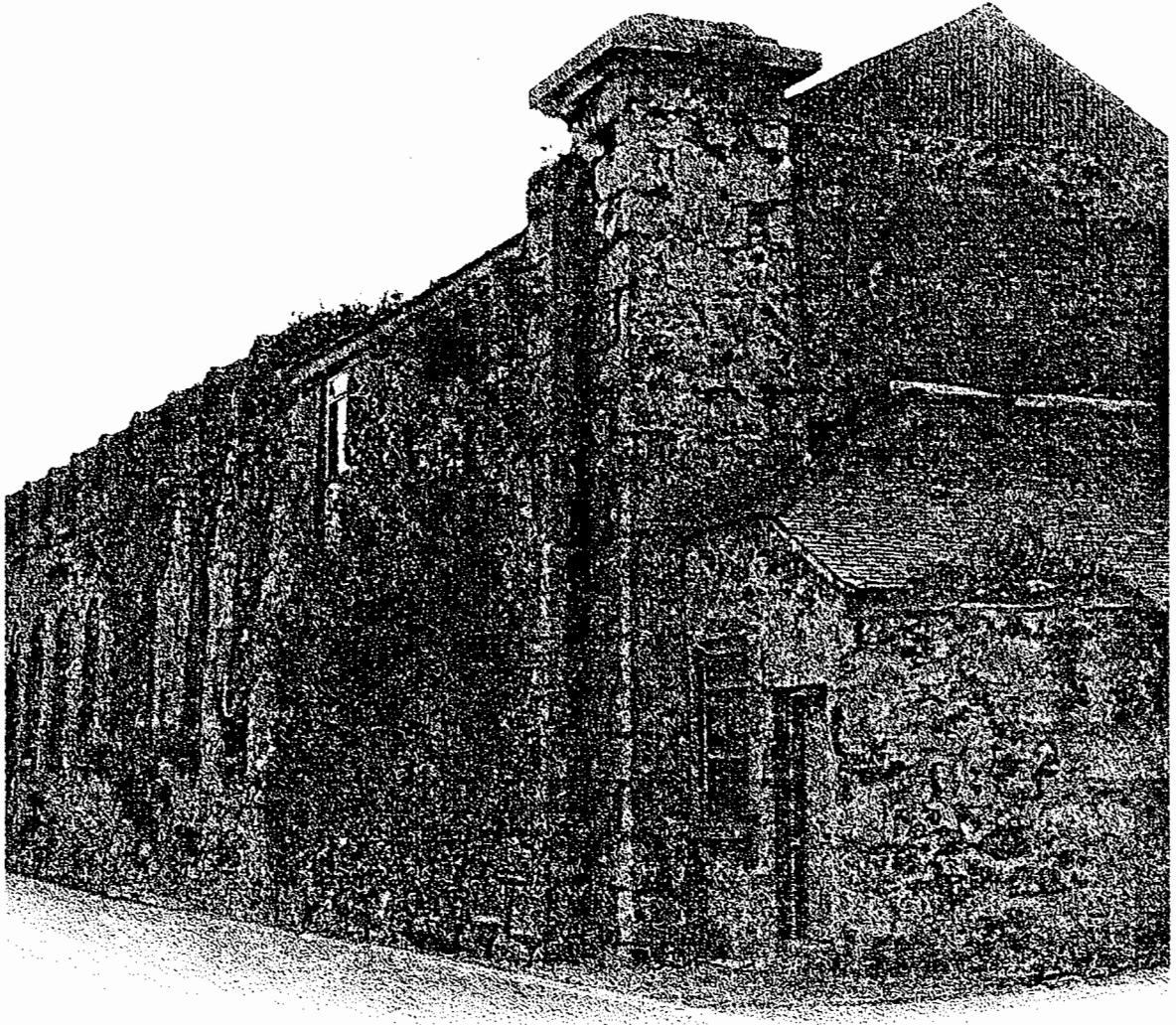


FOUNDRY SQUARE, HAYLE



Cornwall Archaeological Unit

Cornwall County Council

July 1993

1955
[Stamp] 1090 200 100

FOUNDRY SQUARE, HAYLE
ARCHAEOLOGICAL ASSESSMENT

John R Smith

for

Cornwall Archaeological Unit

Cornwall County Council

July 1993

1. Introduction

The Cornwall Archaeological Unit was asked on 22nd June 1993 to carry out an archaeological assessment of the Foundry Square site at Hayle on behalf of Andrew Downie and Partners and Mowlem (E Thomas Construction). The object of the study is to assess the foundry site for its archaeological potential and historical importance in advance of a proposed housing development. Outline permission for the housing development was granted by Penwith District Council in October 1991 subject to the provision of "*a programme of archaeological work*" of which this report forms part.

