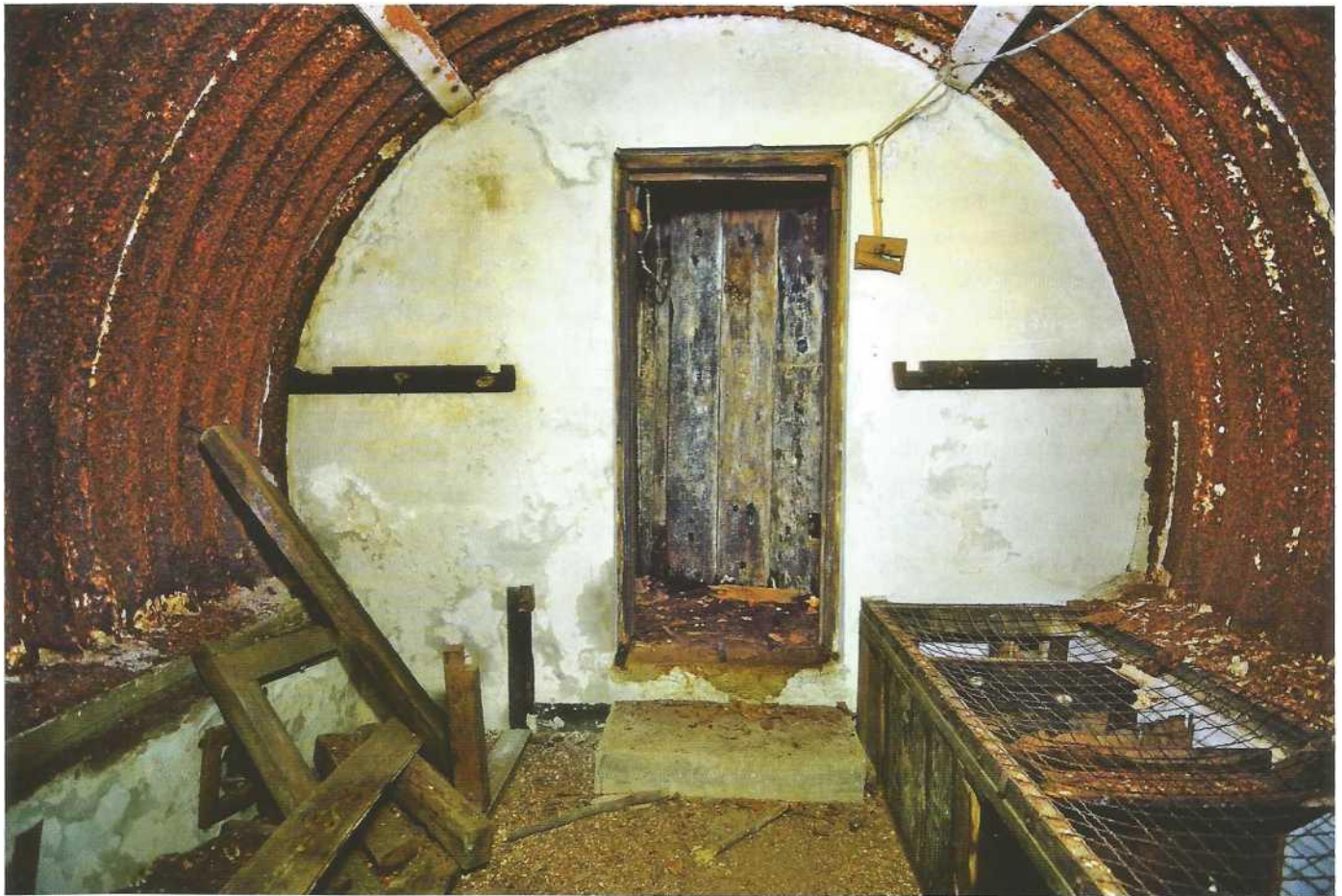


The WWII Super Zero Station at Wilton, near Salisbury

Brian Drury



Looking towards the main entrance. Bunks are seen left and right. The entrance blast-proof door is to the left through the opening. Photo Chris Warren

The Auxiliary Units were formed in World War II to 'go to ground' after a possible invasion and form up as patrols that would wreak havoc behind enemy lines. A second branch, known as 'Special Duties', was later formed and consisted of spies who would continue their normal life but feed intelligence reports through a secret radio network.

