

GUARD ARCHAEOLOGY



**Harlaw Reservoir, Balerno
Data Structure Report
Project 3788**

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Harlaw Reservoir, Balerno

Data Structure Report

On behalf of: Harlaw Hydro Ltd

NGR: NT 1800 6475

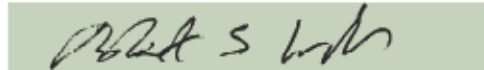
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*This document has been prepared in accordance
with GUARD Archaeology Limited standard operating procedures.*

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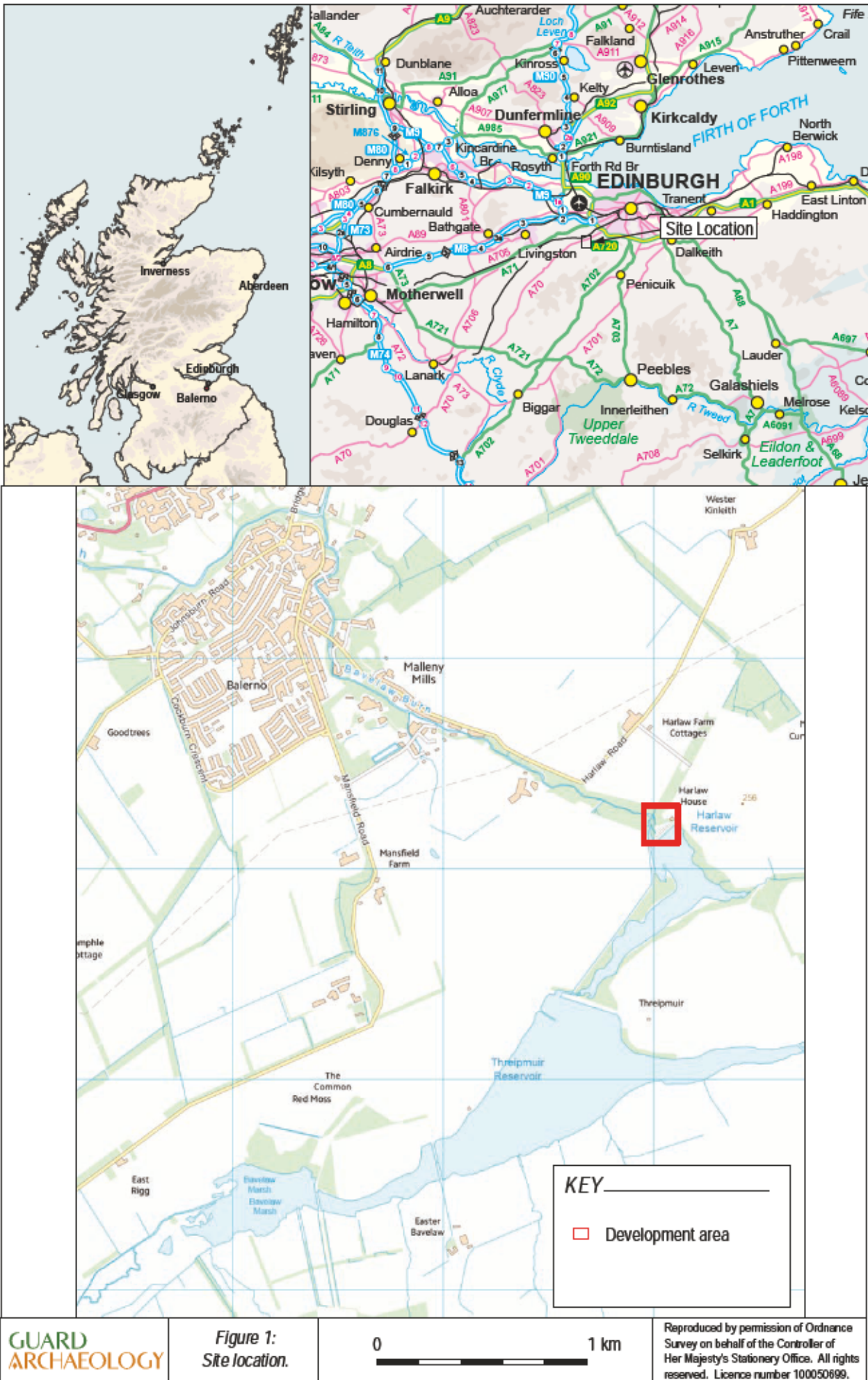


Figure 1:
Site location.

Non-technical Summary

- 1.1 In September 2014 GUARD Archaeology Ltd (GAL) were commissioned by Harlaw Hydro Ltd to undertake a limited standing building survey and archaeological watching brief during development of land in order to install an electricity turbine at Harlaw reservoir by Balerno, Edinburgh. The work was carried out on behalf of Harlaw Hydro Ltd in response to a condition placed on the planning application by the City of Edinburgh Archaeology Service (CECAS). The standing building assessment recorded 6 structures, comprising 2 stone buildings, 3 brick buildings and a brick and concrete manhole. The 2 stone buildings recorded were contemporary with the construction of the dam and associated with water management of the reservoir outfalls. Two of the brick buildings and the brick manhole are likely to have been associated with the earlier turbine installation and the third brick building probably a pump house formerly supplying water to the building currently in use as the Harlaw Reservoir Visitor Centre. The watching brief comprised a supervised topsoil strip of a temporary access road from the Harlaw Reservoir Visitor Centre to the site of the new turbine installation, monitoring of ground breaking works during excavation of the footprint of the turbine shed and associated pipe trenches and monitoring during excavation of a service trench from the Harlaw Reservoir Visitor Centre to the turbine shed. A wall revetting the bank along the eastern side of the easternmost outfall was recorded during the watching brief.

Introduction

- 2.1 This data structure report sets out the results for the standing building assessment and archaeological watching brief, carried out to satisfy a planning condition placed on the Harlaw Reservoir development by the City of Edinburgh Council archaeologist, John Lawson.

Site Location

- 3.1 Harlaw Reservoir (NT 1800 6475 centred) is located to the south-east of the village of Balerno to the west of Edinburgh within the Pentland Hills Regional Park. The dam is on the northern extent of the reservoir and leads into the Bavelaw Burn and wooded valley that runs towards Balerno village (Figure 1).

Archaeological Background

- 4.1 Harlaw reservoir was built between 1843 and 1848 by the Edinburgh Water Company and is one of several reservoirs built in the Pentland Hills to control the level of water in the Water of Leith to ensure that there was sufficient water throughout the year for the many mills that operated along the banks of the river. In addition to the dam itself there are several small brick buildings on the north side of the dam and in the surrounding woodland that are associated with the dam some of which may be associated with an earlier electricity turbine. There was the potential for further building remains or foundations that may have been partially obscured or completely covered and the possibility that further archaeological features may have survived.

Aims and Objectives

- 5.1 The aims of the archaeological works were to:
- record the location, nature, significance and extent of any archaeological features around the dam that may be affected by the present development.
- 5.2 The objectives were therefore to:
- Conduct a survey to locate the known buildings associated with the dam
 - carry out a photographic survey along with a written description of the buildings
 - undertake an archaeological watching brief during ground-breaking works associated with the development, to record potential archaeological deposits;

- Submit a report to data structure level for agreement to CECAS on completion of the evaluation;
- Submit, if excavation or post-excavation works are required, an accompanying project design and costing alongside the data structure report, which will outline arrangements for further excavation or post-excavation works.

Standing Building Recording and Fieldwork Methodology

- 6.1 A GUARD Archaeology surveyor surveyed the location of the buildings associated with the Harlaw Reservoir dam, these buildings were subsequently recorded by photographic and written record. A descriptive summary of each structure, such as type of building; materials used in construction; any visible changes in build/additions was made.
- 6.2 The proposed development area was photographed and a brief written description made prior to the commencement of ground-breaking works.
- 6.3 The archaeological watching brief works involved three areas; a temporary access road from the Harlaw Reservoir Visitor Centre to the site of the new turbine installation, monitoring of ground breaking works during excavation of the footprint of the turbine shed and associated pipe trench and monitoring during excavation of a service trench from the Harlaw Reservoir Visitor Centre to the turbine shed.
- 6.4 The topsoil was stripped by machine with a 1 m wide flat-bladed (toothless) ditching bucket to form the temporary access road. Thereafter a narrower bucket 0.4 m wide was used to excavate the pipe and service trenches.
- 6.5 The topsoil was removed in spits to the first archaeological horizon or, where none was found, to the natural subsoil.

Standing Building Assessment Results

7.1 Building 1 (Figure 2 and 3, Plates 1 and 2).



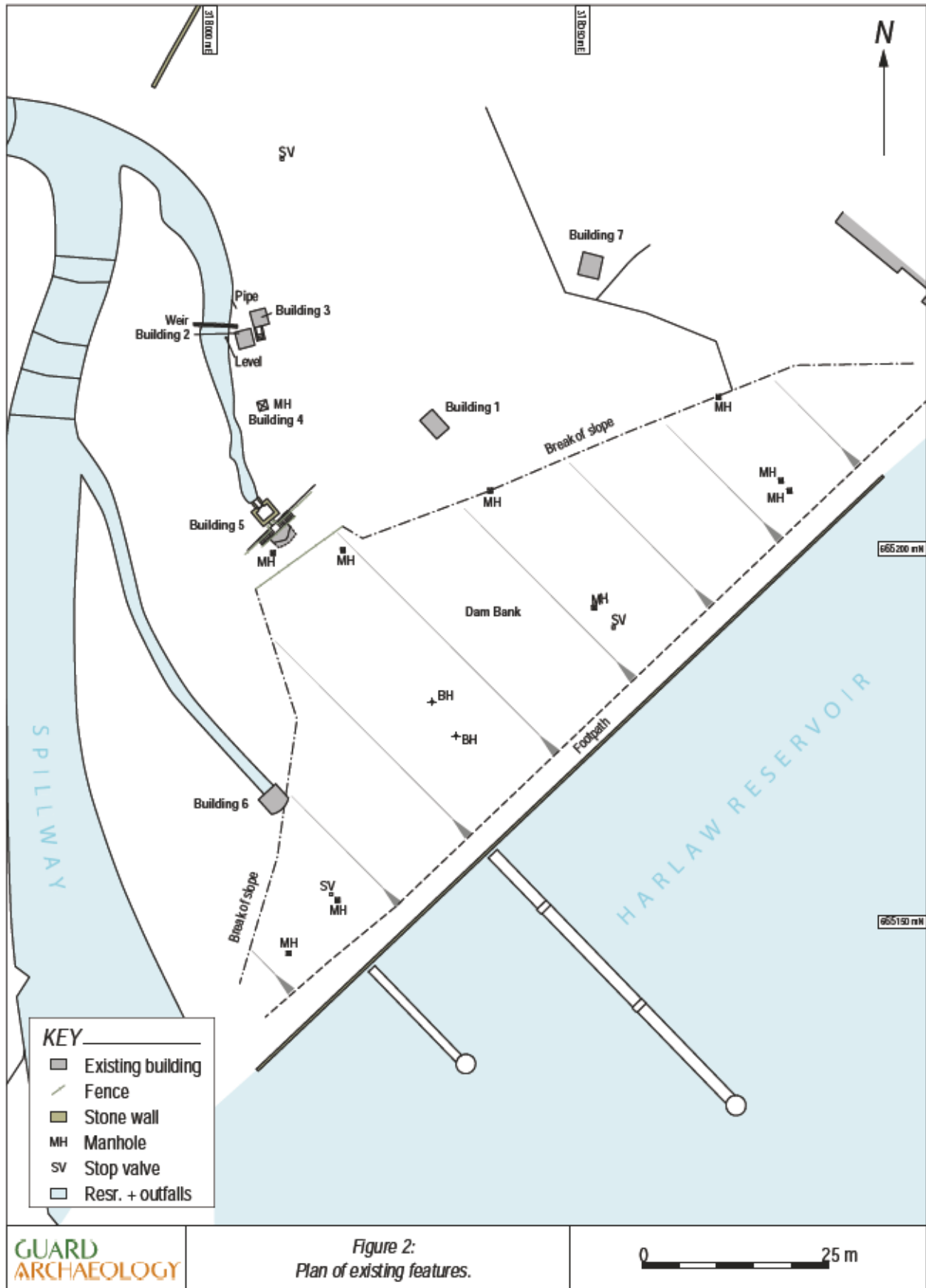
Plate 1: Building 1, from the east.



