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## **Hallin Hall SRE, Hebden Bridge**

Historic Building Recording

ARCUS report 1275.1(1)

April 2009

Client: Mr J D Sugden

**Historic Building Recording**



# Hallin Hall SRE, Hebden Bridge, West Yorkshire

Grid Reference: SD 9866 2938

Historic Building Recording

Assessment Report No. 1275.1(1)

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Location of archive: Calderdale Office of the West Yorkshire Archive Service

Planning reference: 06/00023/CON

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# OASIS SUMMARY FORM

PROJECT DETAILS		
OASIS identifier	arcus2-58217	
Project title	Hallin Hall SRE	
Short description of the project	<p>In March 2009, ARCUS were commissioned to undertake a historic building recording of the Hallin Hall SRE, off Midgehole Road, Hebden Bridge, West Yorkshire (NGR SD 9866 2938). A programme of archaeological recording was required to inform a planning application for redevelopment at the site (planning application number: 06/00023/CON). The programme comprised a site visit, with 35mm and medium format photography, the production of a detailed plan and section, as well as documentary and cartographic research.</p> <p>Hallin Hall was a water treatment works located to the north of Hebden Bridge northeast of Midgehole Road. The water filter house was a single storey stone built structure at a northeast-southwest alignment. Immediately to the south was a subterranean reservoir approximately 3.66m (12') deep. Located a small distance down the hill to the southwest of the reservoir were two open shuttered concrete settling tanks.</p> <p>The water works was opened in 1894 drawing water off of the Halifax Corporation 27" main from Widdup Reservoir. Water was conveyed to the filter house where originally there were three sand filters that were replaced by five pressurised filtration tanks c1950. The works was decommissioned in 1988.</p>	
Project dates	16-03-2009	
Previous/future work	None/unknown	
Monument type and period	Waterworks, 1894	
Significant finds (artefact type and period)	None	
PROJECT LOCATION		
County/Parish	West Yorkshire	
Site address	Off Midgehole Road, Hebden Bridge	
Site co-ordinates	NGR: SD 9866 2938	
Site area	0.5ha	
Height OD	250m – 240m AOD	
PROJECT CREATORS		
Organisation	ARCUS	
Project brief originator	WYAAS	
Project design originator	ARCUS	
Project supervisor	L. Dawson	
Project manager	O. Jessop	
Sponsor or funding body	Developer	
PROJECT ARCHIVES		
Archive Type	Location/Accession no.	Content (e.g. pottery, metalwork, etc)
Physical	N.A.	N.A.
Paper	West Yorkshire Archive Service: Calderdale	Report, fieldwork, photographic contacts
	West Yorkshire Archaeology Advisory Service	Report, photographic archive
Digital	West Yorkshire HER	pdf copy of report
BIBLIOGRAPHY		
Title	Historic Building Recording of Hallin Hall SRE, Hebden Bridge	
Report no	1275.1(1)	
Author	James Thomson	
Date	March 2009	

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## NON-TECHNICAL SUMMARY

*In March 2009, ARCUS were commissioned to undertake an historic building recording survey of the former Hallin Hall SRE, off Midgehole Road, Hebden Bridge, West Yorkshire (NGR SD 9866 2938). A programme of archaeological recording was required to fulfil a planning condition for redevelopment of the site (planning application number: 06/00023/CON). The programme comprised a site visit, with 35mm and medium format photography, the production of measured plans and a section, as well as documentary and cartographic research.*

*Hallin Hall was a water treatment works located to the north of Hebden Bridge northeast of Midgehole Road. The water filter house was a single storey stone built structure at a northeast-southwest alignment. Immediately to the south was a subterranean reservoir approximately 3.66m (12') deep. Located a small distance down the hill to the southwest of the reservoir were two open shuttered concrete settling tanks.*

*The water works was opened in 1894 drawing water off of the Halifax Corporation 27" main from Widdup Reservoir. Water was conveyed to the filter house where originally there were three sand filters that were replaced by five pressurised filtration tanks c1950. Within the filter house were facilities for chemical treatment of the water, including a laboratory. The works was decommissioned in 1988.*

# 1 INTRODUCTION

## 1.1 Scope of Report

This report presents the results of a programme of historic building recording on the site of Hallin Hall SRE, Hebden Bridge. This was required to comply with a condition attached to planning permission (planning application number: 06/00023/CON), and the government's guidance set down in PPG15 and PPG16. The programme included a site visit and rapid archival research, and was prepared in accordance with Institute for Archaeologists guidelines (IfA 2008a and 2008b) and with a specification prepared by West Yorkshire Archaeology Advisory Service (**Appendix 2**).

## 1.2 Site Location

The site (centred on NGR SD 9866 2938), was located north of Hebden Bridge between Hebden Dale and Middle Dean, off Midgehole Road (**Illustration 1**). The 0.5ha site had formally functioned as a Yorkshire Water Authority water treatment works retaining a rectangular single storey stone built filter house and a subterranean reservoir. The site was on a gradient rising steeply towards the northwest (**Illustration 2**). The average height above Ordnance Datum was c.245m.

# 2 AIMS AND METHODOLOGY

## 2.1 Aims and Objectives

The general aim of the report was to produce a permanent record of the former Hallin Hall SRE as a planning requirement of the proposed development of the site. This was achieved through examination of existing archaeological and historical information relating to the building and a detail record of the structures on site at the time of survey.

The specific aims were:

- to assess the form, function and phasing of standing buildings on the site; and
- to identify, where possible, the principal processes undertaken within the buildings.

## 2.2 Methodology

The recording methodology adopted during this survey has been undertaken in accordance with guidelines described in *Understanding Historic Buildings: A Guide to Good Recording Practice* (English Heritage 2006).

Site fieldwork was undertaken on the 16<sup>th</sup> March 2009, and comprised 35mm and medium format photography, written notes and measured plans and section. The photographic record comprised a series of general and detailed shots of the exterior and interior of the building. A complete set of photographic viewpoints is included in this report (**Plates 1-88**), with corresponding photo registers (**Appendix 1**) and viewpoint location drawings (**Illustrations 10-11**). The drawn record comprised plans of the site and building, and vertical section, showing features of historic/archaeological significance (**Illustrations 5-7**). Phasing was recorded where appropriate (**Illustration 8**). Standard RCHME drawing conventions were followed.

Relevant and readily available published and unpublished documentary sources were consulted, including historic maps (**Illustrations 3-4**). Data was collected from the following sources:

- ARCUS archives;
- Calderdale Office of the West Yorkshire Archive Service;
- Halifax Local Studies Archive; and
- Calderdale maps online ([www.calderdale.gov.uk/siteinfo/online-services/maps](http://www.calderdale.gov.uk/siteinfo/online-services/maps))

### 3 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

The J F Myres 1834-1835 map recorded the land prior to the construction of the reservoir to have been a clearing within Shalkleton Wood known as Winter Wells (**Illustration 3**). Further detail on the 1851 and 1890 OS indicate that there were wells and springs in the vicinity of the site, demonstrating the early association of the area with water. The water treatment plant first appears on the 1894, 1908, and 1921 OS as *Reservoir (Hebden Bridge U.D. Council Water Works)*, and later on the 1934 and 1961 OS as *Hollin Hall Reservoir (Hebden Bridge U.D. Council Water Works)* (**Illustrations 3-4**). Its current name of Hallin Hall is a recent corruption of Hollin Hall. The works appeared to have remained the same from 1894-1955, although by 1961 a small extension had been constructed on the northeast elevation of the filter house, two tanks to the southwest of the reservoir, and a cottage outside of the survey area to the northeast (**Illustration 4**).

National concern for the provision of treated drinking water had been a result of advancements in epidemiology in the mid-19<sup>th</sup> century that demonstrated how disease could be conveyed in clear and odourless water. Consequently numerous water treatment works were constructed from the second half of the 19<sup>th</sup> century to treat water for the removal of pathogens responsible for outbreaks of Cholera, Dysentery, and Typhoid. Further concerns for water treatment during the Second World War were demonstrated by archive material held in the Calderdale office of the West Yorkshire Archive Service (WYAS: Calderdale ref: CMT 8 HEB:192) containing correspondence from Whitehall dated 1940 warning water authorities to protect their supplies from accidental and malicious contamination. The then Waterworks Manager, Mr H.L. Bottomley tendered for, and had installed, two Candy Filter Co. Ltd. manual control gravity solution feed dosers type FR1/0 within the filter house at Hollin Hall at a cost of £74.0.0. These dosers were designed to treat water coming into the plant from the water main with chlorine and ammonia, and came with lab equipment for the monitoring of levels.

A short report produced in August 16<sup>th</sup> 1927 detailing costs incurred during the running of Hollin Hall reservoir, held in the WYAS: Calderdale (ref: CMT 17 HEB: 189), yielded significant information on the history and operation of the water works. The records within this report were from the year ending 31 March 1916 to 1926 and detailed an average rise in the quantity of treated water provided to domiciles and industries in the Hebden Bridge area from 208,129,511 litres (54,982,000 gallons) in 1915 to 222,824,479 litres (58,864,000 gallons) in 1926, with a peak of 285,024,861 litres (62,087,000 gallons) in 1922.

