



Hayle Millpond, Cornwall: archaeological watching brief during repairs to the Scheduled Monument



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Acknowledgements

This study was commissioned by CORMAC Ltd. and was carried out by Cornwall Archaeological Unit, Cornwall Council. The watching brief was undertaken by Martin Andrewes and the mapping and as-completed photography were produced by Antony Angove.

The Project Manager was Adam Sharpe.

The views and recommendations expressed in this report are those of Cornwall Archaeological Unit and are presented in good faith on the basis of professional judgement and on information currently available.

Freedom of Information Act

As Cornwall Council is a public authority it is subject to the terms of the Freedom of Information Act 2000, which came into effect from 1st January 2005.



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Fig 21. Detail of the repair works surrounding the flue opening near the base of the wall. The joints between the blocking bricks have not been repointed, and no stabilisation treatment has been applied to the iron lintel.

Abbreviations

CAU	Cornwall Archaeological Unit
CIfA	Chartered Institute for Archaeologists
CRO	Cornwall Record Office
HE	Historic England
HER	Cornwall and the Isles of Scilly Historic Environment Record
NGR	National Grid Reference
OD	Ordnance Datum – height above mean sea level at Newlyn
OS	Ordnance Survey

1 Summary

Cornwall Archaeological Unit (CAU) undertook an intermittent watching brief based on photographic recording during repairs to a short length of walling forming part of the former Hayle Foundry Hammer Mill complex, this now making up part of the eastern boundary wall of the amenity area called Hayle Millpond Gardens. The site is part of a Scheduled Monument (National No 1204628), and the watching brief was a condition of the Scheduled Monument Consent for the works to remediate wall destabilisation caused by intrusive Buddleia growth. The repairs were undertaken in early January 2019 by CORMAC Ltd, and the final works were completed in July. No new archaeological findings resulted from the work.

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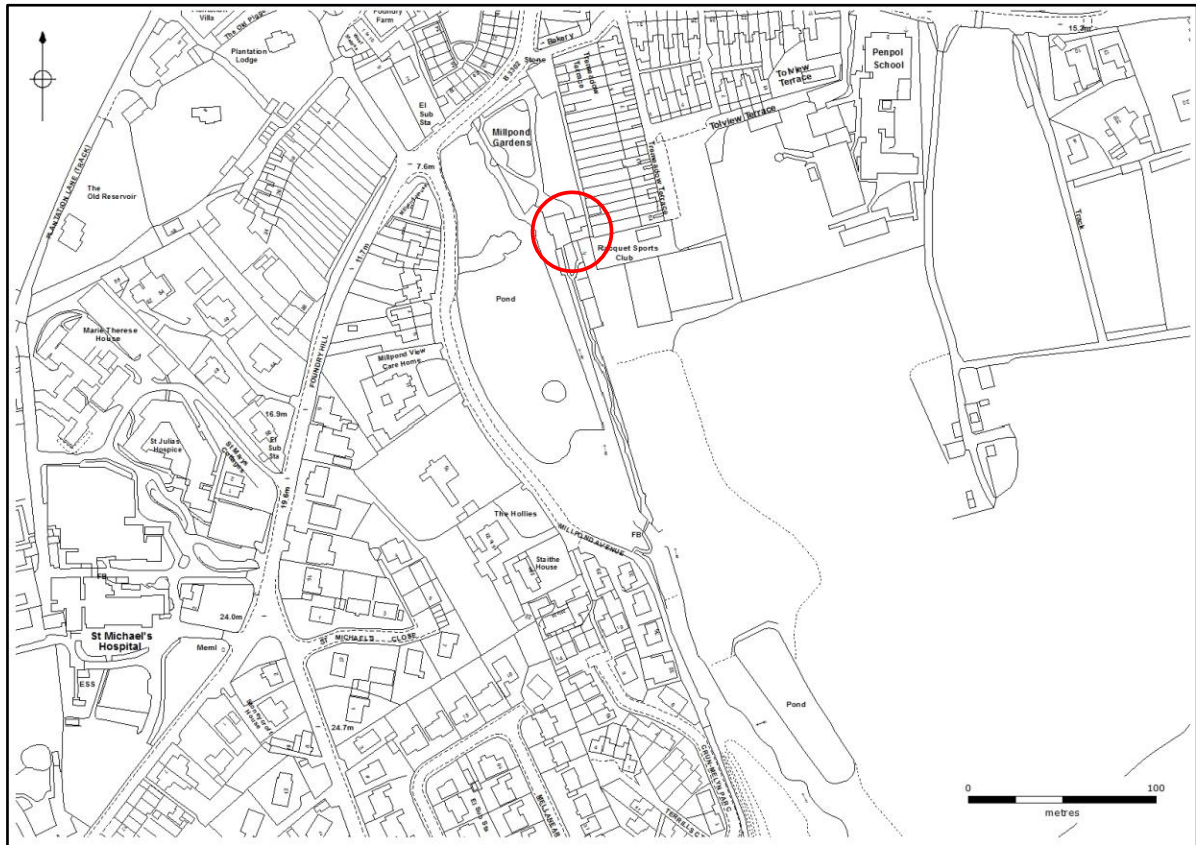


Fig 1. The location of Hayle Millpond showing the location of the works area. © Crown copyright. All rights reserved. Cornwall Council (100049047).

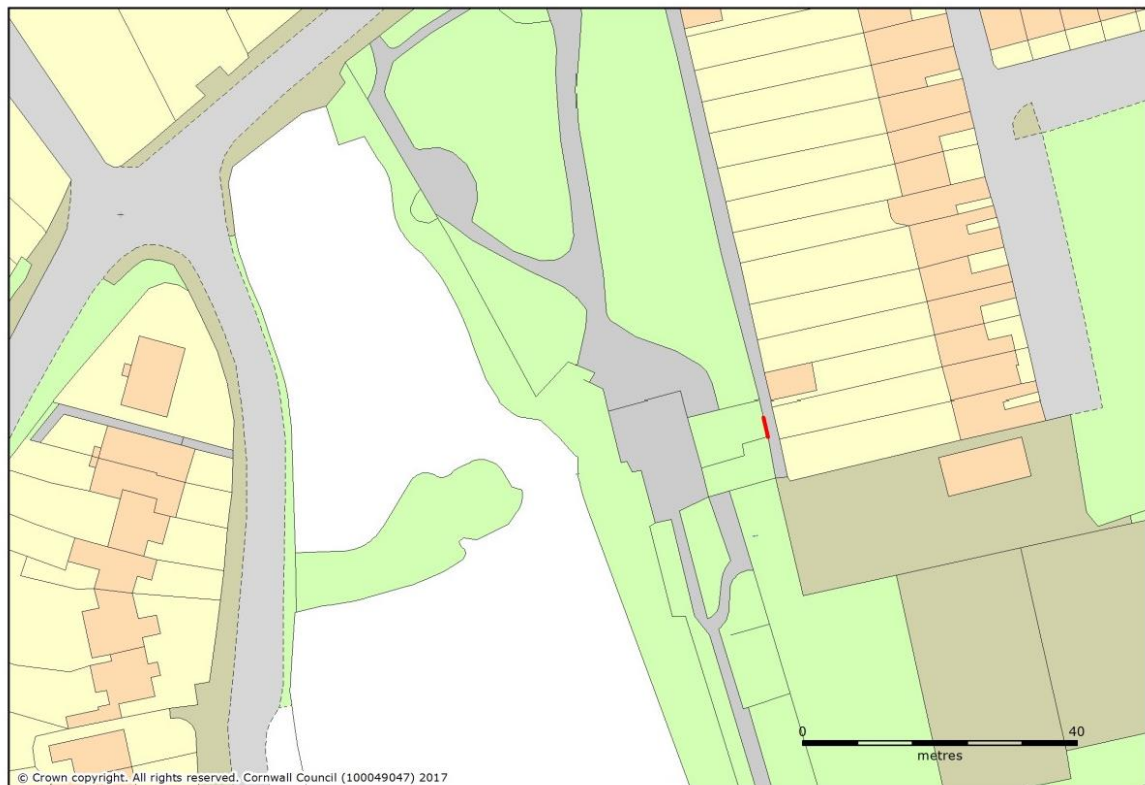


Fig 2. The extent (in red) of the walling to be repaired at Hayle Millpond. © Crown copyright. All rights reserved. Cornwall Council (100049047).