Plate 2: Building 1, from the north-east, cast-iron valve is visible on the rear wall of the building.

- 7.1.1 The results presented below should be read in conjunction with the fuller building descriptions presented in Appendix A see concordance
- 7.1.2 Building 1 was the easternmost structure recorded and was located within woodland at the base of the dam bank. Built with bricks stamped ETNA (ETNA Brickworks, Armadale, West Lothian c1890-1947) the structure was rectangular in plan, aligned north-west to south-east and measured externally 3.26 m long by 2.3 m wide. The walls measured 2.1 m in height on the north-east side of the building reducing to 2.02 m in height on the south-west side of the building; the walls carried a sloping concrete slab roof. 0.1 m thick. Metal vents were visible inserted at mid-point in the north-west and south-east elevations of the structure which was

entered via a doorway 0.86 m wide by 1.7 m in height, the entrance was offset towards the south-east end of the north-east facing elevation. The doorway featured a concrete lintel, wooden jambs and door. Concrete steps at the threshold descended 0.5 m down into the building which was floored with concrete, a large cast-iron valve and associated pipe were visible at floor level, above a steel H-beam supported the concrete roof.



7.2 Building 2 (Figure 2 and 3, Plate 3 and 4)

7.2.1 Building 2 was located slightly downstream from the easternmost outflow of the reservoir at the base of the dam bank and was terraced into the slope of the bank on the east side of the outfall. The building was square on plan, built with brick and had a sloping concrete slab roof 0.1 m thick. A padlocked, barred metal gate mounted to a metal frame set below a concrete lintel formed the entrance to the structure through the south-facing elevation, both north and south wall elevations contained vents. The building externally measured 2.2 m² and stood to a height of 2 m reducing to 1.8 m in height at the lower end of the roof slope. No access was gained to the interior of the building but a channel was visible in the concrete floor. A section of sandstone rubble walling revetting the bank was visible at the entrance to the building. This measured 2.2m long and stood 0.75m high and consisted of four courses of sandstone rubble which was aligned to the south from the south wall of the building.



Plate 3: Building 2 with sandstone revetting wall, from the south-west.



Plate 4: Building 2 and Building 3 just visible to the right of Building 2, from the south-east.

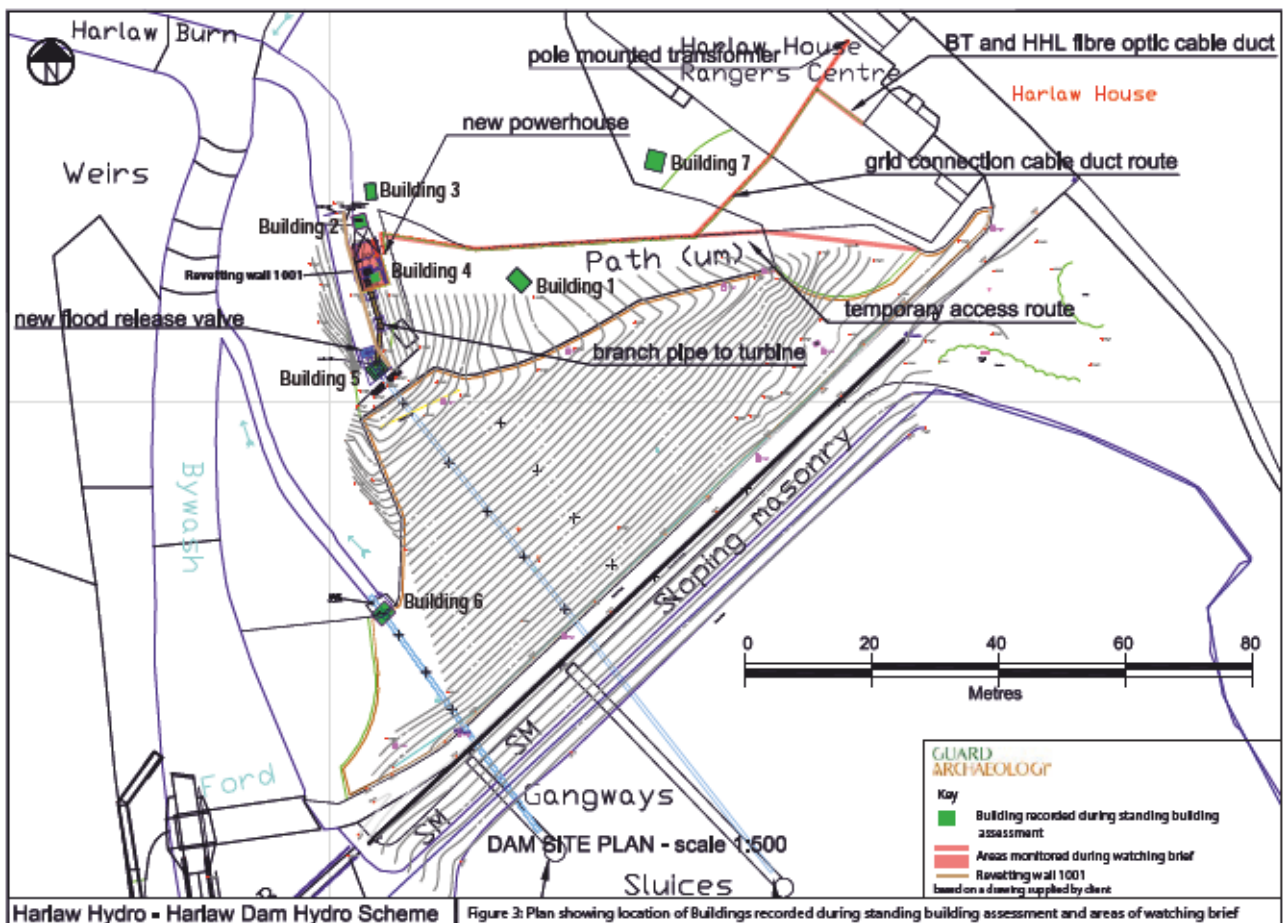


Figure 3: Plan showing location of Buildings recorded during standing building assessment and areas of watching brief

7.3 Building 3 (Figure 2 and 3, Plate 4 and 4B)

7.3.1 Building 3 was located immediately north-east of Building 2 and similarly terraced into the eastern bank of the outfall and was predominantly subterranean and largely obscured by vegetation. The building was square on plan, built with brick and had a sloping concrete slab roof 0.1 m thick; a barred metal gate mounted to a metal frame formed the entrance to the structure through the south-facing elevation which was accessed via a flight of concrete steps which descended 1 m from ground level between 2 sandstone revetting walls to the entrance. The building externally measured 2.3 m² and the walls consisted of 5 visible courses of brick in height. No access to the interior was gained but a Blake Hydram pump was visible attached to the eastern wall of the building and probably formerly supplied water to the dwelling house currently in use as the Harlaw Reservoir Visitor Centre. The Blake Hydram is a hydraulic ram pump that utilises the pressure of the water flowing down the 'drive pipe' to pump water to a maximum height of 150 m above the hydram. No external power source is required to operate the pump which makes this one of the least expensive techniques of raising water in the world.



Plate 4B: Building 2 and Building 3, from the east-south-east.

7.4 Building 4 (Figure 2 and 3, Plate 5)

7.4.1 Building 4 was located to the south of Buildings 2 and 3 and comprised a brick and concrete built manhole. The external measurements of the structure were 1.43 m long by 1.32 m wide; the structure was visible to a depth of 0.48 m. The top of the chamber was covered by a concrete slab capping the brick walls of the structure into which was set a square cast-iron manhole cover embossed with makers name 'ENTEC'.



Plate 5: Building 4, brick and concrete manhole with cast-iron cover removed. Buildings 2 and 3 to rear of frame. From the SSW.

7.5 Building 5 (Figure 2, 3 and 4, Plates 6-10)

7.5.1 Building 5 was located at the head of the easternmost outfall of Harlaw Reservoir and comprised a rectangular chamber or tank built with cement rendered brick walls coped with concrete blocks, the walls of the structure were built off a concrete base. The chamber was filled with water via the outfall pipe controlled by 2 valves, one in the reservoir controlled via an upstand and the second housed in a compartment within a sandstone revetting wall at the base of the dam bank. An opening containing a wooden sluice gate in a metal frame recessed into the sides of the opening was visible in the wall at the north end of the structure and two small sandstone walls abutted the north side of the structure and the lower part of a wooden sluice gate acting as a partial jamb. The sandstone walls appeared to have carried a water wheel; circular scars were visible on both internal faces of the walls. To the immediate east of the sandstone walls an area of disturbed sandstone rubble may represent the base of the earlier turbine, remnants of water wheel paddles were visible strewn across the rubble. The building measured 2.82 m long by 2.6 m wide and stood to a height of 1.5 m.



Plate 6: General view of Building 5, from the north-east.



Plate 7: General view of Building 5, rubble spread left of frame may represent the site of the earlier electricity turbine. Rear of frame the sandstone wall revetting the base of the bank of the dam with a valve chamber compartment, from the north-west.



Plate 8: Detail of wooden sluice gate controlling flow of water to waterwheel mounted on projecting sandstone walls on the north side of Building 5. Part of a semi-circular scar made by the water wheel is visible to right of and below the base of the ranging rod, from the north-west.



Plate 9: Inlet pipe to tank, from the north-west.



Plate 10: Remnants of the water wheel metal paddles which would have driven the earlier turbine.

7.6 Building 6 (Figure 2 and 3, Plates 11 and 12)

7.6.1 Building 6 was located towards the west end of the dam at the tree line. This was a square structure with a curved south wall, built with dressed sandstone blocks; the building featured a slightly pitched roof covered with stone slabs 0.11 m thick and stone ridges. Access to the building was through an arched top wooden doorway in the north elevation accessed via a metal bridge straddling the reservoir western outfall pipe. Externally the building measured 3.06 m long by 2.5 m wide and stood 12 course of stone in height 2.34 m. No access was gained to this building.



Plate 11: Building 6, from the north-west.



Plate 12: Building 6, from the south-east.

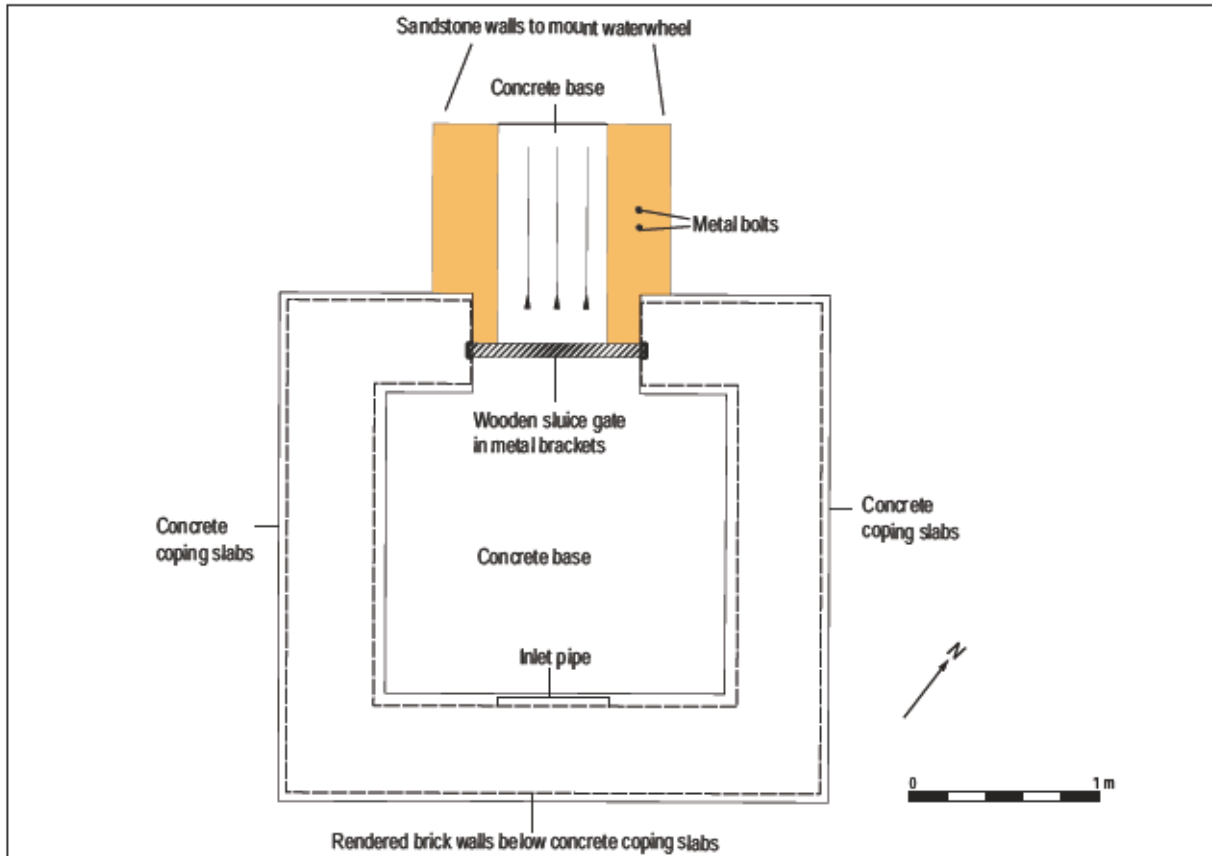


Figure 4: Plan of Building 5.

