tower is via a metal ladder fixed to the outside wall. At the top is a large rectangular water tank which is open to the elements. Adjacent to this is a second, slightly smaller tank that is located within a chamber with a concrete slab roof and open on its southeast side (plate 32). The purpose of this tower would have been to provide a reservoir of water to aid the cooling of the diesel engine that would have powered the generator in the adjacent building. It is likely that some form of heat exchanger would also have been employed.

Access to the tower was via an opening in the southeast wall that once held a pair of double-doors, although only one door remains (plates 33 and 34). A large, unframed opening is present in the opposite wall and further large opening was once present in the brickwork above the doorway, although this is now bricked up (plate 35, also visible in 28). In the southwest wall of the cooling tower is a large, full width opening approximately 4.4m high, although marks on the inner faces of the opening indicate it was probably filled with a timber screen (a grille is suggested in the detailed floor plan, Fig. 11), with a door adjacent the west corner of the tower, the hinges for which remain (plate 36), the whole arrangement was also painted green.

Internally, the lower section of the tower is painted white up to a level marked by a clear horizontal, but presumably arbitrary, boundary (plate 37). The white paint continued around the edges of the large opening in the southwest wall but does not continue into the northwest opening. Pipework, electrical switches, light fittings, an electrical heater and sockets are present on the northeast wall within the cooling tower. Prominent in the northeast wall are two, 100mm diameter, pipes which would have carried the cooling water to and from the diesel engine in the main room. A pair of pipes, one of which terminates in a small valve, run down from the tanks above (plate 38).

#### Internal Arrangement (see Fig. 11)

**The Store/substation:** This once comprised a rectangular room formed within the leanto at the northwest end of the Generator House. This space is separated from the main room of the Generator House by an internal brick wall and prior to the creation of an internal doorway (in the ?1970s), the only means of access was via the external doors. The inserted door between the two rooms has two doors, presumably to reduce noise levels in the store (plate 40). Internally, the walls are faced with two types of brick. The lower section, up to a height of *c*.1.4m, a white glazed brick was used; above this was an unglazed light grey to white brick. The floor was formed of dark red glazed floor tiles (approx. 153mm square). At the junction of the floor and wall a dark brown glazed brick/tile with a curved cross-section was employed. These wall and floor finishes were continued throughout Generator House.

A small room formed by brick walls is located in the northeastern end of this space but it can only be accessed via an external doorway, which was locked. It is believed to contain an electrical transformer. A 'generator switch substation' is located within the store (plate 41) that was last inspected by Freedom Networks in August 2013, suggesting that it, and the transformer, are possibly still in use. The store is internally divided by a modern stud wall to separate the substation from the rest of the building. Other than an electrical heater (plate 42) and a writing shelf (plate 43) the store was devoid any significant fittings. Observation of the brickwork in the vicinity of the external door in the northwest wall suggested that this was a later insertion and that a large part of the western corner of the structure had been rebuilt (visible in plate 19), probably as part of its creation. An unusual feature in this part of the building was an inserted internal wall, formed of flettton bricks, which ran the full width of the store. It separated off a roughly 0.5m wide area to which there was no obvious access. Two wooden framed windows with opening casements where also included in this wall but with no obvious purpose (plate 44). It can only be assumed that there was an intention to remove the outer wall but that this was never fully realised.

**Main Room:** (see plates 45 and 46 for a general overall view of this room) This comprised a space approximately 11m in length and 7.3m wide with a main entrance comprising double doors in the southeast wall and single door, marked 'FIRE ESCAPE', in the northeast wall. A gently sloping ramp inside the main entrance leads up to the internal floor level from the outer yard level which is *c*.50mm higher than the concrete slab to the southeast of the building. The roof rested on the gable ends and a pair of king post timber trusses which spanned the width of the building (plate 47), which rested on ?concrete blocks built into the brickwork (plate 48).

The room was internally finished in a similar fashion to the store with the white glazed and unglazed brickwork, although both sections had been painted white (plate 49). The floor surface was also of dark red glazed floor tiles but with lighter red, and very slightly larger tiles that appeared to mark the locations of the machinery and covered underfloor ducts (plate 50).