The works was opened in December 1894, and by 1927 comprised a meter house, sand shed, sand washer, three sand filters and a storage reservoir. The facility at Hollin Hall served the area around Hebden Bridge, treating water sourced from the Halifax Corporation 27" water main from Widdup Reservoir that passed across the valley just to the north. Water drawn from the main was registered on two 4" water meters (originally one 8" meter) from where it was conveyed through an 8" main to

the sand filters in Hollin Hall. On arrival at the filter house the water was controlled by valves arranged so that all or any one filter could be shut off, or the flow increased or retarded as required. Each filter was 24' 6" square, and filled to a depth of 4' 2" with filtering media, laid as follows:

*Bottom 2'0" of limestone in lumps covered with smaller pieces; 12" of riddled clinker; 4" of river sand; 6" of sand and lime (2 to 1); and 4" of sand, forming top layer.*

The 1908 and 1921 1:2500 OS maps (**Illustration 4**) indicated that the filter house was divided into equal thirds, corroborated by a simple plan drawn by H. L. Bottomley in 1940 (ref: CMT 8 HEB: 192) indicating the westernmost third to have been an open settling tank, presumably for washing sand. The average time a filter would run was recorded as 10 days after which the top half inch of sand was skimmed off and passed through a sand washer, cleansed and reused. Around one ton of sand was treated in the washer in each operation, requiring 10,000 gallons of water, losing approximately 15% of the sand along with the water, and would take two men 35 minutes to complete. Additional sand, obtained from the river at York, cost 14/9d per ton at Hebden Bridge Station.

The filtered water was conveyed from the filters into a storage reservoir. The reservoir measured 170'0" x 80'6" x 12'6" deep, was capable of holding 697,000 gallons equal to 4½ days supply in 1927 or around 3 days by 1940, and was emptied once a year for washing and cleansing. Samples of both filtered and unfiltered water were taken every three months for analysis. A 10" main formed the outlet from the reservoir to which a 4" pipe is connected to the rear of the meter house, and which were laid side by side under the roadway to Hebden Bridge.

The works was decommissioned in 1988.

## **4 DESCRIPTION OF THE STANDING BUILDINGS**

### **4.1 External Surrounding**

Access to the site (**Illustration 5**) was down a track from Midgehole Road to the northeast (**Plate 1**), which continued along the northern elevation of the filter house, bounded to the north by a dry stone retaining wall, and opening out to form a concrete covered yard to the west of the filter house. The water filter house lay at a northeast-southwest alignment to the north of the survey area (**Plate 2**). Immediately to the south was a large concrete subterranean reservoir (**Plate 3**), which occupied the largest portion of the site. Located a small distance down the hill to the southwest of the reservoir were two open shuttered concrete tanks (**Plate 4**) with intake pipes entering from the northeast.

For the purposes of this report Hallin Hall is treated as lying on an east-west alignment.

The site was bounded by a dry stone wall that ran along the hill to the north, south down around the reservoir, and along the southern extent of the property. The circumference was broken to the west where it has been robbed out. The dry stone wall to the north of the site and around the reservoir was of squared grit stone blocks built to courses, with a rubble core, battered profile, and level rounded coping. This wall differed to the retaining wall beside the road between the northern boundary wall and the filter house, and the southwest boundary wall that abutted that around the reservoir. In these instances the dry stone walls were formed from more roughly squared grit stone blocks with buck-and-doe coping (alternating vertical and

horizontal stones). Set into the southwest boundary wall, in proximity to the settling tanks, was a stile (**Plate 5**). A roughly inscribed date stone within the northern retaining wall bore the initials F.C., the date 14.9.81, and a mason's mark of a cross, presumably indicating work on the site in the latter half of 1981 (**Plate 6**). The existence of both walls on the 1894 OS suggests that they were contemporary despite their different constructions.

The yard to the west of the filter house was paved in concrete and bounded to the south by a cast iron balustrade (**Plate 7**). To the northwest corner of the yard, abutting the dry stone walls was a small stone built outbuilding with a flat roof, measuring 1.10 x 1.20m (3'6" x 4') (**Plate 8**). There was a timber panelled door in the southern elevation, and a small blocked window in the eastern elevation. Internally the outbuilding had been recently panelled in wood obscuring evidence for former use, although it is likely to have been a shed or toilet. Beneath the yard to the southeast was a brick built chamber with a RSJ reinforced concrete ceiling abutting the west elevation of the filter house. Entry into the chamber was through a doorway in the retaining wall separating the lower level of the reservoir from the yard. A flue on the southwest corner of the filter house extended into this chamber where there were two openings for a removed exhaust duct (**Plate 9**). A manhole from the yard above acted as a coal chute, corresponding to a pile of coal and ash in the western half of the chamber (**Plate 10**). It is believed that the room housed a generator, possibly a backup power supply to power water pumps in the case of a power cut.

The reservoir measured 54 x 24.5m (177' x 80'6"), with a concrete roof/cover rising 80cm above ground level (**Plate 11**). Spaced at regular intervals across the top of the reservoir were 12 small iron vents with ornate finials (**Plate 12**), for the venting of gases that could build up within the reservoir. Towards the centre of the reservoir were two depth gauges for measuring the level of the water inside the reservoir that were manufactured by The LEA Recorder Co. Ltd., Manchester (**Plate 13-17**). In addition there was also cluster of inspection covers (**Plate 18**) towards the centre of the reservoir, with two manholes possessing fixed ladders to allow access into the interior of the reservoir (**Plate 19**). Internally the reservoir was 3.66m (12') deep, had slopping slides, concrete lining, frequent square concrete columns supporting the cap, and pipes running east west across the base of the reservoir (**Plate 20**). A manhole to the north of the reservoir, against the southern elevation of the filter house, showed that water from the filter house could be diverted to the west away from the reservoir, presumably during cleaning of the filters (**Plate 21**). To the east of the reservoir was a deep shaft with an iron cover and cast iron stench pipe over the location where water was drawn from the reservoir down to a meter house by Midgehole Road where there was a water main into Hebden Bridge (**Plate 22**).

Located west of the reservoir, down the hill, were two open shuttered concrete tanks (**Plate 23-24**). On the eastern side of each tank was a cast iron inlet pipe (**Plates 25-26**), ladder, and a modern plastic stench pipe (**Plate 27**). To the southern side of the tanks was a concrete inspection shaft with iron cover (**Plate 28**). Between the two concrete tanks and the reservoir was a concrete structure, probably a water tank, of unknown function (**Plate 29**). Situated to the south of the concrete tanks was a depression was a large rectilinear earthwork feature of unknown function (**Plate 30**).

## **4.2 Building Descriptions**

### **4.2.1 Exterior of filter house**

The water treatment works was a stone clad single storey rectangular structure, measuring 24.2 x 8.9 (79'6" x 29'), with a flat roof surrounded by a parapet (**Plate 31**)



(**Illustration 6-7**). The stone work consisted of narrow squared roughly tooled stone set to courses with occasional large blocks spanning two courses. A string course ran unbroken around the entire building above first storey level. The string course was squared with a straight channel along the centre of the face. An offshoot from the eastern elevation, measuring 6.30 x 4.60m (21'6" x 15'), was a later extension built in a similar style to the rest of the building which maintained the stringcourse but was built solely of narrow stones. The western eight meters of the main structure was built of a slightly differently tooled stone, with a lighter mortar, indicating it had been added/rebuilt at some point. This was corroborated within the reverse of the parapet where there was a straight joint within the brickwork.

The north elevation of the filter house faced onto the track way that ran from Midgehole Road (**Plates 32-34**). Located just east of centre along the elevation was a timber panelled door within a protruding stone architrave (**Plates 35-36**). A further entrance in the northern elevation of the eastern extension, with a timber door, also faced onto the track (**Plates 37-38**). Situated between these doors were two small windows at ground floor level, with stone lintel.

Extending from the east elevation was a later offshoot extension running adjacent to the track, with a wide rectangular timber framed window with chamfered stone sill and lintel in its southern elevation (**Plate 39**). Within the southern half of the original elevation, still visible from the exterior, was a wide rectangular window with two stone mullions, a stone lintel, and a chamfered stone sill (**Plate 40**). Running down this elevation from the track to the reservoir was a footpath, with stone steps along its southern extent (**Plate 41**).

The southern elevation had few features beside two windows towards the western end of the elevation (**Plates 42-43**) and a truncated pipe in the centre (**Plate 44**). Abutting the bottom of the wall was a stone wall built of a rougher stone with level coping.

The west elevation faced onto a concrete paved yard (**Plate 45**). On the southern end of the elevation was a large chimney stack matching the architectural style of the rest of the structure, to the northern end there was a window with stone lintel and chamfered stone sill, and between them there was a double timber door with sandstone jambs and lintel with prominent imitation voussoir. To the north of the window was a cast iron downpipe with a hopper ornamented with a rose emblem (**Plate 46**).

#### 4.2.2 Interior of filter house

The interior of the filter house was divided into four rooms numbered 1-4 from east to west. The building was partially built into the bank so that on the north side internal floors were below ground level, except for the 1960s east extension that was built at external north ground level.

Room 1 was a rectangular extension at the east of end of the original building, measuring 5.95 x 3.7m (19'6" x 12') (**Plates 47-48**). The internal walls consisted of brick to the north, south and east and the stone facing of the former eastern elevation of the filter house to the west. A door and window had been inserted within the western wall (**Plate 47**), divided by a brick pier, and replacing an original window that had been similar to that in the eastern wall of room 3, for which a rubbed brick lintel was still visible above the inserted openings. Fixed to either jamb of the inserted door were two recent (c1980s) perspex signs indicating that access was at the bequest of Yorkshire Water Authority (**Plate 49**), and detailing safety procedures in the event of leakages (**Plate 50**). Within the southern wall was a timber framed

window with concrete lintel and sill divided horizontally into three timber casements (**Plate 51**). The casements were hinged to open outward and secured with iron monkey-tail catches. Steel security bars had been inserted on the inside of the window. There were also small high level vents within the north and east walls. The walls were painted white with blue flecks. The concrete floor was elevated compared to the original building where the rooms were built into the slope of the hill rather than on it, as in room 1. Within the floor was a c30cm deep floor duct along the northern edge of the room with recesses along each side to support a cast iron cover, of which two sections remained to the west (**Plate 52**). Within the duct was a 0.20m (8") cast iron water pipe with bolted flanges, representing the inlet pipe to the filter house from the meter house to the northeast. The ceiling was of shuttered concrete.