7.7 Building 7 (Figure 2 and 3, Plate 13)

7.7.1 Building 7 was located within the woodland to the east of the dam towards the visitor centre and walled garden area and was built into the hillside. This was a rectangular structure built with dressed red sandstone blocks and bricks; the building featured the remains of a flat roof built with one course of bricks over a concrete base, this had collapsed and only survived as a small section. Access to the building was through a doorway with a wooden lintel in the west elevation which also had the remains of a large window with a brick built sill. Two large vertical timber were set at either side of the window, these measured 1.45m high and were 0.3m square, the one at the south was



Plate 13: Building 7.

leaning outward. Externally the building measured 3.95 m long by 1.8 m wide and stood 8 course of stone in height 1.8 m. No access was gained to this building. Immediately in front of the building was a pile of masonry rubble that was covered in moss and vegetation.

Watching Brief Results

8.1 Temporary access road (Figure 3, Plate 14)

8.1.1 The temporary access road was aligned roughly east to west from the south-east corner of the Harlaw Visitor Centre down a steep slope to the turbine site and measured 87 m long by 2 m wide. Topsoil measuring 0.12 m-0.25 m deep was found overlying a pale yellow brown natural sand with occasional small stones. Occasional tile and ceramic and brick/rubble drains were encountered no archaeological features were observed. To the east of the access road at the top of the dam, was the remains of a stone built revetting wall that survived to 3 courses and ran parallel to the boundary wall of the visitor centre garden. This feature was not affected by the construction of the access road and presumably relates to the building and garden.



Plate 14: General view during topsoil stripping to form temporary access road.

8.2 Service trench (Figure 3, Plates 15 and 16)

8.2.1 The service trench for electricity and fibre optic cables was aligned north-east to south-west, with a north-west to south-east spur to carry the fibre optic cable to the visitor centre. The trench was excavated from the base of a pole mounted transformer across the garden of the visitor centre, tunnelled below the drystone wall enclosing the garden then continued down the side of a very steep embankment before turning to the west and following the course of the temporary access road to the site of the turbine installation. Topsoil measuring 0.25-0.3 m deep was removed, below this a pale yellow brown sand or orange/grey clay was encountered. Small rubble and ceramic tile drains were encountered in the north-east to south-west branch of the service trench and a plethora of services were visible towards the visitor centre in the north-west to south-east branch of the fibre optic cable trench. Numerous fragments of rusty metal objects were recovered from a dump of material on the south-west side of the wall enclosing the garden on the course of the service trench no archaeological features were seen.

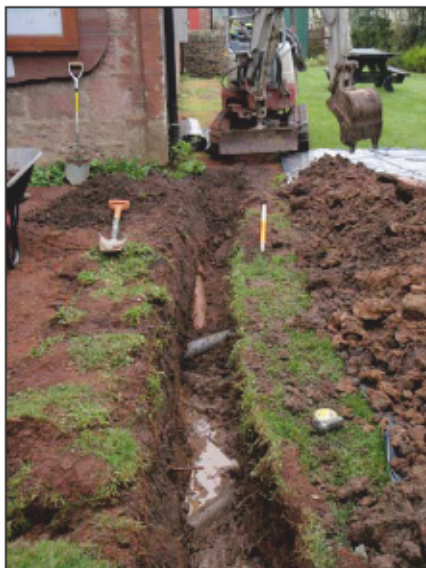


Plate 15: General view of services in the fibre optic cable branch of the service trench in the visitor centre garden, from the north-west.



Plate 16: General view of the north-east to south-west electric cable trench in the visitor centre garden, from the north-east.

8.3 Electricity turbine shed base and branch pipe to turbine trench (Figure 3, Plates 17-19)

8.3.1 The footprint of the concrete base for the turbine shed measured 7.62 m long by 3.4 m wide and was excavated to a maximum depth of 2.4 m on the upslope side of the bank leading down to the outfall. Topsoil measuring 0.08 m-0.12 m deep was found overlying orange/brown clay with grey mottling. No archaeological features were encountered.

8.3.2 The branch pipe from the new turbine water supply and flood release valve at the outfall of the reservoir on the site of Building 5, associated with an earlier turbine installation, was aligned roughly north to south and measured 12.1 m long by 1 m wide and was excavated to a depth of 1.2 m deep. Topsoil measuring 0.08 m-0.12 m deep was found overlying orange/brown clay with grey mottling. A section of stone walling (1001) revetting the base of the eastern edge of the outfall bank aligned NNW-SSE was recorded where the pipe trench cut through the edge of the bank. This revetting wall was built off a rubble base with roughly rectangular quarried stone visible at this point to 2 courses in height 0.4 m and measuring 0.45 m wide. The wall was recorded over a distance of 15 m and continued to the NNW



Plate 17: South-south-east facing section of the turbine base trench.



Plate 18: North-north-west facing section of the turbine base trench, water supply pipe and flood release valve top right of frame.



Plate 19: Bank revetting wall 1001 at the base of the bank along the eastern edge of the outfall, from the west-south-west.

8.4 Harlaw Reservoir (Figures 6 - 12)

8.4.1 As part of this project research into the history and construction of Harlaw reservoir was carried out by Harlaw Hydro Ltd. During the course of this research the original drawings and plans for the reservoir from 1847 prepared by the Edinburgh Water Works were discovered and have been reproduced below.

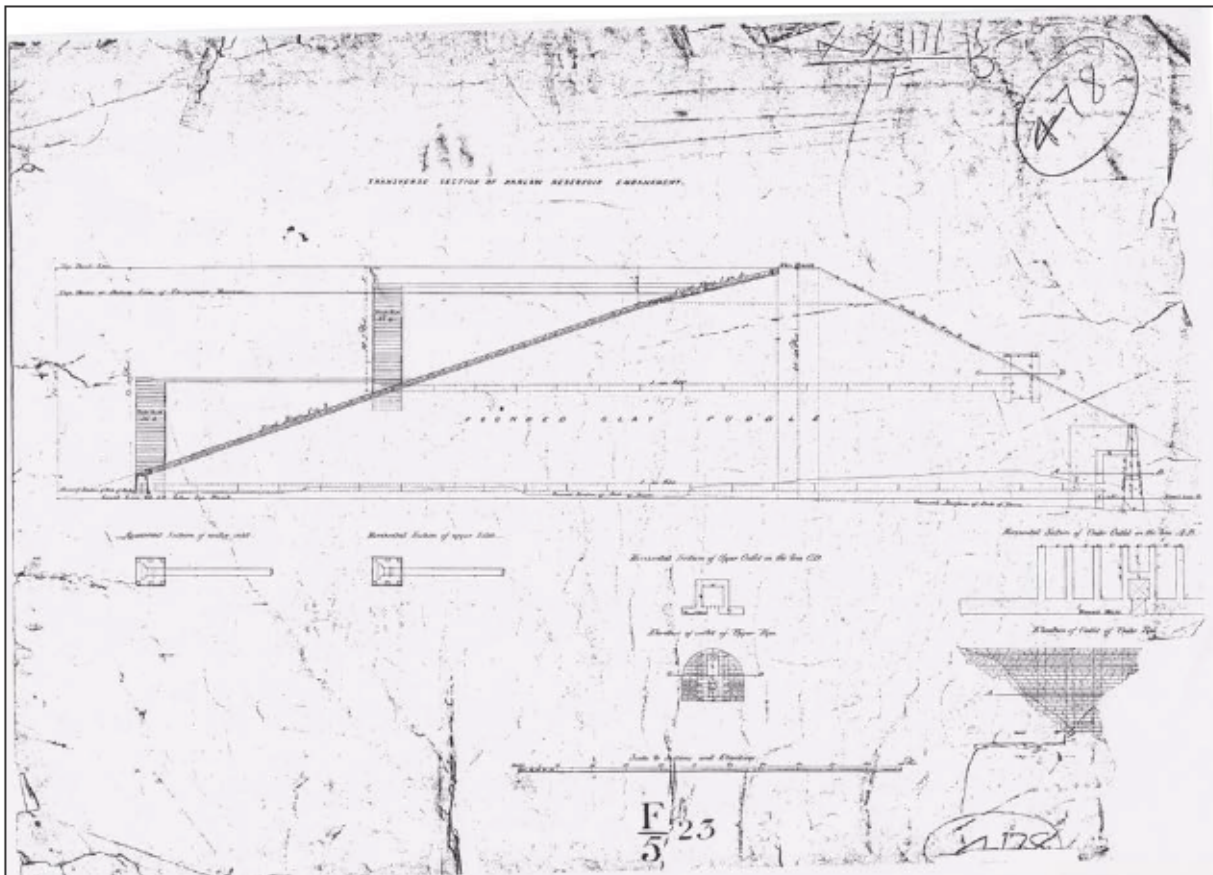


Figure 5: Transverse Section of Harlaw Reservoir Embankment.

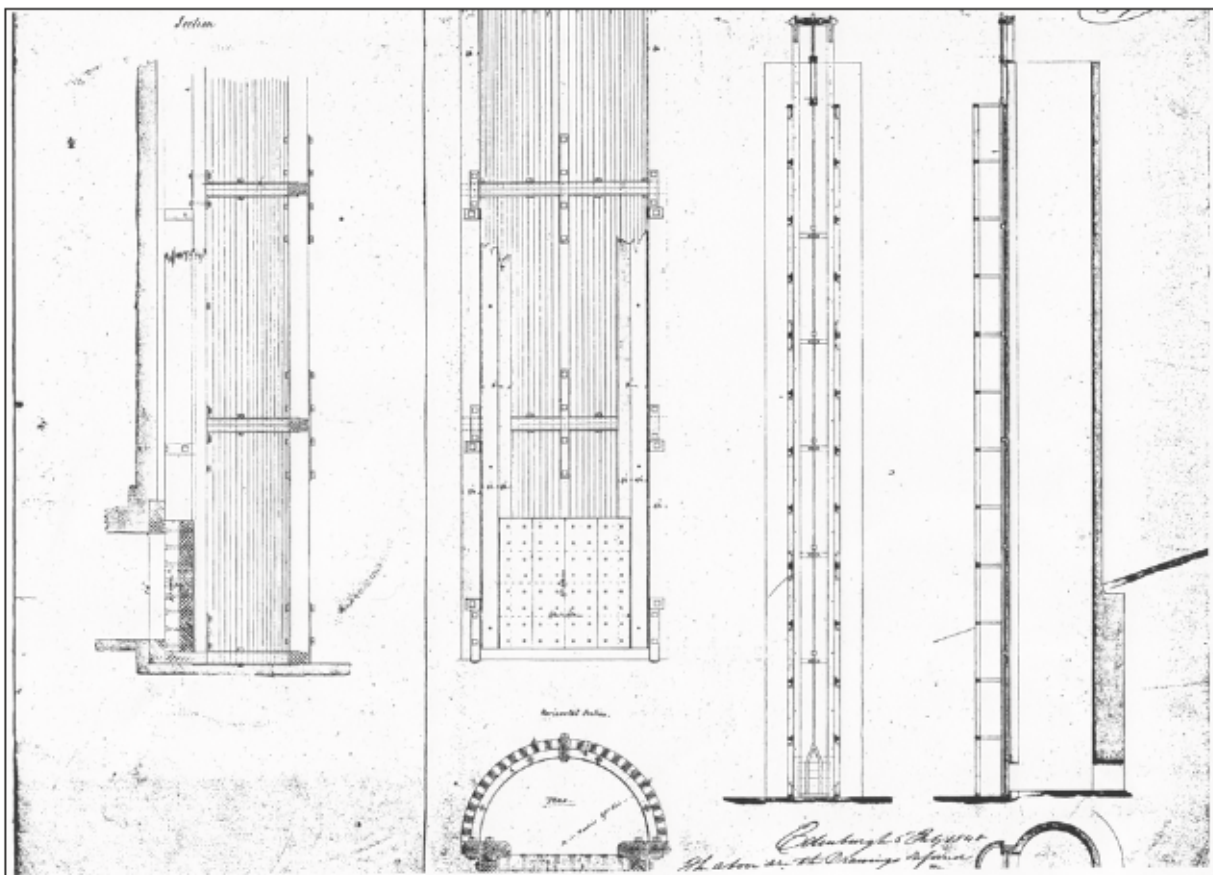


Figure 6: Detail of Inlet.

