Case information

Case ID	300018679
File Reference	HBH/B/R/52
Name of Site	Churchill Barrier No 4, Burray to South Ronaldsay, Orkney Islands

Local Authority	Orkney Islands Council		
National Grid Reference	ND 47363 98518		
Designation No. (if any)	LB52417		
Designation Type	Listed Building	**Current Category of Listing**	N/A
Case Type	Designation		

Received/Start Date	12/06/2014
Decision Date	18/11/2016

1. Decision

In our current state of knowledge, Churchill Barrier No 4 meets the criteria for listing at category A. The structure has been designated (listed).

Statutory Address	Churchill Barrier No 4, Burray to South Ronaldsay, excluding concrete edge beam, crash barriers, modern road surfacing, car parking area and toilet block to northeast, Orkney Islands

2. Designation Background and Development Proposals

2.1 Designation Background

The Churchill Barriers were not previously considered for designation, but they were visited in 2013 by Historic Scotland designation officers to inform an initial scoping review of Scapa Flow for its possible interest as a Historic Marine Protected Area.

2.2 Development Proposals

Pre-application discussions about a renewable energy scheme that might affect the Churchill Barriers took place with Orkney Islands Council and a developer in 2012. At this time, solutions to prevent wave overtopping, which continued to cause concern for local safety and road traffic management, were also explored.

In 2016 an application for a screening opinion was made to Orkney Islands Council relating to a proposed scheme for tidal flow energy capture at Churchill Barriers Nos 1 and/or 2 together with a wave overtopping solution for Barrier 2 (Orkney Islands Council planning portal: ref 16/034/SCR).

3. Assessment

3.1 Assessment information

A listing proposal for Churchill Barrier No 1 was received in 2014. The case was extended to consider whether all the barriers (Nos 1-4) met the criteria for listing, scheduling, or inclusion as part of a Historic Marine Protected Area (HMPA). Planning considerations which had been put forward in 2012 were also considered as part of the ongoing assessment (see 'Other considerations' below).

A site visit took place on 14/06/2016 and Barriers 1-4 were viewed.

3.2 Assessment against designation criteria

Churchill Barrier No 4 was found to meet the criteria for listing.

Listing is the appropriate designation for the barriers. Scheduling is generally not appropriate for structures which carry road traffic while designation as an HMPA would not be appropriate for these specific structures which permanently protrude above sea level and are part of the land transport network.

An assessment against the listing criteria was carried out. See **Annex A**.

The designation criteria are published in the Historic Environment Scotland policy statement June 2016, Annex 2, pp. 51-53.
https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/legislation-and-guidance/historic-environment-scotland-policy-statement/

3.3 Other considerations

Historic Environment Scotland and its predecessor Historic Scotland have been aware of tidal energy development proposals affecting primarily Barriers 1 and 2 since 2012. They have also been aware since 2012 of the desire locally to resolve

issues of wave overtopping at Barrier 2 which cause safety issues and force the closure of the road linking Mainland with the islands to the south.

In view of the longstanding development proposals affecting primarily Barriers 1 and 2 and the road safety issues at Barrier 2, we did not consider it appropriate to propose these barriers for listing. However, Barriers Nos 3 and 4 are not the subject of existing development proposals.

We therefore propose that Churchill Barrier No 4 should be listed. Churchill Barrier No 3 is the subject of a separate listing assessment.

Elizabeth McCrone
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ANNEX A – Assessment Against the Listing Criteria*

Churchill Barrier No 4, Burray to South Ronaldsay, excluding concrete edge beam, crash barriers, modern road surfacing, car parking area and toilet block to northeast, Orkney Islands

1. Description

Churchill Barrier No 4, about 650m long, is part of a group of four 'Churchill Barriers' built between 1940 and 1944 to link islands at the eastern side of Scapa Flow. The barriers are solid causeways that prevent access from the east into the four channels leading to Scapa Flow, the main British naval base during the Second World War. The scheme was designed and supervised by Sir Arthur Whitaker, Civil Engineer-in-Chief of the Admiralty. The contractors were Balfour Beatty & Co Ltd. Italian prisoners of war who were interned at Lamb Holm formed part of the workforce that made the concrete blocks and built the structure.

In accordance with Section 1 (4A) of the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 the following are excluded from the listing: excluding concrete edge beam, crash barriers, modern road surfacing, car parking area and toilet block to northeast.

The defensive barriers were constructed to prevent ships and particularly submarines from entering Scapa Flow from the east, but they also provide road access southwards from Mainland to South Ronaldsay. Barrier 4 links Burray and South Ronaldsay. Although conceived and built at a time of national crisis, their lasting role has been as causeways and roads linking islands together.

Barrier 4, like the other barriers, has a base built using bolsters, wire cages or baskets that were filled with broken rock and then dropped into the water of the channel. Most of this deep structure is underwater. A road carriageway formed from dumped aggregate and horizontally laid concrete blocks overlies the causeway base.. Five and ten ton cast concrete blocks placed in varying positions on either side of the barrier at angles help to protect the causeway core and prevent the tide from overtopping the carriageway. In total, all four barriers required about 250,000 tons of stone rubble and 66,000 concrete blocks.