Room 2 was within the northeast corner of the original filter house building, measuring 5.50 x 3.95m (18' x 13') (**Plate 53-55**). The walls of the room were brick, thickening by an extra course within the lower 0.91m (3') along the northern and eastern walls. There were two small timber framed two paned fixed windows in the northern wall (**Plate 56**), possessing brick sills and arched brick lintels, and a timber battened door in the southern wall. In the eastern wall the original rubbed brick arch was visible above the later opening (**Plate 57**). A scar in the paintwork adjacent to the door on the southern wall indicated that there had most likely been a cabinet against it (**Plate 58**). The upper walls were painted white with blue flecks, whereas the lower projecting wall was plastered and painted off-white. Due to the elevated level of room 1 a metal staircase and concrete platform supported on a brick pier had been inserted within the northeast corner of room 2 (**Plate 55**). The staircase also provided access to a timber gantry running along the north wall and across the centre of the room supported on a metal frame set into the walls (**Plates 53-54**). Signs and switches on the west and south walls at gantry level indicated that there had been two chemical tanks in the room with electric water heaters (**Plates 59-60**). Within the concrete floor was a duct running north-south beneath the gantry (**Plate 61**) with recessed edges to take a cover, aligned with a valve in the 0.20m (8") cast iron water pipe that continued along the north wall, from room 1, supported on a brick pier (**Plate 62**). The ducting continued beneath the southern wall into room 3. The ceiling was of shuttered reinforced concrete, with a reinforced concrete joist crossing the room from north to south, and a glass block skylight to the west.

Room 3 was situated in the southeast corner of the filter house, measuring 5.50 x 3.05m (18' x 10'). The walls of the room were brick, thickened by an extra course within the lower 0.91m (3') along the southern and eastern walls. There were identical timber battened doors in the northern and western walls with soldier lintels of bricks on end. The western door was preceded by a flight of three concrete steps with a cast iron banister, rising to the slightly higher floor level in room 4 (**Plate 63**). Within the eastern wall was a high level iron framed multi-paned window with two stone mullions, upper inward opening casements in the north and south lights, rubbed brick lintel, and brick sill (**Plate 64**). An electrical switchboard and four cut-off switches were located to the north of the doorway in the western wall (**Plates 65-66**), and junction boxes and switches beneath the window in the eastern wall (**Plate 64**). Located adjacent to the north wall was a rectangular raised tiled brick machine base with associated floor duct to the north of it that had possibly once supported water testing equipment (**Plate 67**). The floor duct continued beneath the north wall into room 2, and beneath the west wall into room 4. Situated against the southern wall in the eastern corner were two timber cupboards (**Plates 68-69**) that were associated with a number of glass phials. The walls were painted white with blue specks in the upper half, and the lower 0.91m (3') was plastered and painted off-

white. The ceiling was of reinforced concrete with a reinforced concrete joist continuing across the building from room 2.

Room 4 was within the western two-thirds of the filter house, measuring 17.80 x 7.10m (58'4" x 23'6") (**Plates 70-72**). The walls were of brick, thickening by an extra course of white glazed brick within the lower 0.91m (3') of all walls. Above the glazed brick on the north and south elevations were five brick piers supporting reinforced concrete joists. The central piers on each wall were thicker and wider than the others, protruding into the room, with the projecting glazed brick dado continuing around. These piers mark the position of the former western wall of the filter house as illustrated by H. L. Bottomley in 1940 in the site plan held in WYAS: Calderdale (ref: CMT 8 HEB: 192). Beyond this point there had originally been a settling tank, which room 4 was evidently expanded into incorporating some original material probably c1950. Located in the east end of the north wall was a timber battened door at external ground level height preceded by a flight of concrete steps along the east wall with a cast iron banister identical in design to that within room 3 (**Plates 73-74**), as well as a metal light switch beside the door (**Plate 75**). The 8" cast iron pipe from rooms 1 and 2 passed beneath the concrete steps, and although it had been truncated, two brick piers suggest there had been a junction that turned ninety degrees toward the south. In the south end of the east wall was a timber battened door into room 3, with two concrete machine bases situated to the north of the door that were associated with two electrical boxes and a pressure gauge (**Plate 76**). Two chamfered timber framed windows were situated in the western half of the southern wall with stone lintels and brick jambs (**Plate 77**), and a truncated section of iron pipe to the exterior within the eastern half of the southern wall. In addition against the southern wall were a glazed brick floor basin with two associated hydraulic pressure gauges (**Plates 78-79**), and a raised glazed tiled concrete machine base with associated water and gas pressure gauge (**Plate 80**). Within the western wall was a timber double taking-in door at external ground level with a RSJ beam for a hoist centred above (**Plate 81**), and a window to the north of it in the west wall with a modern replacement frame, stone lintel, and brick sill.

The floor of room 4 was laid in brick with concrete over, and cut by numerous interconnected ducts shaped on the upper edges to take covers. There were two main ducts within the floor; one circumventing the room along the north and west walls and exiting through the southern wall; and another running just south of centre across the room (**Plate 82**) turning to the south alongside the first duct and with five short branches projecting at even intervals to the north. Located around each of these branches were four square concrete pads indicating plant had been positioned above them (**Plate 83**). In addition there were square scars in the floor to the east of each branch duct indicating additional associated structures, possibly short brick piers supporting elements of the plant. A further narrow branch duct from the southern main duct extended to the south where there had been a stone base set over it with two gas pressure column gauges in grey plastic cabinets (**Plates 84-85**). Above where the two main ducts exited beneath the southern wall was a wooden board that had previously taken a gauge (**Plate 86**). The ceiling of room 4 was of shuttered reinforced concrete with a cast iron framed hipped lantern skylight with reinforced glass above the eastern half of the room (**Plate 87**). In addition there were a number of additional light fittings including a halogen strip light and a lamp with metal shade (**Plate 88**).

## 5 CONCLUSIONS

### 5.1 Functional Interpretation

Despite alterations made within the filter house, the overall layout of the water works had changed little during its operation. The reservoir had never been enlarged, and the direction water flowed into and out of the system remained the same. However changes to the way in which the system was cleaned were made, probably at the same time the filter house was extended in the 1950s. In the redesigned system, water from the filtration tanks and reservoir was directed to the two shuttered concrete settling tanks in the southwest of the site where material loosed in the cleaning processes could be separated from the waste water. Prior to this the filters had been emptied into a settling tank that had occupied the western third of the present filter house, whereas the reservoir appeared to have simply been emptied directly into surface water.

Changes to the main internal structure of the filter house appeared to have been made besides the addition of the eastern extension (Room 1), which was most likely used as an office, and the extension of room 4 to the west (**Illustration 8**). Both additions to the filter house are thought to have occurred in the latter half of the 21<sup>st</sup> century.

From the surviving evidence it is likely that room 2 contained two tanks for the treating of incoming water with chemicals before filtering. The tanks would have been located against the western wall and could have been serviced/operated from the timber gantry lit through the skylight above. Historical records suggest that sterilisation was through a combination of chlorine compounds and ammonia. The extent to which this practice continued in the years before the works was decommissioned is unknown, although the chemical plant had not been removed or extended. Chemical treatment appears not to have been undertaken on a large scale at Hallin Hall filter house before c1940, indicating that the contamination of water at the source in Widdup Reservoir was not believed to be a problem before that date.

Room 3 had likely functioned as a lab, with cabinets for the storage of chemicals, and machinery for testing water before and after filtration.

Room 4 housed 5 pressurised filtration tanks. Chemically treated water entered the room through the 0.20m (8") pipe in the NE corner, from where it could be directed straight out to the settling tanks or through all or any one of the filtration tanks. Pressurised tanks operated at a greater rate than earlier filters, forcing the water through layers of sand and gravel. The floor within room 4 was of one phase throughout the room, and consequently is likely to date to the period in which the pressurised filters were installed, c.1950. No evidence for the layout of the original tanks was observed.

The alterations made during the expansion and updating of the water works make it difficult to infer the original arrangement of filtration tanks in the building's first phase of use. It is however likely that the original system would have used the structure in a similar way, with three slow sand filtration tanks in room 4, a lab/office in room 3, and chemical treatment plant in room 2.

### 5.2 Discussion

The archaeological survey of the decommissioned Hallin Hall waterworks was of value in contributing to our understanding of the construction and operation of water filtration works in the 19<sup>th</sup> and 20<sup>th</sup> centuries. Archive evidence for the installation of a chlorine plant during the Second World War in Hallin Hall has not been evidenced

elsewhere, but illustrated that such installations must have been common place in waterworks at that time. Despite the absence of evidence for the original layout of the works, significant infrastructure remained to enable a reconstruction of the final layout of plant before decommission (**Illustration 9**).