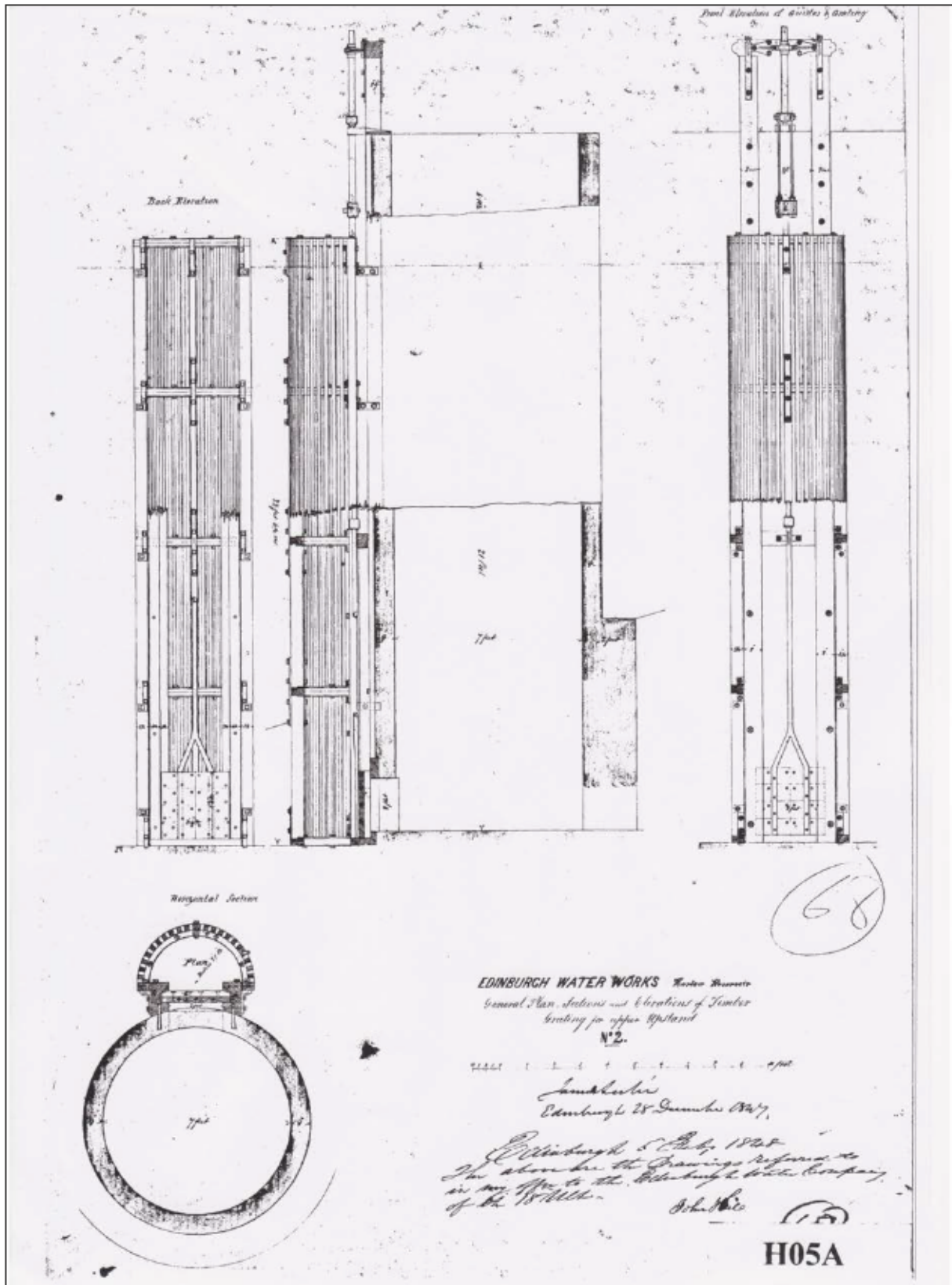


Figure 7: General Plan Sections and Elevation Timber Grating Upper Upstand.

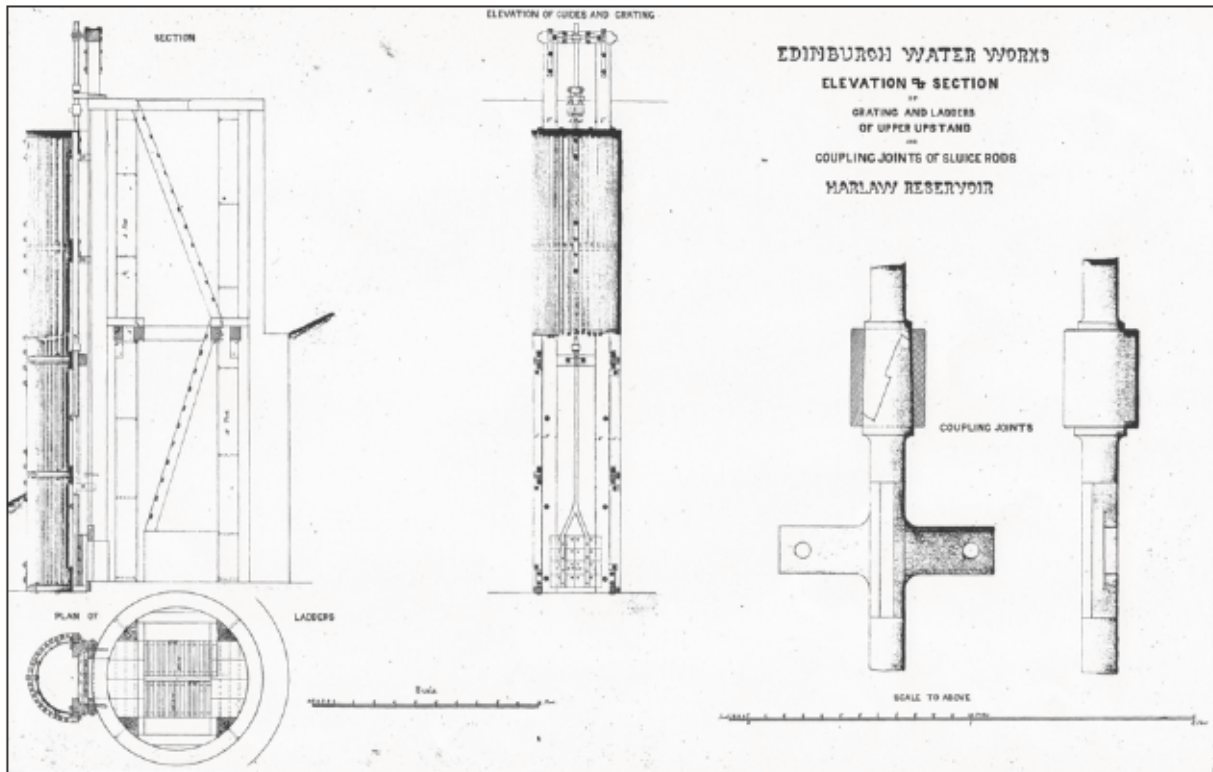


Figure 10: Elevation and Section Grating And Ladders Upper Upstand.

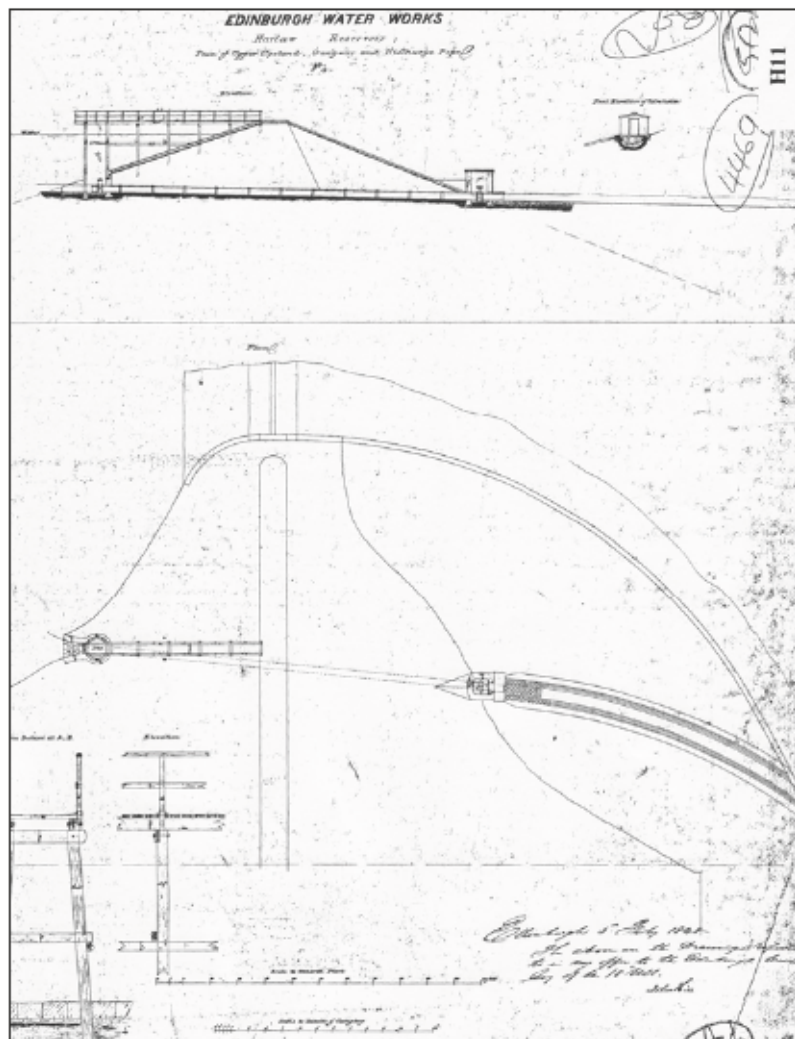


Figure 11: Plan of Upper Upstand Gangway and Discharge Pipe.