The assessment briefly outlines the historical significance of the site; considers the major phases of development; examines the extent and nature of present-day surviving buildings; considers the location and possible survival of remains below the present ground surface; and makes recommendations for further site recording and research.

2. Historical Background

John Harvey (1720-1803) was a blacksmith at Gwinear who moved to Hayle in 1779 (Barton, 1969). He had the vision and commercial instinct to realise that the Cornish mining industry would welcome and benefit from a county-based foundry and engineering works capable of supplying their needs. Although his business remained localised and small-scale for the first few years, by 1800 50 men were employed by Harvey. The early years of the 19th century were characterised by the establishment of many Cornish industrial enterprises set up to serve mining and quarrying, where previously such services had of necessity been sought outside the county. Gunpowder manufacture, fuse-making, brick-making, engineering and iron-founding all flourished with the great expansion of hard-rock mining as the century progressed.

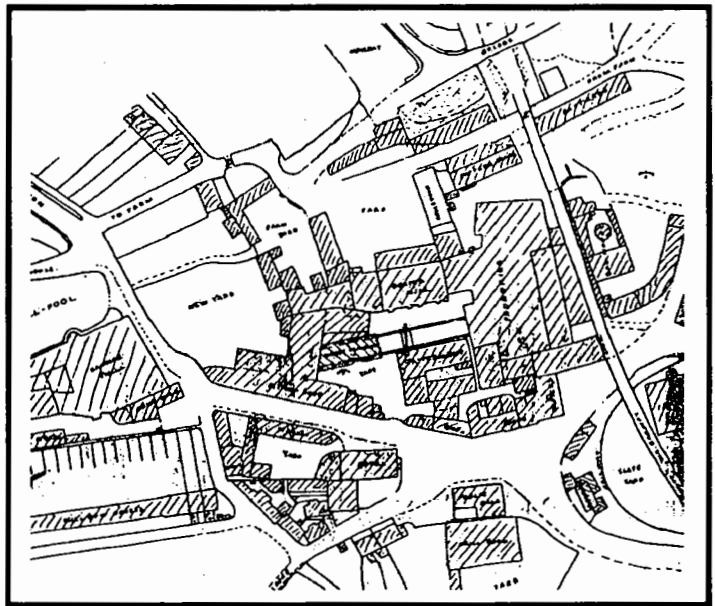
John Harvey's son, Henry Harvey (1775-1850), expanded the Foundry business and made Harvey's an international and greatly respected firm. Close family ties with Trevithick and later professional partnerships with great engineers such as William West gave the firm a level of expertise unmatched by other engineering works in Cornwall. Their reputation was built on the design and manufacture of Cornish beam engines, but these machines were merely the most spectacular and visible portion of a great range of mining machinery and equipment. The bedrock of the business was not the great engines, splendid though they were, but the wholly mundane though essential import and sale of coal, timber, and building materials through the now rapidly expanding port of Hayle.

Harvey's influence and prosperity peaked from around 1820 to 1870 (Barton 1969, 150), and 460 were employed in the Foundry in 1841, with another 400 engaged in the wharves, building and coal trades.

Engines were built for mines in Cornwall, many other metal and coal mines in Britain, Australia, South Africa, South America and Spain; engines were also supplied to waterworks in Britain and Holland (the Haarlem Mere engines). During this period the works in Foundry Square was adapted and expanded to cope with an ever-increasing volume of work; by the 1870s the Foundry included a forge and smithy, two machine shops, a boring mill, two fitting shops, hammer mills, pattern shops and stores, and the foundry itself with five cupolas and two air furnaces.