The room was dominated by the centrally placed mountings and an engine bed for the generating set that formerly operated in this building (plate 51). The engine bed comprised a pair of parallel, flat topped, steel beams, 3.6m in length and set 0.93m apart, laid flush with the floor surface and running parallel with the longitudinal axis of the room. These would have held the large diesel engine that would have been directly coupled to the generator. It is recorded (Fig. 11) that an English Electric, 16 cylinder engine fitted with a Napier turbocharger and turning at 1000rpm was fitted although whether this was the only engine fitted or if it was a later replacement is not clear. The engine bed started c.1.6m from the main entrance in the southeast wall and terminated adjacent to the concrete and steel mounting blocks that once held the generator and the exciter (plate 52), which was located just to the northwest of the centre of the room. This is recorded as being an AC generator (50 cycles) rated at 32kV which was fitted with an external exciter (a separate generator to energize the main generator's coils). A number of below ground ducts covered with steel sheets run across the floor and these would have contained the electrical cabling and other associated services to which the generator set was connected (plates 50, 53 and 54). The main electrical cabling would have been in the ducts to the northwest of the generator set and run to the 'main isolator', on the northwest wall, and out to the site of the transformer in the walled enclosure outside the building. The controls and supply stations were located around the edges of the room, the locations of which are marked in Figure 11. A number of switch boxes are *in-situ* on the northwest wall (plate 55), although these may have been left due to associations with the extant transformer and switchgear in the store.

Figure 11 indicates the diesel's exhausts were at a high level and exited the building through the southeast wall. This exit is probably through the lower section of a partly bricked up window located in the centrally, above the main entrance (plate 56). A pair of fixings, above the level of the opening but offset to the northeast, have been cut off from the outer face of the wall. These run through to square metal anchoring plates on the inner face of the wall. There located directly above a pair of cut ?'L' shaped beams that once protruded from the lintel above the main entrance which could suggest they are associated. These may have been brackets to support the exhausts, although this is not conclusive.

Other than the generating set the only other substantial piece of equipment was an air compressor fitted in the eastern corner of the room for which a pair of concrete mountings and threaded rods protruding from the floor were extant (plate 57). An adjacent sign indicates it was diesel powered, supplied by 'Lister', and gives instructions on its use (plate 58).

Within the main room an overhead gantry crane that ran the full length of the space was fitted (see plate 47). Signage affixed to the crane stated it was built by 'Herbert Morris' of 'Loughborough' and had a weight limit of '3 tons'. It was finished in black paint. Stenciled in white paint was a number, 'L/2761' and in a smaller font an additional number, '20977', above the text 'SWL 3 Tons', these are presumably the manufacturers serial number and possibly a reference number for its weight limit certification. The weight limit is also repeated in a number of wall mounted signs (plate 59).

The crane itself comprised a trolley mounted hoist (plate 60) that ran along a pair of 'H'section bridging girders resting on two-wheeled trucks (plate 61). The crane rested on rails fixed to 'H'-section girders at a height of *c*.4.1m above the floor slab. The whole was supported by four uprights on each side of the building. Those in the corners were formed of a pair tubes strapped together and resting on square steel plates bolted to a slightly raised plinth on the floor (visible in plate 57), whilst the two additional uprights comprised 'H'-section girders that appeared be set into the floor (visible in plate 50) and were held in place by brackets bolted to the walls. At each end of the crane rails a horizontal tube braced the supporting girders against spacers against the wall. These were clamped via square steel plates on the outer faces of the walls.

Movement of trolley and the crane was via hand operated chains connected to driven wheels. In the case of the crane, this was located at the southwest end of the beam (plate 61) and drove the southeast wheel of each truck via gears and a shaft. The hoist was also operated by hand via a chain and comprised of a heavier duty chain around a single pulley with a cast-iron hook (plate 62). The excess chain was held in a cylindrical container mounted on the trolley. This crane would have been installed solely to assist in servicing of the diesel engine and the generating equipment. The diesel engine would have been a large bulk weighing several tons but would have been fitted with a separate head for each of its sixteen cylinders and this crane would have enabled their removal for repair or replacement along with other components parts such as turbo chargers and oil pumps (see plate 63 for an example of an English Electric 16 cylinder engine of similar dimensions to that fitted here). The components of the generator may also have required occasional lifting to service bearings etc. for which a crane would be required.