These messages were received at an underground receiving station, known as a Zero Station (from the code used during transmission). Unlike the patrols, both men and women were part of the Special Duties section. *Subterranea* 34 (December 2013) carried an article by Evelyn Simak describing a Zero Station near Halstead in Essex. The piece provided a general description of the wireless network to which the station was connected and that network included a larger Zero station at Wilton in Wiltshire which is known as a Super Zero Station. There is some dispute over the origin of the name Zero station, with some researchers believing it to have evolved after WWII; however, the author believes it is the original

term that was used.

Network Map

The existence of a station somewhere in the Salisbury area became public knowledge when a network communications map was unearthed at The National Archives (TNA). The map is located within TNA document bundle WO/199/1194 TNA positively encourage visitors to photograph documents but the original paper map is too large for a single camera image. This picture (overleaf) was created by joining two photos using Photoshop. The horizontal and vertical lines are where the original was folded allowing it to fit inside the document bundle.

The map is signed by Major R.M.A. Jones as corrected to June 1944. Major Jones was the officer commanding Auxiliary Units Signals when it was closed down in September 1944. The author has annotated the smaller maps to indicate station locations where known. The link colour denotes operating frequency. Blue is 52 MHz, black is 60 MHz and red is 65MHz. The VHF aerials were

Although Barbara has added her own comments and interpretations in the diary notes it is most unlikely that she coined the term of 'Super'; during another interview with the author she claimed to have only ever entered one dugout. In fact she says the Zero Station dugouts were not introduced until after her field support role was finished. Also, she claimed to have no knowledge of any station at Wilton.

Diary Entries

Beatrice Temple was driven by Price to Salisbury where Mr Gardiner (or Gartner) shows her the new Super Zero station. The diary provides a new clue to the existence of an underground communication centre somewhere near Salisbury. The relevant diary entry is:

Nov 15th 1943

To Shaftesbury (Price driving) - hospital case, and then Salisbury for stationery supplies. Visited Hut - shown the super zero by Mr Gartner. On to Barrack Officer — very helpful. Then to Ann? About changing her mind. —Mickie to come as Store Officer. Had letter from the Commander. Price lost way. HH at 21.00.

Mr Gartner/Gardiner has not been identified. Ann was probably Ann Ellis-Hughes who was stationed in the above ground site at Blandford for a while. Mickie is very likely to be Mickie Brown (nee Trant). HH is Hannington Hall in Hannington village, Wiltshire; this was the administrative base and billet for senior ATS personnel. The station at Wilton is the largest so far discovered and may be the biggest that was built although there could yet be something similar to be found on Reigate Hill in Surrey. Prior to becoming operational, Salisbury area communications were controlled by the station at Alderbury. This was an above ground hut rather than a dugout. Beatrice visited the Zero Station for an exercise. The exercise was joined by Major Jones who returned Beatrice to her hotel after dinner.

Feb 13th 1944

To Salisbury - visited zero - returned to Hut after dinner at 9pm- Exercise joined by Major Jones who returned me to Hotel. O/N[side note: Cpl Styan going to have a baby] What is clear from research on this subject is that the network varied in detail during its period of operation. The only certainty is the network map that Major Jones has signed. How accurate the map was at the time is difficult to judge but so far many of the stations shown have been confirmed. In addition to the Major Jones map, a further clue to the Wilton location is a letter from Major Peter Forbes (Special Duties Major) to Arthur Gabbitas dated 1 Feb 1998 in which Peter says:

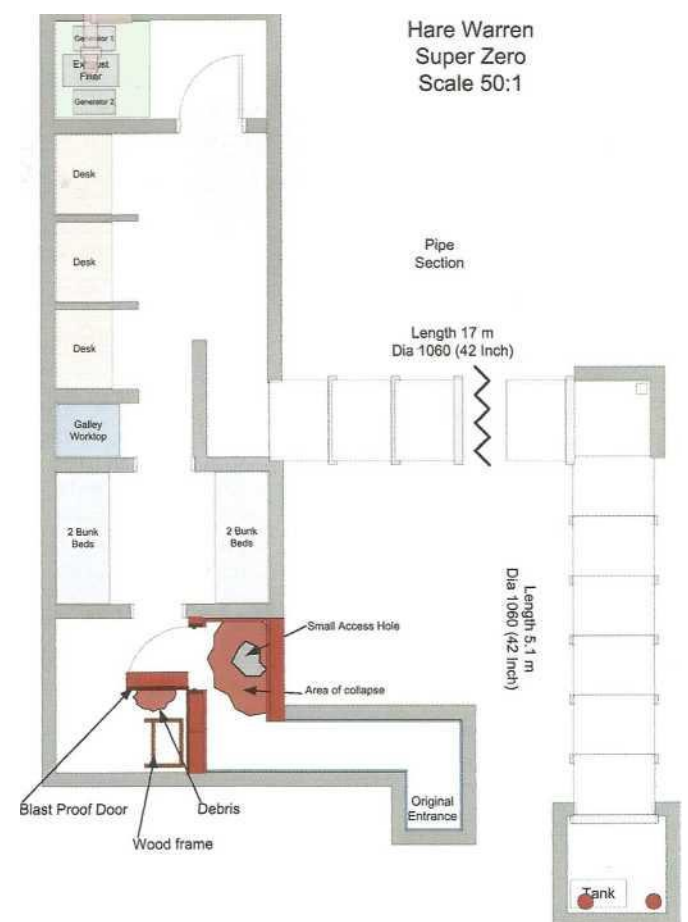
My job was to write exercises to test all the networks & then go round to see them carried out. In my 6 months I visited all the Zero stations etc but I cannot now remember where most were. I remember visiting Maj Fraser & staying at Sevenoaks & Canterbury. There was one, I think, in Wilton, Salisbury & one on top of Reigate Hill.

The Major Jones map was converted to a transparent GIF image and used as an overlay in Google Earth. The coastal outline was used to align the image and then the location of the stations was compared to known locations. In some cases the dot on the network map is remarkably close to the known location of the station.

However, in most cases the alignment is poor; there are several reasons for the map image to be inaccurate. To begin with there are the field measurement and cartographer's errors. Then there are photographic problems including the distortion produced by folds in the paper and the parallax error due to using a hand-held camera. Finally, the cylindrical projection used in Google Earth may not precisely match the projection used in Major Jones' coastal outline.

The dot for Wilton suggests the location to be about four miles east of Wilton. The dots to scale are as much as 1.5 miles across therefore a four-mile error is probably reasonable. After much searching, the Wilton Super Zero Station was eventually located in Hare Warren Woods. The site is of such historical importance that it was listed by Historic England and recorded photographically. A scale plan view drawing was also produced.

Station Layout



Entrance

Entry to the underground dugout was via a hatch and passageway leading to the entrance lobby. The substantial blast-proof door was constructed from railway sleepers lined on the inside with an earth-filled box made from



Inside view of the blast door

planks and batters. Soil can be seen within the door cavity in this photo.

This door was both camouflaged and fortified. It is not clear if the soil-filled compartment was designed to increase the effective density and prevent discovery by simply tapping the internal walls of the first chamber but it certainly has that effect. It seems that the small entry lobby was designed to appear as if the dugout finished at that point. Checking for further voids by banging the walls would not reveal the main part of the dugout.

Sleeping Bay



One side of the sleeping bay area. Photo Chris Warren Four beds were provided. Battens for the upper bed can be seen but the horizontal pieces and mesh have gone. An elaborate ventilation system using salt-glazed ceramic pipes is provided in the sleeping area. This has not been seen in any of the smaller Zero Stations.

Wireless Bays

The wireless room is provided with three operator positions. Each has a separate aerial connection and the bays are enclosed with sound-absorbing material. Three bays suggest that up to three wireless links were operated



The three wireless bays. Photo Chris Warren

at the same time. If we assume that 24-hour operation was required, then using an eight-hour shift system the crew would be - three operating, three sleeping and three cooking/resting, although the cramped conditions would make resting quite unpleasant. It is possible that a different shift system with just two crews could have been used. The doorway to the left leads to the tiny galley or kitchen area which is equipped with its own head-height ventilation pipe and lighting plus a light switch.

Tunnel Corridor



Tunnel entrance. Photo Chris Warren

The tunnel entrance corridor is to the left and the wireless bays are located over to the right.

