



Newhailes House Estate, Flower Garden Wall recording.

March 2007

Carried out on behalf of the National Trust for Scotland



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Appendix 1: Photo List

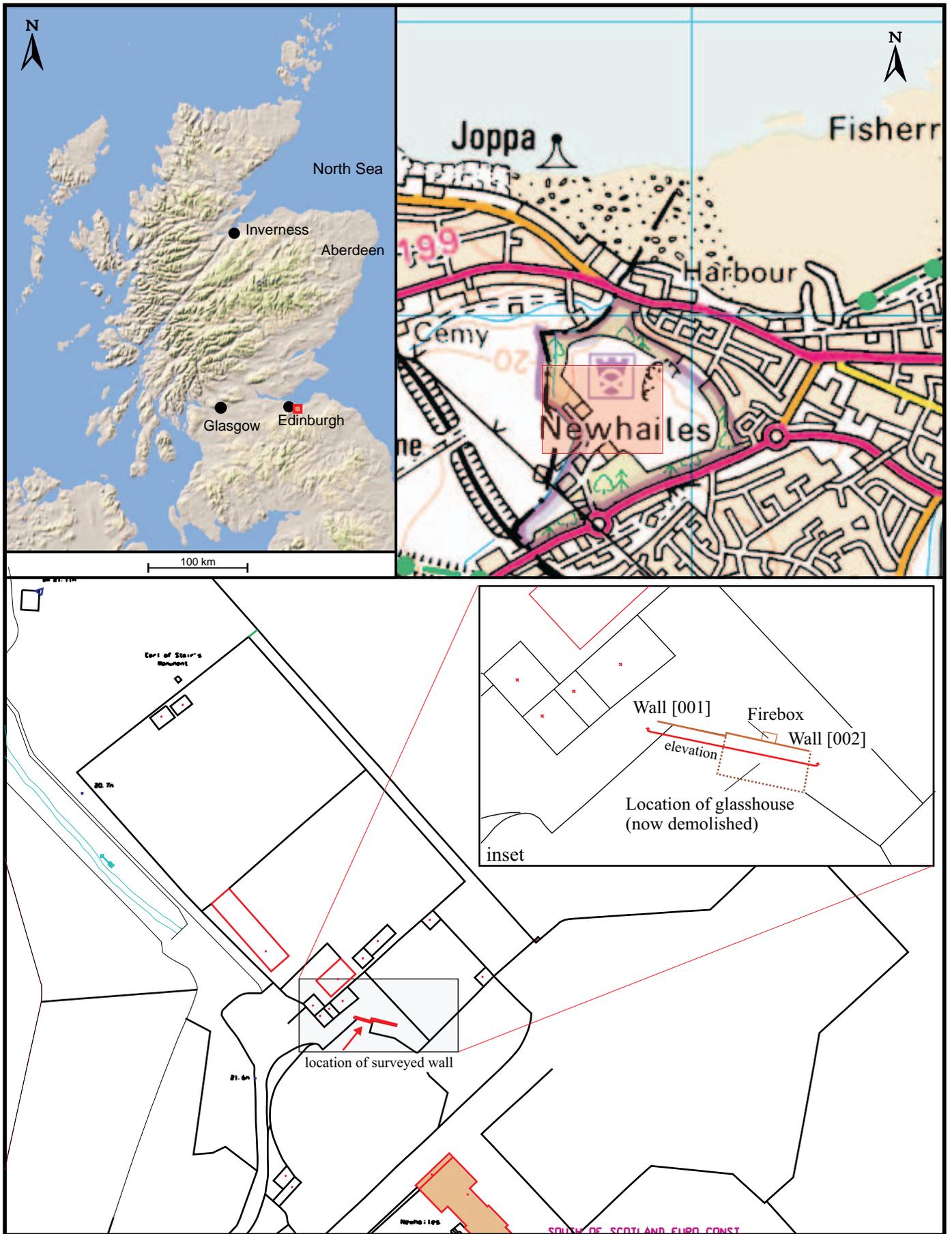


Figure 1: Location plan, showing Newhailes House and the location of the Flower Garden Wall.

1.0 SUMMARY

- 1.1 An archaeological photographic and drawn building survey was required due to the collapse of a brick wall at the Flower Garden wall within the estate. These works were commissioned by Rob Adams and Robin Turner of the National Trust for Scotland in advance of and in conjunction with works carried out by masons in the repair of the wall, if possible to a functional design. The work was undertaken in February and March 2007.
- 1.2 The work enabled the flue systems in the east and west halves of the wall to be recorded and better understood.
- 1.3 Further historic building recording is recommended for the section of brick wall to the east.

2.0 INTRODUCTION

2.1 Site location

The wall is located on the north wall of the walled garden to the west of the main House at NT 332710 672635 (Fig. 1).