Around the walls of the building numerous fittings, holes for fittings and signs were present, some of which were *in-situ*. Those worthy of particular mention comprise an engine start warning sign (plate 64), telephone equipment (plate 65) and a sign fitted to the wall in the vicinity of the 'fuel gauge' (as marked in Fig. 11) that appears to be a fuel tank status display with moveable markers to denote valve positions for each of the external fuel tanks (plate 66). Other evidence that survives on the walls are variations in the painted surfaces caused by the presence of fixtures and fittings at the time of the wall being painted. These are particularly noticeable along the southwest wall and in the western corner and indicate where a number of rectangular fixtures or signage have been removed. Plates 67 and 68 comprise overlapping images of the southwest wall whilst plates 69 and 70 are views of the northeast wall.

Two tanks were fitted in the roof space at the southeast end of the room. One was relatively large and clad in wood (or set within a wooden box), presumably for insulation (visible in plate 47). It was supported on a series of 'H'-section beams, one of which spanned the width of the building whilst others rested on it and the southeast gable wall. A wire running over a series of small pulleys led from this tank and hung down close to the eastern corner of the building, this was probably part of a mechanism for indicating water levels in the tank. Adjacent to this, but resting on 'L'-section brackets set into the wall, was a second, smaller tank. Both were accessed via a steel ladder fixed to the wall. These tanks are presumably for water with the smaller tank holding drinking water and the larger tank water for use in cleaning equipment, diluting chemicals etc.

#### Fuel storage area

A fuel storage area is located to the southwest of the Generator House. It consisted of a rectangular area of concrete slab, measuring 16.5m by 6.1m, surrounded by a wall *c*.1m in height (plates 71 and 72). This was topped with profiled concrete slabs, although few of these remained *in-situ*. The northwest wall and parts of the end walls are constructed of cement rendered brick whilst the remaining walls are of cement rendered blockwork
(plate 73), most of which has been knocked over. This may be a later rebuild although the change from brick to blockwork was marked by a vertical boundary suggesting that originally only part of the fuel storage area was walled and that the blockwork was a later addition.

A series of three linear, raised concrete 'beams', spaced *c*.1.05m apart, ran longitudinally across the base of the storage area along with the cut-off remains of three pairs of 'T'-sectioned iron brackets (plate 74). These formed supports for a series of presumably metal tanks, cylindrical in shape, which would have held diesel fuel for use in the generator set. The undated plan and section (Fig. 12) depicts four cylindrical tanks of equal size lying horizontally across the width of the storage area although what is probably a fuel tank status display within main room of the Generator House (plate 66) indicates a smaller fifth smaller tank alongside four equally sized tanks, denoting what is probably a later arrangement of the storage arrangements.

A brick-lined sump was located half way along the northwest side of the enclosed area (plate 75). This is presumably to deal with rainwater but would also be where spilt fuel would collect in the event of a tank failure. A similar brick-lined pit was present on the outside the walled enclosure within which a cast iron pipe fitted with a large valve protruded (plate 76). The purpose of this valve was not immediately apparent. It may have been part of the fuel system or was simply to allow rainwater to drain from the storage area. A hand pump was secured to the inner face of the wall which would enable the sump to be pumped dry (plate 77). If fuel had been spilt, it is assumed that the outer valve would be closed and the hand pump used to transfer the fuel to containers for reuse or disposal.

## 6. Archive deposition

Paper, digital and photographic archive will be sent to the County HER, ref. BAW 207.

A copy of the report will be uploaded to the OASIS on-line database (suffolka1-208194).

## 7. Acknowledgements

The building record was carried out by Mark Sommers from the Suffolk Archaeology Community Interest Company. The project was managed by Stuart Boulter, who also provided advice during the production of the report.