The Escape Tunnel

In common with other Auxiliary Unit bunkers, the station is equipped with an emergency exit in the form of a 22m tunnel constructed from 1.06m (42 inch) interlocking concrete pipes. A right-angle direction change is provided 17m from the dugout. Cable clips fitted by Bert Davis can still be seen today. In 2001 Bert Davis (Royal Signals) wrote:

I spent many days fitting and wiring that station - one fact I will never forget is running electric wiring through the concrete pipes. I cannot remember the distance involved but I do remember fitting the cable clips with rawlplugs. In those days we had no drills or masonry bits, just a hammer and an old rawlplug punch. Blisters and backache bent up in a 48' (1.22m) diameter pipe. "



The emergency escape tunnel. Photo Chris Warren



Ventilation pipes near tunnel exit



Cable clips inside the tunnel

LIGHTS OFF



Sign on the dividing wall outside the tunnel entrance

Tunnel Exit

A short distance beyond the original tunnel exit there are two long salt-glazed pipes. Exactly what these are for is not clear although an apparent lack of toilet facilities elsewhere in the dugout suggests it may be associated with some sort of chemical toilet.

The walls immediately below the pipes are of a different colour which may be significant. The galvanised tank is assumed

to have held water for some purpose.

The obvious problem with the toilet theory is that access must be through the 42-inch diameter tunnel. However, the choice is between an uncomfortable trip to the toilet or easy access to a much closer facility that would undoubtedly have created a bad smell and health hazard after a few days. A vent pipe can be seen on the ceiling and the two long pipes are assumed to be inlets. However, if the two long pipes are designed to remove smell from human waste products then the long pipes are more likely to be outlets.

Ventilation

The ventilation system in the Super Zero is more complex than has been seen elsewhere. Presumably the lessons learned from the construction and operation of the smaller Zero stations has been improved upon to achieve a better airflow throughout the dugout. This would be especially important if as many as eight or nine operators would be living underground for any length of time.

Some smaller Zero station dugouts were fitted with forced-air ventilation. The much larger Wilton dugout with a more complex system most likely had the same but no evidence of an extractor or inlet fan was seen. The main areas with ventilation were: sleeping quarters, wireless bays, generator bay, tunnel and the galley.

The 'standard' Zero station design provides outlet pipes near the roof of the dugout and inlet pipes near floor level. This makes use of natural convection although forced-air extraction is also believed occasionally to have been used. A feature not seen elsewhere is located in the floor just inside the entrance to the tunnel corridor.



Access hatch to ventilation chamber in the floor

A small removable lid covers an arrangement of salt-glazed pipes as seen below.



Ventilation chamber open

The author assumes that this is designed to minimise the distribution of sound originating from inside the dugout to the outside world. The current theory is that sound attenuation was achieved by simply de-coupling the pipes. The downward facing pipe is assumed to carry sound and by directing the flow downwards possibly onto a sound-absorbing surface such as a layer of dry leaves, the noise reaching the second pipe would be much attenuated.

Entry & Exit Hatches



Pulley-wheel for one of the hatches



Counterweight for hatch

The original entry and exit would have been covered with a heavy hatch operated by a system of weights and pulleys. Only one of these pulleys remains and is shown here resting on a bunk bed.

Diary entry Feb 8 1944

Salisbury (SATSO Conference) then to Hut where message to ring AG 16 (o) — want confidential report on Doris and 5 officers are to be interviewed on Sat (12th). Spent a long time testing weights etc with Mr Gardner (?) One of the counterweights for the entry or exit hatch can be seen lying on the ground outside the dugout. **Electrical Wiring**

The station was provided with external mains power via a heavy duty armoured cable shown at the top and slightly right of centre.



Cable Distribution Panel

The five cables at top middle are feeder cables to the aerials which were most likely mounted in nearby trees. The base of a large felled or fallen tree can be seen today very close to the dugout. Five feeder cables suggest that five aerials were in use yet the Major Jones map suggests that only three wireless links were in operation in June 1944. This is perfectly possible because the removal of a link did not require the wiring to be altered.

The late ex-Royal Signals Cpl Arthur Gabbitas spent years researching the SD network. He was assigned to the Winchester Zero station during the war and was able to produce a map of the communication paths. Arthur included a link from Wilton to the Zero Station at Buckland St Mary which the Major Jones map does not show. The fifth link may have been to the Battle HQ at the now disused RAF Holmsley South airfield. This could be the station referred to by Sgt Alf Ellis as Battle.