Comparison with contemporary filtration houses within West Yorkshire such as those at White Well reservoir in Ilkley (Barnes and Jessop 2008a), Gilstead reservoir in Eldwick (Jessop 2003b) and Blackmoorfoot reservoir in Huddersfield (Jessop 2003a, Barnes and Jessop 2008b), is essential for putting Hallin Hall into context. Externally the filter house, although exhibiting some architectural style, was more modestly constructed than the more grandiose structures of Ilkley and Blackmoorfoot. Internally Hallin Hall was functionally appointed with glazed brick dado, painted brick walls, and concrete ceiling rather than the tongue and groove panelling in other filter houses. Hallin Hall also appeared to have operated on a smaller scale: running five tanks rather than the six in Ilkley or the 20 in the North Filter House at Blackmoorfoot. Internally water treatment appears to have been simpler, with no evidence for the addition of alum or lime (to act as coagulant and softener respectively) prior to filtration. However it should be noted that the exact function of the chemical plant in Hallin Hall post 1945 is not known and may have been converted to other treatment methods.

## **6 ARCHIVE**

The project archive will be deposited with WYAS: Calderdale. The archive will be prepared by ARCUS staff in accordance with the requirements specified in Management of Research Projects in the Historic Environment (English Heritage 2006) and with IfA guidelines (2007). In addition, copies of this report will be deposited with Sheffield SMR, circulated to the client, and retained in the offices of ARCUS.

## **7 ACKNOWLEDGEMENTS**

The author would like to thank Mr J D Sugden for arranging and facilitating access to the property, the staff at Halifax library for assistance in using their services, and Richard Deeley of Yorkshire Water for assistance in searching for historic information.

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### **Primary documents**

- CMT 8 HEB: 192 Bundle of correspondence, drawings, plans and brochures relating to the installation and operation of emergency sterilisation procedures during war time.
- CMT 17 HEB: 189 Bundle of clerks records relating to operation costs of Hollin Hall.

### **Historic maps consulted**

- 1834-1835 J.F. Myres
- 1851 OS (available [www.calderdale.gov.uk/siteinfo/online-services/maps](http://www.calderdale.gov.uk/siteinfo/online-services/maps))
- 1890 OS sheet CCXV, 1:10560
- 1894 OS (available [www.calderdale.gov.uk/siteinfo/online-services/maps](http://www.calderdale.gov.uk/siteinfo/online-services/maps))
- 1908 OS sheet CCXV, 1:2500
- 1921 OS sheet CCXV.13, 1:2500
- 1934 OS (available [www.calderdale.gov.uk/siteinfo/online-services/maps](http://www.calderdale.gov.uk/siteinfo/online-services/maps))
- 1955 OS sheet SD 92 NE, 1:10560
- 1961 OS sheet SD 9829, 1:2500

## 9 APPENDIX 1: PHOTOGRAPHIC REGISTERS

Film 1					
Format	35mm	Type	B/W	Photographer	O. Jessop
Film & frame	Description	Direction	Date	Plate	
1.1	Vertical wall joint southwest of balustrade to filter house	NW	16.03.09	-	
1.2	Detail in small generator room southwest of filter house	SW	16.03.09	as 10	
1.3	Detail in small generator room southwest of filter house	SW	16.03.09	as 10	
1.4	Detail of circular vent over roof of reservoir	E	16.03.09	18	
1.5	Detail of circular vent over roof of reservoir	E	16.03.09	18	
1.6	Detail of access ladder down into reservoir	N	16.03.09	19	
1.7	Detail of access ladder down into reservoir	N	16.03.09	19	
1.8	Detail of water depth dial over reservoir	S	16.03.09	14	
1.9	Detail of water depth dial over reservoir	S	16.03.09	14	
1.10	Detail of water depth dial over reservoir	S	16.03.09	16	
1.11	Detail of water depth dial over reservoir	S	16.03.09	16	
1.12	Detail of pipe in south wall of filter house	NW	16.03.09	44	
1.13	Detail of pipe in south wall of filter house	NW	16.03.09	44	
1.14	Detail of steps in southeast corner of filter house	N	16.03.09	42	
1.15	Detail of steps in southeast corner of filter house	N	16.03.09	42	
1.16	Detail of roof vent over reservoir	NW	16.03.09	12	
1.17	Detail of roof vent over reservoir	NW	16.03.09	12	
1.18	Detail of cast iron access cover east of reservoir	N	16.03.09	21	
1.19	Detail of cast iron access cover east of reservoir	N	16.03.09	21	
1.20	Detail of style in boundary wall southeast of tanks	SE	16.03.09	5	
1.21	Detail of style in boundary wall southeast of tanks	SE	16.03.09	5	
1.22	Detail of ladder and pipe in south tank	NE	16.03.09	26	
1.23	Detail of ladder and pipe in south tank	NE	16.03.09	26	
1.24	Detail of metal cover west of tanks	N	16.03.09	28	
1.25	Detail of metal cover west of tanks	N	16.03.09	28	
1.26	Detail of concrete tank in west hillside	E	16.03.09	29	
1.27	Detail of concrete tank in west hillside	E	16.03.09	29	
1.28	Detail of cast iron balustrade	S	16.03.09	7	
1.29	Detail of cast iron balustrade	S	16.03.09	7	
1.30	Detail of downpipe and hopper, northeast corner	E	16.03.09	46	
1.31	Detail of downpipe and hopper, northeast corner	E	16.03.09	46	
1.32	Detail of external north elevation and door	S	16.03.09	37	
1.33	Detail of external north elevation and door	S	16.03.09	37	
1.34	General view of entrance	SW	16.03.09	as 3	
1.35	General view of entrance	SW	16.03.09	as 3	
1.36	I.D. shot	-	16.03.09		

Film 2						
Format	400 speed	Type	Medium format	Photographer	S. Jessop	
Film & frame	Description			Direction	Date	Plate
2.1	General view across water tanks and entrance			SE	16.03.09	3
2.2	General view across water tanks and entrance			SE	16.03.09	3
2.3	View along north elevation and entrance			SW	16.03.09	1
2.4	View along north elevation and entrance			SW	16.03.09	1
2.5	Northeast corner and view along north elevation			SW	16.03.09	34
2.6	Northeast corner and view along north elevation			SW	16.03.09	34
2.7	Detail of window in southeast corner			W	16.03.09	40
2.8	Detail of window in southeast corner			W	16.03.09	40
2.9	Detail of northeast doorway on north elevation			S	16.03.09	38
2.10	Detail of northeast doorway on north elevation			S	16.03.09	38

Film 3						
Format	400 speed	Type	Medium format	Photographer	S. Jessop	
Film & frame	Description			Direction	Date	Plate
3.1	Detail of main door in north elevation			SE	16.03.09	36
3.2	Detail of main door in north elevation			SE	16.03.09	36
3.3	General view along north elevation			NE	16.03.09	32
3.4	General view along north elevation			NE	16.03.09	32
3.5	General view of small outbuilding, northwest corner of yard			NW	16.03.09	8
3.6	General view of small outbuilding, northwest corner of yard			NW	16.03.09	8
3.7	Detail of west elevation			E	16.03.09	45
3.8	Detail of west elevation			E	16.03.09	45
3.9	General view looking up to filter house and tank			NE	16.03.09	31
3.10	General view looking up to filter house and tank			NE	16.03.09	31



**Film 4**

Format	400 speed	Type	Medium format	Photographer	S. Jessop	
Film & frame	Description			Direction	Date	Plate
4.1	General view over tanks in hillside southwest of filter house			S	16.03.09	23
4.2	General view over tanks in hillside southwest of filter house			S	16.03.09	23
4.3	General view over tanks in hillside southwest of filter house			W	16.03.09	24
4.4	General view over tanks in hillside southwest of filter house			W	16.03.09	24
4.5	General view over tanks in hillside southwest of filter house			N	16.03.09	27
4.6	General view over tanks in hillside southwest of filter house			N	16.03.09	27
4.7	Detail of ladder and pipe in north tank			NE	16.03.09	25
4.8	Detail of ladder and pipe in north tank			NE	16.03.09	25
4.9	General view across rectangular pond in southwest of tanks			N	16.03.09	30
4.10	General view across rectangular pond in southwest of tanks			N	16.03.09	30

**Film 5**

Format	400 speed	Type	Medium format	Photographer	S. Jessop	
Film & frame	Description			Direction	Date	Plate
5.1	General view across main reservoir and filter house			NE	16.03.09	43
5.2	General view across main reservoir and filter house			NE	16.03.09	43
5.3	General view across main reservoir and filter house			NW	16.03.09	42
5.4	General view across main reservoir and filter house			NW	16.03.09	42
5.5	Detail of southeast corner of filter house			NW	16.03.09	39
5.6	Detail of southeast corner of filter house			NW	16.03.09	39
5.7	Detail of water gauges on reservoir roof			SE	16.03.09	13
5.8	Detail of water gauges on reservoir roof			SE	16.03.09	13
5.9	Detail of pipe out flow, southwest wall of filter house			NW	16.03.09	21
5.10	Detail of pipe out flow, southwest wall of filter house			NW	16.03.09	21