3.0 OBJECTIVES

- 3.1 To record the section of wall that had collapsed and present a template for rebuilding as it was, and to understand the flue construction on the basis of reconstructing a fully working system in the future. Finally, to provide recommendation for further work.

4.0 METHODOLOGY

- 4.1 A series of photographs were taken at high resolution and these were rectified and used to produce a CAD drawing of the south wall face. A thumbnail list of all photographs can be found at the end of the report (and enclosed CD).
- 4.2 Further site visits were made during the takedown and rebuild to check constructional techniques and advise the process.

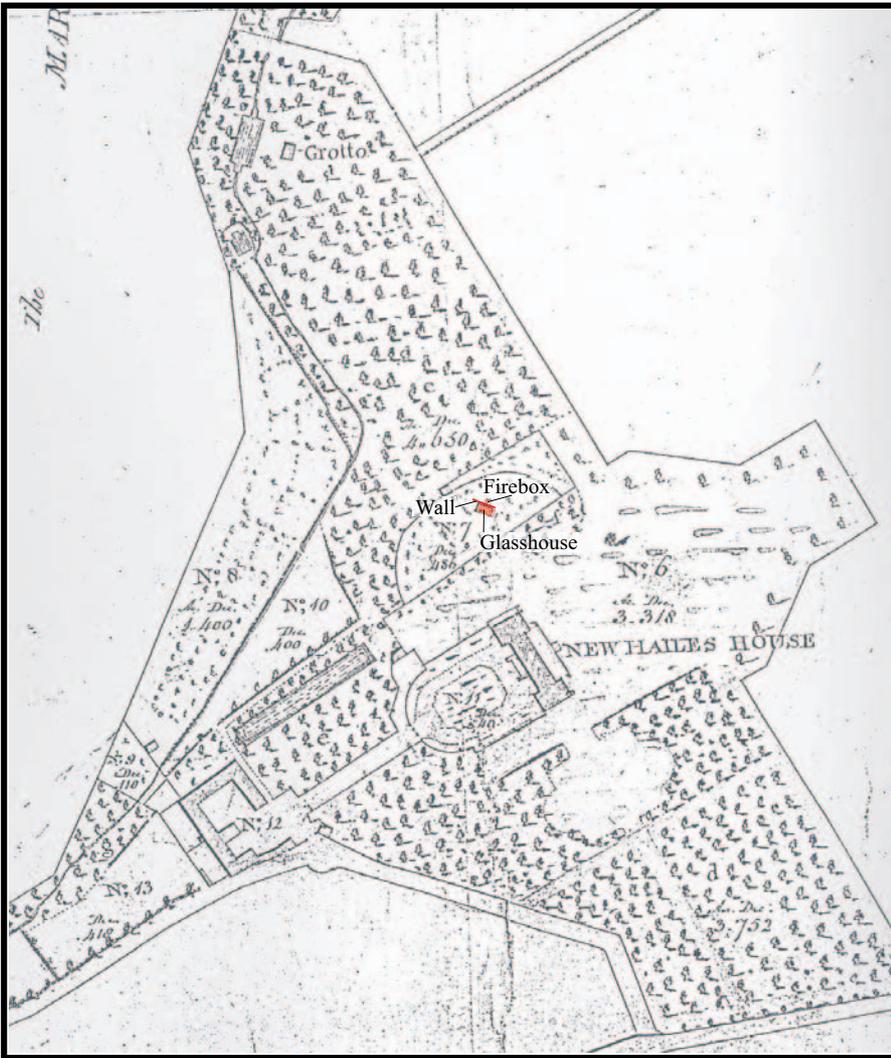


Figure 2: (Top) Bauchop, 1798 house and core estate - wall and glasshouse highlighted in red.
Figure 3: (Bottom) Hay proposals, 1818 - location of glasshouse highlighted in red.

