

# CFA Archaeology Ltd

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## **Cullochy Combing Weir, Caledonian Canal**

### **Watching Brief**

**Report No.3294**

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This document has been prepared in accordance with CFA Archaeology Ltd standard operating procedures.

### **Cullochy Combing Weir, Caledonian Canal**

#### **Watching Brief**

#### **Report No.3294**

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## **1. INTRODUCTION**

### **1.1 General**

On Sunday the 8th March 2015 Cullochey Weir (Fig 1) was breached by unusually high water levels, a combination of high rainfall and snow-melt. The water surge washed away approximately a 10m length of weir, the weir's stone pitching protection facing the River Oich and 35m of northern embankment. Cullochey Weir forms part of the Scheduled Monument that is the Caledonian Canal, Loch Oich to Cullochey Lock (Index No 6495).

This report presents the results of an archaeological watching brief carried out during the removal of the remaining weir structure on the 26<sup>th</sup> and 27<sup>th</sup> March 2015.

The scope for the work was described in a brief supplied by Chris O'Connell, Heritage Advisor for Scottish Canals. It was refined during an onsite meeting between CFA and Chris O'Connell on the 26<sup>th</sup> March.

### **1.2 Objectives**

The project's aims and objectives as described in the addenda were:

- To undertake a watching brief during the removal of the remains of the weir in order to record the surviving remains and obtain details of its construction through photography, scaled drawing and written description.

## **2 HISTORICAL BACKGROUND**

The following historical information was provided by Chris O'Connell, Heritage Advisor for Scottish Canals.

### **2.1 General History**

William Jessop and Thomas Telford were appointed as project engineers and construction of the Caledonian Canal began in 1803. It was expected to take just seven years to complete. To link the lochs of the Great Glen, 22 miles of artificial waterway had to be dug by hand and 28 locks constructed. At that time the canal was one of the largest civil engineering schemes ever undertaken in Britain.

The canal was finally completed in 1822 but at twice the projected cost. The quality of the work was poor however and by 1844 major repairs were needed which closed the canal for three years.

### **2.2 History of Cullochey Combing Weir**

Loch Oich is the summit impoundment on the Caledonian Canal. Its level was raised by constructing a low weir across the River Oich where it flows out of the loch, this work probably being done circa 1820. In 1822 Cullochey Lock was completed and the canal was opened. A very severe flood in 1849 breached the canal bank at Cullochey

and in the reach between Cullochy and Kytra. During the following year the canal banks between Cullochy Lock and Aberchalder Bridge were raised by 0.6m and a combing weir was constructed in the canal bank south of the lock, at the same time stop log boards were installed on each side of the south gate of the lock.

### **2.3 Timeline of repairs and developments in the vicinity of the Weir**

Modifications and repairs known to the Inspecting Engineer since then are summarised below:

(a) 1843-47 Raised retaining weir built at outlet from Loch Oich to retain the reservoir at its current level

(b) 1849 Repair of breaches of canal embankments at Cullochy and between Cullochy and Kytra following severe floods

(c) 1850 Canal banks between Cullochy Lock and Aberchalder Bridge raised by 0.6m and a combing weir constructed in the canal bank south of the lock. Stop log boards installed on each side of the south gate of Cullochy Lock.

(d) 1966 Hydraulic operating system installed at Cullochy Lock

(e) 1976 Rebuilding of hollow quoin in lock wall at lowest pair of gates at Laggan Locks following failure due to uplift of the spindle of the east gate.

(f) 1979 new gates installed at Cullochy Lock

(g) 1989 Repair and upgrading work carried out at Cullochy Lock.

(h) 1982-83 Minor grouting work undertaken on the west wall of Cullochy Lock , and both the lock cills were repaired by divers to reduce leakage between the cills and the gates

(i) 1990 Remedial works carried out to seal cavities found in the ground behind both walls of Cullochy Lock and serious leakage from behind the walls downstream of each pair of gates when they were closed

(j) Early 1990s. Levels of the reservoir retaining embankments at Cullochy and Laggan were raised to general levels 34.8 m at Cullochy reach and 35.7 m at Laggan reach

(k) 1995 and 1999 Repairs to the River Oich weir

(l) About 2003 Scour protection to toe of combing weir between Aberchalder and Cullochy by placing massive armour stones

(m) 2005 Refurbishment of Laggan Locks as part of programme of lock refurbishment on the entire canal, including injection of clay into voids behind walls, grout injection into voids within wall, anchoring of bulging areas of lock walls,

modified masonry quoins with cast iron inserts, new steel gates with expanded polystyrene buoyancy inserts, and replacement of stonework as required

### **3. WORKING METHODS**

#### **3.1 General**

CFA Archaeology Ltd follows the Chartered Institute for Archaeologists' Code of Conduct and Standards and Guidance as applicable.