Harvey & Co's main competitors during this period were the Copperhouse Foundry of Hayle, and the Perran Foundry at Perran Wharf between Truro and Falmouth. By 1880 both of these had gone, victims of the decline in Cornish mining, and Harvey's was forced to diversify in order to survive. A new shipbuilding yard was constructed with slipways and boilerworks, intended to compete on a national level with other yards producing vessels up to 4000 tons. This venture was not a success, and the foundry was gradually run down as the century ebbed; final closure came in 1903. The firm of Harvey & Co continued to act as builder's merchants, and merged with UBM in 1969.

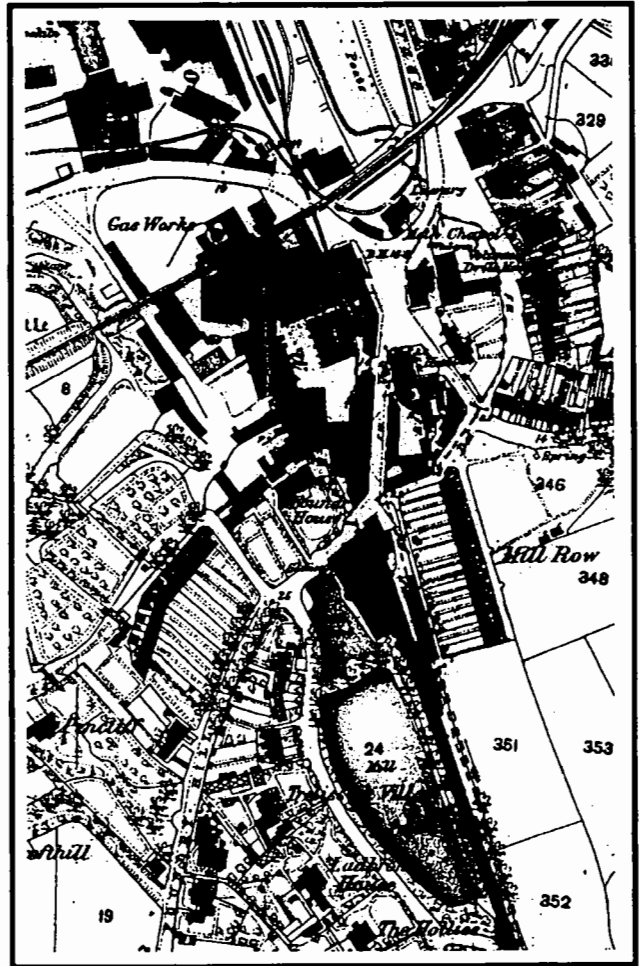
3. Development of the Foundry Site



circa 1880

The area affected by the proposed development covers only a small part of a major 19th century industrial complex. Little is known of the early years of the Foundry, from 1779 to 1840. The place chosen by John Harvey for his enterprise was a greenfield site in the late 18th century; the earliest casting foundry was sited in much the same locality as the later Casting Shops (immediately to the south of the later West Cornwall Railway (WCR) viaduct). The Hammer Mills and first Boring Mill also pre-date 1815, and were one of the first developments on the site, once

John Harvey had decided to venture into the manufacture and erection of Cornish engines after 1800. John Phillip's map of 1841 (County Record Office (CRO) DDH 166/11) shows the Foundry in a developed state, before the building of the WCR. The site included the Casting Shops, Stores, Offices, Retail Stores, Pattern Shop, Erecting Shop, Boiler Works, Smith's Shops, Pattern Store, and Transport section (Foundry Farm); across the Helston road to the south were the Hammer Mills, Boring Mill, Grist Mill, and millpond; and to the east were the White Hart Hotel, stables and dwelling houses also owned by Harvey's.



The Foundry in 1880, from OS 1st Edition 1:2500

By the 1880s the works had consolidated on the Foundry site, and expanded to the north with the new Gasworks, Shipyard, Boiler Works, and slipways. Virtually every building, yard and quay at this end of Hayle was either owned or controlled by Harvey & Co; Hayle's very existence centred around this concern now that the Copperhouse Company had closed. Within the study area some significant changes had taken place; the old Erecting Shop had been converted to a Boring Mill, and a new Erecting and Fitting Shop was built on the site of the Smith's Shop (the "Coliseum", now demolished). The function of some other buildings in this group had also altered to reflect changing demands on the works.