Special thanks also go to Camille Nickson, The Alexander College Bursar, for her help and assistance.



Plate 1. General view of the Generator House from the northwest showing the security fence and lighting



Plate 2. Generator House viewed through the security fence on the southeast side of the enclosed area, camera facing north



Plate 3. General view of the Generator House, fuel store and water tower from the southwest



Plate 4. Generator House and water tower from the east



Plate 5. Generator House and water tower from the northwest



Plate 6. Generator House as view from the southwest. The bases of one of the former buried reserve masts can be seen to the right



Plate 7. Generator House, camera facing northeast



Plate 8. Generator House, camera facing northwest



Plate 9. Generator House, camera facing southwest



Plate 10. Southwest gable wall window, external and internal views



Plate 11. Generator House, camera facing west



Plate 12. Generator House, camera facing north



Plate 13. Generator House, camera facing east



Plate 14. Generator House, camera facing south



Plate 15. External and internal views of the northeastern window in southeast wall



Plate 16. Main room window operating mechanism



Plate 17. Mechanically operated louvered vent on main room window, internal view



Plate 18. Mechanically operated louvered vent on main room window, external view



Plate 19. Fixed window in southwest wall of store, also shows the lintel and renewed brickwork associated with what is probably an inserted door



Plate 20. External and internal views of the entrance in southeast wall (the northeast door is a modern replacement)



Plate 21. Hinge on main entrance door



Plate 22. Sub-station access and northeast entrance to store



Plate 23. Internal view of northeastern entrance to store



Plate 24. Generator House vents, external and internal views



Plate 25. Transformer enclosure on southwest side of Generator House, camera facing east



Plate 26. Transformer enclosure on southwest side of Generator House, camera facing north



Plate 27. 'Scar' in brickwork of southwest wall, visible within the cooling tower



Plate 28. View of the cooling tower, camera facing north



Plate 29. View of the cooling tower, camera facing northeast



Plate 30. View of the cooling tower, camera facing east



Plate 31. View of the cooling tower, camera facing southeast



Plate 32. Cooling tower tanks, camera facing north



Plate 33. Double doors in southeast wall of cooling tower



Plate 34. Doors into cooling tower showing detail of closing mechanisms



Plate 35. Bricked up opening high in southeast wall of cooling tower



Plate 36. View through large opening in southwest wall of cooling tower showing hinges for a former door mounted on the northwest edge. Also visible is the opening in the northwest wall



Plate 37. View into the cooling tower showing pipes etc. on the northeast wall



Plate 38. Water pipe with valve in western corner of the cooling tower



Plate 39. Curving revetment wall to the southeast of the Generator House



Plate 40. Inserted door between store and main room, as viewed from the store



Plate 41. Sub-station switchgear



Plate 42. Electrical heater as fixed to inserted wall within store



Plate 43. Probable writing shelf fixed to southeast wall of store



Plate 44. Inserted wall within store showing one of the two windows



Plate 45. General view of the southeast end of the main room



Plate 46. General view of the northwest end of the main room



Plate 47. View of the king post timber roof truss and the gantry crane. Also visible is the large water tank and its supporting girders



Plate 48. End of roof truss resting on ?concrete block built into brickwork



Plate 49. General view of the northwest wall within the main room showing the glazed and unglazed brickwork with remnants of later white paint



Plate 50. Floor surface within the main room showing the use of different colour tiles



Plate 51. Engine bed (distant) and generator mount (foreground), camera facing southwest



Plate 52. Generator mount with an additional mount for the external exciter to the right, camera facing southwest



Plate 53. Covered service ducts in southern corner of main room



Plate 54. Covered service ducts in vicinity of northeast doorway. A disconnected electric isolator mounted on the wall is also visible



Plate 55. Electrical boxes and switchgear on the northwest wall of the main room



Plate 56. Southeast wall of the Generator House showing the bricked up central window with probable exhaust exit and adjacent brackets