2 Introduction

2.1 Project background

Conservation works were undertaken by CORMAC Ltd. to repair a 6.6m long section of walling forming the eastern side of Millpond Gardens, Hayle which had lost structural integrity owing to the ingress of Buddleia roots, and which was, as a result, potentially hazardous to users of the adjoining public footpath (for location see Figs 1 and 2).

The wall adjoins a public footpath, is owned by Cornwall Council and is part of Scheduled Monument (1204628) (Fig 4). It is part of the former Harvey's Hammer Mill complex, and incorporated the remains of a chimney flue, which was to be retained within the rebuilt section of the wall. A failing timber lintel over a doorway was to be replaced in granite. Given the designated status of the walling, the specifications for the proposals were agreed in advance with the Historic England Inspector of Monuments.

One requirement of the Scheduled Monument Consent for the works was that a competent archaeological contractor was to be engaged to make a pre-works photographic record of the walling, carry out an archaeological watching brief during the repair works (if necessary providing advice on the works) and produce an as-completed photographic record of the repaired section of walling (Appendix 1). A pre-works drawn record of the walling produced by CORMAC was made available to CAU (Fig 3). The watching brief was undertaken for CAU by Martin Andrewes and this report was produced by Adam Sharpe incorporating mapping and as-constructed photography produced by Antony Angove.

Further details of the background and the aims and methods of the project can be found in the Written Scheme of Investigation (WSI) reproduced in Appendix 2 of this report.

1.1 Location and summary site history

Millpond Gardens are located in the southern part of Foundry, Hayle, Cornwall. The area of wall failure was centred at SW 55871 56933 and is sited on the eastern side of the former Harvey's hammer mill, part of the wider foundry complex (Figs 1 and 2).

The area under investigation has previously been the subject of a number of archaeological recording exercises. These, together with a map regression (Figs 5-8), have informed the rest of this section.

Relevant extracts from the Scheduled Monument description read as follows (the full version is reproduced in the WSI forming Appendix 2 of this report):

The Hayle Estuary has been a focus for settlement and maritime trade since prehistoric times. From at least the mid 18th century it developed into one of Cornwall's main industrial ports, serving surrounding mines and becoming home to Copperhouse Foundry and Harvey's Foundry. Internationally renowned for the scale of their work and the breadth of their engineering expertise, these rival companies were largely responsible for the expansion of Hayle during the C19.

Harvey's Foundry was established at the head of Penpol Creek, an area later known as 'Foundry', in 1779. Initially serving local mine needs, it became one of the world's leading suppliers of industrial pumping engines in the early C19, a role shared with the rival Copperhouse Foundry located in the north-east part of the town. Accompanying this industrial growth, the foundry companies operated as general merchants, developing the necessary storage, cartage and stabling facilities and further stimulating use of the port.

The former industrial complex to the east of Millpond Avenue includes the remains of hammer mills, a grist (grain) mill, and a ropeworks. The initial development of the site dates from circa 1780 and it developed through the C19 as an industrial focus growing from the establishment of John Harvey's iron foundry at the head of Penpol Creek in

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1779. The site finally ceased operation in the early C20, having spanned the full duration of Harvey's engineering production.

In the north-east part of the site are the ruins of a building which map evidence confirms as the earliest mill at the site. ... Extending west and south-west from the grist mill are remains of Harvey's C19 hammer mills. Early-C19 map evidence indicates that they occupied most of the area between the grist mill and the millpond, with an extended frontage to the millpond which provided the power. An 1864 plan adds detail, showing three elongated roofed ranges adjoining side by side, ending along Foundry Hill to the north but extending south to different lengths, the central range being the shortest. ... The hammer mills survive with their north, west and southern walls standing to single-storey height, of granite rubble masonry with dressed granite quoins and lintels. ... The ropeworks is situated to the south of the hammer mills. The ropewalk extended SSE, straight along the narrow strip between the millpond and the leat, eventually reaching about 210m long at its maximum extent by the 1840s. Of this, the northern 158m survives, lacking its roof. The ropewalk interior, about 5m wide, is defined to the west by a substantial rubble wall, now slightly reduced, with frequent external buttresses. ... At the north-eastern end of the ropeworks is a mid- to late-C19 building that is marked on a plan of the 1880s as a store [the building repaired in 2019]. It survives to first-floor height and is roughly square in plan, subdivided into several rooms, one containing a chimney base and another, a small hearth. The frontage to the lane has three broad brick-arched openings appropriate for wagon-loading.

3 Archaeological results

For this project, the archaeological watching brief was based almost wholly on photographic recording (see the approved WSI, Appendix 2) (Figs 9-21). This consisted of a general pre-works record of the area of the Scheduled Monument which would be affected by the works, images taken during the works programme (including detail of features revealed during this activity) and a post-works record of the completed repairs. These images and this report should be read in conjunction with the work proposals and methodological statement drawn up by the contractors (CORMAC Ltd) prior to the works programme. There was no significant deviation from the methodology approved in advance by Historic England, with the exception of a variation in the specification for the sand used in the mortar mix.

Description of the building

The building is likely to be part of a series of conjoined structures shown at the northern end of the Hayle Foundry millpond on the St. Erth Tithe Map (Fig 5) dating to *circa* 1840; from its location it is likely to be one component of the ropeworks element of this complex. By 1878 (OS map evidence) the complex had expanded, and individual buildings were not discernible on the mapping, though a large roofed structure was shown on the western side of the pathway separating it from the elongated gardens to the rear of the Mill Row cottages. The area containing the building to be repaired remained under an overall roof in 1908 (OS map evidence). By the mid 1930s (OS map evidence) the main complex had been unroofed, but a series of individual buildings were shown along the eastern side of the site (Mill Row had by then been renamed Tremeadow Terrace).

Owing to the temporary closure of the Cornwall Records Office during its relocation to a new site it did not prove possible to examine detailed plans of the Foundry complex housed there to determine the original function of the building repaired in 2019.

Like adjacent structures, which had been constructed as part of the hammermill and ropewalk complex, the average 0.6m thick wall which was the subject of the repair works was originally built in a mixture of granite and killas in random courses using lime-based bedding and pointing mortars, though post-construction patch repairs (most having used a Portland cement based mortar) were noted. The original lintels are of

granite (though that to be replaced in 2019 was of timber, and of almost certainly of reduced depth compared to that which would have originally been in this location); the door reveals are formed by granite quoins, whilst the first floor lintel reveals consist of fourteen courses of alternating header and stretcher courses of red stock bricks. The wall overall is 4.1m high, the doorways measure 2.46m high by 1.22m wide, the lower floor window openings measure 1.78m high by 1.09m wide and the upper floor window opening measures 0.91m high by 1.0m wide.

A small flue opening runs through the thickness of the wall, the location of the hearth being exposed in the internal elevation of the wall, where it had been blocked in using six courses of red brick (600mm high); the hearth opening measured two brick stretchers wide (400mm wide). The head of the hearth had been formed using an iron flat bar lintel, though this had suffered some degree of corrosion. Two courses of probably original brickwork overlaid this lintel, but some stonework had been lost above these, and cracking was evident at the sides of the flue-line up through the internal wall face. The interior of the flue had an irregular sub-circular form measuring an average of 300mm in diameter, and had been partly infilled with stone, brick and mortar, probably following the removal of the roof of the building. Given its dimensions and location it is probable that it was originally fronted by a small cast-iron fireplace of domestic type, and that the interior of the building had been lime plastered, though the flue opening seems to have been bricked in at some point when the fireplace became disused. The original function of the building, and of this room, could not be determined, and may well have changed over the lifespan of the building.