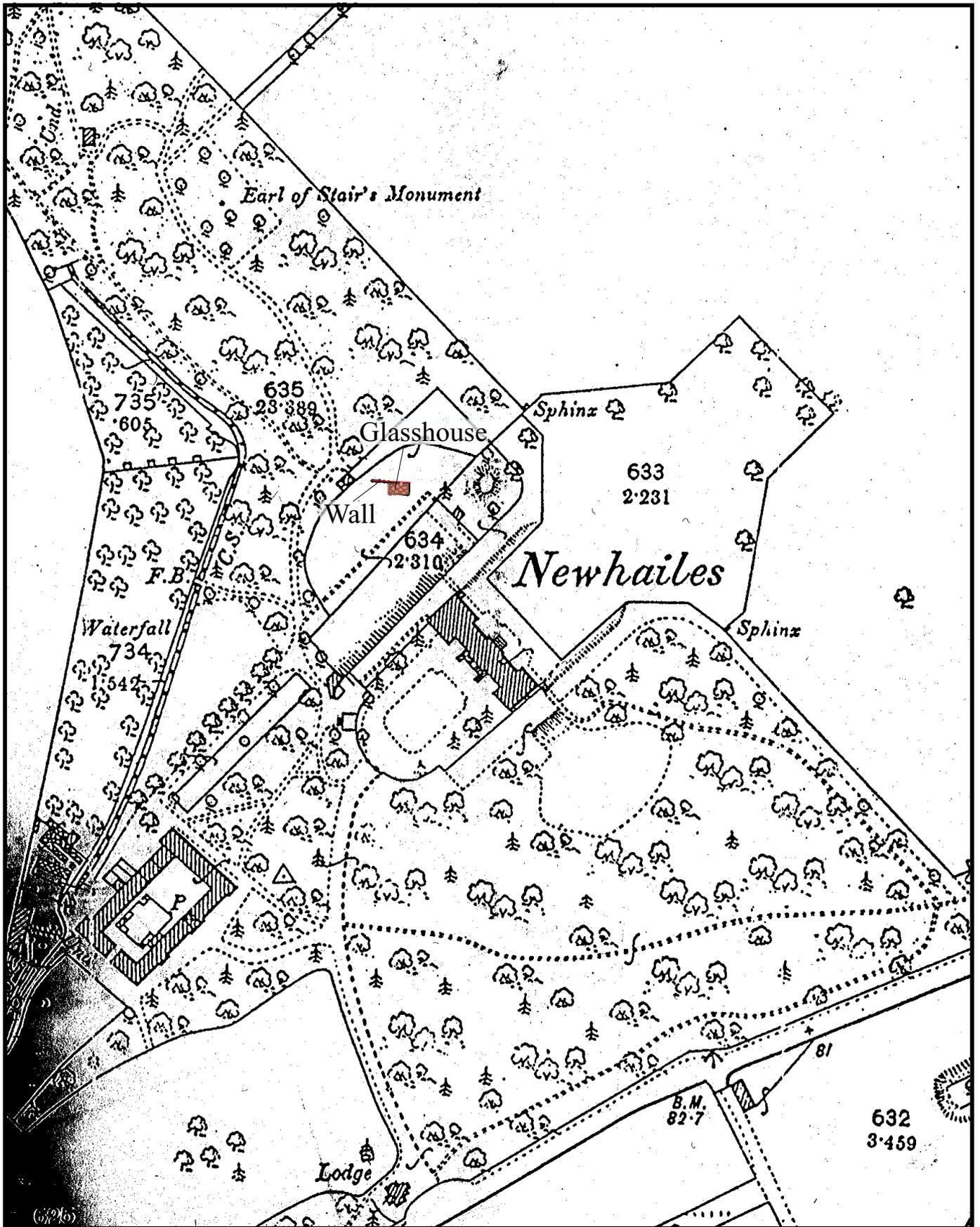


Figure 4: 1893 Ordnance Survey map, showing Newhailes estate and location of wall and glasshouse highlighted in red.

5.0 RESULTS

5.1 The Wall (Fig. 5)

The wall is divided into two sections – an east wall [001] (which was external) and a west wall [002] (which provided the rear of a glasshouse). This is confirmed by map regression (Bauchop, 1798 – (Fig. 2) and the 1893 Ordnance Survey map – (Fig. 4)). The Hay plan of 1818 shows a scheme that would have removed the structures to make way for an elaborate garden, but this was never implemented. It is likely the wall dates to the early to mid 18th century, based on the constructional techniques and brick type, and would have been part of the original walled garden.

Wall [001] measures 6.50m (21'4") in length before a return to the north, followed by the continuation of wall [002] for a further 7.42m (24' 4"). The height of the wall from the base of the extreme west end, which forms a terminus, is to the top of the copes is 3.07m (10').

The brick style used is English Garden Wall bond, which is specific to strong walling techniques and would have been a commonly employed method in the 18th century, matching the date of the bricks. The bricks measure 235 mm x 64mm x 83mm (9 ¼ " x 2 ½ " x 3 ¼ ") and are hand-made, most probably locally. The thickness of the wall (640 mm or 2'1") allows space for the internal horizontal flues, four in total [003-6], a vertical flue [007] leading to a chimney hole in the stone wall cope [010], and a further flue [008] that exits from the north face of wall [001]. There is a flaw in this design however: the internal stretcher courses of bricks that create the horizontal divide between the flues are not tied into the southern skin wall of brick (see Fig. 7).

The walls both to the east [001] and west [002] were constructed at the same time, with the northern brick face shared by both walls. The wall to the east clearly belongs to a structure – a south-facing glasshouse – with sandstone ashlar blocks [011] along the wallhead used to brace roof trusses. The coping on this section has been replaced with cement slabs [012]. The wall to the west however was an external wall (as can be seen from the early maps (Figs 2 and 4) and had no traces of plaster render [009] on the surface as carried on the eastern wall. The heating system in both walls is integral and the extension of the system into wall [001] must have been to provide warmth, probably for a fruit tree attached to the wall.