#### **3.2 Watching Brief**

A watching brief was undertaken during the removal of the remains of the weir in order to record the surviving remains and obtain details of its construction through photography, scaled drawing and written description.

### **4. ARCHAEOLOGICAL RESULTS**

On arrival emergency works had already commenced but it was clear that the entire north-western side and north-eastern end of the weir had been washed away (Fig. 2). This had exposed a longitudinal (Figs. 5 & 10) and transverse (Figs. 6 & 9) section through the weir structure, albeit the transverse section was only through the surviving south-eastern half of the weir. The emergency works has also exposed a section through the end of the canal bank (Figs. 3, 4 & 11) at the south-western end of the weir where the weir connected with the bank.

Where the weir connected with the canal bank the remains of mortared stone revetting walls (**007**) were present (Figs. 4 & 11). The canal bank was built from river derived pebbles / cobbles and gravel (**009**) capped with a more soil rich deposit (**008**) and turf (**006**) (Figs 3 & 11).

The weir survived to a height of between 1.6m and 1.7m. It was simply constructed; it had a concrete and irregular stone slab surface (**001 & 002**) (Figs. 8 & 12) and the main body of the weir structure was made from river derived pebbles / cobbles and gravel (**003**) (Figs 6 & 9) like the canal bank. This appeared to have been built directly over the natural (**004**) which was similar material. A deposit of grey clay (Figs. 5, 6, 9 & 10) was identified in the centre of the weir structure. This survived to the full depth of the main body of the weir and may have been a clay core which was built in to the weir to prevent water penetrating through the weir structure itself. Where the actual weir structure had been completely removed wooden posts (**011**) (Figs. 6, 7 & 9) were identified at regular intervals along the south-east side of the weir. These may have formed some sort of shuttering or shoring during the weirs construction. One wooden post (**010**) (Figs. 5 & 10) was identified in front of the exposed north-west facing section. This may have been an artifact from the construction of the weir but given the amount that survived it is not really possible to be sure.

#### 4. CONCLUSIONS

The works recorded the surviving remains of the weir structure and the construction details of the canal bank. During the emergency works the entire remaining weir structure was removed.

Based on the results of this work, where the remains of the weir were completely removed and the canal bank was proven to be constructed from river derived stone. CFA do not recommend any further work during the building of the new weir. However, it is recognised that the final decision on this lies with Historic Scotland.

The project archive, comprising all CFA record sheets, maps and reports, will be deposited with the National Monuments Record of Scotland (NMRS) and copies of reports will be lodged with the Highland Council Sites and Monuments Record.

Upon completion of this project a summary statement of the results will be submitted for publication in *Discovery and Excavation in Scotland* (Appendix 3) and an *OASIS* entry for the project will be completed.

## APPENDIX 1: Photographic Register

Shot No.	Summary description of subject	Taken from	Conditions
1	SE face of retaining wall 007	SE	Overcast
2	Oblique view of SE face of retaining wall 007	SE	Overcast
3	Oblique view of SE face of retaining wall 007	N	Overcast
4	Showing damage to embankment 008/009	NE	Overcast
5	Showing damage to embankment 008/009	NE	Overcast
6	NW end of retaining wall 007	NE	Overcast
7	Oblique shot of retaining wall 007 looking towards River Oich	E	Overcast
8	Damaged part of wall	NE	Overcast
9	Damaged part of wall	NE	Sunlight
10	NE-facing section where weir was removed by water	NE	Sunlight
11	NE-facing section where weir was removed by water	NE	Sunlight
12	NW-facing section/profile of weir longitudinally showing clay 003	NW	Overcast
13	NW-facing section/profile of weir longitudinally showing clay 003	NW	Overcast
14-15	NW-facing section/profile of weir longitudinally showing clay 003, oblique shot	W	Overcast
16	Alignment of round post NE-SW)	N	Overcast
17	Alignment of round post NE-SW)	N	Overcast
18-19	NE-facing section showing profile of weir	NE	Overcast
20	NE-facing section showing profile of weir	NE	Overcast
21	Oblique shot of NE section	N	Overcast
22	Plan view of cobble surface 001	SW	Overcast
23	Plan view of cobble surface 001	SW	Overcast
24	Plan view of cobble surface 001	SW	Overcast
25	Post holding in the rubble against washed away clay	NW	Overcast
26	Post holding in the rubble against washed away clay	NW	Overcast
27-58	Working shots of the removal of cobbles	Various	Overcast
59-68	Working shots of levelling of the weir	Various	Overcast
69-78	Working shots of levelling of the weir	Various	Overcast