Generator Bay



Exhaust box for generators. Photo Chris Warren



Typical Generator (not from this site)

monoxide and any gas attacks from reaching the occupied areas beyond the door.

This view of the back wall with the generator bench to the left is probably where the batteries were stored and operated. The damage to the wall covering is believed to relate to the sulphuric acid droplets ejected from the cells during out-gassing.



Back wall of the dugout



Generator Door

The generator bay is designed to accommodate two generators sharing one exhaust box. Each generator was mounted on two rubber couplings to minimise noise and vibration.

This charging set is typical for the period. The photo is provided for reference only and is not associated with the Wilton station. Notice the central fixing point at the front. A still functioning door viewed from the generator area leads back into the wireless room. The black material is anti-gas Union cloth soaked in oil to prevent carbon

ATS Hut

It was common practice for Zero Stations to be associated with an above ground hut and according to several of the ATS operators, they had instructions to decommission the hut of its wireless equipment and set up the station in the dugout when an invasion alarm was raised.

Bert Davis recorded the following in a letter to William Ward dated 5 June 2001:

In the early 1960 s I visited the site in Hare Warren; it was very overgrown with shrubs and brambles, no sign of the tree trunk stump or hut that was the decoy nearby.

The hut was justfitted out as an office with a telephone. I had to tap into the phone line and ran concealed wiring to the buried Nissan (sic) hut. The GPO did visit the hut on one occasion and did not find my secret connection - perhaps they had been told not to be too inquisitive.

*To the best of my memory there was only one exercise carried out - a number of ATS officers spent a few nights underground. I was reduced to sanitary duties. I think that the tunnel led to the Nissan hut- hence the electric cabling. The suggestion here is that when Bert Davis was at Hare Warren the above-ground hut was not used to operate the wireless sets from. Other dugouts have been recorded as using tree stumps as covering for an entry hatch. **Network Function***

It is no coincidence that the Wilton dugout is located in the grounds of Wilton House where the Southern Command HQ was based.

The following text comes from: www.bbc.co.uk/history/ww2peopleswar/stories/63/a4233863.shtml

L/Cpl Alice Catherine Hunt nee Griffin ATS W/1 12190

On 30 October 1942 I moved to 3rd Command Signal Company, Wilton House, in Salisbury. This was where we worked again in shifts, in underground cellars in Wilton House, receiving signals through the teleprinters.

At Headquarters (HQ) teleprinters received messages (signals) constantly and these messages were then redistributed to their intended destinations either by teleprinter, telephone or despatch rider, some of whom were ATS.

Most of the signals were Orders and during a particularly busy period many came through with the name Overlord on them. These were in code and had to pass through the cipher office before they could be issued.

The following text is from:

www.wiltshire-opc.org.uk/Items/Wilton/Wilton%20

[-%20Army%20at%20Wilton%20&%20Erskine%20](http://www.wiltshire-opc.org.uk/Items/Wilton/Wilton%20)

[Barracks.pdf](http://www.wiltshire-opc.org.uk/Items/Wilton/Wilton%20) (replace '%20' with a space)

During the Second World War Wilton's links with the Army were renewed. Wilton House was requisitioned as the new HQ of Southern Command; Nissen huts were set up in the grounds and used as extra offices and accommodation. The Pembroke Arms Hotel became the Officers Mess and what is now the Estate Office was a canteen run by Lady Pembroke and a team of helpers. Much of the planning for D-Day was done at Wilton House; Southern Command stretched from Sussex to Land's End. Communications were vital and 750 miles of telephone wire was laid in and around Wilton House, linking the centre of operations with all units in the area. After the war, Southern Command stayed at Wilton House until 1949 when the Army purchased Fuggles tone House (part of the Wilton Estate). The American Army had used Fugglestone as their Southern Command Field Base during the war. Erskine Barracks utilised the existing buildings and built extensive new office accommodation in the early 1960s.