The western half of wall [001] is solid, while the rest contains the system of flues previously described. Figure 7 shows the phasing for construction of the wall.

Each flue had been plastered internally, though sooting is only found on Flues 1 and 3 [003 and 005]. The sooting on the first (lowest) flue is the most evident, and strangest as the flue was blocked from the vertical flue (and also the firebox) so it seems impossible that any heat could have entered. The blocking of this flue was evident on the cleaning of debris, and

examination of the north face showed a blocked flue hole with marked sooting spread up across the wall (see Fig. 2).

A metal plate [013] has been inserted into the wall from the north side (Fig. 5), and this could have been slid into or out of the vertical flue to control draught which was integral to the original system.

The north face of the walls were not drawn, but a limited photographic survey was undertaken (see Appendix 1 – Photo register).

5.2 The Working flue system (Fig. 6)

The walls were built with the flue system integrated and heated from the same Firebox, found to the rear of wall [002] (this had been previously investigated by Addyman Associates in 2001).

The western wall [001] was the only flue section examined in detail, as the south skin wall had collapsed allowing examination of the interior structure. The eastern wall [002] can be seen to have a similar flue structure, currently only visible through a small hole in the wall. At least two flues ([014] and [015]) can be discerned in the east wall, but the extent either horizontally or vertically cannot be confirmed.

It is clear that two phases of use had taken place within wall [001]. As much as can be understood, the original phase had four horizontal flues [003-6] that drew heat from the main firebox to the rear of wall [002]. The heat would be drawn up both the vertical chimney flue [007] and along flue 1 [003] (the draw for flue 1 is created by a small aperture [008] in the north face of wall [001][not clear what this means]). This would draw hot air into flue 1 [003] and then up into flue 2 [004]. If the iron plate [013] was also set in place (as it is positioned half way down flue 3) the draw would continue along flue 3 [005] and return by flue 4 [006] back to the vertical chimney flue [007]

It is clear that the metal plate was essential for regulating and controlling the system. The deep blackened sooting on the lowest flue [003], and the blocking of this flue at the east and west ends, leads to the conclusion that a fire damaged the system. It is not clear how these systems could have been cleaned to help prevent chimney fires - a more difficult task with complicated horizontal flues that double back on themselves.

The blocking of flue 1 [003] and the partial blocking of flue 2 [004] would have meant that only the top two flues [005 and 6] would continue to work. This would make the use of the metal flue plate essential to ensure that a draw was created through the upper flues rather than directly up the vertical flue and chimney.

The workings of this system can be viewed on Figure 6, while a cross-section on Figure 7 shows the lack of tying in of the bricks dividing the flues with the south skin wall.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This programme of works has recorded the walls as specified. An elevation of repair has been produced (Fig. 5) and the construction and operation of the flue has been interpreted (Fig. 6).

Further remedial work will be required on the east wall, to both repair the collapses and also to ensure that the flue and heating system is repaired fully, as the entire system must be rebuilt and cleaned before any of it will function. A glasshouse could be reconstructed on the foundations present, in which case further recording work would be required on the remainder of the wall, and plans made of the foundations. Research on similar structures would be useful.