## APPENDIX 2: Context Register

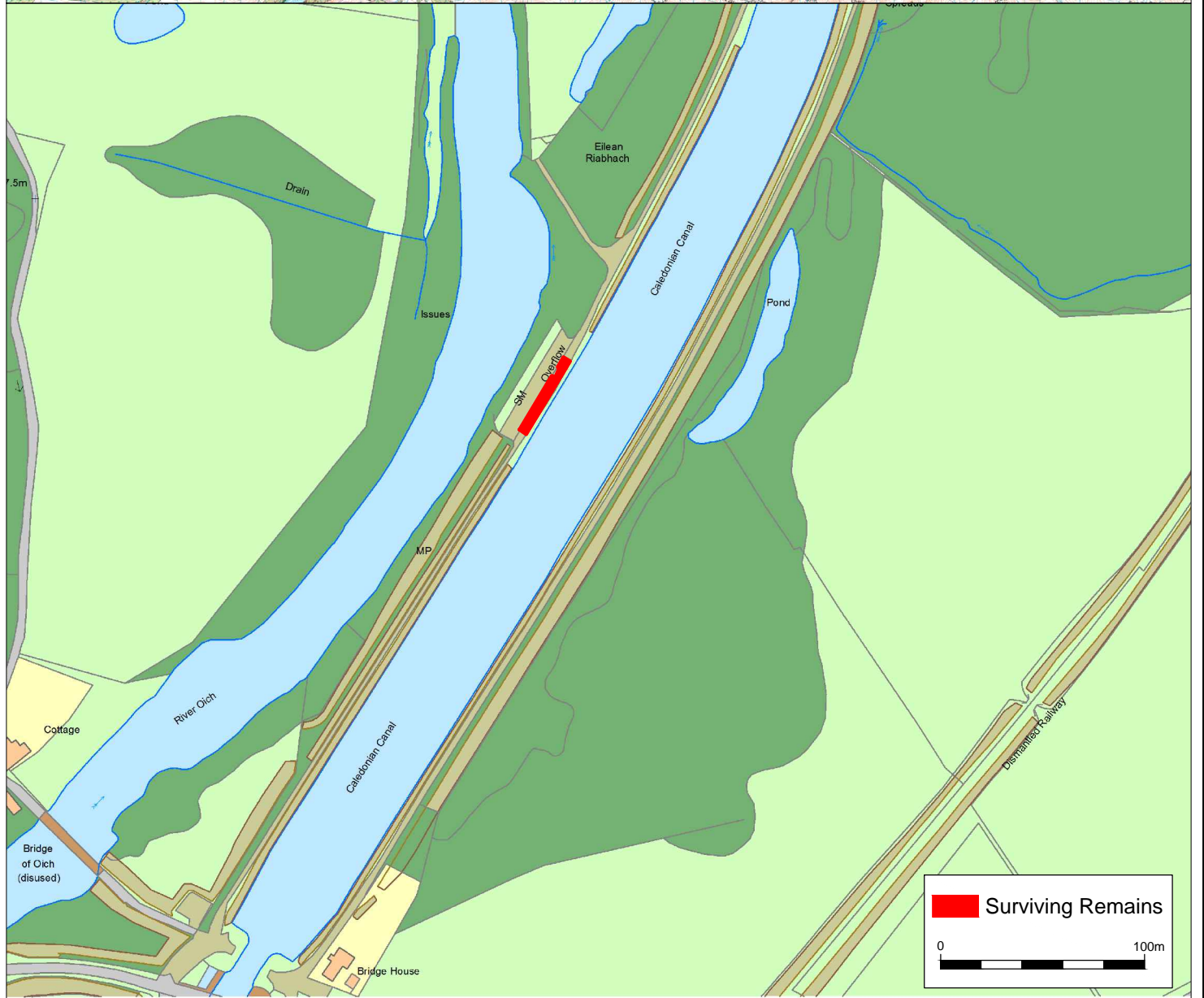
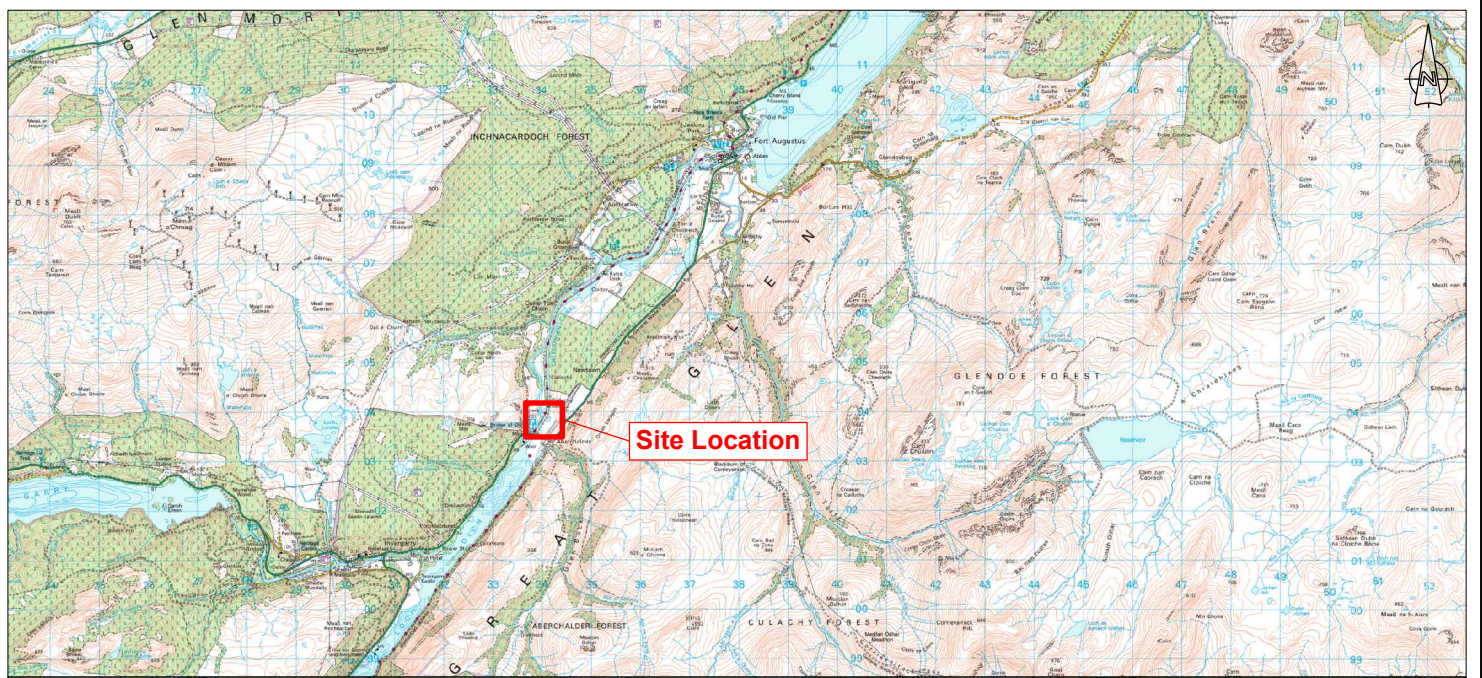
Context no.	Description
001	Flat angular stone surface of weir
002	Concrete in to which stone surface 001 is set
003	Grey clay core of weir – ran along length of weir structure
004	Sand and river cobbles below weir – probable natural
005	Main body of weir - River derived pebbles, cobbles and gravel
006	Turf on top of canal bank
007	Retaining walls connecting canal bank with weir
008	Gravelly topsoil over canal bank core
009	Main body of canal bank - River derived pebbles, cobbles and gravel
010	Wooden post within clay core of weir
011	Wooden posts along south-east side of weir