A 1.2m wide public footpath runs adjacent to the eastern elevation of the walling, separating it from the gardens associated with a terrace of pre-1840s mill cottages.

The buddleia which had taken root in the wall had, in some areas, become well-established and of a substantial trunk size, locally deforming the walling, causing distortion of its profile, partially dislodging some stonework and thus creating a potential hazard to users of the adjacent footpath. This vegetation was cut back to stumps, which were chemically treated prior to the main work programme. Once these had died back and shrunk to a degree, they were removed from the wall structure without causing any significant further stone loss. This initial work was undertaken prior to the watching brief being commissioned.

All of the upper section of walling over a length of 6.6m at its head was taken down in a controlled fashion and reconstructed (see Fig 2 for the extent of this work). The timber lintel over the doorway was removed and replaced using a recycled weathered granite lintel. All significant stones within the repaired section were replaced in their original positions, this process being guided by a series of pre-works photographs taken by the contractors.

The mortar used for both gauging and pointing repair work consisted of pre-mixed bagged Cornerstone NHL3.5 dry mix, which was batched as required on site. The pointing mortar was brushed back to achieve good contact with the wall stonework, and to bring up the required surface texture. Most of the finished pointing was slightly recessed from the faces of the stonework, though in some areas it was finished flush with them. Some closely-matching replacement brick was utilised where the originals were found to be in poor condition and not capable of reuse, whilst the decaying timber lintel over the doorway was replaced using a locally-sourced granite item. The original wall capping, which had largely been lost, was replaced using a slightly flanchéd profile in lime mortar. No gallets were incorporated into this, and it may, in the future, therefore prove somewhat vulnerable to thermally-induced cracking. The absence of any rust treatment to the iron lintel over the blocked flue opening may, in the future, result in damage to the overlying masonry and brickwork through expansion of the lintel as it rusts.

4 Discussion

The archaeological watching brief did not identify any previously unknown components of the Scheduled Monument, but allowed for the limited inspection of the largely backfilled small-scale chimney flue within the thickness of the wall at this point.

Any future structural repairs or below ground interventions at the Scheduled Monument known as Hayle Millpond which may be required, should be the subject of archaeological recording, and will require Scheduled Monument Consent.

2 References

2.1 Primary sources (in chronological order)

Tithe Map and Apportionment, c1840. Parish of St. Erth (licensed digital copy at CRO)

Ordnance Survey, c1880. 25 Inch Map First Edition (licensed digital copy at CAU)

Ordnance Survey, c1907. 25 Inch Map Second Edition (licensed digital copy at CAU)

Ordnance Survey, mid-1930s, 25 inch Map Third Edition (licensed digital copy at CAU)

Ordnance Survey, MasterMap Topography

2.2 Published material

Historic England Scheduled Monument description for National Monument No 1402608.

2.3 Websites

<http://www.heritagegateway.org.uk/gateway/> Online database of Sites and Monuments Records, and Listed Buildings

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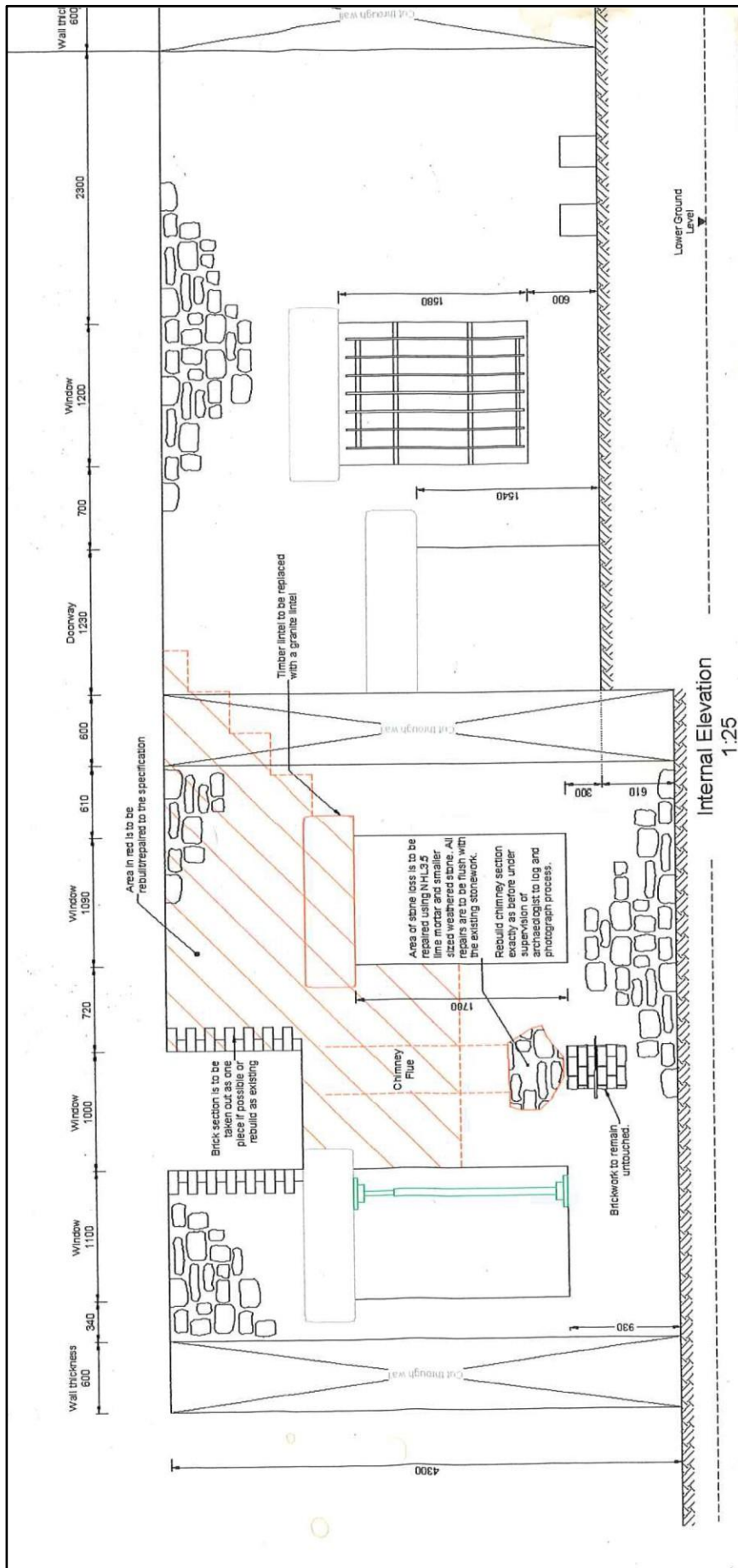


Fig 3. Information supplied by CORMAC Ltd showing the detail of the extent of the proposed reconstruction and repair works for the internal elevation of the walling of the building.