©Wiltshire OPC Project/2014/Eileen Barnett Some of the equipment used for this network has been identified for type and function. A list follows: **Batteries**

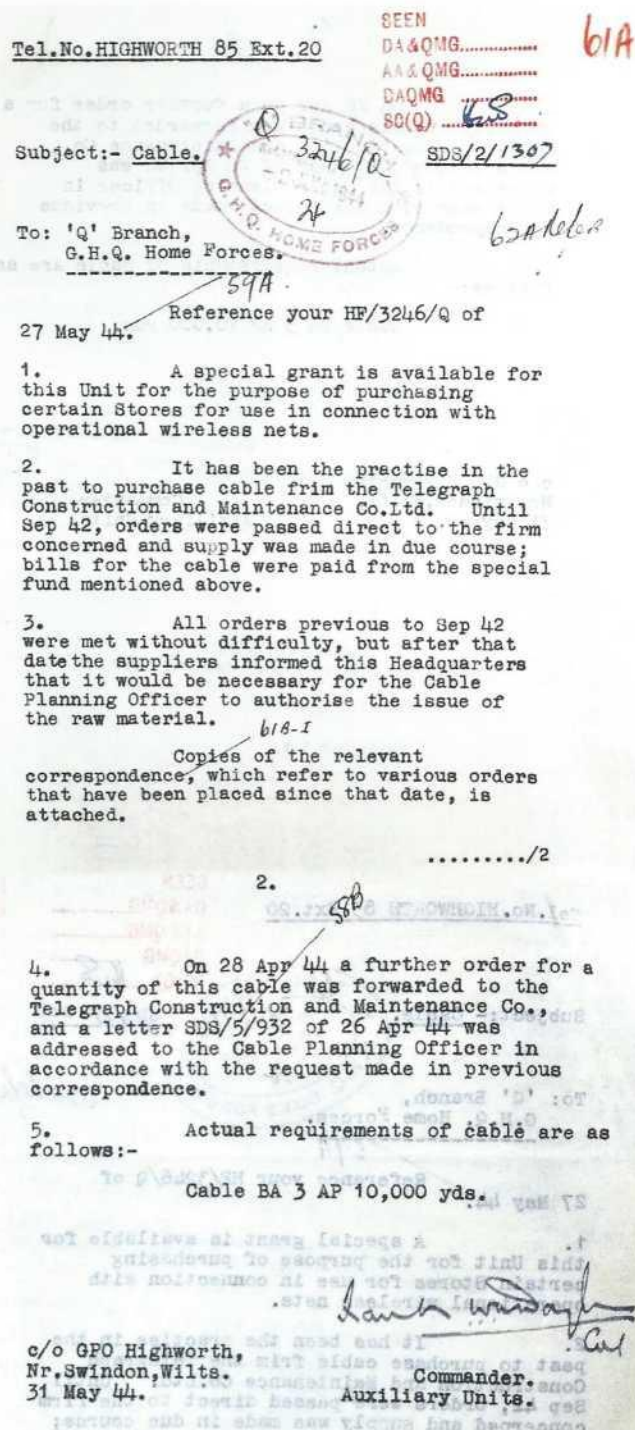
The stations used transmit/receive wireless sets which operated from 6V DC using car batteries. Obviously the technology of the day was thermionic valves and the high-tension supplies required were provided by DC to DC inverters.

Wireless Feeder Cable

Trivial one may think but reducing the size of the cable used between a VHF set and its associated remote aerial was a major headache in 1939/1940. The problem was solved using a two-core balanced 80-Ohm feeder cable identified as BA 3 AP and manufactured by the Telegraph Construction & Maintenance Company.

The following communication is copied from TNA document bundle WO/199/937 The reason this cable was able to achieve an impedance of 80 Ohm is that the classified insulating materials used had a very high dielectric constant. The author believes this material was polyethylene. A detailed account of the development of this material is available on Wikipedia but this section is interesting:

But because of World War Two, commercial production was halted and secrecy imposed and the new ICI process was used to produce polyethylene for insulation of wires and cables in radar sets.



It is difficult to imagine why the request was made as late as 31 May 1944 requesting an enormous 10,000 yards of the cable.

The Wireless Sets

Perhaps the most interesting items in the stations were the VHF communications sets now generally known as the TRD. These sets were relatively small, light, and easy to operate. Also, they required only a single 6-volt car battery for power. More importantly, according to Captain Ken Ward they used a 'quench' modulation technique making them difficult to intercept.

Aerials

The tree-mounted pre-assembled aerials were made from copper tubing. Indoor aerials were very simply constructed on-site by stripping back the two insulated



conductors and laying the cable out in the shape of a 'T' mounted broadside to the direction of propagation.