David Connolly
March 2007

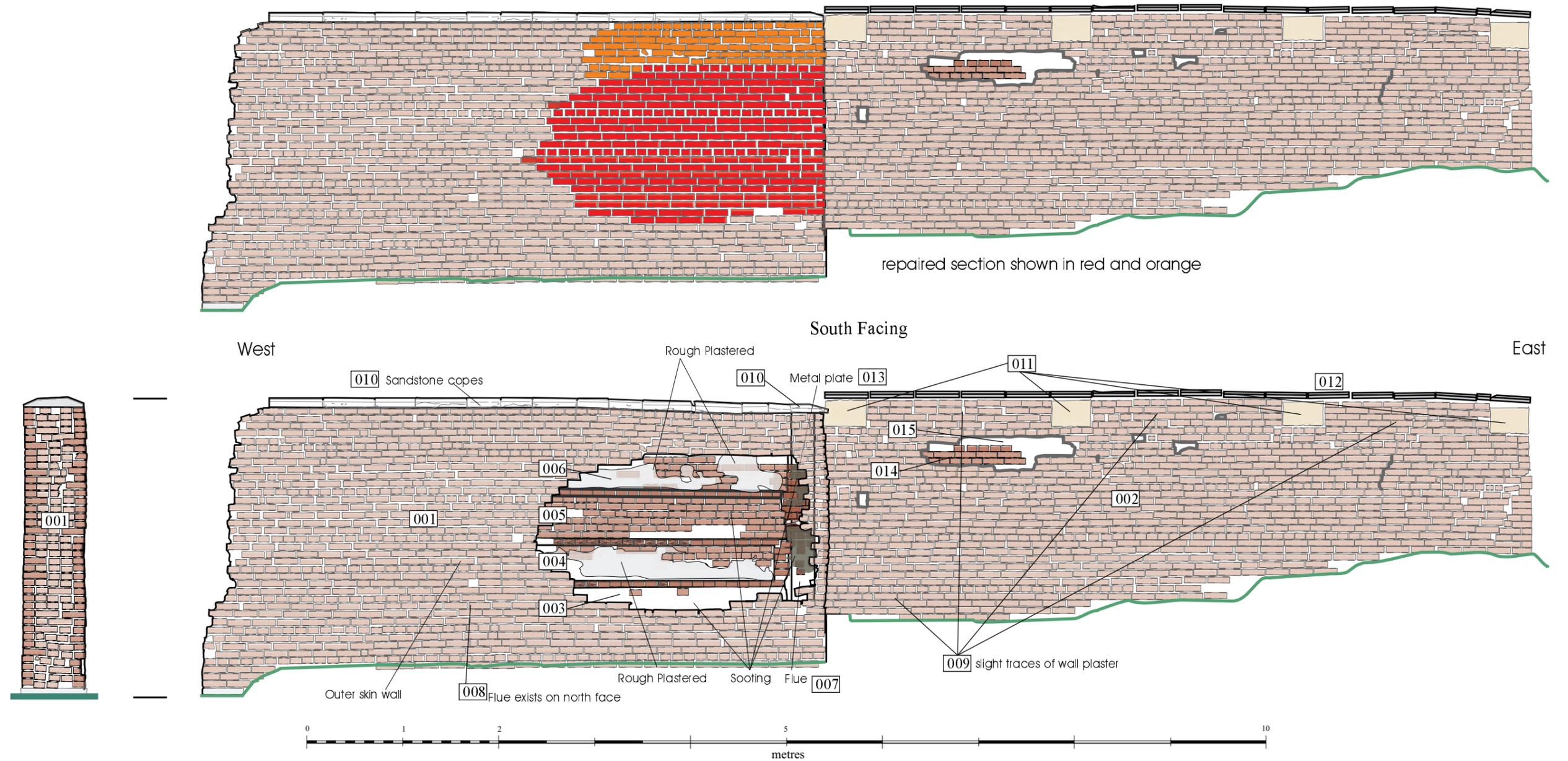


Figure 3: Top: Wall showing area to be repaired and position of bricks
 Middle: Wall recorded as seen
 Bottom: Photomontage of wall.