### APPENDIX 3: Discovery and Excavation in Scotland Entry

<b>LOCAL AUTHORITY:</b>	Highland
<b>PROJECT TITLE/SITE NAME:</b>	Cullochy Combing Weir, Caledonian Canal
<b>PROJECT CODE:</b>	BWSF8
<b>PARISH:</b>	Boleskine and Abertarff
<b>NAME OF CONTRIBUTOR:</b>	Bruce Glendinning
<b>NAME OF ORGANISATION:</b>	CFA Archaeology Ltd
<b>TYPE(S) OF PROJECT:</b>	Archaeological Watching Brief
<b>NMRS NO(S):</b>	N/A
<b>SITE/MONUMENT TYPE(S):</b>	N/A
<b>SIGNIFICANT FINDS:</b>	N/A
<b>NGR (2 letters, 10 figures)</b>	NH 33994 03832
<b>START DATE (this season)</b>	26 March 2015
<b>END DATE (this season)</b>	27 March 2015
<b>PREVIOUS WORK (incl. <i>DES</i> ref.)</b>	N/A
<b>MAIN (NARRATIVE) DESCRIPTION:</b> (May include information from other fields)	<p>Cullochy Weir which forms part of the Caledonian Canal was breached by unusually high water levels. The water surge washed away approximately a 10m length of the weir, the weir's stone pitching protection facing the River Oich and 35m of northern embankment. As a result Scottish Canals had to undertake emergency works to repair the weir. A watching brief was undertaken during these works to record the surviving remains.</p> <p>On arrival emergency works had already commenced but it was clear that the entire north-western side and north-eastern end of the weir had been washed away. This had exposed a longitudinal and transverse section through the weir structure, albeit the transverse section was only through the surviving south-eastern half of the weir. The emergency works has also exposed a section through the canal bank at the south-western end of the weir where the weir connected with the bank.</p> <p>Where the weir connected with the canal bank the remains of mortared stone revetting walls were present. The canal bank was built from river derived pebbles / cobbles and gravel capped with a more soil rich deposit and turf.</p> <p>The weir survived to a height of between 1.6m and 1.7m. It was simply constructed it had a concrete and irregular stone slab surface and the main body of the weir structure was made from river derived pebbles / cobbles and gravel like the canal bank. This appeared to have been built directly over the natural which was similar material. A deposit of grey clay was identified in the centre of the weir structure. This was the full depth of the main body of the weir and may have been a clay core to prevent water penetrating through the weir structure itself. Where the actual weir structure had been completely removed wooden posts were</p>

	identified at regular intervals along the south-east side of the weir. These may have formed some sort of shuttering or shoring during the weirs construction.
<b>PROPOSED FUTURE WORK:</b>	N/A
<b>CAPTION(S) FOR ILLUSTRS:</b>	N/A
<b>SPONSOR OR FUNDING BODY:</b>	Scottish Canals
<b>ADDRESS OF MAIN CONTRIBUTOR:</b>	The Old Engine House, Eskmills Park, Musselburgh, EH21 7PQ
<b>EMAIL ADDRESS:</b>	cfa@cfa-archaeology.co.uk
<b>ARCHIVE LOCATION</b> (intended/deposited)	National Monuments Record of Scotland