Operational Purpose

It is clear that the Wilton Super Zero Station was opened a few months before the network was closed down in July 1944. One may ask why work continued when fear of an invasion was long past and the originally intended stay-behind function could no longer be fulfilled.

As with all engineering and construction projects these things have inertia and sometimes it is easier to continue than it is to stop. Also, the SD network played a part in the preparations for D-Day and Wilton may have been useful in that regard. The cost to complete a project of this size would have been insignificant compared to the overall D-Day commitment.

What Next?

The evidence from smaller but similar Zero Stations makes clear that this unique structure will eventually collapse. How long this will take is difficult to predict. Fortunately the general condition of the main corrugated section, although very heavily corroded, is intact. The timber-constructed chamber near the blast door is of wood construction so is likely to go first as it has already done to some extent.

With sufficient time, money, and of course permission from the landowner, it may be possible for this unique example of Britain's WWII secret history to be preserved. However, at the present time this is most unlikely and eventual collapse is sadly the expected fate for this station.

Historic England Listing

The importance of the site has been recognised by its scheduling as a Site of national importance. There's no better summary and conclusion than to quote from the key part of the scheduling:

The underground wireless station in Hare Warren Woods, Wilton was constructed in 1943/4 as part of a secret military organisation to operate in areas of Britain should they come under German occupation. With the increasing threat of a German invasion in the summer of 1940, the Prime Minister, Winston Churchill, directed that a covert Army unit called 'GHQ Auxiliary Units' was to be formed. This has sometimes become referred to as the 'British Resistance Organisation' or BRO. The Operational Branch of the unit trained and equipped civilians to carry out acts of sabotage behind enemy lines.

A completely separate branch called 'Special Duties', to which this station belonged, trained civilian volunteers living in the most threatened coastal areas of Britain to act as 'observers' (spies) and report on German military activities from within occupied areas. Observers left their reports in 'dead letter drops', which were delivered by runners to hidden wireless stations, called 'OUT-Stations'. Civilian operators

would then transmit the reports to military manned 'IN-Stations' outside the occupied area. The wireless networks were set up by Royal Signals from the GHQ Auxiliary Units Signals. The IN-Stations were manned by specially selected signallers or by officers of the Auxiliary Territorial Service (ATS).

Many of these IN-Stations were sited near to the Division or Corps HQs responsible for the operations in that area, and reports were delivered to the nearby HQ by runner or telephone. Initially, IN-Stations worked from wooden huts near to the HQ which they served, but from 1941 onwards many were provided with concealed underground dugouts. These were equipped with rations, water, sanitation and power supplies so that if the Germans occupied the surrounding area, they could remain concealed and operate in isolation for up to 21 days.

Considerable ingenuity was used to conceal the entrances via trap doors and locking mechanisms. Special ventilation systems were built to provide fresh air in the dugout and to disperse foul air, generator exhaust fumes or cooking smells while muffling the sounds of activity and the noise of the generators. Aerials were concealed in nearby trees and the feeder cables were hidden under the bark. If access was gained into the dugout by the enemy, a layer of security was provided by heavy concealed doors, which gave time for the crew to destroy sensitive material and hopefully escape via a special tunnel with a hidden exit.

Royal Signals set up 20 wireless networks, each with an IN-Station (sometimes called a Control or Zero Station) to collect the intelligence reports transmitted from the OUT-Stations, which in most cases were near to the coast. Initially, the wireless coverage was in Kent, Surrey and East Anglia but there was a steady expansion northwards up the east coast, eventually to Sutherland and Caithness. The networks also expanded westwards along the South Coast from Hampshire through Dorset, East Devon, Somerset and along the South Wales coast. The station at Hare Warren appears to have been operational in a hut from March 1942 or earlier and evidence suggests that Wilton was the only command HQ to eventually have underground facilities.

Contemporary documents indicate that the dugout was constructed in late 1943 and early 1944, when the threat of invasion was extremely low although there was still the possibility of German airborne or seaborne raids, but only near the coast. A reference to a 'super station' by Senior Commander Beatrice Temple (ATS), in her diary, probably refers to the station at Hare Warren: it is approximately three times the size of any other known IN-Station and accommodated 8 or 9, rather than 3, operators.