Film 6						
Format	35mm	Type	B/W	Photographer	O. Jessop	
Film & frame	Description			Direction	Date	Plate
6.1	Detail of floor ducts in room 4			E	16.03.09	82
6.2	Detail of floor ducts in room 4			E	16.03.09	82
6.3	Detail of base, south wall of room 4			S	16.03.09	80
6.4	Detail of base, south wall of room 4			S	16.03.09	80
6.5	Detail of pressure gauges, south wall of room 4			S	16.03.09	84
6.6	Detail of pressure gauges, south wall of room 4			S	16.03.09	84
6.7	Detail of dial/switches, east wall of room 4			E	16.03.09	76
6.8	Detail of dial/switches, east wall of room 4			E	16.03.09	76
6.9	Detail of switches, west wall room 3			SW	16.03.09	65
6.10	Detail of switches, west wall room 3			SW	16.03.09	65
6.11	Detail of concrete footing, room 3			W	16.03.09	67
6.12	Detail of concrete footing, room 3			W	16.03.09	67
6.13	Detail of wooden bench/cupboard, south wall room 3			E	16.03.09	68
6.14	Detail of wooden bench/cupboard, south wall room 3			E	16.03.09	68
6.15	Detail of high level window, room 3			NE	16.03.09	64
6.16	Detail of high level window, room 3			NE	16.03.09	64
6.17	General view of floor ducts, room 2			NE	16.03.09	61
6.18	General view of floor ducts, room 2			NE	16.03.09	61
6.19	Detail of east wall, room 2			SE	16.03.09	58
6.20	Detail of east wall, room 2			SE	16.03.09	58
6.21	Detail of switch and signage, west wall of room 2			W	16.03.09	60
6.22	Detail of switch and signage, west wall of room 2			W	16.03.09	60
6.23	Detail of wooden window frame, south wall room 2			NW	16.03.09	56
6.24	Detail of wooden window frame, south wall room 2			NW	16.03.09	56
6.25	Detail of switch signage, south wall room 2			S	16.03.09	59
6.26	Detail of switch signage, south wall room 2			S	16.03.09	59
6.27	Detail of sign in doorway reveal between rooms 1 and 2			NW	16.03.09	50
6.28	Detail of sign in doorway reveal between rooms 1 and 2			NW	16.03.09	50
6.29	Detail of sign in doorway reveal between rooms 1 and 2			SE	16.03.09	49
6.30	Detail of sign in doorway reveal between rooms 1 and 2			SE	16.03.09	49
6.31	Detail of gulley with main feed pipe			W	16.03.09	52
6.32	Detail of gulley with main feed pipe			W	16.03.09	52
6.33	Detail of south window, room 1			SE	16.03.09	51
6.34	Detail of south window, room 1			SE	16.03.09	51
6.35	Date stone on access road, north retaining wall			N	16.03.09	6
6.36	Date stone on access road, north retaining wall			N	16.03.09	6

Film 7					
Format	400 speed	Type	Medium format	Photographer	S. Jessop
Film & frame	Description	Direction	Date	Plate	
7.1	General view of filter house from hillside	SE	16.03.09	2	
7.2	General view of filter house from hillside	SE	16.03.09	2	
7.3	General view of tanks from hillside	SW	16.03.09	4	
7.4	General view of tanks from hillside	SW	16.03.09	4	
7.5	General view of room 1	W	16.03.09	47	
7.6	General view of room 1	W	16.03.09	47	
7.7	General view of room 1	E	16.03.09	48	
7.8	General view of room 1	E	16.03.09	48	
7.9	General view of room 2	W	16.03.09	53	
7.10	General view of room 2	W	16.03.09	53	

Film 8					
Format	400 speed	Type	Medium format	Photographer	S. Jessop
Film & frame	Description	Direction	Date	Plate	
8.1	General view of upper window between rooms 1 and 2	E	16.03.09	57	
8.2	General view of upper window between rooms 1 and 2	E	16.03.09	57	
8.3	Detail of staircase, ground level room 2	E	16.03.09	55	
8.4	Detail of staircase, ground level room 2	E	16.03.09	55	
8.5	Void	-	16.03.09	-	
8.6	Void	-	16.03.09	-	
8.7	General view of room 3	SW	16.03.09	63	
8.8	General view of room 3	SW	16.03.09	63	
8.9	Void	-	-	-	
8.10	Void	-	-	-	

Film 9						
Format	400 speed	Type	Medium format	Photographer	S. Jessop	
Film & frame	Description			Direction	Date	Plate
9.1	General view of room 4			E	16.03.09	70
9.2	General view of room 4			E	16.03.09	70
9.3	Detail of dials and glazed brick base, south wall of room 4			SE	16.03.09	78
9.4	Detail of dials and glazed brick base, south wall of room 4			SE	16.03.09	78
9.5	Detail of glazed skylight, room 4			NE	16.03.09	87
9.6	Detail of glazed skylight, room 4			NE	16.03.09	87
9.7	Detail of east staircase in room 4			NE	16.03.09	73
9.8	Detail of east staircase in room 4			NE	16.03.09	73
9.9	Detail of double loading doors in west wall of room 4			SW	16.03.09	81
9.10	Detail of double loading doors in west wall of room 4			SW	16.03.09	81

Film 10					
Format	35mm	Type	B/W	Photographer	L. Dawson
Film & frame	Description	Direction	Date	Plate	
10.1	Void	-	-	-	
10.2	Void	-	-	-	
10.3	Void	-	-	-	
10.4	Void	-	-	-	
10.5	Void	-	-	-	
10.6	Void	-	-	-	
10.7	Void	-	-	-	
10.8	Void	-	-	-	
10.9	Void	-	-	-	
10.10	Void	-	-	-	
10.11	Void	-	-	-	
10.12	Void	-	-	-	
10.13	Void	-	-	-	
10.14	Void	-	-	-	
10.15	Void	-	-	-	
10.16	Void	-	-	-	
10.17	Void	-	-	-	
10.18	Void	-	-	-	
10.19	Void	-	-	-	
10.20	Void	-	-	-	
10.21	Void	-	-	-	
10.22	Void	-	-	-	
10.23	Void	-	-	-	
10.24	General view of interior of room 4	W	16.03.09	71	
10.25	General view of interior of room 4	W	16.03.09	71	
10.26	Detail of light switch, north wall of room 4	N	16.03.09	75	
10.27	Detail of light switch, north wall of room 4	N	16.03.09	75	
10.28	Detail of light fitting, room 4	W	16.03.09	88	
10.29	Detail of light fitting, room 4	W	16.03.09	88	
10.30	Detail of pads from removed filter units in floor of room 4	N	16.03.09	83	
10.31	Detail of pads from removed filter units in floor of room 4	N	16.03.09	83	
10.32	Detail of window in south wall of room 4	S	16.03.09	77	
10.33	Detail of window in south wall of room 4	S	16.03.09	77	
10.34	Detail of pipe channels extending beneath south wall of room 4	S	16.03.09	86	
10.35	Detail of pipe channels extending beneath south wall of room 4	S	16.03.09	86	
10.36	I.D. shot	-	16.03.09	-	

Colour slide					
Format	35mm	Type	Colour slide	Photographer	L. Dawson
Slide	Description	Direction	Date	Plate	
1.	Detail of pressure dial on south wall of room 4	S	16.03.09	79	
2.	Detail of pressure dial on south wall of room 4	S	16.03.09	79	
3.	Detail of stairs in northeast corner of room 4	NE	16.03.09	74	
4.	Detail of stairs in northeast corner of room 4	NE	16.03.09	74	
5.	Detail of pressure gauge cabinets in room 4	S	16.03.09	85	
6.	Detail of pressure gauge cabinets in room 4	S	16.03.09	85	
7.	General view of room 4	NW	16.03.09	72	
8.	General view of room 4	NW	16.03.09	72	
9.	Detail of cupboards in room 3	S	16.03.09	69	
10.	Detail of cupboards in room 3	S	16.03.09	69	
11.	Detail of cut-off switches on west wall of room 3	W	16.03.09	66	
12.	Detail of cut-off switches on west wall of room 3	W	16.03.09	66	
13.	Detail of 8" water main against north wall of room 2	NW	16.03.09	62	
14.	Detail of 8" water main against north wall of room 2	NW	16.03.09	62	
15.	General view of room 2	SW	16.03.09	54	
16.	General view of room 2	SW	16.03.09	54	
17.	Detail of maker's plate on depth gauge	E	16.03.09	17	
18.	Detail of maker's plate on depth gauge	E	16.03.09	17	
19.	Detail of depth gauge dial	S	16.03.09	15	
20.	Detail of depth gauge dial	S	16.03.09	15	
21.	General view of reservoir	SE	16.03.09	11	
22.	General view of reservoir	SE	16.03.09	11	
23.	North and west elevations of filter house	SE	16.03.09	33	
24.	North and west elevations of filter house	SE	16.03.09	33	
25.	Detail of main door in north elevation of filter house	S	16.03.09	35	
26.	Detail of main door in north elevation of filter house	S	16.03.09	35	
27.	General view of entrance into water works	W	16.03.09	as 1	
28.	General view of entrance into water works	W	16.03.09	as 1	