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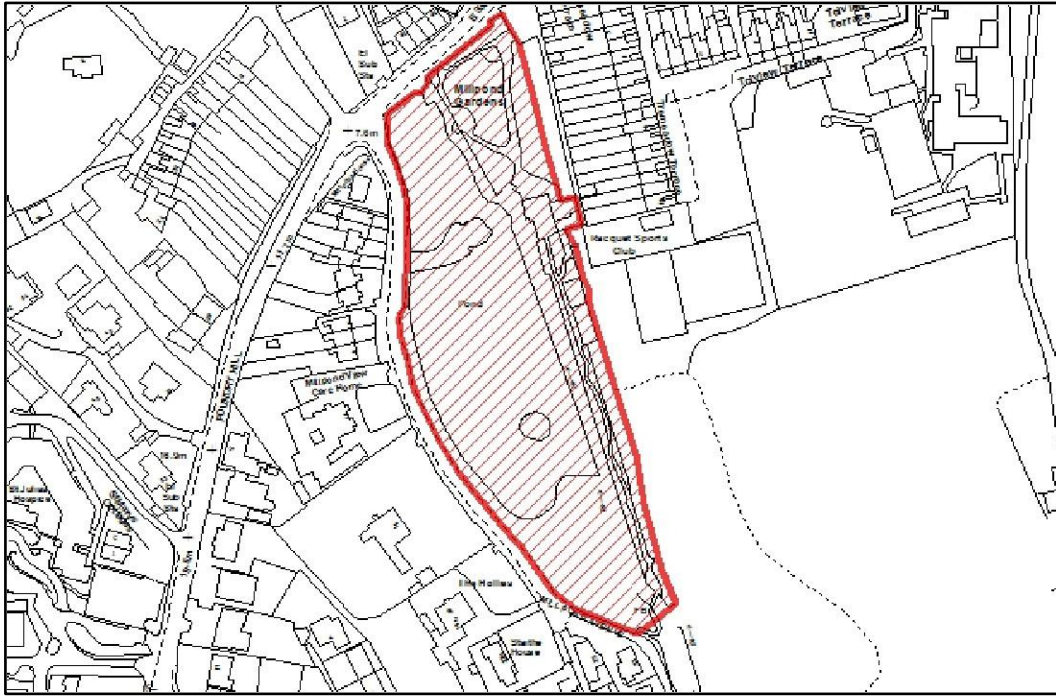


Fig 4. The extent of the footprint of the Scheduled area covering Hayle Millpond Gardens. The area of walling to be repaired forms part of the eastern boundary of the designated area. © Crown copyright. All rights reserved. Cornwall Council (100049047).

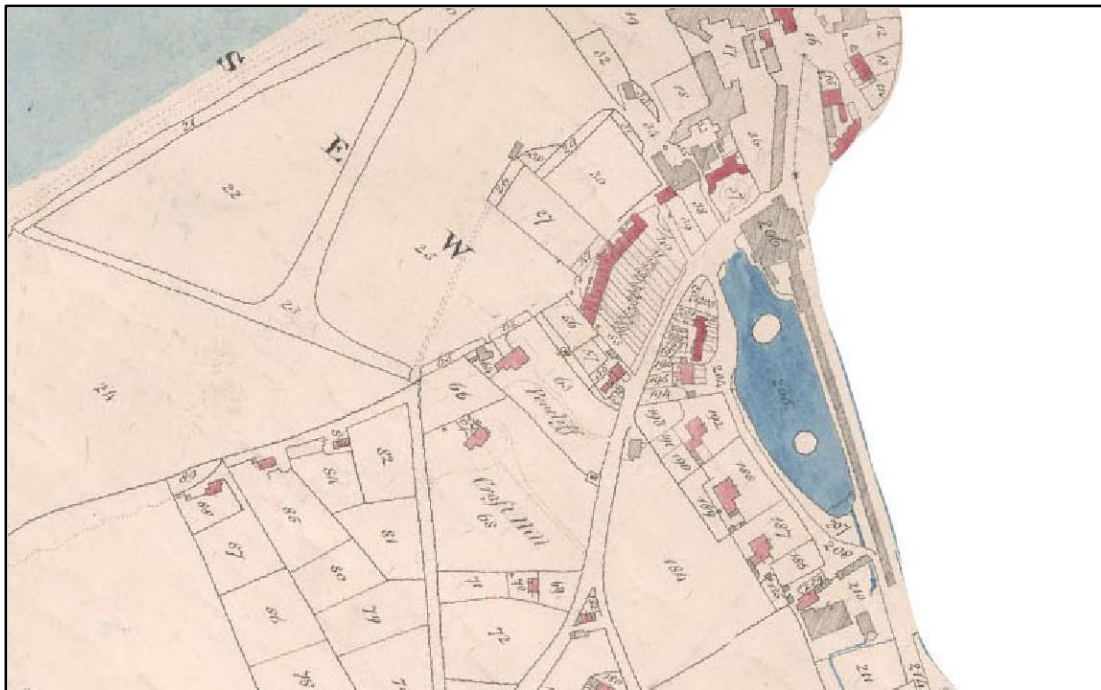


Fig 5. Hayle Foundry and the Millpond area as depicted on the circa 1840 St Erth Tithe Mapping. Note the extended roofed ropewalk forming the eastern side of the site adjacent to the Millpond. © Cornwall Record Office, 2019.

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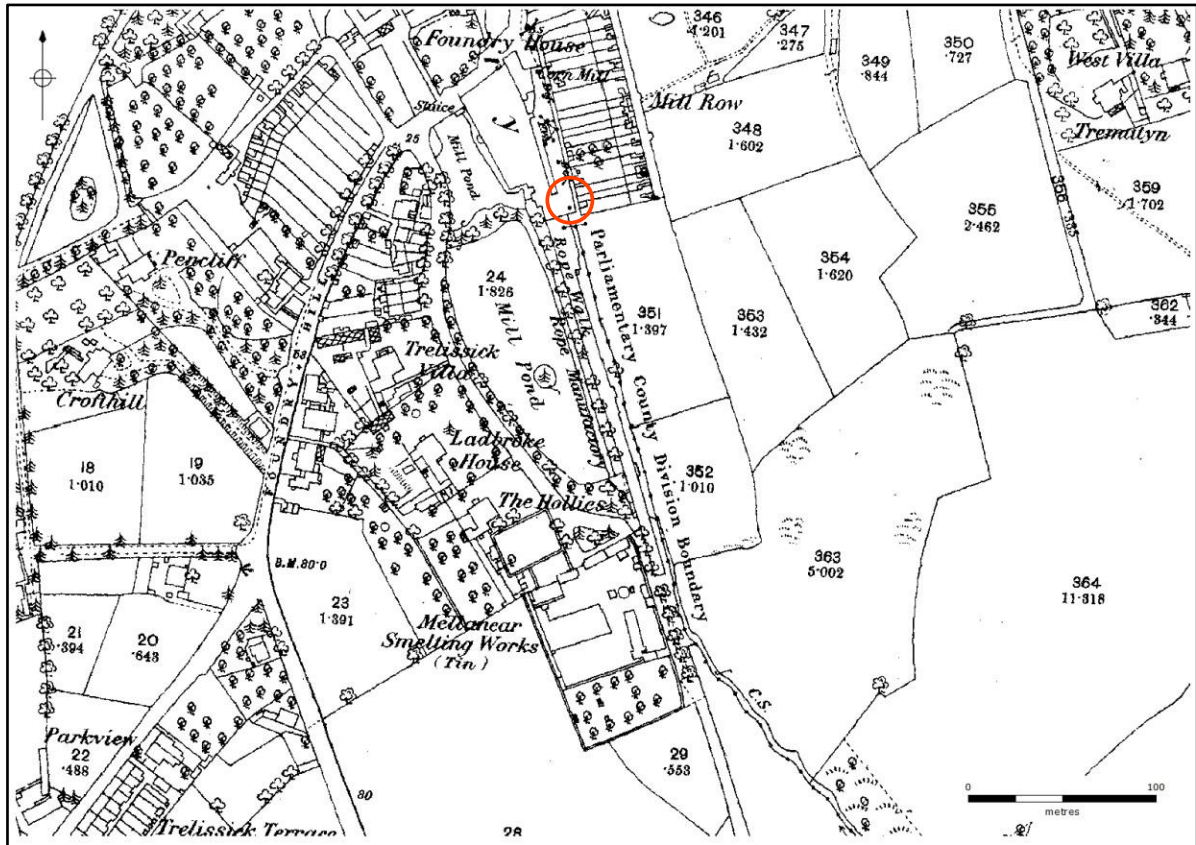


Fig 6. The location of the building as shown on the circa 1878 OS 25 inch mapping. © and database right "Crown Copyright and Landmark Information Group Ltd" (All rights reserved 2019).