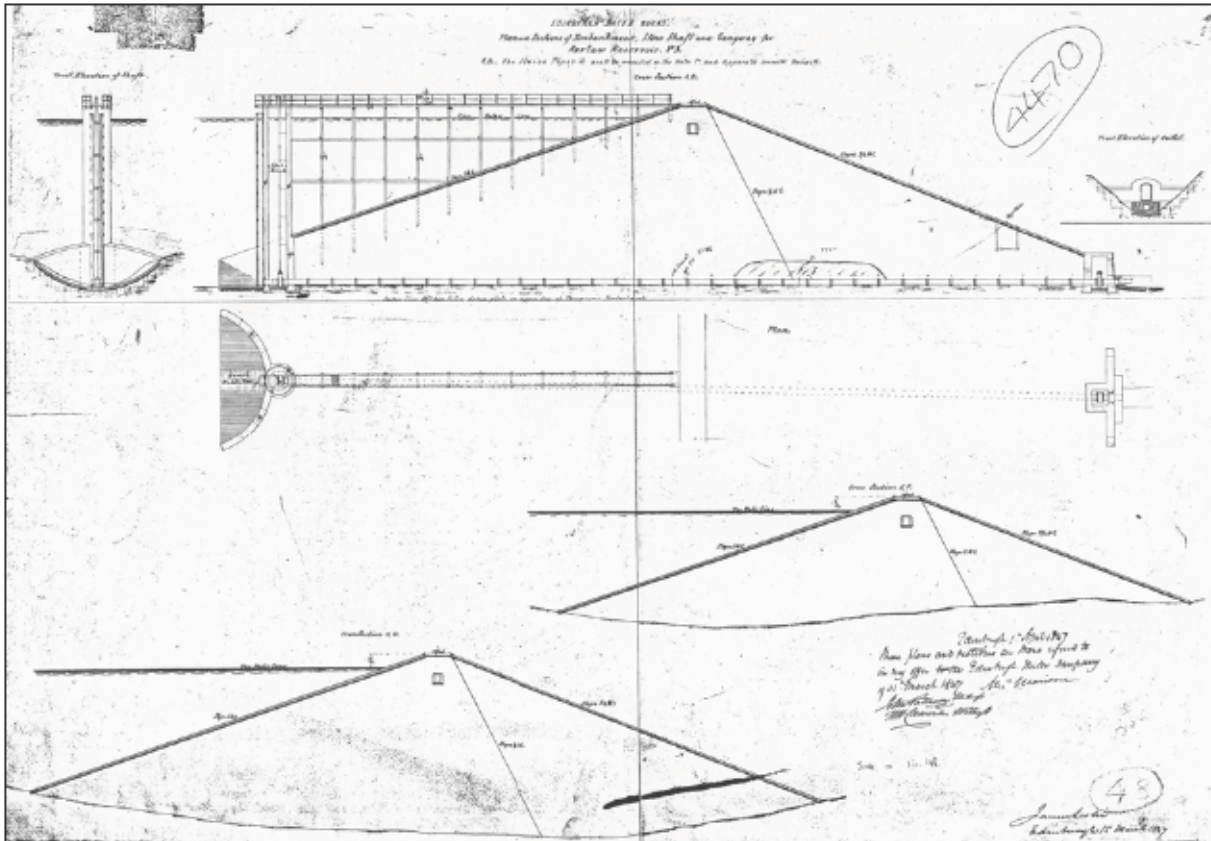


Figure 12: Plan with Sections of Embankment Stone Shaft and Gangway.



Plate 20: General view along the top of the dam, from the north-east.



Plate 21: general view of the confluence of the westernmost reservoir outfall and the spillway.

Conclusion

- 9.1 The standing building assessment recorded a number of brick and stone built structures associated with the working of the dam. Two of these stone buildings, the sandstone revetting wall containing a valve chamber compartment for the easternmost outfall at the base of the dam behind Building 5 and Building 6 a valve chamber for the westernmost outfall of the reservoir, would appear contemporary with the construction of the dam and formation of the outfalls and were instrumental in regulating the flow of water to the Water of Leith which supplied the water to drive the many mills located along its banks. The remaining brick built structures would appear as secondary buildings associated with the original electricity turbine and modernisation of the water supply to the dwelling house, currently in use as the Harlaw Reservoir Visitor Centre.

- 9.2 The watching brief recorded a revetting wall along the east edge of the most eastern outfall which appeared contemporary with the construction of the dam and formation of the outfalls.
- 9.3 Several iron artefacts, paddles and drive shafts from the original water turbine were recovered from the area around Building 5, these were kept to one side and may be used at a later stage as part of a display. A number of artefacts were recovered from the service trenches by the visitor centre but these all appear to be of a recent date. No other artefacts or features that could relate to earlier activities prior to the construction of the dam were encountered.
- 9.4 While GUARD Archaeology advise that no further archaeological work or post-excavation work is required, final decisions on the nature and extent of any future archaeological work rest with the planning authority.
- 9.5 A summary of the project results will be submitted to *Discovery and Excavation in Scotland*. A copy of this is included in Appendix . The archive for the project, including a copy of the report, will be submitted to the National Monuments Records for Scotland within six months.
- 9.6 The online OASIS form at <http://ads.ahds.ac.uk/project/oasis/> (OASIS Reference: guardarc1-200300) will be completed within 3 months. Once the Data Structure Report has become a public document by submission to or incorporation into the SMR, the City of Edinburgh Council archaeologist will validate the OASIS form thus placing the information into the public domain on the OASIS website

Acknowledgements

- 10.1 GUARD would like to thank Ian Hynd and Martin Petty of Harlaw Hydro Ltd. for their assistance. Plant and driver were supplied via SJB Construction Ltd. Technical support was from Aileen Maule and John Kiely. The illustrations were produced by Fiona Jackson and Alan Hunter Blair. The project was managed for GUARD by Bob Will.

**Harlaw Reservoir, Balerno
Data Structure Report**

Section 2: Appendices



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Appendices

Appendix A: Building Survey

Building 1
Located at the base of the dam within the woods at the edge of the dam
Brick built rectangular building with concrete slab roof and a doorway on the east side.
External dimensions 3.26m N/S by 2.3m E/W and sloping roof 2.10m on east side and 2.02m on west side.
The walls consist of 22 courses of brick on the higher east side with vents on the north and south walls.
The roof consists of a concrete slab 0.1m thick
The doorway on the east side is 0.86m wide and 1.7m high with a concrete lintel and a wooden frame and door. The doorway is located 0.72m from the south-east corner.
Internal the floor is 0.5m lower with steps down at the threshold.
There is a large cast iron pipe on the inside with a large valve at floor level and a steel 'H' beam along the ceiling.
Built from brick stamped 'ETNA'
Building 2
Located next to the outflow at the base of the dam on the east side of the stream and built into the sloping bank.
Brick built square building with concrete slab roof with doorway on the south wall.
External dimensions 2.2m N/S by 2.2m E/W and sloping roof
The walls consist of 21 visible courses of brick on the west side and 12 courses on the east side with vents on the north and south walls.
The roof consists of a concrete slab 0.1m thick that slopes down to the north with a height difference of 0.2m
The doorway on the south side is 0.61m wide and 1.77m high with a concrete lintel and metal door frame. The doorway is located 0.28m from the south-east corner and has a door consisting of iron railings.
No access to interior but a channel was visible in the floor.
A section of stone revetting that was 2.2m long and 0.75m high and consisted of four courses ran south from the doorway.
Building 3
Located to the east of building 2 and built into the sloping bank and is mainly below ground and largely obscured by vegetation.
Brick built square building with concrete slab roof with doorway on the south wall with external steps down to the gate.
External dimensions 2.3m N/S by 2.3m E/W and sloping roof
The walls consist of 5 visible courses of brick.
The roof consists of a concrete slab 0.1m thick that slopes to the north with a height difference of 0.2m
The doorway on the south side is 0.6m wide and 0.86m high with a concrete lintel and a metal door frame. The doorway is located 0.22m from the south-east corner and has a door consisting of iron railings.
No access to interior.
The external steps were 1.5m by 1m and built from stone and concrete with stone revetting walls 1m high. No access as the steps were filled with rubble and vegetation.
Building 4
Located to the south of buildings 2 and 3
Brick and concrete built manhole.
External dimensions 1.32m by 1.43m
Metal manhole cover square 0.61m by 0.61m with the makers name 'ENTEC'
Walls mainly visible on the west side to a height of 0.48m.
Building 5
Located at the head of the northernmost outfall of Harlaw Reservoir and comprised a rectangular chamber or tank built with cement rendered brick walls coped with concrete blocks, the walls of the structure were built off a concrete base.
The chamber was filled with water via the outfall pipe controlled by 2 valves, one in the reservoir and the second housed in a compartment within a sandstone revetting wall at the base of the dam bank.

Building 5 (continued)
An opening containing a wooden sluice gate in a metal frame recessed into the sides of the opening was visible in the wall at the north end of the structure and two small sandstone walls abutted the north side of the structure at either side of the wooden sluice gate opening.
The sandstone walls appeared to have carried a water wheel; circular scars were visible on both internal faces of the walls.
To the immediate east of the sandstone walls an area of disturbed sandstone rubble may represent the base of the earlier turbine, remnants of water wheel paddles were visible strewn across the rubble.
The building measured 2.82 m long by 2.6 m wide and stood to a height of 1.5 m.
Building 6
Located at the west end of the dam at the tree line.
Stone built square building with a slightly pitched stone slab roof with ridge slabs, a doorway on the north and a curved south wall.
External dimensions 2.5m N/S by 3.06m E/W and sloping roof
The walls consist 12 visible courses of rectangular shaped stone blocks with tooling marks. The walls are 2.34m high.
The pitched roof consists of a stone slabs 0.11m thick and the ridge is 2.65m high. The ridge stones are 0.3m wide and 0.08m thick.
The doorway on the north side is 1m wide and 1.9m high with a shaped stone lintel. The doorway is located 0.22m from the south-east corner and has a door consisting of iron railings.
No access to interior.
Building 7
Building 7 was located within the woodland to the east of the dam towards the visitor centre and walled garden area and was built into the hillside
A rectangular structure built with dressed red sandstone blocks and bricks; the building featured the remains of a flat roof built with one course of bricks over a concrete base.
Access to the building was through a doorway with a wooden lintel in the west elevation
Two large vertical timber were set at either side of a window, these measured 1.45m high and were 0.3m square
Externally the building measured 3.95 m long by 1.8 m wide and stood 8 course of stone in height 1.8 m
Immediately in front of the building was a pile of masonry rubble that was covered in moss and vegetation.
No access was gained to this building

Appendix B: List of Context

Context No.	Area	Description	Interpretation
001	Site	Deposit: A moist, loose mid brown sandy loam with occasional inclusions of small angular stones. Measured 0.06-0.35 m deep.	Topsoil
002	Site	Deposit: A moist, firm pale orange/brown sand. Occasionally an orange/brown clay	Natural underlying geology
1000	Building 5	See building 5 description, Building description appendix	-
1001	Easternmost outfall	A section of stone walling (1001) revetting the base of the eastern edge of the outfall bank aligned NNW-SSE was recorded where the pipe trench cut through the edge of the bank. This revetting wall was built off a rubble base with roughly rectangular quarried stone visible at this point to 2 courses in height 0.4 m and measuring 0.45 m wide. The wall was recorded over a distance of 15 m and continued downstream to the NNW	Bank revetting wall

Appendix C: List of Finds

Find No.	Area	Context No.	No. of Pieces	Material	Type	Description
001	Visitor Centre	001	17	Metal	Iron	Rusty metal objects
002	Visitor Centre	001	1	Metal	Brass	Brass lamp fitting
003	Visitor Centre	001	4	Ceramic	Pottery	Glazed pottery fragments
004	Visitor Centre	001	1	Glass	Vase	Decorative glass fragment

Appendix D: List of Drawings

Drawing No.	Area	Sheet No.	Subject	Scale
1	Building 5	1	Plan of Building 5	1:20

Appendix E: List of Photographs

24/09/14

Shot No.	Area	Description	Taken from
1	-	General view of lower end of temporary access road pre-ex	W
2	-	General view of Building 4	W
3	-	General view of Buildings 4 and 5	N
4	-	General view of Buildings 2, 3 and 4	SSE
5	-	General view of temporary access road pre-ex	W
6	-	General view of temporary access road pre-ex	E
7	-	Possible structure on slope north of track	S
8	-	General view of lower end of temporary access road pre-ex	SE
9	-	View of electricity cable uncovered during topsoil stripping	S
10	-	General view during topsoil stripping temporary access road	NW
11	-	General view during topsoil stripping temporary access road	E
12	-	General view during topsoil stripping temporary access road	W
13	-	Possible brick and rubble drain during topsoil stripping temporary access track	S
14	-	View of electricity cable uncovered during topsoil stripping	E
15	-	Possible brick and rubble drain during topsoil stripping temporary access track	S
16	-	General view during topsoil stripping temporary access road	SE