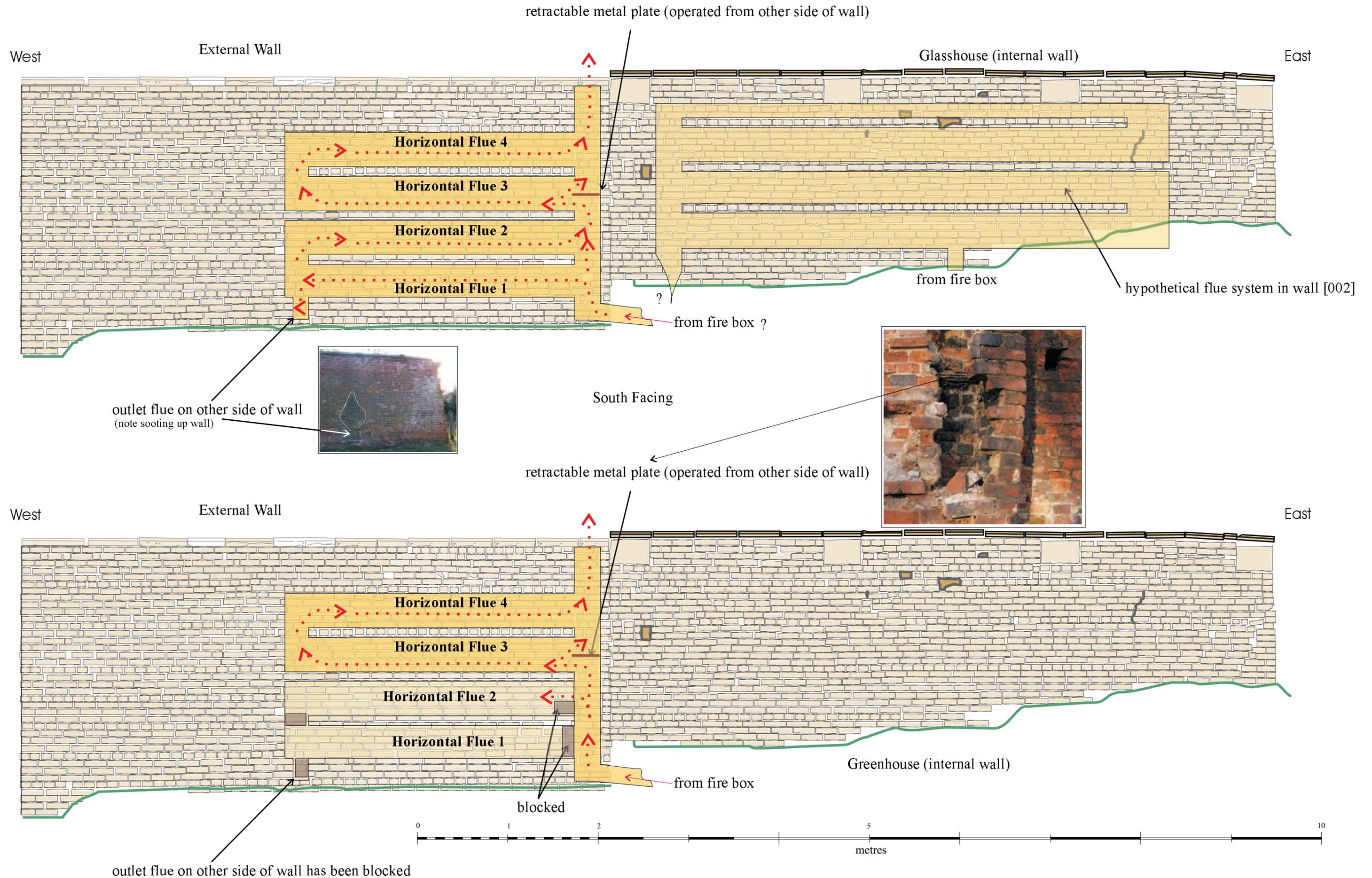
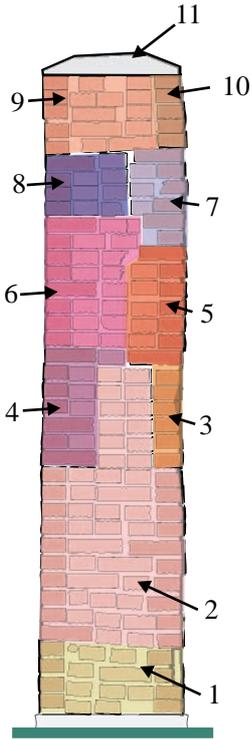


Figure 6: Top: Wall as built, with 4 flues operational. Bottom: Wall after blocking of lower flue.



phases of construction for building wall [001]

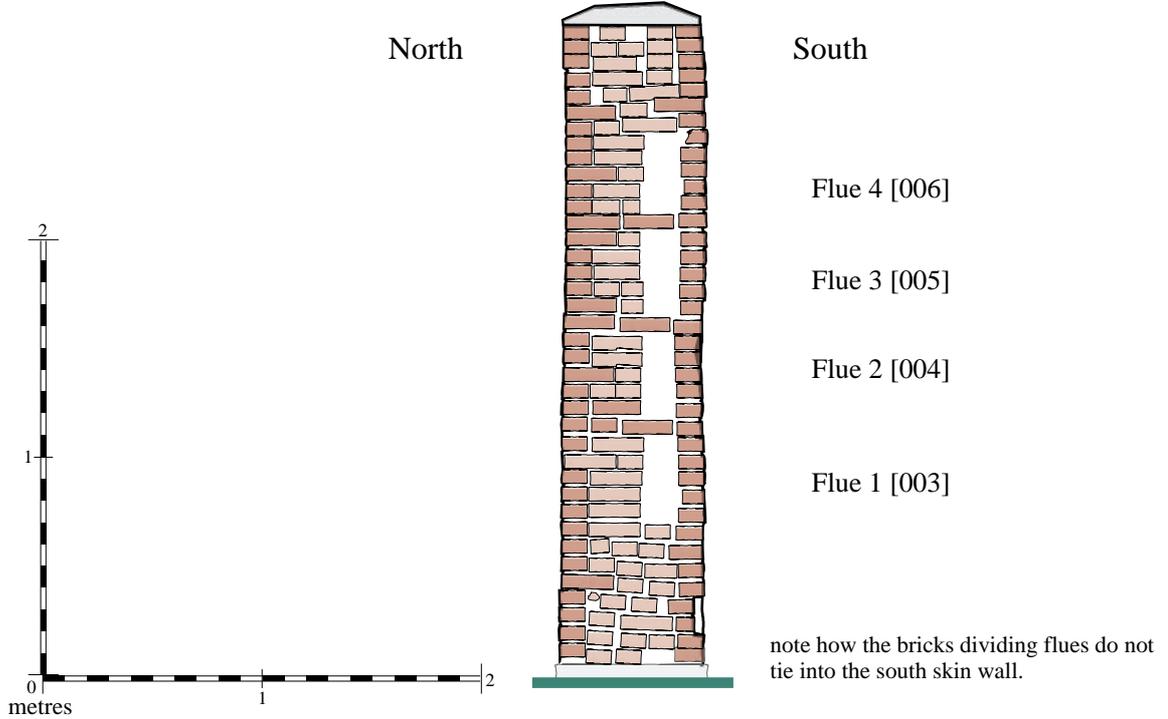


Figure 7: Cross section of Wall [001] showing flues and possible phased construction of wall.