This IN-Station is of particular significance as it was an 'Inner Network' Station (collecting intelligence

via IN-Stations rather than directly from OUT-Stations) serving the headquarters of the Army Southern Command, which had requisitioned Wilton House for its HQ and was responsible for the coastline from Portsmouth westwards to Lands End, and along the Bristol Channel into Gloucestershire. Documentary evidence in the National Archives (WO 199/1194) shows it had direct wireless links from IN-Stations at Blandford covering the Dorset coast and Winchester covering Hampshire, plus another link to Coleshill, which gave indirect access from IN-Stations covering Somerset and East Devon. Coleshill House was the headquarters of the Auxiliary Units. There was also an alternate route from these stations via the Blandford site to Wilton.

By July 1944, approximately 3,500 civilians had been trained and the wireless networks were operating with over 125 civilian-operated OUT-Stations (and 78 SUB OUT-Stations), most of which were concealed in dugouts or hidden behind dummy walls in houses, attics, sheds or other buildings. Special Royal Engineers teams were used for this secret work. There were c.30 IN-Stations, most of which were also linked to an 'INNER Network' which

enabled the intelligence to be passed back to Army District or Command HQs.

The Special Duties branch was closed down in July 1944 and orders were given that all equipment was to be removed from the stations, and the concealed dugout entry and exit shafts were to be capped off with concrete and covered with earth. By 18 September 1944, documents in the National Archive (W0199/1194) report that all IN and OUT stations had been dismantled and closed down and that all dugouts had been blocked off. Between July and September 1944, the main entrance at Hare Warren was sealed with a concrete slab and covered with earth to conceal the facility and prevent access to it. The structure, its constructional details, and its facilities were to remain a secret in case the special techniques were to be required at some point in the future. In 2013, the Wilton Control Station remains intact with steel grilles fixed across the two entrances. One area of roof has collapsed, possibly through human intervention.

From:

<https://historicengland.org.uk/listing/the-list/list-entry/1417594>

Photos by Brian Drury unless stated

Bruniquei Cave - the earliest known man-made structure on the planet

Linda Dixon

Bruniquei is a tiny village near Montauban in the Midi- Pyrenees region of southwestern France. There are several caves in the area and I came across an article about the fascinating Bmniquel Cave in the Newsletter (September 2016) of the William Pengelly Cave Studies Trust.



Each ring is made up of pieces of stalagmite roughly the same size, with structures having chunks stacked on top of each and

Discovery

The ancient cave was discovered by a 15-year-old boy in 1990. He dug a 39-metre long passage through a rock pile, in pursuit of a draught, and came across a sizeable collection of chambers. Archaeologists then investigated the cave, which had closed naturally during the Pleistocene.

Over 300 metres into the cave the explorers found structures made of stalagmites which had been broken off and interlinked. Some 400 pieces had been arranged into two rings - a large one between four and seven metres across and a smaller one, just two metres wide. Loose stalagmites had been propped up against these and there were four piles that were not yet arranged. Traces of fire were everywhere and there was a mass of burnt bones.

Early research

During the investigation, great care was taken to preserve the natural formations. In addition to the stalagmite circles, there were flowstones, an underground lake, calcite rafts, bone remains and dozens of bear hibernation hollows in pristine condition. A thick layer of calcite coated all the structures, making dating difficult but the archaeologists at the time came up with a date of 47,600 years old.

The latest studies

In 2016 Jacques Jaubert of Bordeaux University led a team to carry out a scientific appraisal of the structures. They used Uranium-series-dating which gave an astonishing age of 176,500 years before present, making the circular stalagmite structures the oldest known hominid construction on the planet. This corresponds to a time when early Neanderthals were the only humans in the area at that time, and therefore they must have been the builders.

Jaubert said, "The most surprising element of the research was finding signs that the early Neanderthals had succeeded in mastering the underground environment. The location and topography of the structures are key here. They are far from the entrance and the light of day, which suggests that these people were organised, had skills to enter deep into the cave and to transport materials inside it as well as to light it up." The discovery shows that early Neanderthals were capable of building more elaborate structures than previously realised, and that they had a more complex social organisation than previously thought.

References:

William Pengelly Cave Studies Trust *Newsletter No. 123*, September 2016

Wikipedia: https://en.wikipedia.org/wiki/Bruniquei_Cave
Jaubert, Jacques et al: "Early Neanderthal Constructions deep in Bruniquei Cave in Southwestern France". *Nature* 534 ISSN 0028-0836.