Plate 57. Site of Lister diesel compressor, eastern corner of main room



Plate 58. Instructions regarding use of the compressor



Plate 59. Weight limit sign relating to the overhead gantry crane



Plate 60. The gantry crane hoist trolley



Plate 61. Crane truck, at the southwest end of the bridging girders. The chain operated drive mechanism can also be seen



Plate 62. View of the hoist



Plate 63. Example of a turbo-charged English Electric 16 cylinder diesel engine with generator



Plate 64. Warning sign, southwest wall



Plate 65. Telephone equipment on the northwest wall (a repeater set of bells were also located on the northeast wall)



Plate 66. Fuel tank status diagram, also a gantry crane weight limit sign



Plate 67. Southwest wall (southeast section)



Plate 68. Southwest wall (northwest section)


Plate 69. Northeast wall (northwest section)



Plate 70. Northeast wall (southeast section)



Plate 71. The fuel storage area, camera facing west



Plate 72. The fuel storage area, camera facing east



Plate 73. The fuel storage area, camera facing northeast. Note the change to blockwork.



Plate 74. Concrete 'beams' and 'T'-section iron uprights within the fuel storage area camera facing southwest



Plate 75. Sump and hand pump within fuel storage area, camera facing northeast



Plate 76. Fuel storage area, external pipe and valve, camera facing southeast



Plate 77. Sump and hand pump within fuel storage area, camera facing northwest



Plate 78. Cast iron stopcock location signs close to the eastern corner of the Generator House



## Old Generator House, Bawdsey Manor Bawdsey, Suffolk (BAW 207)

# Written Scheme of Investigation for Historic Building Recording

Date: January 2016 (final version) Prepared by: Stuart Boulter Issued to: Richard Hoggett (SCCAS Conservation Team) © SACIC

## **Summary Project Details**

Sita Nama	Old Congrator House
Site Name	
Site Location/Parish	Bawdsey
Grid Reference	TM 3430 3849
Access	Off Ferry Road
Planning Application No	SC/15/1994
HER code	BAW 207
Event No.	ESF23418
OASIS ref.	suffolka1-240937
Туре:	Historic Building Recording
Area	N/A
Project start date	8 <sup>th</sup> February 2016
Fieldwork duration	c.1 day on site followed by reporting
Number of personnel on site	Projected as 1 SACIC staff

#### Personnel and contact numbers

SACIC Project Manager	Stuart Boulter	Office: 01449 900122
		Mobile: 07885 223524
Project Officer (first point of	Mark Sommers	Office: 01449 900124
on-site contact)		Mobile: 07753 788607
Curatorial Officer	Richard Hoggett	01284 741226
Consultant	N/A	-

#### Emergency contacts

Local Police	Ipswich Police Station, 10 Museum Street, Ipswich, Suffolk, IP1 1HT	101 or emergency 999
Location of nearest A&E	Heath Road, Ipswich, Suffolk IP4 5PD	01473 712233

#### Hire details

Plant (if required):	N/A	N/A
Welfare	Provided by client	N/A
Tool hire:	N/A	N/A

#### Contents

- 1. Background
- 2. Fieldwork and Historic Document Search
- 3. Reporting
- 4. Additional Considerations
- 5. Staffing