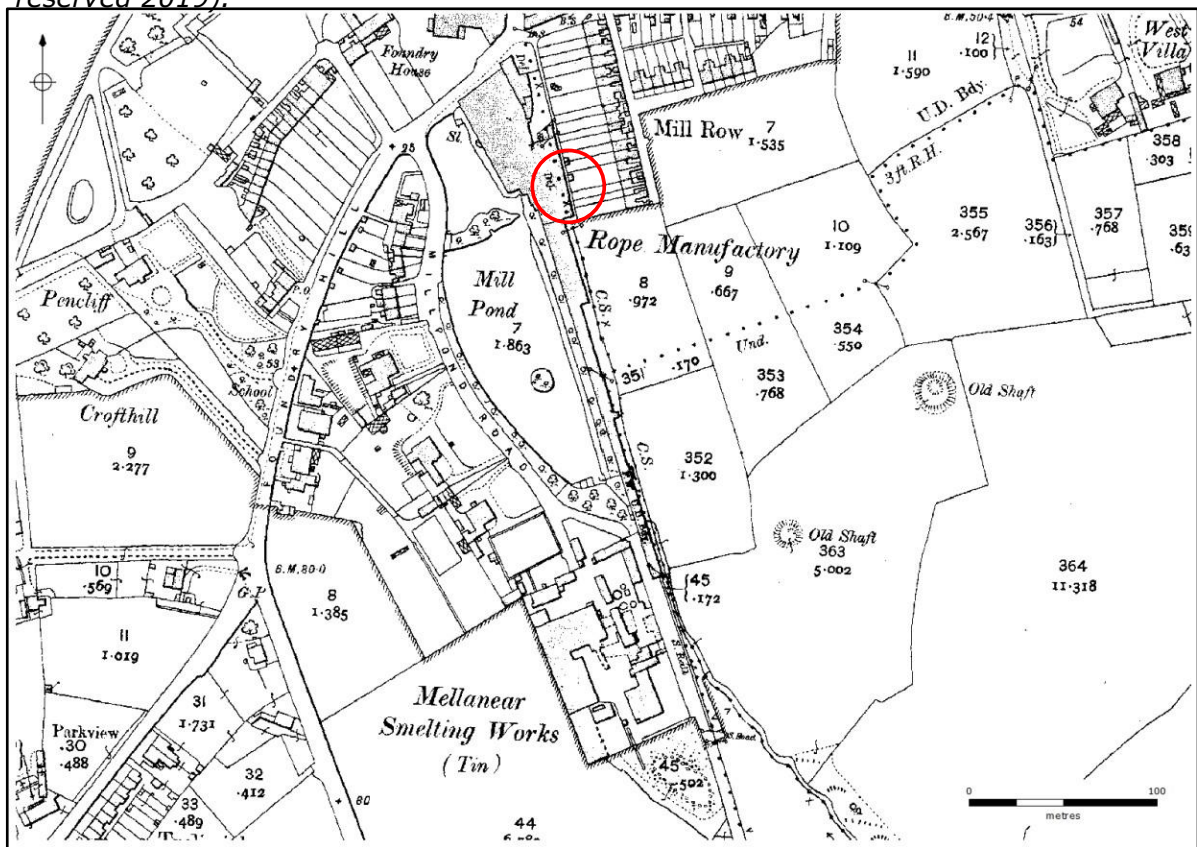


Fig 7. The location of the building as shown on the circa 1907 OS 25 inch mapping. © and database right 'Crown Copyright and Landmark Information Group Ltd' (All rights reserved 2019).

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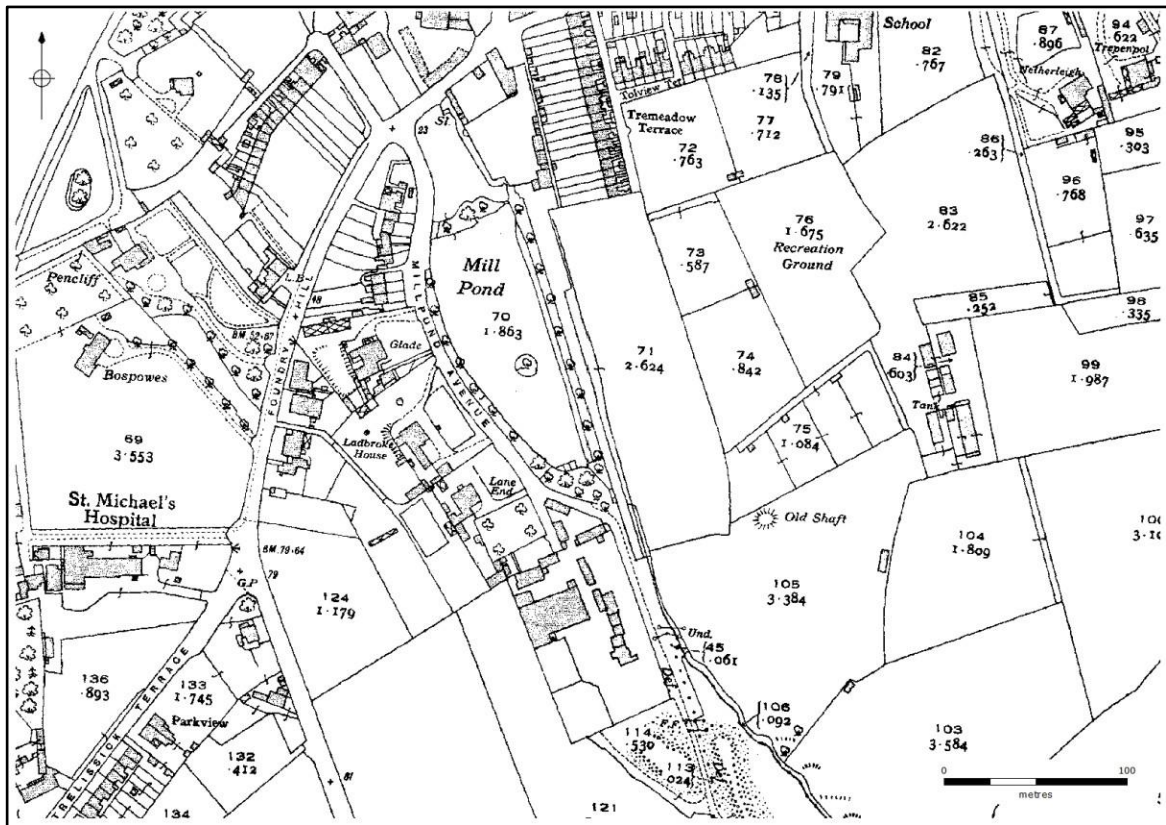


Fig 8. By the mid-1930s, the Ordnance Survey mapped a series of individual buildings along the eastern boundary of the site. © and database right 'Crown Copyright and Landmark Information Group Ltd' (All rights reserved 2019).



Fig 9. A view of the area around the upper floor window following the cutting back and stump treating of the Buddleia, showing the size of some of the destabilising root growth.

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Fig 10. The southern reveal of the upper floor opening, showing the vegetation growth on the cill and wall capping.



Fig 11. The original (replacement) timber lintel to the ground floor wall opening. As can be seen in this view, this had begun to fail and cracking had appeared within the pointing of the walling it supported.



Fig 12. The blocked flue opening on the internal elevation of the section of wall which was repaired.



Fig 13. A view of the section of walling between the wall openings showing its cementitious pointing, Buddleia growth and eroded or cracked wall joints.



Fig 14. Reconstruction work in progress on the southern side of the upper floor wall opening.



Fig 15. Repointing the external face of the walling using a lime pointing mortar.

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Fig 16. Repointed and partially rebuilt stonework adjacent to the flue opening on the internal wall face.



Fig 17. A view of the reconstructed and repointed section of the eastern wall of the building, including (right) the replacement granite lintel.



Fig 18. A view of the repair works to the exterior of the building and a window reveal, showing the appearance of the replacement pointing.



Fig 19. A view of the repair works from the footpath to the east of the building.

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Fig 20. Detail of the partially reconstructed and fully repointed stonework forming the wall panel between the two windows, this incorporating the integral flue.