## **10 APPENDIX 2: BUILDING RECORDING SPECIFICATION**

## **11 ILLUSTRATIONS**



## 12 PLATES



**Plate 1:** General view down track from Midgehole Road (film 2.03)



**Plate 2:** General view of filter house and reservoir looking southeast (film 7.01)



**Plate 3:** General view of covered reservoir from track (film 2.01)



**Plate 4:** General view of settling tanks to west of reservoir, looking south (film 7.03)



**Plate 5:** General view of stile in southern boundary wall (film 1.21)



**Plate 6:** Detail of date stone and mason's mark in retaining wall north of track (film 6.36)



**Plate 7:** Detail of cast iron balustrade to west of filter house (film 1.28)



**Plate 8:** General view of outhouse to west of filter house (film 3.06)





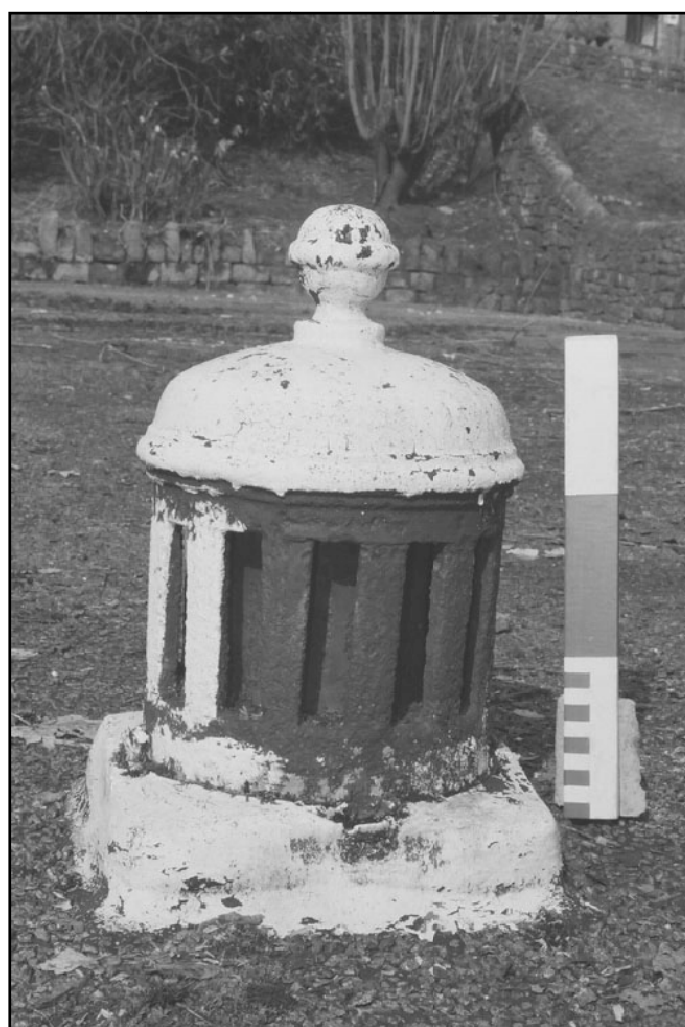
**Plate 9:** Detail of flue in southeast corner of generator chamber beneath yard



**Plate 10:** Detail of coal pile in western half of generator chamber; note manhole above



**Plate 11:** General view across covered reservoir, looking southeast (slide 21)



**Plate 12:** Detail of ornate cast iron vent above reservoir (film 1.16)



**Plate 13:** General view of depth gauges above reservoir, looking southeast (film 5.07)



**Plate 14:** Detail of western depth gauge; note depth registers up to 12ft (film 1.08)





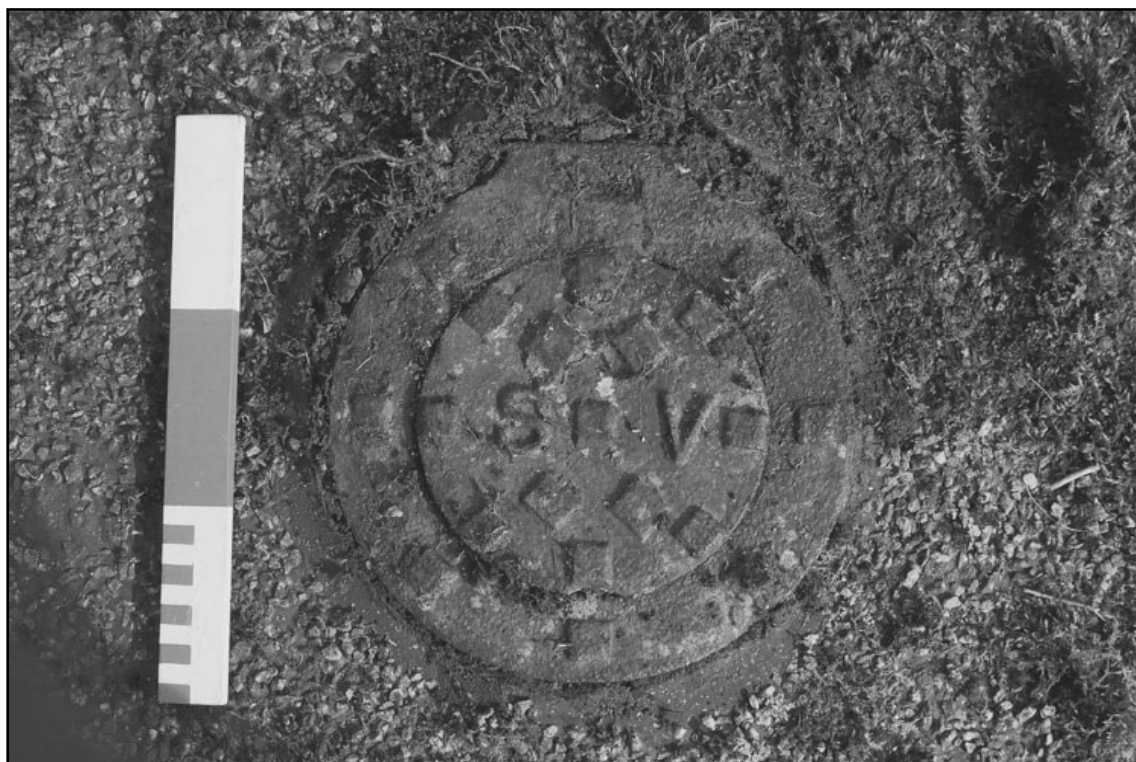
**Plate 15:** Detail of eastern depth gauge (slide 19)



**Plate 16:** General view of eastern depth gauge (film 1.11)



**Plate 17:** Detail of maker's plate on side of eastern gauge (slide 17)



**Plate 18:** Detail of circular inspection cover above reservoir (film 1.04)





**Plate 19:** Detail of manhole with ladder into reservoir (film 1.07)



**Plate 20:** General view into reservoir, looking northeast



**Plate 21:** Detail of wash-out outlet from filter house; note entrance into generator chamber to left (film 5.09)



**Plate 22:** Detail of manhole above reservoir outlet to east (film 1.18)



**Plate 23:** General view of concrete settling tanks, looking southwest (film 4.01)



**Plate 24:** General view of concrete settling tanks, looking west (film 4.03)





**Plate 25:** General view of inlet pipe and ladder on east wall of north tank (film 4.07)



**Plate 26:** Detail of inlet pipe and ladder on east wall of south tank (film 1.23)



**Plate 27:** General view of settling tanks looking north; note pipe in left corner (film 4.05)



**Plate 28:** Detail of manhole to west of settling tanks (film 1.25)



**Plate 29:** Detail of concrete structure northeast of settling tanks (film 1.26)



**Plate 30:** General view of depression to west of settling tanks (film 4.09)





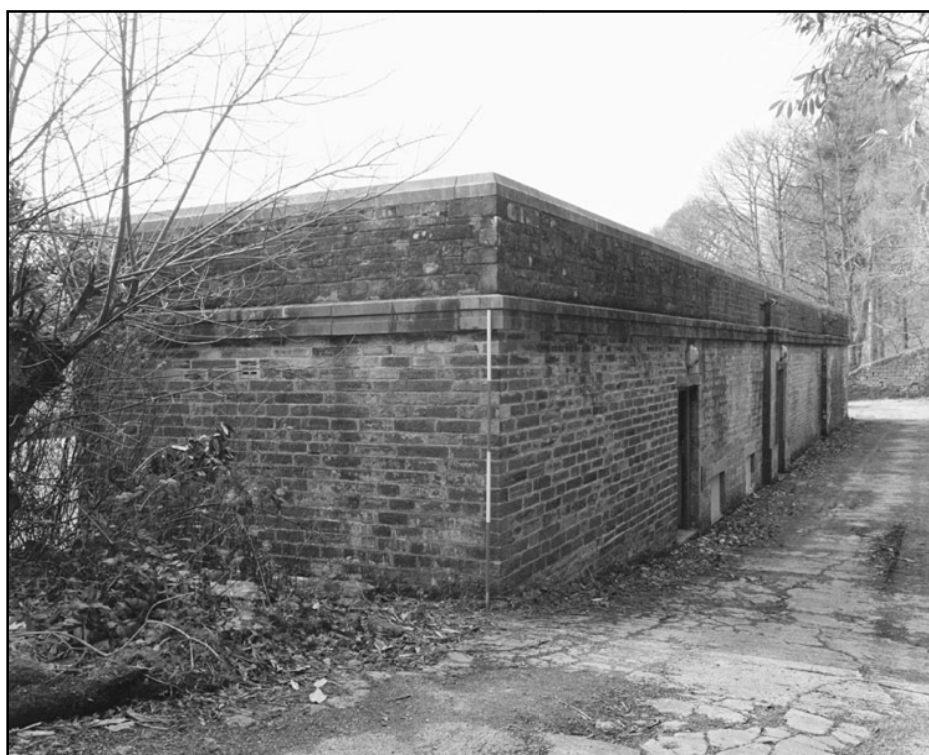
**Plate 31:** General view of filter house to north of reservoir, looking northeast (film 3.09)