## Figures

1. Site location

## 1. Background

- 1.1 Suffolk Archaeology CIC (hereafter SACIC) have been commissioned to undertake a programme of Historic Building Recording of a structure known as the 'Old Generator House', Bawdsey Manor, Bawdsey, Suffolk (Figure 1).
- 1.2 While not listed, the building dates from the late 1930's and was part of a complex of military buildings at the site. As such, the building is an important relic of the Cold War and is considered to be a non-designated Heritage asset under the terms of the NPPF. As such, it requires archaeological recording prior to the conversion programme covered by Planning Application SC/15/1994.
- 1.3 The Historic Building Recording is being requested by the Conservation Team of Suffolk County Council's Archaeological Service (hereafter SCCAS/CT). The Local Planning Authority (hereafter LPA) has been advised that as a condition of the planning consent, a programme of Historic Building Recording will be under taken in order to record the affected building in its unaltered state.
- 1.4 The archaeological investigation will be conducted in order to comply with a Brief covering the specific planning condition that was produced by Richard Hoggett of SCCAS/CT (dated 27<sup>th</sup> January 2016) and a Written Scheme of Investigation (this document) prepared by Stuart Boulter (SACIC), also in January 2016.
- 1.5 The contents of the WSI comply with the requirements of the SCCAS/CT Brief which specifies an English Heritage Level 2 Recording. The following documents will provide guidance for the undertaking of the project:
  - Understanding Historic Buildings: A Guide to Good Recording Practice (English Heritage 2006);
  - Standard and Guidance for the Archaeological Investigation and Recording of Standing Buildings or Structures (Institute for Archaeologists 2001);
  - Measured and Drawn: techniques and Practice for the Metric Survey of Historic Buildings (English Heritage 2006);
  - *Gurney, D 2003, Standards for Field Archaeology in the East of England* East Anglian Archaeology Occasional Paper No.14, 2003 Association of Local Government Archaeological Officers East of England Region;
- 1.6 The academic objective of the project is to provide a detailed understanding of the nature of the buildings, and to provide the historical context, development and significance of the building.



Contains Ordnance Survey data © Crown copyright 2016

Figure 1. Site Location

## 2 Fieldwork and Historic Document Search

- 2.1 The archaeological fieldwork will be carried out by a full-time professional employee of SACIC (Mark Sommers).
- 2.2 The works undertaken in the field will comprise the following elements which form the basis of a Level 2 Building Recording as detailed in the English Heritage guidance document (English Heritage 2006, 14);
  - Both the interior and exterior of the building will be photographed and described along with its setting;
  - Distinctive features will be subject to more detailed photography and description;
  - A block plan will be produced of the site which will locate the building within the group and the main components will be numbered for reference in the report
- 2.3 The defined minimum criteria above will be met or exceeded.
- 2.4 In addition, an historical document search (documentary, cartographic and pictorial) will be undertaken to situate the history of the building within its immediate local context. The search will include a map study to illustrate the development of the building complex.
- 2.5 Note will be taken of the oral history of the complex, particularly relating to the historic use of the building.
- 2.6 The record will present conclusions regarding the location, form, date, development and use of the building.
- 2.10 The site will be recorded under a unique HER number acquired from the Suffolk HER Officer. In this instance, BAW 207 is the HER code and the event number ESF23418.

## 3 Reporting

- 3.1 The unique project HER number BAW 207 will be clearly marked on all documentation and material relating to the project.
- 3.2 All parts of the OASIS online form <a href="http://ahds.ac.uk/project/oasis/">http://ahds.ac.uk/project/oasis/</a> will be completed and a copy will be included in the final report. A digital copy of the report will be uploaded to the OASIS website.
- 3.3 The report will include a brief history of the building complex relating it to the map study and will include illustrations of the maps at a sufficient scale and quality for the buildings to be identifiable.
- 3.4 Where necessary, copyright permissions will be sort in for the documents to be reproduced in the report.

- 3.5 The report will include a description of the building fabric(s), their structural use and any particular features.
- 3.6 Evidence will be presented for the dating and use of the structure(s).
- 3.7 The photographic record will be listed with a description of the viewpoint and will be included on a CD to accompany the report.
- 3.8 The report will include a summary in the established format for inclusion in the annual "Archaeology of Suffolk" section of the *Proceedings of the Suffolk Institute of Archaeology and History*.
- 3.9 On completion, a draft of the report will be submitted to SCCAS/CT within six months of the completion of the fieldwork for approval and will clearly be marked DRAFT.
- 3.10 On acknowledgement of approval of the report from SCCAS/CT a single hard copy and a digital copy will be presented to the Suffolk HER.
- 3.11 The project archive shall be compiled in accordance with the guidelines issued by English Heritage in 2006, particularly section 7. The archive will be deposited with the County HER within six months of the completion of the fieldwork. It will then become publically accessible.