Fig 21. Detail of the repair works surrounding the flue opening near the base of the wall. The joints between the blocking bricks have not been repointed, and no stabilisation treatment has been applied to the iron lintel.

Appendix 1: Scheduled Monument Consent details

Ancient Monuments and Archaeological Areas Act 1979 (as amended); Section 2 control of works Application for Scheduled Monument Consent

MILLPOND GARDENS, HAYLE, CORNWALL, TR27 4HP Scheduled Monument No: SM, HA 1402648 Our ref: S00204804 Application on behalf of J Mitchell, Cornwall Council

1. I am directed by the Secretary of State for Digital, Culture, Media & Sport to advise you of the decision regarding your application for Scheduled Monument Consent received 15 October 2018 in respect of proposed works at the above scheduled monument concerning conservation works including masonry repairs, pointing and vegetation clearance. The works were detailed in the following documentation submitted by you:

Design Statement CN1701200_CSL_SGN_SW5536_DE_S_0001_P01-A3
CN1701200_CSL_SGN_SW5536_DE_S_0002_P01-A3

2. In accordance with paragraph 3(2) of Schedule 1 to the 1979 Act, the Secretary of State is obliged to afford you, and any other person to whom it appears to the Secretary of State expedient to afford it, an opportunity of appearing before and being heard by a person appointed for that purpose. This opportunity was offered to you by Historic England and you have declined it.

3. The Secretary of State is also required by the Act to consult with the Historic Buildings and Monuments Commission for England (Historic England) before deciding whether or not to grant Scheduled Monument Consent. Historic England considers the effect of the proposed works upon the monument to be

a) Beneficial for the preservation of the monument, with arrangements for necessary archaeological recording to be confirmed by email prior to commencement of works.

I can confirm that the Secretary of State is agreeable for the works to proceed providing the conditions set out below are adhered to, and that accordingly Scheduled Monument Consent is hereby granted under section 2 of the 1979 Act for the works described in paragraph 1 above, subject to the following conditions:

a) The works to which this consent relates shall be carried out to the satisfaction of the Secretary of State, who will be advised by Historic England. At least 4 weeks' notice (or such shorter period as may be mutually agreed) in writing of the commencement of work shall be given to Nick Russell IAM; Historic England in order that an Historic England representative can inspect and advise on the works and their effect in compliance with this consent.

b) The specification of work for which consent is granted shall be executed in full.

c) Photographs and/or survey drawings to a scale and quality to be agreed in writing shall be prepared of the monument before the start and/ or after completion of the works and a set of the prints [together with copies on disc if in digital format]/ negatives/ drawings shall be sent to Historic England (Nick Russell IAM) within 3 months of the completion of the works (or such other period as may be mutually agreed).

d) This consent may only be implemented by J Mitchell, Cornwall Council.

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- e) Where consent is transferable to future owners, Historic England shall be notified of land disposal upon completion of the sale.
- f) The consented works shall be undertaken under the overall archaeological supervision of Ann Preston-Jones HARPO who you must contact prior to commencement of works so that she may arrange to visit should she require to do so.
- g) No works shall take place until the applicant has confirmed in writing the commissioning of a programme of archaeological work before and during the development in accordance with a written scheme of investigation which has been submitted to and approved by the Secretary of State advised by Historic England.
- h) Original material shall be reused wherever possible.
- i) Any replacement material shall be of a type, texture and colour which matches the original material.
- j) Any replacement brick/ stone shall be of a suitable size, and laid to match the original courses and joint widths where appropriate.
- k) All fixings shall be made into the joints and not into the brick/ stone.
- l) (All pointing and mortar work shall be in a mixture and finish to match the existing in composition, colour, texture and style.
- m) Care shall be taken that fittings do not rust so as to stain the brickwork/ masonry.
- n) Any vegetation growing in the masonry shall be cut off level with the surface of the stonework and the roots poisoned/ carefully removed.

Control of Site Works

- o) All those involved in the implementation of the works granted by this consent must be informed by the owner and developer that the land is designated as a scheduled monument under the Ancient Monuments and Archaeological Areas Act 1979 (as amended); the extent of the scheduled monument as set out in both the scheduled monument description and map; and that the implications of this designation include the requirement to obtain Scheduled Monument Consent for any works to a scheduled monument from the Secretary of State prior to them being undertaken.
- p) Equipment and machinery shall not be used or operated in the scheduled area in conditions or in a manner likely to result in damage to the monument other than that which is expressly authorised in this consent.
- q) Any works to which this consent relates shall be carried out under the archaeological supervision your chosen archaeological contractor who confirm by email to Historic England that they are willing and able to undertake the agreed supervision and have supplied a suitable Written Scheme of Investigation.
- r) All existing trees, shrubs and woody growths shall be cut off at ground level and the roots poisoned, the stumps being left in situ and not grubbed out.
- s) This consent shall cease to have effect five years from the date of issue .
- t) A summary report on the recording works shall be sent to Historic England and the relevant County Sites and Monuments Record/ Historic Environment Record and address(es) within 3 months (or such other period as may be mutually agreed) of completion of the works. A copy shall be deposited in the County Sites and Monuments.
- u) The specification/ research design/ project design (including analysis, postexcavation and publication proposals) for which consent is granted shall be executed in full, unless variations have been agreed under the terms of condition 1.
- v) The contractor shall complete and submit an entry on OASIS (On-line Access to the Index of Archaeological Investigations - <http://oasis.ac.uk/england/>) prior to project completion, and shall deposit any digital project report with the Archaeology Data Service, via the OASIS form, upon completion.

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4. By virtue of section 4 of the 1979 Act, if no works to which this consent relates are executed or started within the period of five years beginning with the date on which this consent was granted (being the date of this letter), this consent shall cease to have effect at the end of that period (unless a shorter time period is set by a specific condition above).

5. This letter does not convey any approval or consent required under any enactment, bye law, order or regulation other than section 2 of the Ancient Monuments and Archaeological Areas Act 1979.

6. Your attention is drawn to the provisions of section 55 of the 1979 Act under which any person who is aggrieved by the decision given in this letter may challenge its validity by an application made to the High Court within six weeks from the date when the decision is given. The grounds upon which an application may be made to the Court are (1) that the decision is not within the powers of the Act (that is, the Secretary of State has exceeded the relevant powers) or (2) that any of the relevant requirements have not been complied with and the applicant's interests have been substantially prejudiced by the failure to comply. The "relevant requirements" are defined in section 55 of the 1979 Act: they are the requirements of that Act and the Tribunals and Inquiries Act 1971 and the requirements of any regulations or rules made under those Acts.

Appendix 2: Written Scheme of Investigation

Hayle Millpond Gardens repair works recording

Client: CORMAC Ltd

Project background

Conservation works are to be undertaken by CORMAC to repair a 4m long section of waling forming the eastern side of Millpond Gardens, Hayle which is failing due to the ingress of Buddleia roots. The area of failure is centred at SW 55871 56933.

The wall adjoins a public footpath, is owned by Cornwall Council and is part of Scheduled Monument (1204628). It is part of the former Harveys Hammer Mill complex, and incorporates the remains of a chimney, which is to be retained within the rebuilt section of the wall. A failing timber lintel is to be replaced in granite. Given the designated status of the waling, the details of the proposals have been discussed with the Historic England Inspector of Monuments.

A requirement of the consent for the works is that a competent archaeological contractor must be engaged to make a pre-works photographic record of the waling, carry out an archaeological watching brief during the repair works (if necessary providing advice on the works) and produce an as-completed photographic record of the repaired section of waling. A pre-works drawn record of the waling has been produced by CORMAC and has been made available to CAU.

This document sets out a Written Scheme of Investigation (WSI) by Cornwall Archaeological Unit (CAU) for a programme of archaeological recording prior to, during and following the recording, as required by Historic England.

The work has been requested by the Historic England Inspector of Monuments.



Figure 1: Hayle Millpond. The area where the repairs are to take place is

indicated in red.

Site history

The area under investigation has previously been the subject of a number of archaeological recording exercises. These have informed the rest of this section.