01/10/14

Shot No.	Area	Description	Taken from
1	-	Registration	-
2	-	General view during topsoil stripping temporary access road	WNW
3	-	General view of ceramic pipe during topsoil stripping temporary access road	E
4	Building 5	General view Building 5	NE
5	Building 5	General view Building 5	NW
6	Building 5	Wooden sluice gate and sandstone walls to cradle waterwheel Building 5	NW
7	Building 5	Walls to cradle waterwheel north side of Building 5	NE
8	Building 5	Waterwheel score marks on internal elevation of west waterwheel cradle wall Building 5	NE
9	Building 5	Waterwheel score marks on internal elevation of east waterwheel cradle wall Building 5	SW
10	Building 5	Wooden sluice gate Building 5	NE
11	Building 5	Inlet water pipe Building 5	NW
12	Building 5	Mounting bracket for waterwheel Building 5	NE
13	Building 5	Waterwheel buckets/paddles	SW
14	Building 5	General view of tank/chamber to drive waterwheel	SE
15	Building 5	General view of tank/chamber to drive waterwheel	NE
16	Building 5	Bracket to raise wooden sluice gate Building 5	SE
17	-	General view at west end of temporary access road	S
18	Building 5	Driveshafts and waterwheel components associated with earlier turbine	SW
19	Building 5	Breaking out Building 5	NE
20	-	Bank revetting wall 1001	WSW
21	-	Bank revetting wall 1001	WSW
22	-	Bank revetting wall 1001	WSW
23	Building 5	Outfall pipe after removal of Building 5	NW
24	Building 5	Outfall pipe after removal of Building 5	N

Shot No.	Area	Description	Taken from
25	Buildings 2, 3 and 4	Buildings 2, 3 and 4	ESE
26	Building 4	Internal view of manhole Building 4	ESE
27	Building 4	General view breaking out Building 4	ESE
28	Building 5	General view of test-pit below Building 5	ESE
29	Building 5	General view of test-pit below Building 5	ESE
30	Building 5	General view of test-pit below Building 5	ESE

07/10/14

Shot No.	Area	Description	Taken from
1	-	Registration	-
2	-	General view of cable trench in the visitor centre garden	NW
3	-	Rubble drain in cable trench visitor centre garden	NW
4	-	Rubble drain in cable trench visitor centre garden	NW
5	-	General view of cable trench in the visitor centre garden	SW
6	-	Tile drain in cable trench visitor centre garden	NE
7	-	General view of cable trench in the visitor centre garden	NE
8	-	General view of cable trench in the visitor centre garden	SW
9	-	General view of walkway to outfall release valve in Harlaw Reservoir	NW
10	-	General view of walkway to outfall release valve in Harlaw Reservoir	NW
11	-	General view of north-west-south-east aligned BT fibre optic branch of cable trench in visitor centre garden	NW
12	-	General view of services in north-west-south-east aligned BT fibre optic branch of cable trench in visitor centre garden	NW
13	-	General view of BT fibre optic cable trench in visitor centre garden after re-instatement	NW
14	-	General view of Electric cable trench after re-instatement in visitor centre garden.	NE
15	-	General view of cable trench south-west of wall enclosing visitor centre garden	NE
16	-	General view of cable trench south-west of wall enclosing visitor centre garden and north of temporary access road	NE
17	-	General view of cable trench south-west of wall enclosing visitor centre garden and north of temporary access road	NE
18	-	General view of cable trench south-west of wall enclosing visitor centre garden and north of temporary access road	NE

26/11/14

Shot No.	Area	Description	Taken from
1	-	General view of trench for turbine base	N
2	-	General view of trench for turbine base	W
3	-	General view of trench for turbine base showing depth of excavation	W
4	-	General view of trench for turbine base	E
5	-	General view of trench for turbine base	N
6	-	General view of trench for turbine base	W
7	-	General view of trench for turbine base showing depth of excavation	N

SBA File 1

Shot No.	Area	Description	Taken from
1	-	General view of spillway at west end of Harlaw reservoir	N
2	-	General view of spillway at west end of Harlaw reservoir	N
3	-	General view of east outfall Harlaw Reservoir	N
4	-	General view of convergence of spillway and east outfall Harlaw Reservoir	N
5	-	Registration	-
6	Buildings 2 and 3	Buildings 2 and 3	SSE

Shot No.	Area	Description	Taken from
7	Buildings 2 and 3	Buildings 2 and 3	SE
8	Buildings 2 and 3	Buildings 2 and 3	SW
9	-	General view of weir or dam in easternmost outfall Harlaw Reservoir	S
10	Building 5	General view of Building 5	NE
11	Building 5	General view of Building 5	NE
12	Building 1	General view of Building 1	W
13	Building 1	General view of Building 1	NE
14	Building 1	General view of Building 1	NE
15	-	General view looking towards easternmost outfall Harlaw Reservoir from the dam bank	SSE
16	-	General view looking towards easternmost outfall Harlaw Reservoir from the dam bank	SSE
17	Building 6	General view Building 6	E
18	Building 6	General view of Building 6	SE
19	Building 6	General view Building 6	E
20	Building 6	General view Building 6	NW
21	Building 6	General view Building 6	NW
22	Building 6	General view Building 6	NW
23	-	General view of spillway laddering	SE
24	-	General view of spillway	N
25	-	General view of spillway	N
26	-	General view at start of spillway and ford	S
27	-	General view of convergence of western outfall Harlaw Reservoir and spillway	NW

SBA File 2

Shot No.	Area	Description	Taken from
1	Building 1	East wall with door	NE
2	Building 1	South wall gable with air vent	SE
3	Building 1	North wall gable with air vent	NW
4	Building 1	West wall	SW
5	Building 1	Interior from doorway with valve & pipe	NE
6	Building 1	Interior from doorway with debris	N
7	Building 1	Interior details of valve and pipe	N
8	Building 1	Location from dam	SE
9	Buildings 2 and 3	South wall with doorway & metal gate	SSE
10	Buildings 2, 3 and 4	Location from dam/slucice	SSE
11	Building 2	West wall	SW
12	Building 2	East wall with sloping roof	NE
13	Building 2 and 3	SE view of building	SE
14	Building 2	N wall with small window/air vent	NNW
15	Building 2	NE view of building	NW
16	Building 2	External revetting wall by doorway	SW
17	Building 2	Interior from door with debris	SSE
18	Building 2	Interior from door with debris and pipe trench	SE
19	Building 3	South wall with doorway & metal gate	SSE
20	Building 3	South wall with external steps to doorway	SSE
21	Buildings 2 and 3	Location of buildings	NE
22	Building 4	Manhole/access chamber	NE
23	Building 4	Manhole/access chamber	NNW
24	Building 5	Stone built sluice chamber	NE
25	Building 5	Dam & sluice	NE
26	-	Water channel from sluice to building 2	S

SBA File 3

Shot No.	Area	Description	Taken from
1	-	General view along the top of Harlaw reservoir dam	NE
2	-	General view down the dam bank to easternmost outfall	E
3	-	General view down the dam bank to easternmost outfall	SE
4	-	Building 6	NW
5	-	General view down easternmost outfall from the top of the revetting wall at the base of the dam bank	SSE
6	-	General view of Building 5 and the revetting wall at the base of the dam bank	NE
7	-	Buildings 2 and 3	SSE
8	-	General view of easternmost outfall	NNW
9	-	ladder at the base of the spillway	NNE
10	-	General view of the confluence of the spillway and the easternmost outfall	N
11	-	General view of the confluence of the spillway and the easternmost outfall	N
12	Building 7	west elevation with doorway and window	W
13	Building 7	NE corner with door and timber	NE
14	Building 7	building with collapsed roof	S
15	Building 7	details of roof and interior	N
16	Building 7	general location	S
17	-	retvetting wall by visitor centre garden	S

Appendix F: Discovery And Excavation Scotland Entry

LOCAL AUTHORITY:	City of Edinburgh
PROJECT TITLE/SITE NAME:	Harlaw Reservoir
PROJECT CODE:	3788
PARISH:	Currie
NAME OF CONTRIBUTOR(S):	Alan Hunter Blair
NAME OF ORGANISATION:	GUARD
TYPE(S) OF PROJECT:	Standing Building Assessment/Watching Brief
NMRS NO(S):	NT16SE 16
SITE/MONUMENT TYPE(S):	Dam/Reservoir
SIGNIFICANT FINDS:	None
NGR (2 letters, 6 figures)	NT 1800 6475
START DATE (this season)	24 th September 2014
END DATE (this season)	26 th November 2014
PREVIOUS WORK (incl. DES ref.)	—
MAIN (NARRATIVE) DESCRIPTION: (May include information from other fields)	The standing building assessment recorded 6 structures, comprising 2 stone buildings, 3 brick buildings and a brick and concrete manhole. The 2 stone buildings recorded were contemporary with the construction of the dam and associated with water management of the reservoir outfalls. Two of the brick buildings and the brick manhole are likely to have been associated with the earlier turbine installation and the third brick building probably a pump house formerly supplying water to the building currently in use as the Harlaw Reservoir Visitor Centre. The watching brief comprised a supervised topsoil strip of a temporary access road from the Harlaw Reservoir Visitor Centre to the site of the new turbine installation, monitoring of ground breaking works during excavation of the footprint of the turbine shed and associated pipe trenches and monitoring during excavation of a service trench from the Harlaw Reservoir Visitor Centre to the turbine shed. A wall revetting the bank along the eastern side of the easternmost outfall was recorded during the watching brief works.
PROPOSED FUTURE WORK:	—
SPONSOR OR FUNDING BODY:	Harlaw Hydro Ltd
CAPTION(S) FOR ILLUSTRS:	—
ADDRESS OF MAIN CONTRIBUTOR:	GUARD Archaeology Limited, 52 Elderpark Workspace, 100 Elderpark Street, Glasgow, G51 3TR
EMAIL ADDRESS:	bob.will@guard-archaeology.co.uk
ARCHIVE LOCATION (intended/deposited)	Archive to be deposited in NMRS.