## 4 Additional considerations

#### 4.1 Health and Safety

- 4.1.1 The project will be carried out in accordance with SACIC's Health and Safety Policy. The SACIC Policy is presented in Appendix 1.
- 4.1.2 SACIC staff are experienced in working on similar sites with similar conditions to those that will be encountered on the present site and are aware of SACIC H&S policies. All permanent SACIC staff are holders of CSCS cards.
- 4.1.3 SACIC operate a number of standardised Risk Assessments that may be considered relevant to this project, e.g. 'lone working'. Copies will be provided to SCCAS/CT on request.
- 4.1.4 SACIC staff are aware of the specific risk assessments that have relevance to this project.

#### 4.2 Environmental controls

4.2.1 SACIC is committed to following an EMS policy. All our preferred providers and subcontractors have been issued with environmental guidelines. On site the Project Officer will police environmental concerns. In the event of spillage or contamination reporting procedures will be carried out in accordance with SACIC's EMS policies.

## 4.3 Site security

- 4.3.1 Unless previously agreed with the client this Method Statement (and the associated quotation) assumes that the site will be sufficiently secure for archaeological work to be undertaken.
- 4.3.2 In this instance all security requirements including fencing, padlocks for gates etc. are the responsibility of the client.

## 4.5 Access

- 4.5.3 The client will secure access to the site for SACIC personnel and obtain all necessary permissions from any landowners and tenants.
  - 4.5.2 Any costs incurred to secure access, or incurred as a result of access being withheld (for example by a tenant or landowner) will not be the responsibility of SACIC. Such costs or delays incurred will be charged to the client in addition to the archaeological project fees.

## 5 Staffing

- 5.1 The following staff will comprise the Project Team:
  - 1 x Project Manager (Stuart Boulter; supervisory only, not based on site) 1 x Project Officer (Mark Sommers)
  - 1 x Project Officer (Mark Sommers)

## OASIS ID: suffolka1-240937

Project details	
Project name	Old Generator House, Ferry Road, Bawdsey Estate, Bawdsey
Short description of the project	historic building recording of a generator house. Probably dates from the late 1930s and associated with the radar base known as RAF Bawdsey. Generator set removed but obvious evidence of its installation. To be converted to a dwelling.
Project dates	Start: 08-02-2016 End: 17-02-2016
Previous/future work	No / Not known
Any associated project reference codes	BAW 207 - HER event no.
Any associated project reference codes	DC/15/1994/FUL - Planning Application No.
Type of project	Building Recording
Current Land use	Other 2 - In use as a building
Monument type	GENERATOR HOUSE Modern
Significant Finds	NONE None
Methods & techniques	"Photographic Survey"
Prompt	National Planning Policy Framework - NPPF

## **Project location**

Country	England
Site location	SUFFOLK SUFFOLK COASTAL BAWDSEY Old Generator House, Bawdsey Manor
Study area	0 Square metres
Site coordinates	TM 3430 3849 51.994747948646 1.413368764936 51 59 41 N 001 24 48 E Point

#### **Project creators**

Name of Organisation	Suffolk Archaeology CIC
Project brief originator	Local Authority Archaeologist and/or Planning Authority/advisory body
Project design	Suffolk Archaeology CIC

originator

Project	Stuart Boulter
director/manager	
Project supervisor	Mark Sommers
Type of sponsor/funding	Landowner
body	

## **Project archives**

Physical Archive Exists?	No
Digital Archive recipient	Suffolk HER
Digital Archive ID	BAW207
Digital Contents	"other"
Digital Media available	"Images raster / digital photography", "Text
Paper Archive recipient	Suffolk HER
Paper Archive ID	BAW207
Paper Contents	"other"
Paper Media available	"Correspondence", "Report"

## Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Historic Building Record: Generator House, Bawdsey Manor, Ferry Road, Bawdsey Suffolk
Author(s)/Editor(s)	Sommers, M.
Other bibliographic details	SACIC Report No. 2016/014
Date	2016
Issuer or publisher	SACIC
Place of issue or publication	Needham Market
Description	printed sheets of A4 paper with card covers and a plastic comb binding
Entered by	Mark Sommers (mark.sommers@suffolkarchaeology.co.uk)
Entered on	17 February 2016

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