The Scheduled Monument description reads:

The Hayle Estuary has been a focus for settlement and maritime trade since prehistoric times. From at least the mid 18th century it developed into one of Cornwall's main industrial ports, serving surrounding mines and becoming home to Copperhouse Foundry and Harvey's Foundry. Internationally renowned for the scale of their work and the breadth of their engineering expertise, these rival companies were largely responsible for the expansion of Hayle during the C19.

Harvey's Foundry was established at the head of Penpol Creek, an area later known as 'Foundry', in 1779. Initially serving local mine needs, it became one of the world's leading suppliers of industrial pumping engines in the early C19, a role shared with the rival Copperhouse Foundry located in the north-east part of the town. Fierce competition over access to quays produced the 'South Quay' built by Harvey's in 1819, aggravating the natural problems of estuarine silting. These problems were resolved by impounding Copperhouse Pool and, from 1834, creating the wholly artificial Carnsew Pool as tidally-filled sluicing pools whose waters were directed to the canal, quays and harbour mouth. This complex system maintained the port facility that gave the foundries their national and international role besides serving their regional hinterland. Accompanying this industrial growth, the foundry companies operated as general merchants, developing the necessary storage, cartage and stabling facilities and further stimulating use of the port.

The former industrial complex to the east of Millpond Avenue includes the remains of hammer mills, a grist (grain) mill, and a ropeworks. The initial development of the site dates from circa 1780 and it developed through the C19 as an industrial focus growing from the establishment of John Harvey's iron foundry at the head of Penpol Creek in 1779. The site finally ceased operation in the early C20, having spanned the full duration of Harvey's engineering production. Part of the original water management at the site includes a leat that possibly originally powered a metal-boring mill in the north-east part of the site which was later replaced by or converted to a grist (corn) mill; and a reservoir or millpond which John Harvey gained permission to impound in 1780 and which powered hammer mills at the site. The leat allowed the Penpol Stream to bypass the millpond or reservoir as required; it was recut to its present course in 1795 following a dispute over rights to the land it originally crossed. The earliest mill at the site may have originally been a boring mill but by at least 1827 it was grinding corn, which was in demand to feed the many horses that provided Harvey's land transport needs. Milling was one of the major industries in Hayle from the early C19 due to the demand for supplying horses and men with feed. It expanded into a major commercial concern, with flour production and export, baking and retailing all becoming more important throughout the C19 and into the mid-20. In 1851, in a division of Harvey's property, the grist mill complex was sold to J H Trevithick & Son. It was extended during the C19. Milling ceased in the 1890s when a mint humbug factory took over part of the building. A ropery was established at the site in 1796. Rope making was one of the first of Harvey's diversified activities after establishing his foundry and especially used in mines and for ships' rigging and cordage. The ropeworks closed in 1916, demand for its products having declined with the collapse of Cornish mining and the replacement of hemp rope with wire for maritime uses.

PRINCIPAL ELEMENTS. *A former industrial complex which includes the earthworks, standing and buried remains of hammer mills, a grist mill, ropeworks, store, reservoir and leat. It was established in the late C18, and was expanded and altered in the C19. The site is situated in a slight valley extending south from Penpol Creek, and to the east of Millpond Avenue.*

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DETAILS. In the north-east part of the site are the ruins of a building which map evidence confirms as the earliest mill at the site. Rectangular in plan, the grist mill was converted to steam power in about 1830 and was extended southward by about 1832. By the end of the C19, photographs show the mill rising five storeys high to a shallow pitched roof. In 1940 the mill was reduced to first-floor level, reputedly to prevent the tall building from being used as a landmark to guide German bombing raids. The surviving north end and east side walls of the mill are faced externally by granite block masonry and internally by granite rubble, with dressed granite quoins and lintels. Large brick arches pierce each ground-floor wall, with an original window above the north wall arch. A ground-floor doorway and first-floor window in the east wall are now blocked.

Extending west and south-west from the grist mill are remains of Harvey's C19 hammer mills. Early-C19 map evidence indicates that they occupied most of the area between the grist mill and the millpond, with an extended frontage to the millpond which provided the power. An 1864 plan adds detail, showing three elongated roofed ranges adjoining side by side, ending along Foundry Hill to the north but extending south to different lengths, the central range being the shortest. The western range has a rounded projection with a dormer roof extending into the edge of the millpond and is considered to have housed sluices controlling the distribution and force of water to the mill. Early-C20 photographs, taken about the time of the mill's closure, show the western range and its projection as a single-storey building with a shallow-pitched slate roof; a later aerial photograph, prior to 1940, shows that the hammer mills were roofless by this date. The hammer mills survive with their north, west and southern walls standing to single-storey height, of granite rubble masonry with dressed granite quoins and lintels. The north wall, extending west from the grist mill, shows at least three construction phases, corresponding with the ends of the three ranges: the gable end of each range has two window openings with blocked doorways beneath, and the west range has a large brick-arched opening. Against the internal north-east corner of the west range is a masonry chimney stack base with its brick lining projecting above. The mill's west wall, facing the millpond, has closely-spaced window openings, all truncated just below lintel level; the rounded projection into the edge of the millpond is entered by a doorway in its rear wall, set back slightly within the mill, and has a small window facing towards the millpond. The mill's south wall again combines several construction phases, with a window near its west end and the base of a first floor opening at the east.

The ropeworks is situated to the south of the hammer mills. The ropewalk extended SSE, straight along the narrow strip between the millpond and the leat, eventually reaching about 210m long at its maximum extent by the 1840s. Of this, the northern 158m survives, lacking its roof. The ropewalk interior, about 5m wide, is defined to the west by a substantial rubble wall, now slightly reduced, with frequent external buttresses. Along the wall, small rectangular sockets with iron linings are considered to have held spars used in stretching the rope. The eastern side of the ropewalk has a very low wall and was largely open-sided to assist ventilation, the roof being held on supports which no longer survive. East of the ropewalk's northern end are two large, wall-lined flat-bottomed pits; one of these, circular with a rectangular extension to the south, is identified as housing a former steam-powered rope-spooler. The 1870's mapping shows a roofed building over the pits, of which some walling survives, with another ropery building to the south which stands to gable height. At the north-eastern end of the ropeworks is a mid- to late-C19 building that is marked on a plan of the 1880s as a store. It survives to first-floor height and is roughly square in plan, subdivided into several rooms, one containing a chimney base and another, a small hearth. The frontage to the lane has three broad brick-arched openings appropriate for wagon-loading.

The reservoir, known as the millpond, remains largely waterfilled, though partly silted at the south end. It measures about 200m NNW-SSE by up to 55m wide; its slender northern third is sub-divided as an inner pool by a bank. On the east it is defined by a

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strip of raised ground, broad on the north but narrow further south, separating the millpond from a leat which allowed the Penpol stream to bypass the millpond as required. The leat, part of the Harvey's original water management at the site, powered the wheel of a metal-boring mill.

All modern fences and railings, the pedestrian barriers under the entrance arches, modern path surfaces and kerbing, signs and notices, seating, electricity supply cables, control and fuse boxes, telephone pole, cables and guys, lamp posts, modern drains and covers, playground equipment, modern statuary and artwork, litter bins, life-belt and housing, and the modern culverts along the millpond edge are all excluded from the scheduling. The ground beneath all these features is, however, included.

Project extent

The project area is confined to the area indicated by a redline on Figure 1 in this document, which indicates the area where the wall repairs are to be undertaken.

Aims and objectives

The principal aim of the study is to ensure that the wall repairs are undertaken in a way appropriate to the Scheduled status of the monument.

- Obtain scaled photographic records of the walling before, during and on the completion of the works.
- To produce a concise archive report summing up the results of the recording exercise.
- To produce an entry to the Historic England/ADS OASIS database of national archaeological projects.