**Plate 32:** General view of north and west elevations of filter house; note continuous string course (film 3.03)



**Plate 33:** General view of north and west elevations of filter house (slide 23)



**Plate 34:** General view of north elevation and eastern elevation of extension (film 2.05)





**Plate 35:** Detail of main entrance in north elevation  
(slide 25)



**Plate 36:** Detail of main entrance in north elevation (film 3.02)



**Plate 37:** Detail of door in northern wall of east extension (film 1.32)



**Plate 38:** Detail of doorway in northern wall of east extension (film 2.09)



**Plate 39:** General view of east elevation; note window in south elevation of extension (film 5.05)



**Plate 40:** Detail of window in east elevation of filter house (film 2.07)





**Plate 41:** Detail of stone staircase adjacent to east elevation of filter house (film 1.14)



**Plate 42:** General view of south elevation of filter house (film 5.03)



**Plate 43:** General view of south elevation of filter house (film 5.01)



**Plate 44:** Detail of truncated pipe within south elevation of filter house (film 1.12)



**Plate 45:** Detail of west elevation of filter house (film 3.08)



**Plate 46:** Detail of cast iron hopper on west elevation of filter house (film 1.30)





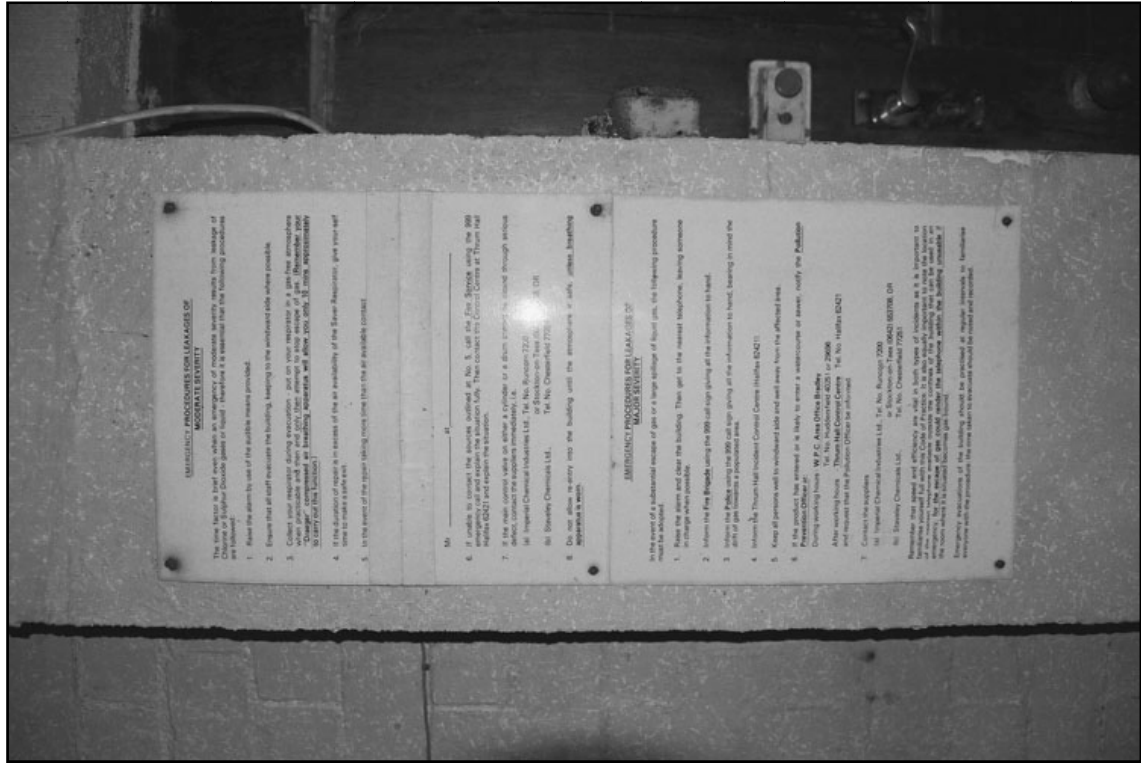
**Plate 47:** General view of room 1 looking west; note inserted doorway in stone faced wall (film 7.06)



**Plate 48:** General view of room 1 looking east (film 7.07)



**Plate 49:** Detail of sign on south jamb of inserted door in room 1 (film 6.29)



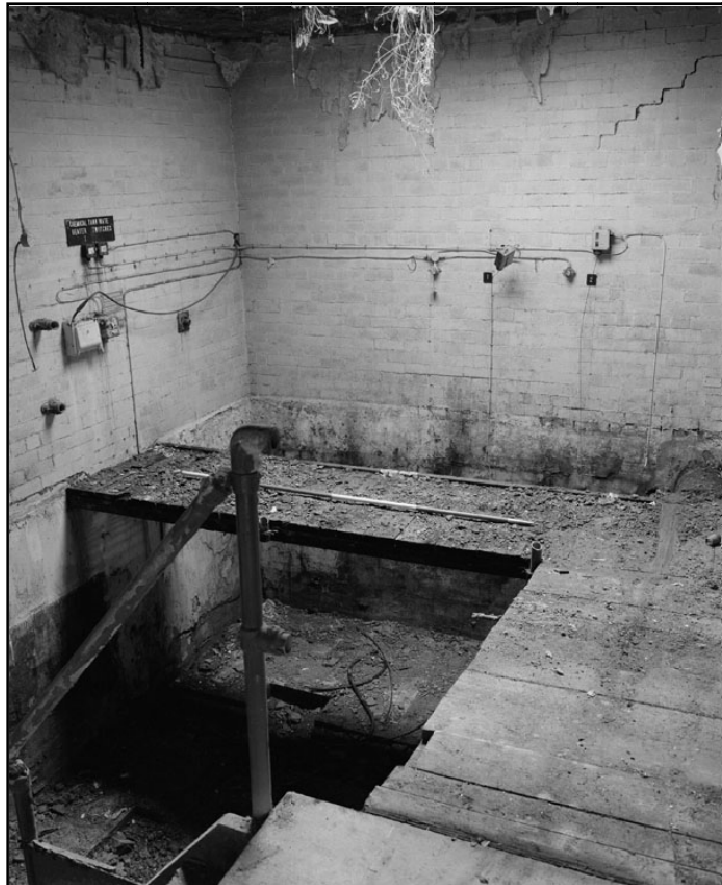
**Plate 50:** Detail of sign on north jamb of inserted door in room 1 (film 6.27)



**Plate 51:** Detail of window in south wall of room 1 (film 6.34)



**Plate 52:** Detail of 8" water main inlet within floor of room 1 (film 6.32)



**Plate 53:** General view of room 2 (film 7.09)



**Plate 54:** General view of room 2 (slide 16)

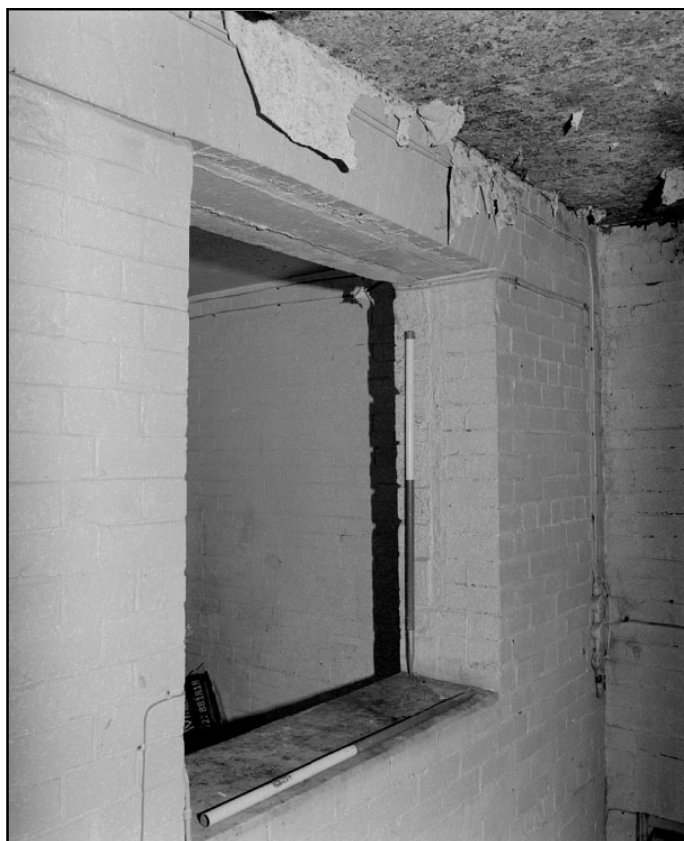




**Plate 55:** General view of room 2; note timber battened door in south wall (film 8.03)



**Plate 56:** Detail of small timber framed window in north wall of room 2 (film 6.24)



**Plate 57:** General view of window in east wall of room 2; note rubbed brick arch above from original larger window (film 8.02)