2. Assessment Against the Listing Criteria (HES Policy Statement, 2016) Annex 2, pp. 51-52

Criteria for determining whether a building is of 'special architectural or historic interest' for listing under the terms of the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 [www.legislation.gov.uk/ukpga/1997/9/contents]

To be listed, a building need not meet all the listing criteria. The criteria provide a framework within which judgement is exercised in reaching individual decisions.

2.1 Age and Rarity

The construction of the Churchill Barriers is described by Paxton and Shipway in their 2007 book 'Civil Engineering Heritage: Scotland - Highlands and Islands'. The barriers were built between May 1940 and September 1944 and were officially opened on 12 May 1945. Scapa Flow was the main British naval base during the Second World War. Its eastern approaches had been protected by blockships during the First World War, vessels that were moored or grounded in the channels in order to block them. But by 1939, the blockships had moved or deteriorated and in October a German submarine penetrated the channel between Mainland and Lamb Holm and sunk the Royal Navy battleship HMS Royal Oak with the loss of 833 lives. The Churchill Barriers were built in response to this event as part of the defences of the main British naval base; their construction cost £2 million.

Other forms of anti-submarine defences were used in Scottish waters, including anti-submarine booms and nets. However, in our current state of knowledge, the Churchill Barriers are the only UK example of an extensive, solid anti-submarine and ship defence built from stone and cast concrete. They are therefore a unique group of defensive structures.

The listing criteria state that buildings put up between 1840 and 1945 which are of special architectural or historic interest and of definite character may be listed. We consider the barriers have special historic interest and are of definite character.

2.2 Architectural or Historic Interest

Interior

N/A

Plan form

Barrier 4 links the small island of Burray with South Ronaldsay to the south. Together with Barrier 3 (see separate listing assessment) and Barriers 1 and 2 (which are not listed) they form a continuous obstacle along the east side of Scapa Flow. The individual barriers are straight, with their orientation reflecting the location of the islands that they join.

Technological excellence or innovation, material or design quality

Building long fixed barriers across bodies of tidal water presented unusual engineering requirements in the mid-20th century. In this period, solid causeways were not a normal response to civilian transport needs, with bridges or ferries usually preferred when open water had to be crossed. The barriers' designers had to take account of the fast flowing tidal water in narrow but relatively deep channels. Paxton and Shipway note that the barriers were designed to withstand a 4-5 knot tidal current. Engineering research had to be undertaken before the barriers could be built, and this included experiments using models conducted at the Whitworth Engineering Laboratories at the University of Manchester, and trials of different types of bolster carried out at Deptford, London. A special feature of the construction operation was the use of aerial cableways to deposit the bolsters. Barrier 4 was built using one of four electrically driven cableways obtained from works on the Kut

Barrages across the Tigris in Iraq.. Three generating stations were built to supply power. The Resident Superintending Civil Engineer was initially E K Adamson, then from 1942 it was G Gordon Nicol, whose notes and photographs are preserved in the Orkney Archives in Kirkwall and form a record of the construction work.

Construction of the Churchill Barriers was a major engineering feat that required initial research at the University of Manchester, and then customised engineering solutions during the build. This adds weight to the case for listing.

Setting

The setting of Barrier No 4 remains largely unaltered from its setting at the time of construction, though natural processes have caused the formation of a wide deposit of sand on the east side of the barrier. Today, as in the 1940s, the barriers link islands with predominantly rural, agricultural landscapes, occupied by small settlements and dispersed farms. Also, their setting continues to reflect the military context of their construction: the remains of old blockships can still be seen protruding from the waters around Churchill Barriers Nos 2 and 3. In addition, the contemporary Italian Chapel (1940-42), listed at category A, still stands on Lamb Holm between Barriers 1 and 2, where it was built by Italian prisoners of war who were working on the construction project. The lack of change to the wider setting of the barriers adds to the case for listing.

Regional variations

N/A

2.3 Close Historical Associations

The Churchill Barriers were constructed in the aftermath of the sinking of the British battleship HMS Royal Oak on 14 October 1939. During the First World War, the anchorage at Scapa Flow had been protected by measures including the sinking of blockships in critical access channels. However, the defences had not been maintained during peacetime and the naval base was clearly exposed. In their book ‘Scapa Flow’, Malcolm Brown and Patricia Meehan note that on 31 October 1939 Winston Churchill went to Scapa Flow to meet Admiral Forbes and they agreed the comprehensive reinforcement of the defences, including more booms, blockships and batteries. Most of the work was to be completed by March 1940 but sealing the eastern approaches would take longer. Brown and Meehan state it was Churchill’s view was that only solid concrete barriers could guarantee the security of the anchorage; on current knowledge the building of the barriers was due to his personal intervention. Brown and Meehan also suggest this was a psychological necessity as well as a strategic one, demonstrating visibly that the weakness exploited by the Germans on 14 October 1939 had been sealed.