Working methods

All recording work will be undertaken according to the Chartered Institute for Archaeologists (CIfA) guidance (CIfA 2014a, 2014b). Staff will follow the CIfA *Code of Conduct* (2014d). The Chartered Institute for Archaeologists is the professional body for archaeologists working in the UK.

Creation of the physical and digital archive

Following review with the CAU Project Manager the results from the fieldwork will be collated as an archive.

This will involve the following.

- All records (drawings, context sheets, photographs, etc.) will be ordered, catalogued and stored in an appropriate manner (according to CAU guidelines).
- Any black and white negative film will be catalogued and deposited with the site archive.
- Colour digital images taken as part of the site archive will be converted from colour to black and white negative film and added to the site archive.
- Completion of the Historic England/ADS OASIS online archive index.
- All correspondence relating to the project, the WSI, and a single paper copy of the report, stored in an archive standard (acid-free) documentation box.
- Additional digital data (survey, external reports, etc.)

Archive deposition

An index to the site archive will be created and the archive contents prepared for long term storage, in accordance with CAU standards.

- The project archive will be deposited initially at ReStore PLC, Liskeard and in due course (when space permits) at Cornwall Record Office.
- Digital data will be stored on the Cornwall Council network which is regularly and frequently backed up.
- Digital data (CAU reports, external reports, survey data, geophysics data, digital photographs, etc.) forming part of the site archive will be deposited with the ADS.

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CAU uses the following file formats for stored digital data:

- DOCX Word processed documents
- XLSX Spreadsheets
- PDF Exports of completed documents/reports/graphics
- JPG Site graphics and scanned information
- DNG or TIF Digital photographs
- DWG AutoCAD drawings, measured surveys
- MXD ArcView GIS (electronic mapping) data
- AI Adobe Illustrator graphics

Pre-fieldwork

In advance of the fieldwork CAU, will discuss and agree with the client:

- Working methods and programme.
- Health and Safety issues and requirements.

Fieldwork: watching brief

Following the completion of a pre-works scaled photographic record of all sections of the walling which be affected by the repair work, an intermittent watching brief will be undertaken during the project to fulfil Historic England's requirements. A further photographic record will be produced on the completion of the repair works.

This work will be guided by CIfA's guidance on undertaking watching briefs (CIfA 2014a).

Recording

The archaeologist will:

- Produce a scaled photographic record of both elevations of the the walling prior to works taking place;
- Identify and record any un-recorded architectural features on a copy of the elevation drawings to be supplied by CORMAC;
- Record the extent of the repairs on the elevation drawings;
- Take representative photographs of the works as they take place, including any architectural detail revealed during the dismantling process;
- Produce a scaled photographic record of the walling on the completion of the works.
- The photographic recording will comprise black and white negative photography using an SLR camera. Photographs will include a record of significant features and general working shots. A metric scale, site and context identifier, and a north arrow where appropriate, will be included in all record shots.
- Digital photographs with a resolution of 10Mpx or higher will be taken for illustrative purposes.

Reporting

The results from the project will be drawn together and presented in a concise report. The scope of the report will be dependent on the scale and significance of the results from the project.

In the case of negative results the findings will be presented in a CAU short report format. In the case of limited results the findings will be presented in a concise archive report. The most appropriate type of report will be determined at the conclusion of the fieldwork stage.

The report will include the following elements:

- Summary
- Project background
- Aims and objectives
- Methodology
- Location and setting

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- Designations
- Summary site history
- Watching brief results
- Conclusions
- References
- Project archive index
- Supporting illustrations: location map, historic maps, plans, elevations/sections, photographs

Timetable

The study is anticipated to commence during November 2018. CAU will normally require at least 2 weeks' notice before commencement of work, in order to allocate field staff and arrange other logistics.

The archive report will be completed within 3 months of the end of the fieldwork. The deposition of the archive will be completed within 3 months of the completion of the archive report.

Monitoring and Signing Off Condition

Monitoring of the project will be carried out by the CAU management team.

- Notification of the start of work shall be given, preferably in writing, to the Historic England Inspector of Monuments at least one week in advance of its commencement.
- Any variations to the WSI would need to be agreed with Historic England in writing, prior to them being carried out.

References

CIfA, 2014a. *Standard and guidance for an archaeological watching brief*, CIfA, Reading

CIfA, 2014b. *Code of Conduct*, CIfA, Reading

Historic England 2015. *Guidance note on Digital Image Capture and File Storage*, Historic England, Swindon.

Cornwall Archaeological Unit

Cornwall Archaeological Unit is part of Cornwall Council. CAU employs 20 project staff with a broad range of expertise, undertaking around 120 projects each year.

CAU is committed to conserving and enhancing the distinctiveness of the historic environment and heritage of Cornwall and the Isles of Scilly by providing clients with a number of services including:

- Conservation works to sites and monuments
- Conservation surveys and management plans
- Historic landscape characterisation
- Town surveys for conservation and regeneration
- Historic building surveys and analysis
- Maritime and coastal zone assessments
- Air photo mapping
- Excavations and watching briefs
- Assessments and evaluations
- Post-excavation analysis and publication
- Outreach: exhibitions, publication, presentations

Standards



CAU is a Registered Organisation with the Chartered Institute for Archaeologists and follows their Standards and Code of Conduct.

<http://www.archaeologists.net/codes/ifa>

Terms and conditions

Contract

CAU is part of Cornwall Council. If accepted, the contract for this work will be between the client and Cornwall Council.

The views and recommendations expressed will be those of CAU and will be presented in good faith on the basis of professional judgement and on information currently available.

Project staff

The project will be managed by Adam Sharpe BA MCIfA who will:

- Discuss and agree the detailed objectives and programme of each stage of the project with the client and the field officers, including arrangements for health and safety.
- Monitor progress and results for each stage.
- Edit the project report.
- Liaise with the client regarding the budget and related issues.

Work will be carried out by CAU field staff, with assistance from qualified specialists and sub-contractors where appropriate. All staff will follow CAU's Health and Safety Policy and work in accordance with a site-specific risk assessment.

The project fieldwork will be undertaken by:

Martin Andrewes BSc Plymouth 2013

After gaining his degree in 2013 Martin volunteered for CAU on a number of excavations, principally St Piran's Oratory and Carwynnen Quoit where his practical skills made him a vital part of the team. He was subsequently employed as a site assistant at CAU working on a variety of sites and gaining experience in field excavation and site recording processes. These have included prehistoric smelting/settlement sites (Hayle Viaduct Hill), industrial sites (South Crofty), church/burial excavation (Sithney Church) and recording geotechnical pits. In 2016/17 Martin was appointed as Environmental Sampling supervisor for the Tintagel Castle Archaeological Research Project. Martin is a qualified mechanic and holds a HGV 2 and tracked vehicle license.

Report distribution

Paper copies of the report will be distributed to the client, to local archives and national archaeological record centres.

A digital copy of the report, illustrations and any other files will be held in the Cornwall HER and also supplied to the client on CD or other suitable media.

Copyright

Copyright of this Written Scheme of Investigation will be reserved to Cornwall Archaeological Unit, Cornwall Council. It may only be used/reproduced with permission from Cornwall Archaeological Unit.

Existing copyrights of external sources will be acknowledged where required.

Freedom of Information Act

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As Cornwall Council is a public authority it is subject to the terms of the Freedom of Information Act 2000, which came into effect from 1st January 2005.

CAU will ensure that all information arising from the project shall be held in strict confidence to the extent permitted under the Act. However, the Act permits information to be released under a public right of access (a "Request"). If such a Request is received CAU may need to disclose any information it holds, unless it is excluded from disclosure under the Act.

Health and safety statement

CAU follows Cornwall Council's *Statement of Safety Policy*.

Prior to carrying out on-site work CAU will carry out a site-specific Risk Assessment.

Insurance

CAU is covered by Cornwall Council's Public and Employers Liability Insurance, with a policy value of £50m. The Council also has Professional Negligence insurance with a policy value of £10m.

*Adam Sharpe BA MCIfA
Archaeology Projects Officer
16 November 2018*

Cornwall Archaeological Unit

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