**Plate 58:** General view of south wall of room 2; note scar from removed cabinet (film 6.20)



**Plate 59:** Detail of chemical tank sign on south wall of room 2 (film 6.26)



**Plate 60:** Detail of numbered switches on west wall of room 2 (film 6.21)



**Plate 61:** Detail of floor ducts within room 2 (film 6.18)



**Plate 62:** Detail of 8" water main in room 2, noting valve (slide 14)

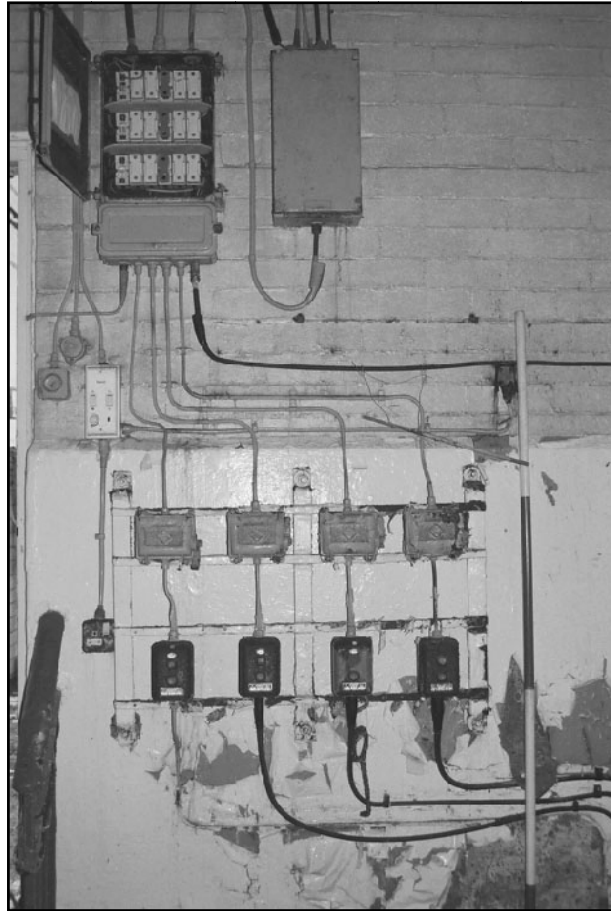




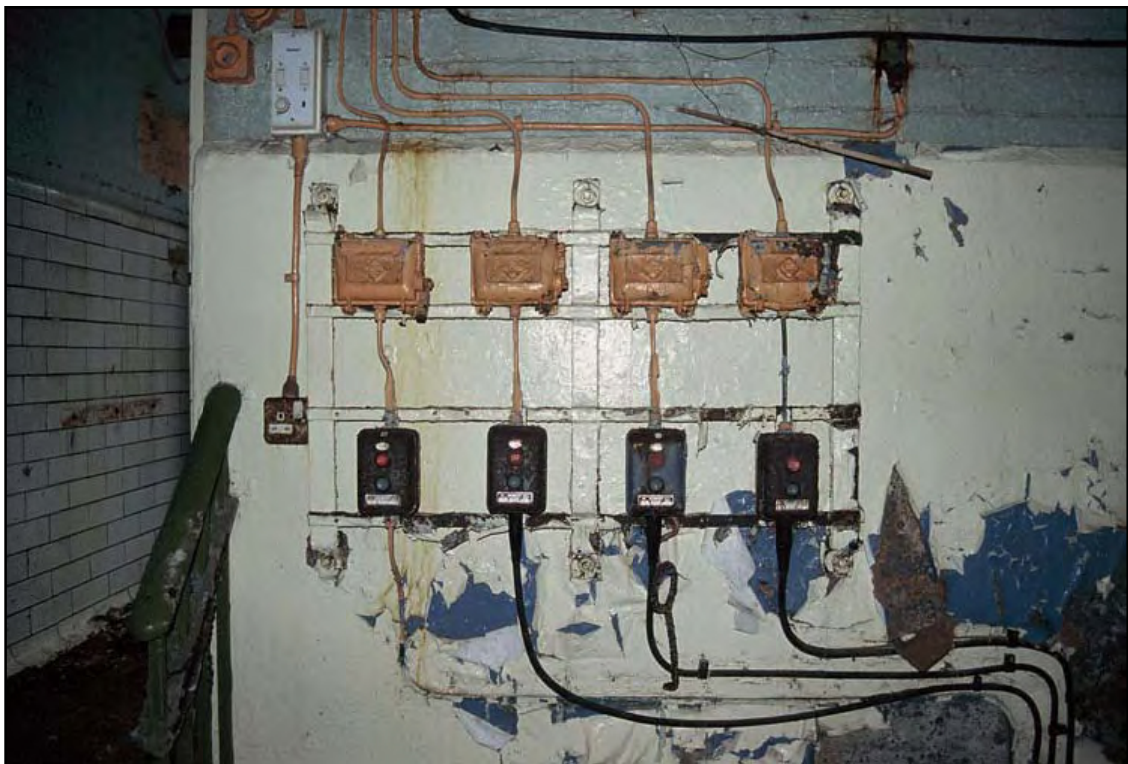
**Plate 63:** General view of door and protruding lower wall in room 3 (film 8.08)



**Plate 64:** Detail of iron framed window and electrical junction boxes on east wall of room 3 (film 6.16)



**Plate 65:** Detail of electrical switches on west wall of room 3 (film 6.09)



**Plate 66:** Detail electrical switches on west wall of room 3; note banister to left (slide 11)



**Plate 67:** Detail of tiled concrete base in northwest corner of room 3 (film 6.11)



**Plate 68:** Detail of cabinets in southeast corner of room 3 (film 6.14)





**Plate 69:** Detail of cabinets in southeast corner of room 3 (slide 9)



**Plate 70:** General view of room 4 looking east (film 9.02)



**Plate 71:** General view of room 4 looking northwest (film 10.24)



**Plate 72:** General view of room 4 looking northwest (slide 7)

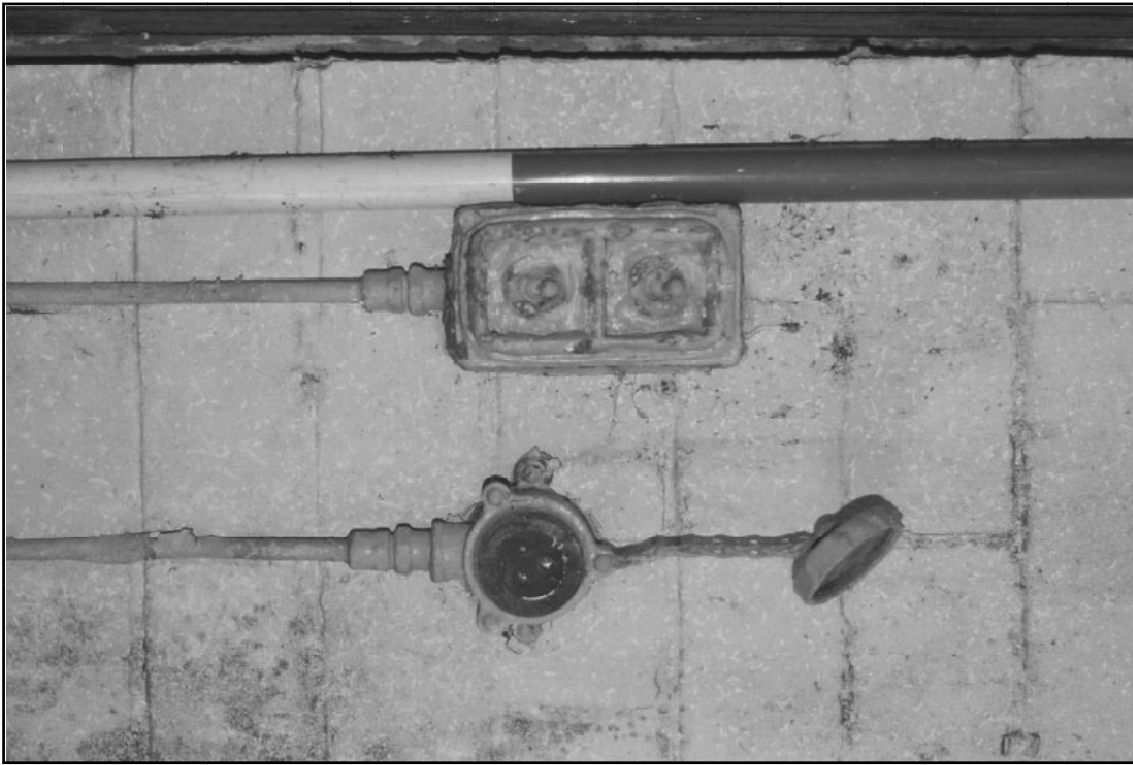




**Plate 73:** General view of staircase in northeast corner of room 4 (film 9.08)



**Plate 74:** General view of staircase in northeast corner of room 4; note truncated 8" water main beneath (slide 3)



**Plate 75:** Detail of metal light switch to west of door in north wall of room 4 (film 10.26)



**Plate 76:** Detail of machine base, dials and switched adjacent to door in east wall of room 4 (film 6.07)



**Plate 77:** Detail of chamfered timber framed window in south wall of room 4 (film 10.32)



**Plate 78:** Detail of glazed brick floor basin against south wall of room 4 (film 9.03)





**Plate 79:** Detail of pressure gauge above glazed basin on south wall of room 4 (slide 1)



**Plate 80:** Detail of tiled concrete machine base against southern wall of room 4 (film 6.03)



**Plate 81:** Detail of taking in door in west wall of room 4 (film 9.10)



**Plate 82:** Detail of southern main floor duct, looking east (film 6.01)



**Plate 83:** Detail of concrete pads around branch duct in room 4 (film 10.31)



**Plate 84:** Detail of pressure gauges (not *in situ*) from southern wall of room 4 (film 6.05)





**Plate 85:** Detail of pressure gauges (not *in situ*) from southern wall of room 4 (slide 5)



**Plate 86:** Detail of ducts and board for gauge against southern wall of room 4 (film 10.34)



**Plate 87:** Detail of reinforced glass lantern skylight above room 4, looking northeast (film 9.05)



**Plate 88:** Detail of metal light shade and fitting within room 4 (film 10.28)

Consultancy  
Planning Advice  
Field Services  
Historic Buildings Analysis  
Parks & Gardens  
Cultural Resource Management  
Material Culture  
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Visualisation & Reconstruction  
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