Appendix G: Written Scheme of Investigation**HARLAW RESERVOIR, BALERNO**

ARCHAEOLOGICAL WORKS

WRITTEN SCHEME OF INVESTIGATION

PROJECT 3788

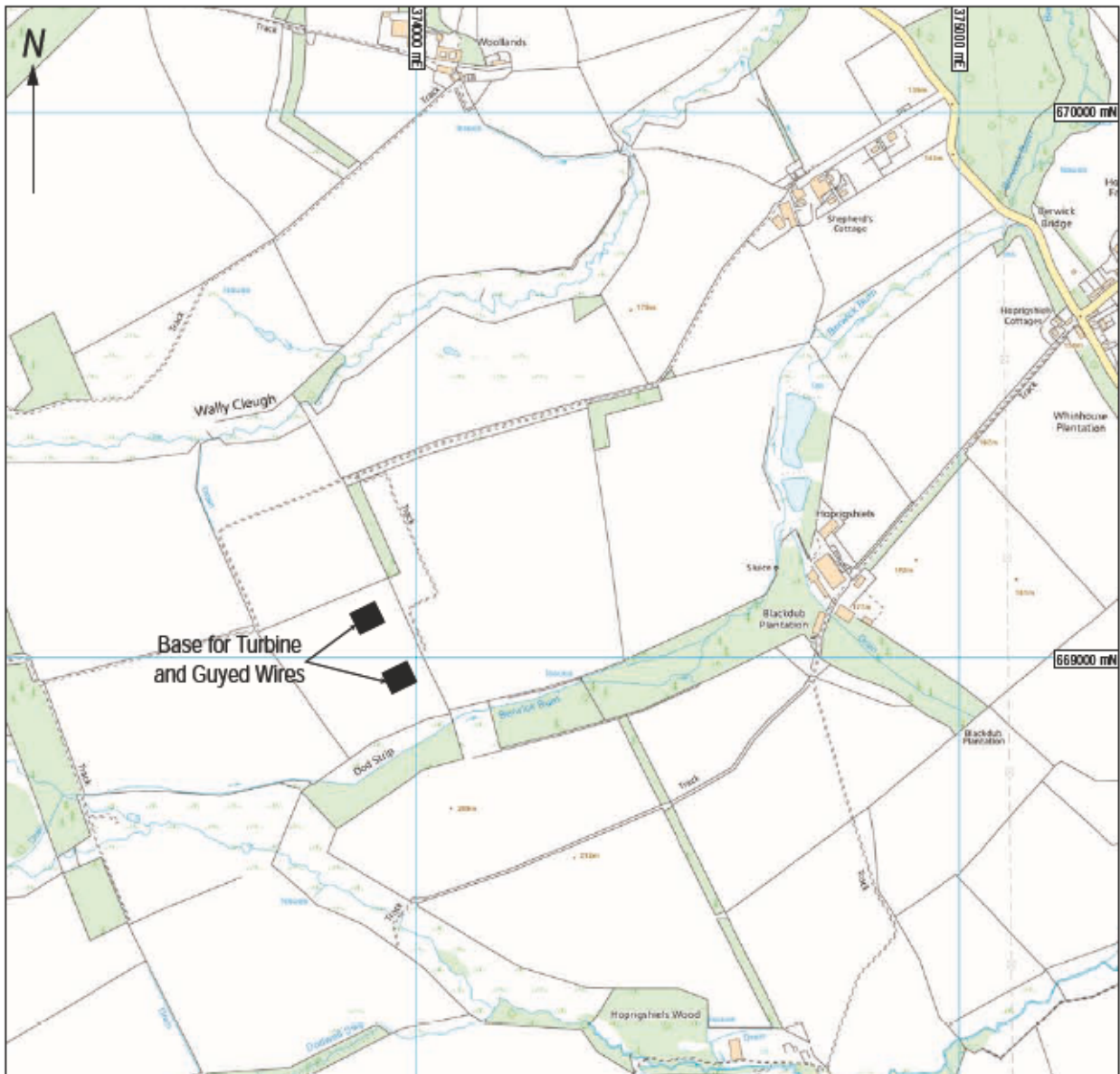
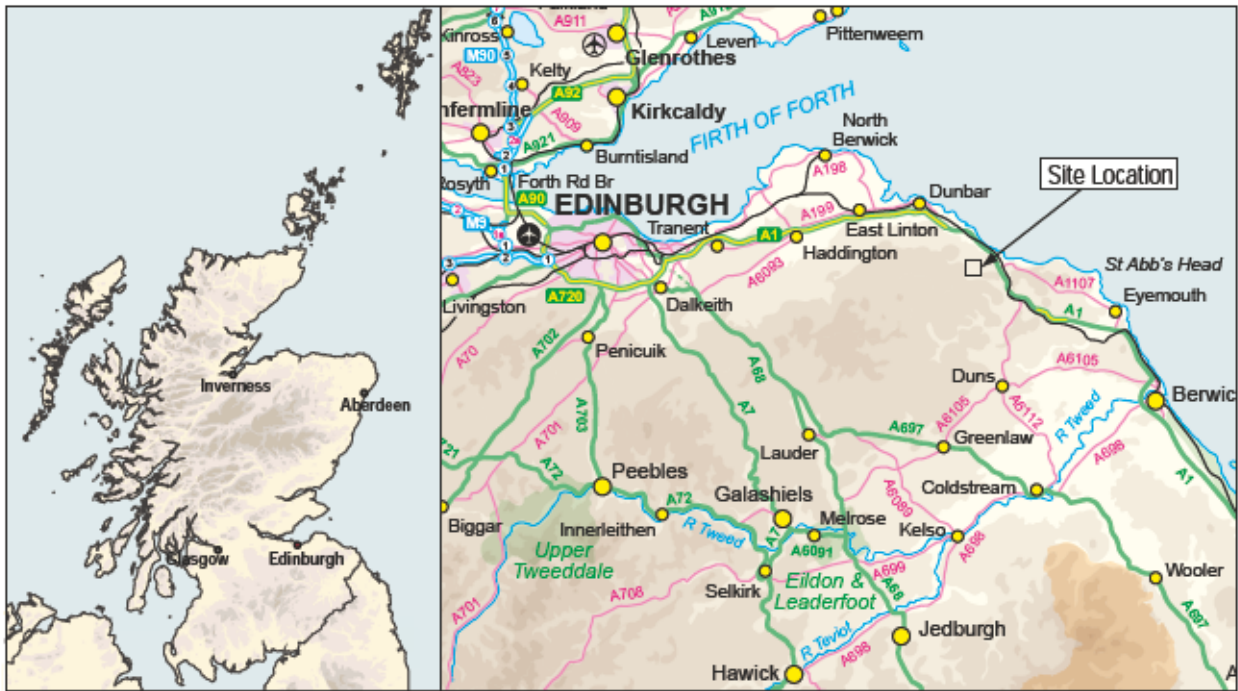


Figure 1:
Site location.

Executive Summary

- 1.1 This Written Scheme of Investigation forms the archaeological method statement for the archaeological works associated with the proposed construction of a Community Hydro Scheme at Harlaw Reservoir by Balerno on the outskirts of Edinburgh. This Written Scheme of Investigation has been developed in consultation with the local authority archaeologist.

Introduction

- 2.1 This Written Scheme of Investigation (WSI) sets out the methodology for the archaeological works associated with the construction of a small hydro electricity plant at Harlaw reservoir by Balerno to the west of Edinburgh. In accordance to the specification provided by the City of Edinburgh Council Archaeology Service (CECAS), the scope of work covers several elements; a survey of the existing buildings to accurately locate them in relation to the dam and other features within the landscape, a photographic record of the existing buildings as these may be re-used or affected by the proposed construction scheme and an archaeological watching brief during ground works required by the construction programme to record the presence, nature, significance and extent of any archaeological features within the construction area. All archaeological works will be funded by the client Harlaw Hydro Ltd

Site Location

- 3.1 Harlaw Reservoir (NT 1800 6475 centred) is located to the south-east of the village of Balerno to the west of Edinburgh within the Pentland Hills Regional Park. The dam is on the northern extent of the reservoir and leads into the Bavelaw Burn an wooded valley that runs towards Balerno village (Figure 1).

Archaeological Background

- 4.1 Harlaw reservoir was built between 1843 and 1848 by the Edinburgh Water Company and is one of several reservoirs built in the Pentland Hills to control the level of water in the Water of Leith to ensure that there was sufficient water throughout the year for the many mills that operated along the banks of the river. In addition to the dam itself there are several small brick buildings on the north side of the dam and in the immediate woodland that are associated with the dam but also housed an earlier electricity turbine. In addition there may be further building remains or foundations that are presently obscured or completely covered and the potential for further archaeological features to survive.

Aims and Objectives

- 5.1 The aims of the archaeological works are to:
 - record the location, nature, significance and extent of any archaeological features around the dam that may be affected by the present development.
- 5.2 The objectives are therefore to:
 - Conduct a survey to locate the known buildings associated with the dam
 - carry out a photographic survey along with a written description of the buildings
 - undertake an archaeological watching brief during ground-breaking works associated with the development, to record potential archaeological deposits;
 - Submit a report to data structure level for agreement to CECAS on completion of the evaluation;
 - Submit, if excavation or post-excavation works are required, an accompanying project design and costing alongside the data structure report, which will outline arrangements for further excavation or post-excavation works.

Methodology

- 6.1 A GUARD Archaeology surveyor will survey the location of the buildings associated with the dam and record these buildings by photographic and written record. A descriptive summary of each structure, such as type of building; materials used in construction; any visible changes in build/additions will be made.
- 6.2 During the watching brief the topsoil will be removed in spits to the first archaeological horizon or, where none was found, to the natural subsoil. Any archaeological features encountered will be cleaned by hand by the on-site Archaeologist to determine their character and extent
- 6.3 Suitable down time will be provided to the Watching Brief Archaeologist in order to fully recover any archaeological evidence encountered on site
- 6.4 All potential archaeological features encountered during the watching brief will be investigated by the on-site archaeologists. All significant features including negative-cut features will be 25-50% excavated in order to determine their significance, date and function. A full record of excavated features will be made using a single context planning system using pro forma sheets, drawings and photographs. All archaeological features will be photographed and recorded at an appropriate scale. Sections will be drawn at 1:10, and plans at 1:20. All levels will be tied into Ordnance Datum and the trenches accurately located with the National Grid.
- 6.5 All archaeological finds will be dealt with by the experienced on-site archaeologists in addition the GUARD project manager will be on hand to provide advice on artefacts and sampling strategies. Finds and animal bone will be collected as bulk samples by context. Significant small finds will be three dimensionally located prior to collection. All finds will be processed to MAP2 type standards and subject to specialist assessment. Palaeo-environmental samples will also be taken where appropriate. If necessary, conservation of finds will be appraised to allow for specialist study.
- 6.6 All excavated feature fills and horizons will be sampled, using bulk soil samples, for palaeo-environmental evidence (samples will be a minimum of 20 litres where sediment volume allows).
- 6.7 A representative section will be recorded by scale drawing within the construction footprint denoting depth of topsoil, any stratigraphy present and the nature of the soil. Additional information will be logged in the day book together with a sketch drawn to scale and a photographic record of deposits.
- 6.8 All buildings and features will be accurately surveyed using a Total Station or GPS and will be related to the Ordnance Survey Grid. A record of the full extent in plan of all archaeological deposits as revealed in the investigation will be made, either digitally or by hand, and related to the OS grid. In addition to archaeological features this will include recent agricultural features and changes in the subsoil. Where digital planning is used, the project archaeologist will ensure that a sufficient number of points are taken on each feature to ensure an accurate representation of the site. A plan of each trench will be made and included in the report where appropriate.
- 6.9 Should significant archaeological remains be encountered during the watching brief, requiring more than the limited sampling outlined above, the remains will be largely left *in situ* pending the agreement of the City of Edinburgh Council Archaeology Service.
- 6.10 Should human remains be revealed by the excavation, the local police, the client and the CECAS will immediately be informed. Any human remains will be left *in situ*, pending the agreement of the police, the client and CECAS on an appropriate mitigation strategy.
- 6.11 All elements of the fieldwork and any subsequent post-excavation work will be undertaken in line with the policies and guidelines of the IfA (Institute for Archaeologists) of which GUARD Archaeology Ltd is a registered organisation.

Report Preparation and Contents

- 7.1 A report detailing the results of the archaeological evaluation will be submitted to the client and to CECAS. The report will take the form of a Data Structure Report and will contain an analysis of the results of the archaeological works. The report will include a full descriptive text that will characterise any archaeological features encountered. It will also include plans and photographs at

an appropriate scale showing the location of the buildings and features along with a photographic record, written descriptions and archiving lists of all drawings and photographs.

7.2 The report will include the following:

- executive summary
- a site location plan to at least 1:10,000 scale with at least an 8 figure central grid reference
- OASIS reference number; unique site code
- Planning application number
- contractor's details including date work carried out
- nature and extent of the proposed development, including developer/client details
- description of the site history, location and geology
- a site plan to a suitable scale and tied into the national grid so that features can be correctly orientated
- context & feature descriptions
- features, number and class of artefacts, spot dating & scientific dating of significant finds presented in tabular format
- plans and section drawings of the features drawn at a suitable scale
- initial assessment of relevant finds/samples if appropriate
- discussion of the results of the archaeological works
- recommendations regarding the need for, and scope of, any further archaeological work, such as excavation, post-excavation analysis and publication
- bibliography

7.3 At least four copies of the report will be prepared for the client and a further one including a digital PDF copy sent to CECAS along with a disc containing jpegs of images of the project and trench information in Arcview shape-file format.

7.4 The report will be presented in an ordered state and contained within a protective cover/sleeve or bound in some fashion. The report will be page numbered and supplemented with section numbering for ease of reference.

Copyright

8.1 Unless otherwise agreed copyright for any report resulting from the archaeological work undertaken as part of this project will rest with GUARD Archaeology Ltd and CEC.

Publication

9.1 A summary of the project results will be submitted to *Discovery and Excavation in Scotland*. In the event of minor archaeological remains being encountered during the work, it is proposed that a comprehensive report submitted to *Discovery and Excavation in Scotland*, will form the final publication of the site. A copy of this will be included in the Data Structure Report.

Archive

10.1 The archive for the project, including a copy of the report, will be submitted to the National Monuments Records for Scotland within three months of completion of all relevant work.

10.2 The online OASIS form at <http://ads.ahds.ac.uk/project/oasis/> will be completed within 1 month of completion of the work. Once the Data Structure Report has become a public document by

submission to or incorporation into the SMR, CECAS will validate the OASIS form thus placing the information into the public domain on the OASIS website.