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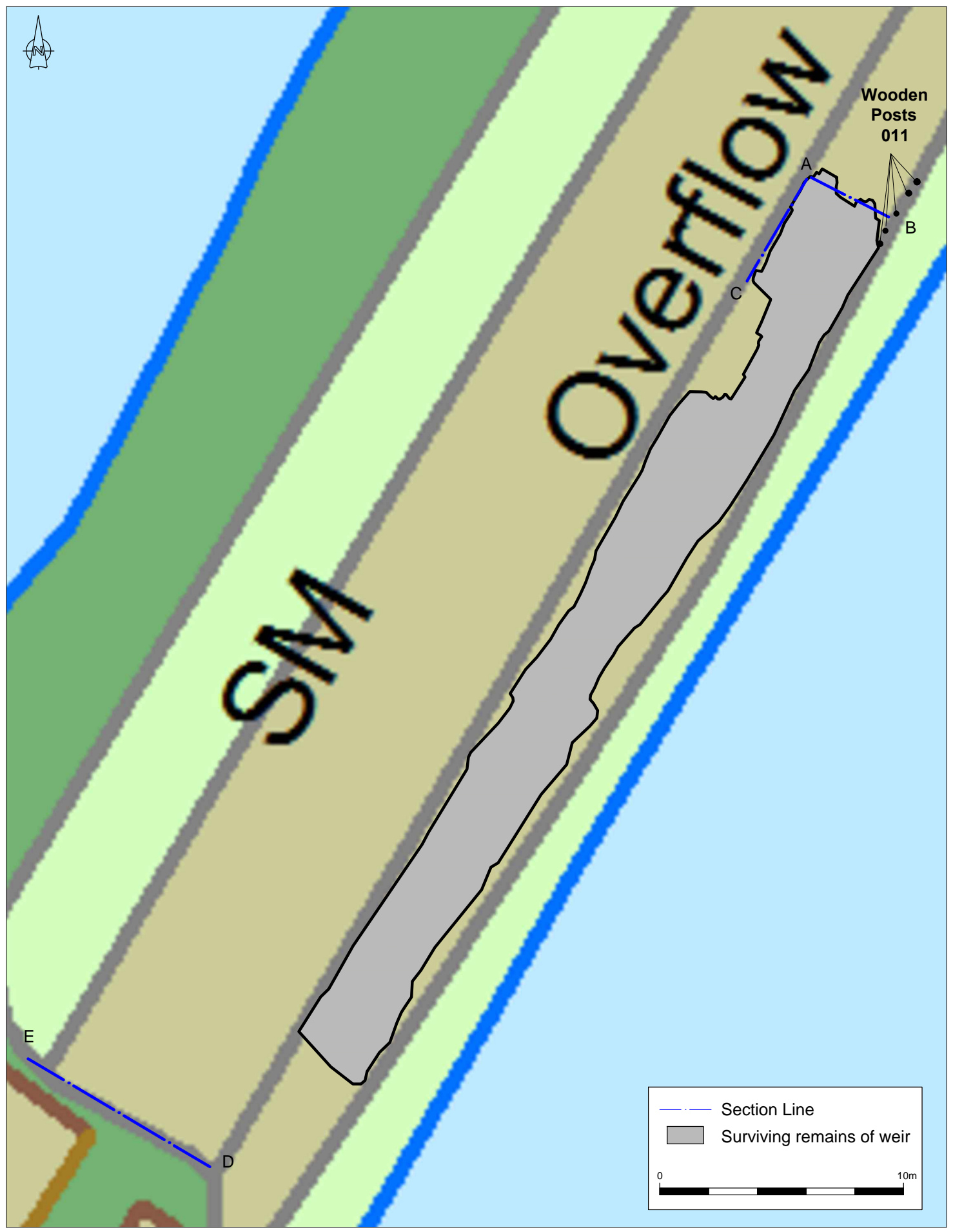
Title:  
**Location map**

Project:  
**Cullochy Combing Weir, Caladonian Canal**

Fig No:	1	Report:	3294	Drawn by:	SW	CKD:	BG	Date:	30/04/2015
Client:		<b>Scottish Canals</b>							
Scale:		<b>1:3000</b>							

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— — — Section Line  
 Surviving remains of weir

0 10m

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<b>Title:</b>	Plan of Surviving Remains
<b>Project:</b>	Cullochy Combing Weir, Caladonian Canal

<b>Fig No:</b>	2	<b>Report:</b>	3294	<b>Drawn by:</b>	SW	<b>CKD:</b>	BG	<b>Date:</b>	30/04/2015
<b>Client:</b>		Scottish Canals							
<b>Scale:</b>		1:200							

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Fig. 3 Section through Canal bank at south-west end of weir



Fig. 4 Section through Canal bank at South-west end of weir showing remains of retaining wall



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Title:	Fig. 3 - 4	Report: 3294	Drawn: GC	CKD: SW	Date: 30/04/15
Client:	Scottish Canals				
Project:	Cullochy Combing Weir, Calandonian Canal				



Fig. 5 North-west facing section through weir showing clay core



Fig. 6 North-east facing section through weir



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Title:	Fig. 5 - 6	Report: 3294	Drawn: GC	CKD: SW	Date: 30/04/15
	Client: Scottish Canals				
Project: Cullochry Combing Weir, Calandonian Canal					