Newhailes House Estate, Flower Garden Wall, March 2007

Photo Record List – Flower Garden Wall – Newhailes Estate				
Photo ID	Digital	Description	Direction from	Date
1	NH_1_001	Record shot of Wall [001] south facing elevation	SW	17/01/2007
2	NH_1_002	Record shot of Wall [001] south facing elevation	SW	“
3	NH_1_003	Record shot of Wall [001] south facing elevation	SW	“
4	NH_1_004	Record shot of Wall [001] south facing elevation	SW	“
5	NH_1_005	Record shot of Wall [001] & [002] south facing elevation	SW	“
6	NH_1_006	Record shot of Wall [001] & [002] south facing elevation	SW	“
7	NH_1_007	Record shot of Wall [001] & [002] south facing elevation	SW	“
8	NH_1_008	Record shot of Wall [002] south facing elevation	SW	“
9	NH_1_009	Record shot of Wall [002] south facing elevation	SW	“
10	NH_1_010	Record shot of Wall [002] south facing elevation	SW	“
11	NH_1_011	Record shot of Wall [002] south facing elevation	SW	“
12	NH_1_012	Record shot of Wall [002] south facing elevation	SW	“
13	NH_1_013	Record shot of Wall [002] south facing elevation	SW	“
14	NH_1_014	Record shot of Wall [002] corner	S	“
15	NH_1_015	Record shot of Wall [002] end	SE	“
16	NH_1_016	Record shot of Wall [002] north facing elevation	E	“
17	NH_1_017	Record shot of Wall [002] north facing elevation	NE	“
18	NH_1_018	Record shot of Wall [002] north facing elevation	NE	“
19	NH_1_019	Record shot of Wall [002] north facing elevation	NE	“
20	NH_1_020	Record shot of Wall [002] north facing elevation	NE	“
21	NH_1_021	Record shot of Wall [001] & [002] north facing elevation	NE	“
22	NH_1_022	Record shot of Wall [001] north facing elevation	NE	“
23	NH_1_023	Record shot of Wall [001] north facing elevation	NE	“
24	NH_1_024	Record shot of Wall [001] north facing elevation	NE	“
25	NH_1_025	Record shot of Wall [001] end	NW	“
26	NH_1_026	Record shot of Wall [001] end	NW	“
27	NH_1_027	Record shot of Wall [001] end	NW	“
28	NH_1_028	Record shot of Wall [001] end	NW	“
29	NH_1_029	Record shot of Wall [001] end	NW	“
30	NH_1_030	Record shot of Wall [001] end	NW	“
31	NH_1_031	Detail of Flues [005] & [006] and vertical flue [007]	SW	“
32	NH_1_032	Detail of Flues [003] & [004] and vertical flue [007]	SW	“
33	NH_1_033	Detail of Flues [005] & [006]	SW	“
34	NH_1_034	Detail of Flues [003] & [004]	SW	“
35	NH_1_035	Detail of Flues [004], [005] & [006]	SW	“
36	NH_1_036	Detail of Flues [003], [004] & [005]	SW	“
37	NH_1_037	Detail of Flues [014] & [015] in Wall [002]	SW	“
38	NH_1_038	View of SE return in wall [001]	E	“
39	NH_1_039	View of SE return in wall [001]	E	“
40	NH_1_040	View of SE return in wall [001]	E	“
41	NH_1_041	View of SE return in wall [001]	W	“
42	NH_1_042	View of Glasshouse foundations	NW	26/02/2007
43	NH_1_043	View of Glasshouse foundations	NW	“
44	NH_1_044	General view of wall [002]	W	“
45	NH_1_045	General view of wall [002]	W	“