Paxton and Shipway state that initially building of the massive causeways was undertaken by British and Irish workmen. However, the barriers became recognised as causeways for potential civilian use; this lead to a more relaxed interpretation of the Geneva Convention and from early 1942 up to 1200 Italian prisoners of war worked on the scheme. The Italians lived on Lamb Holm, where they created the

ornately decorated Italian Chapel from two Nissen huts. The Italian Chapel is listed at Category A (LB12728).

Close associations with nationally important people or events can be a significant factor. The barriers are well preserved in a form and condition that directly illustrates their associations with the fortification Scapa Flow in the years following 1939 and its relationship with a nationally and internationally significant military site.

3. Working with the Principles of Listing (SHEP 2011, p76)

In choosing buildings within the above broad headings particular attention is paid to:

a. special value within building types
b. contribution to an architecturally or historically interesting group
c. the impact of grouping
d. authenticity

When working with the principles of listing the Barrier No 4 has particular interest under a, b, c and d.

a. The barrier has special value as one of a group of coastal defences that are unique in Scotland.

b. The barrier makes a contribution to a nationally important group of assets relating to the defence of Scapa Flow, the main British Naval Base during the First and Second World Wars. Many of these assets are designated as scheduled monuments, such as the coast artillery battery at Holm (SM13500), 1.1km ENE of Barrier No 1, which protected the east entrance to Scapa Flow before the barriers were in place. The barriers are also closely associated with several sunken blockships, which represent previous attempts to prevent access to Scapa Flow from the east. A recent unpublished report 'Scapa Flow 2013 Marine Archaeology Survey Report' provides up-to-date information on the location and survival of these blockships. The blockships are considered likely to represent one of the largest surviving wartime defensive systems of their kind in Western Europe.

c. The interest of the barrier is enhanced by the nearby Italian Chapel, created by the prisoners of war who worked on construction of the barriers. The Italian Chapel is of national importance and is listed at category A (LB12728).

d. Researchers have made differing statements about whether road carriageways were built during the first phase of barrier construction or added immediately after the war. However, a 1944 photograph that can be viewed on the BBC News website (_58676961_churchill_barriers.jpg) shows that Barrier 1 was constructed with a roadway along the top, and Seath's 1946 paper confirms that roads were part of the original layout. Although the barriers have required maintenance from as early as 1945-7, it is clear that Barrier No 4 retains a significant proportion of its original fabric, has authenticity and retains the ability to convey its significance as a structure from the Second World War that prevented access to Scapa Flow.

4. Summary of Assessment Against the Listing Criteria**

Churchill Barrier No 4 forms part of a nationally important group of structures related to the Second World War and itself is an outstanding engineering achievement.

The Churchill Barriers were built during the Second World War at the instigation of Winston Churchill following a traumatic event of national significance – the sinking of the British battleship HMS Royal Oak by a German submarine. The barriers were required to seal the eastern approaches to Scapa Flow, the main British naval base at the time, and they are unique in Scotland as extensive, solid anti-submarine defences forming causeways. The four barriers are functional structures built of stone rubble and concrete blocks. They have a very high level of national and international historic interest and represent a notable civil engineering achievement. Their construction required experimentation and a customised solution to the problem of creating a stable structure to block fast flowing tidal currents, suggesting exceptional structural form. The barriers have a close historical association with Winston Churchill and with the defence of Scapa Flow in 1939-1945, and their surviving form directly illustrates their wartime function. There have been alterations to Barrier No 4 since construction, primarily the upgrading of the road over the barrier and replacement of blocks protecting the barrier sides, however these have not affected its authenticity.

In our current state of knowledge Churchill Barrier No 4 meets the criteria for listing.

5. Category of Listing

Categories of listing are non-statutory and buildings are assigned a category (A, B or C) according to their relative importance following the assessment against the criteria for listing.

Category definitions are found at: www.historic-scotland.gov.uk/heritage/historicandlistedbuildings/listing

Churchill Barrier No 4 is a historic structure of national and international importance, one of a group of unique, little-altered wartime defences. It therefore meets the criteria for listing at category A.

6. Other Information

N/A

7. References

Historic Environment Scotland http://canmore.org.uk/ CANMORE ID 2379, 112585, 112588, 112590

Books and papers

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Miller, J. (2004) *The North Atlantic Front: Orkney, Shetland, Faroe and Iceland at War*. Edinburgh: Birlinn

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http://portal.historic-scotland.gov.uk/designation/LB12728 [accessed 06/04/2016]

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http://www.odin.uk.com/cms/ [accessed 06/04/2016]

Scapa Flow website, showing photograph of construction of Barrier No 2, Skerry Sound, 1944, © Orkney Library & Archive
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Orkney Archives, photograph of Barrier No 2, Skerry Sound, 1944

* This assessment is based on our current state of knowledge and has been prepared for the purpose of consultation or to provide a view on the special interest of a building. This assessment is a consultation document and will form the basis of any new or updated listed building record should the structure be listed. The content of this assessment may change to take into account further information received as a result of the consultation process.
** A building may be found to meet the listing criteria but in some circumstances may not be added to the list. See 'When might Historic Environment Scotland list a building' at https://www.historicenvironment.scot/advice-and-support/listing-scheduling-and-designations/listed-buildings/what-is-listing/