Fig. 7 Wooden piles along south-east side of weir



Fig. 8 Stone surface of weir



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Title:	Fig. 7 - 8	Report: 3294	Drawn: GC	CKD: SW	Date: 30/04/15
	Client: Scottish Canals				
Project: Cullochry Combing Weir, Calandonian Canal					

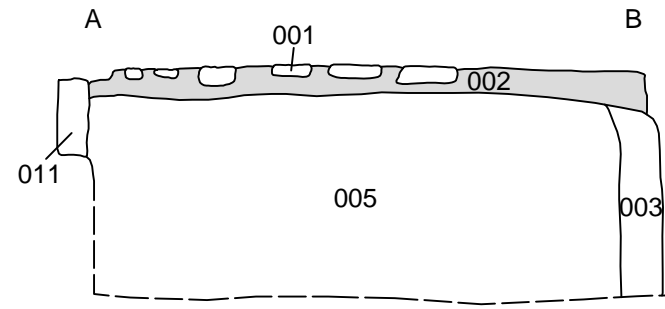


Fig.9 North-east facing section through weir

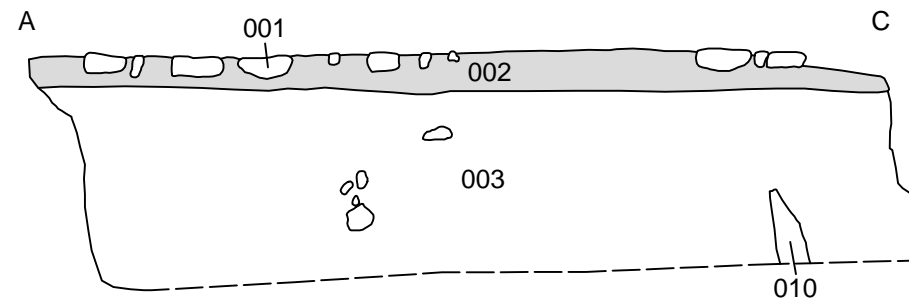


Fig.10 North-west facing section through weir

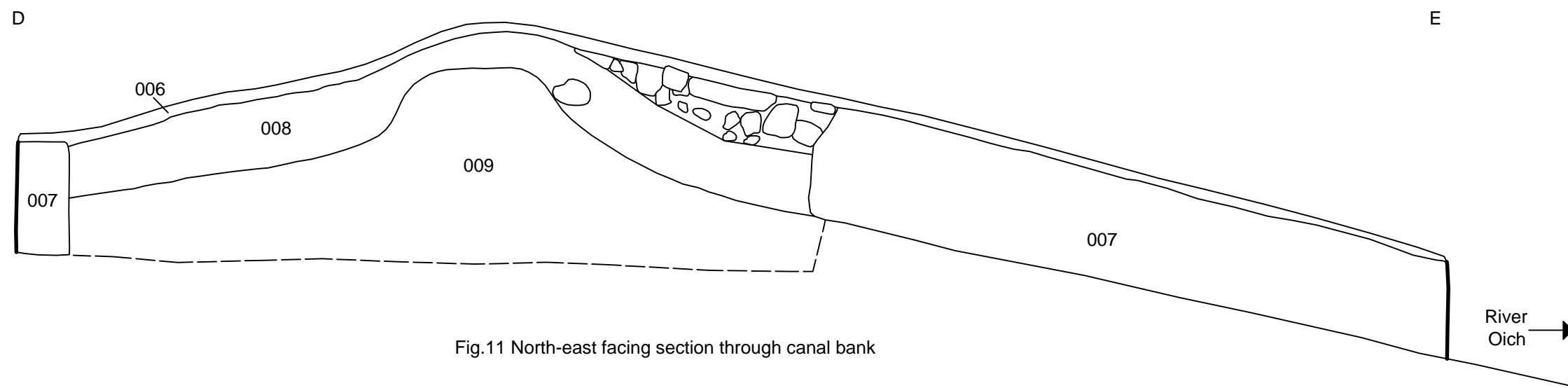


Fig.11 North-east facing section through canal bank

Key:



Fig. No: 9-11 Report No: 3294

Title:

Project:  
**Cullochy Combing Weir,  
 Caladonian Canal**

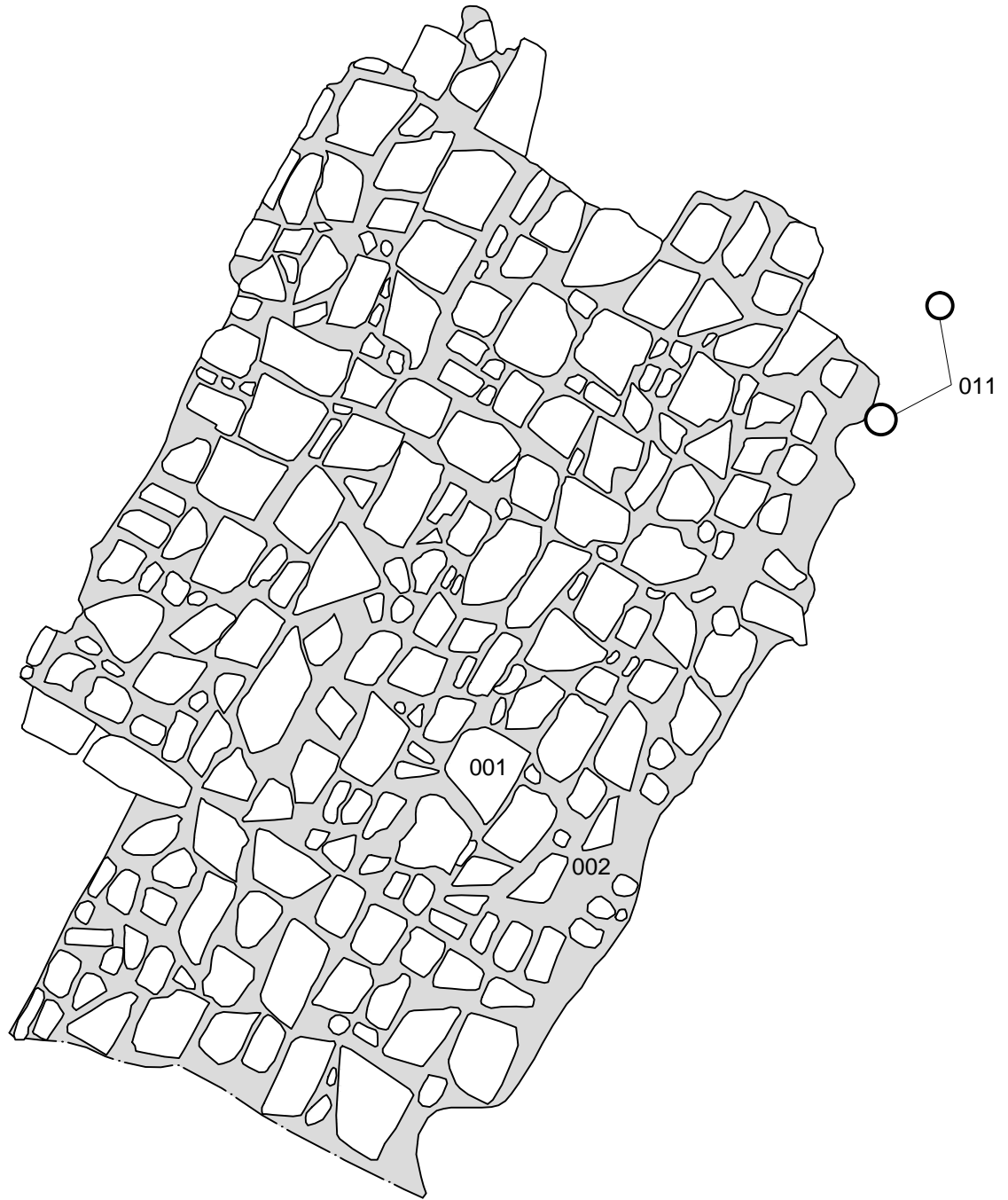
Client:  
**Scottish Canals**

Scale at A3:  
**1:50**

Drawn by: GC	Checked: SW	Date: 30/04/2015
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Title:  
**Plan of a sample area of the stone surface of the weir**

Project:  
**Cullochy Combing Weir, Caladonian Canal**

Fig No:	12	Report:	3294	Drawn by:	SW	CKD:	BG	Date:	30/04/2015
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