Finds Disposal

- 11.1 The arrangement for the final disposal of any finds made in connection with the archaeological work, will be deposited in keeping with Scottish legal requirements as set out in the Treasure Trove Code of Practice published by the Scottish Government in December 2008. The laws relating to Treasure Trove and *Bona Vacantia* in Scotland apply to all finds where the original owner cannot be identified. This includes all material recovered during archaeological fieldwork. Accordingly, all assemblages recovered from archaeological fieldwork are claimed automatically by the Crown and must be reported to the Scottish Archaeological Finds Allocation Panel through its secretariat, the Treasure Trove Unit. In the event of the discovery of small finds, a filled-out copy of the form "Declaration of an Archaeological Assemblage from Fieldwork" and two copies of the pertinent Data Structure Report will be submitted to the Panel at the conclusion of the fieldwork. The Panel will then be responsible for recommending to the Queen's and Lord Treasurer's Remembrancer which museum should be allocated the finds. All artefacts will be temporarily stored by GUARD Archaeology until a decision has been made by the panel.

Personnel and Liaison

- 12.1 The GUARD Archaeology team will comprise the following qualified and experienced GUARD archaeologists:
- GUARD Surveyor: Fiona Jackson
 - Additional field staff: Robin Murdoch
 - Technical Support: Ms Aileen Maule
 - Finds and Environmental Support and Conservation: Ms Aileen Maule
 - Illustrator: Ms Fiona Jackson
 - Project Manager: Mr Bob Will
- 12.2 The GUARD Archaeology Senior Project Manager, Mr Bob Will, will be the point of contact for the archaeological works. A full CV for key individuals concerned is appended.

Monitoring and Timetable

- 13.1 Once the proposed start date for the archaeological works has been agreed provisionally Friday 2 May 2014, CECAS will be given a minimum of three days notice and will be informed of the site mobile phone number prior to the start date so that monitoring visits can be arranged.

Health & Safety and Insurance

- 14.1 GUARD Archaeology Limited adheres to the guidelines and standards prescribed for archaeological fieldwork set down in the Institute for Archaeologists approved Health and Safety in Field Archaeology document. It is standard GUARD Archaeology policy, prior to any fieldwork project commencing, to conduct a risk assessment and to prepare a project safety plan (see appended), the prescriptions of which will be strictly followed for the duration of all archaeological fieldwork. Copies of the resultant project safety plan and of GUARD Archaeology Limited's Fieldwork Safety Policy Statement may be viewed upon request.
- 14.2 GUARD Archaeology Limited also possesses all necessary insurance cover, proofs of which may be supplied upon request.

Appendices

Risk Assessment

GUARD
ARCHAEOLOGY



Project No: 3840 Site Location: Huntly House Museum Courtyard, High Street, Edinburgh	Project Management Team Project Manager: Bob Will Project Director: Alan Hunter Blair Other Team Members: Dougie Allen Site Contact No: 07775 195619 GUARD Office Contact No: 0141 445 8800
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Dates when fieldwork will take place:	TBC
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Owner/Developer: City of Edinburgh Council

Brief Description of Project : Archaeological evaluation consisting of three hand excavated test pits
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<p>Standard Procedures:</p> <p>Emergency Procedures: There will be a mobile phone on site to ensure communication with emergency services if required. The GUARD Archaeology office will have contact details for all teams in the field.</p> <p>In case of emergency, 999 will be dialled and the appropriate service requested.</p> <p>The closest A&E department is located at:</p> <p>Edinburgh Royal Infirmary 51 Little France Crescent Edinburgh Midlothian EH16 4SA Telephone: 0131 536 1000</p> <p>Health & Safety Induction: All personnel must familiarise themselves with this document on their first day on site.</p> <p>PPE provided: PPE will consist of a minimum of hard hat, safety boots, high visibility vest and eye protection. Additional PPE (dust mask, ear defenders etc) will be available as required.</p> <p>First Aid: A First Aid kit will be available in the vehicle.</p> <p>Welfare provision: ?</p> <p>Good Housekeeping: The site and vehicle will be kept tidy. Access routes will be kept clear of tools and equipment. Rubbish will be properly disposed of.</p> <p>Environmental concerns: As far as can be ascertained, there are no safety or environmental issues over proximity to water courses, trees & habitat, wildlife or notifiable species on this site.</p>
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Underground and overhead services - Checklist

If overhead power lines are located within or on the boundaries of the development site the following precautions must be taken; if in doubt check with GUARD Archaeology manager.

- Do **NOT** trench underneath power lines with a machine
- Determine whether the machine has to pass under the power lines - is there an alternative route?
- Determine the safe height /clearance for the machine to pass under the power lines – check in advance with the power company if possible. For steel pylons the safe clearance height is approximately 7m
- If there is adequate height supervise the machine as it passes under the cables and ensure that the bucket/arm is as low as possible.
- Do NOT excavate within 15 m of a steel pylon line or 9 m from a wooden pole line and always ensure that the machine is working away from the cables – if necessary mark the 15/9m limit with hazard tape.
- Do NOT excavate within 20 m of the foundations of pylons.
- Do NOT dump spoil underneath or close to the cables as this reduces the height /clearance
- Do NOT carry ladders, ranging rods, scaffolding poles close to or underneath the cables

Underground Services

- Check services plans before starting
- Use cable detecting equipment (CAT Scanner and Genny) for all trenches
- If in doubt hand dig to locate services before using machine

Plant/Machine Driver's Name and Certificate Number: Not applicable

Common Hazards/Risks	Persons At Risk	Current Controls	Action Required
Site Access/travel/Security:	All	Site is a secure courtyard with no public access	Care to be taken when entering or exiting the site. Vehicles are to be parked at an appropriate parking space.
Public Access	GUARD Staff	No public access to courtyard although there is a locked metal gate	Any enquiries from the public will be answered politely and directed to the GUARD office or the client
Hazardous Substances:	All	None known	Care to be taken during hand excavation. If hazardous substances are suspected this will be immediately reported to the client and no further work will take place in this area until advised that it is safe.

Common Hazards/Risks	Persons At Risk	Current Controls	Action Required
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Underground/Overhead Services:	All	There are no known underground services present on the site. The GUARD Archaeologist will use a catscan at each of the test pit locations prior to and during excavation.	If services are uncovered the trench will be extended to avoid them if safe to do so or the trench will be abandoned and safely backfilled following consultation with the client
Manual Handling:	GUARD staff	Sensible manual handling of shovels, buckets and wheelbarrows will be a regular feature of the work.	Site personnel will be reminded of correct manual handling procedures, in particular: not overfilling buckets or barrows; being aware of others working close by while shovelling; bending from the knee and asking for assistance in lifting heavy objects when necessary.
Excavations:	GUARD staff	The condition of trench edges will be monitored to ensure that they are safe and excavation will be limited to 1.2m in depth assuming edges are stable	If trench edges are not stable they will be cut back and either stepped or angled. Excavation below 1.2m will only be undertaken if the trench can be extended and the edges stepped in a safe manner
Work at Heights/Risk of falling (objects or people):	GUARD staff	In this instance the danger is of people or objects falling into a trench where people are working	Trench edges will be kept clear of tools and spoil and will be fenced off with orange mesh fencing
Confined Spaces:	None	Not applicable as the trenches although small will be outside with fresh air and easy access/egress	Trench edges will be monitored to ensure that they are safe to work in.
Hand/Power Tools:	GUARD staff	Only hand tools will be used. Spades, shovels, mattocks, trowels, brushes and hoes will be used as part of the day-to-day work on site by experienced staff. Gloves to be worn.	Site personnel will be instructed/reminded of safe working practices and handling techniques for these tools. Gloves to be replaced when required. Ensure hand tools are maintained in good condition. Tools will be inspected before use.
Fire:	All	Minimum fire risk as working outside. No smoking on site. No flammable material to be kept on site.	N/A
Vehicles/Mechanical Plant/Equipment:	GUARD staff	No vehicles or plant on site	
Common Hazards/Risks	Persons	Current Controls	Action Required

	At Risk		
Environmental Hazards: (eg noise, dust, weather, animals)	GUARD staff	While extreme sun is a possibility, high winds, mist and heavy rain are more likely conditions. Site personnel will be reminded of the necessity of wearing layers of warm, waterproof clothing, keeping hydrated and wearing sun cream. Any signs of hypothermia will be treated according to standard first aid procedures. Foreign bodies in personnel's eyes is also a potential hazard, particularly in windy conditions.	Use GUARD vehicle for shelter during extremely bad weather. Eye wash will be kept close at hand in the event of dust/grit in eyes, and safety goggles will be available to all personnel should conditions require them. The site will be kept tidy to minimise dust etc
Slips/Trips/Falls:	GUARD staff	These are among the most likely risks on site. Personnel will be working on uneven surfaces that may become wet, and slippy. Personnel will be expected to take reasonable care in moving around, entering and exiting the excavation trenches.	Personnel will wear safety boots with ankle support. Any potential obstacles or loose material will be removed or consolidated wherever possible.
Electricity:	All	Not applicable	N/A
Lone Working:	GUARD staff		There will be no lone working on the project.

Assessed by (Field Director) Alan Hunter Blair	Date: 10/02/14
Checked by (H&S Manager)Bob Will	Date: 10/02/14
This Risk Assessment form has been developed by GUARD Archaeology Ltd to ensure safe working conditions on site	

I, the undersigned, hereby declare that I have received a health and safety induction in advance of beginning work on this archaeological project, and that I have read and understood the Risk Assessment/project safety plan.

To be signed by ALL field staff and a copy returned to the GUARD Archaeology Ltd office

Name (Print)	Name (Sign)	Date
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Staff CV's

CURRICULUM VITAE

Name Bob Will MA (Hons) FSA Scot MIFA

Job Title Senior Project Manager

Qualifications

University of Glasgow 1982-1986 MA (Hons) Archaeology and Medieval History
 Member of the Institute for Archaeologists
 Fellow of the Society of Antiquaries of Scotland
 Member of the Medieval Pottery Research Group (Treasurer 1997-2002)
 NEBOSH NGC (credit) June 2010

Profile

Bob is GUARD Archaeology Ltd's Senior Project Manager, responsible for the management of projects from fieldwork through to publication. Bob has over 25 years experience working on and leading a wide range of rural and urban archaeological projects in Scotland, UK and the Middle East. He has in this time acquired extensive experience of all aspects of archaeological fieldwork and post-excavation procedures, including directing and managing a number of community or volunteer based projects and writing numerous reports for a variety of archaeological journals, monographs and magazines. His main areas of specialism comprise Medieval and Post-medieval Pottery, and Medieval archaeology. He has worked on a number of projects at military sites and barracks including the recent survey of WW1 training trenches at Dreghorn Barracks in Edinburgh, recording a WW2 Prisoner of War Camp outside Glasgow as well as excavations at Fort George, Fort Charlotte, Edinburgh Castle and Stirling Castle. Several of these projects were undertaken in collaboration with the Centre for Battlefield Archaeology at the University of Glasgow. In addition Bob has an extensive knowledge of urban archaeology having directed and worked on projects in Edinburgh, Glasgow, Aberdeen and Stirling.

Bob has and continues to be involved in a number of community projects including Paisley Abbey Drain, Iona Housing Partnership and Kilmun Collegiate Church and between 1999 and 2006 he managed and directed the NTS archaeology volunteer research programme on St Kilda.

Between 2003 and 2012 Bob taught the medieval and artefacts sections of the Certificate of Field Archaeology course run by the Department of Adult and Continuing Education at the University of Glasgow. In addition Bob is responsible for health and safety on all GUARD Archaeology Ltd projects and has certificates in First Aid at Work and is CSCS accredited.

Examples of Project Experience

Supervisor at the excavations at Edinburgh Castle 1988 -91 (Driscoll & Yeoman 1997)

Director of the excavations at Blackfriars Street, Edinburgh (2005)

Project Manager for the 12 month fieldwork programme at the Carrick, Midross Loch Lomond (2004- 05)

Project Manager of the Edinburgh tram network advance archaeological works (February 2008 – ongoing)

Director of Survey of WW1 practise trenches at Dreghorn barracks, February 2013

Project manager of survey of WW2 Prisoner of War camp at Deaconsbank/Patterton, Glasgow (2004)

Supervised/monitored various investigations at Fort George, Inverness (1994)

Excavation of gun platforms at Fort Charlotte, Lerwick, Shetland (1994)

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