Newhailes House Estate, Flower Garden Wall, March 2007

Photo Record List – Flower Garden Wall – Newhailes Estate				
Photo ID	Digital	Description	Direction from	Date
46	NH_1_046	General view of wall [002]	SE	“
47	NH_1_047	General view of wall [002]	E	“
48	NH_1_048	General view of wall [001] coping [010] and chimney hole	E	“
49	NH_1_049	General view of wall [001] coping [010] and chimney hole	E	“
50				
51				
52	NH_1_052	Composite of Wall [001]	SW	“
53	NH_1_053	Composite of Wall [002]	SW	“
54				
55	NH_1_055	Composite of Wall [001] terminal end	NW	“
56	NH_1_056	Detail of SE return in wall [001]	SE	“
57	NH_1_057	View of SE return in wall [001]	SE	“
58	NH_1_058	View of SE return in wall [001]	SE	“
59	NH_1_059	Detail of Flues [003] & [004]	SW	“
60	NH_1_060	Detail of Flues [003] & [004]	SW	“
61	NH_1_061	Detail of Flues [003] & [004]	SW	24/03/2007
62	NH_1_062	Detail of Flues [003] & [004] from above	S	“
63	NH_1_063	View along Flue [004] - note beginning of solid brick walling	-	“
64	NH_1_064	View of horizontal course in Flue [004] - note bricks do not tie to wall.	-	“
65	NH_1_065	View along Flue [004]	-	“
66	NH_1_066	View along Flue [003] – note solid brick terminus	-	“
67	NH_1_067	Details shot of blocked flue exit in wall [001] on north facing elevation, including soot marks up wall.	NE	“
68	NH_1_068	Detail of Flues [003] & [004] and vertical flue [007] – metal plate to top of image.	SW	“



NH_1_001.JPG



NH_1_002.JPG



NH_1_003.JPG



NH_1_004.JPG



NH_1_005.JPG



NH_1_006.JPG



NH_1_007.JPG



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NH_1_016.JPG



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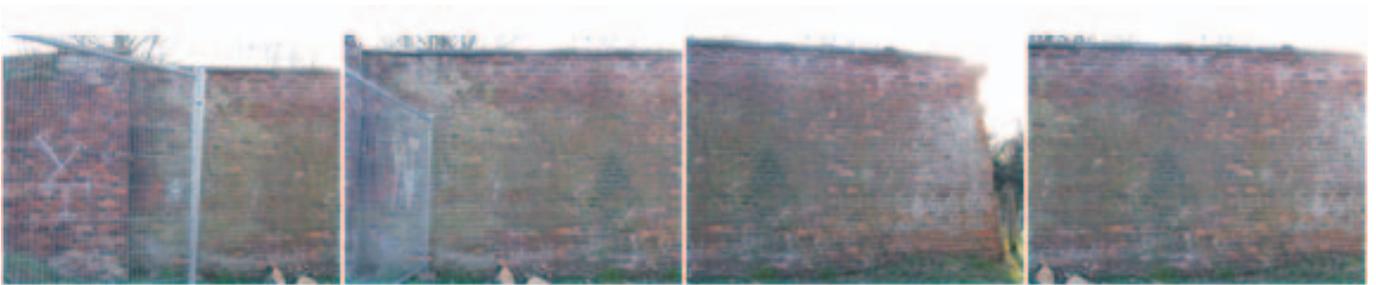
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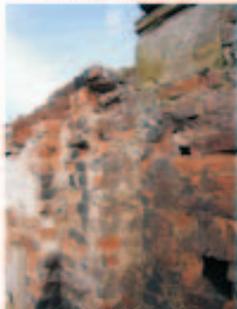
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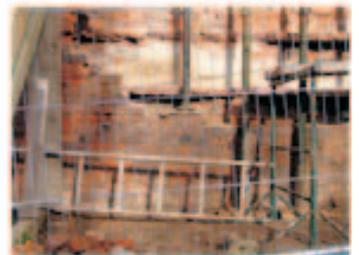
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NH_1_080.JPG



NH_1_081.JPG



NH_1_082.JPG



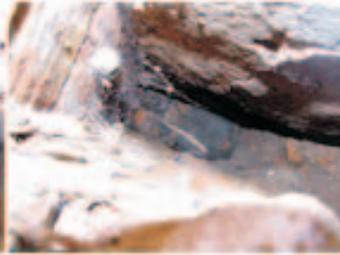
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NH_1_067.JPG



NH_1_068.JPG

Discovery and Excavation Scotland

LOCAL AUTHORITY: East Lothian

Site Name: Newhailes Flower Garden Wall

Parish: Inveresk

Name of Contributor(s): David Connolly (Connolly Heritage Consultancy)

Type of Site or Find: 18th century Heated Garden Wall

NGR (2 letters, 6 or 8 figures): NT 332710 672635

Report:

An archaeological photographic and drawn building survey was required due to the collapse of a brick wall at the Flower Garden wall within the estate. These works were carried out in advance of and in conjunction with works carried out by masons in the repair of the wall, to allow where possible a functional design to be restored. The work was undertaken in February and March 2007 and enabled the flue systems in the east and west halves of the wall to be recorded and better understood.

The heated wall, built in handmade brick in the 18th century, showed a sophistication of design and use, for both an external heated wall and an internal greenhouse wall. The western wall was rebuilt to elevation plans produced from the building record.

Sponsor(s): HS, Society, Institution, Developer, etc. (where appropriate):

The National trust for Scotland

Address(es) of Main Contributor(s):

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