In 1903 the entire Foundry and engineering works was dismantled and the materials sold off or scrapped. During the succeeding years, the buildings were partly reused by Harvey's for the building trade, but gradually became more derelict. In the 1980's Harvey-UBM sold the site to a firm of developers who demolished many of the structures.

4. The Significance of the Foundry Site

Until Boulton and Watt's patent expired in 1800, the Soho (Birmingham) foundry had a monopoly on the market for beam pumping and winding engines installed on Cornish Mines. As the 18th century came to an end, the new Cornish foundries such as Harvey's and Perran Foundry were poised to take advantage of a new period of free competition within the now rapidly expanding market for mining equipment. At first, however, there was neither the skill or experience available within the county for the building of complete beam engines, and a great deal of work was contracted out to foundries such as the Neath Abbey works in South Wales.

By 1830 the three leading Cornish foundries (Harvey's, Perran, and Copperhouse) were producing work equal to that anywhere in Britain (Barton 1969, 148), and in another ten years were pre-eminent in their field:

"Not only did they supply virtually every one of the very numerous engines used on the Cornish mines from about 1820 onwards, but they supplied collieries and ironworks in South Wales, the Midlands and the North, waterworks in London and elsewhere, metal mines in Ireland, Wales and Derbyshire as well as Spain, France, South America, Mexico, Australia, the West Indies, South Africa and all other countries abroad where deep mining was carried on." (Barton 1969, 149).

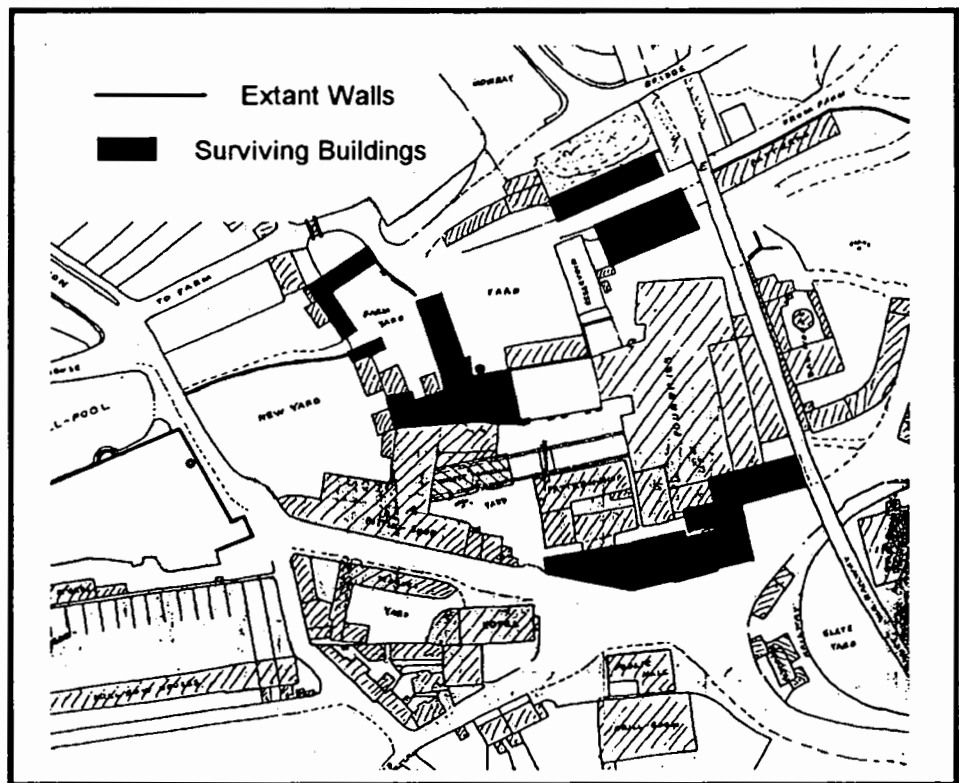
The Cornish foundries were known and respected by engineers and miners throughout the world; their stature was on a par with the great railway workshops of Swindon and Crewe, or the shipbuilding yards on the Clyde. Harvey's stood among the top three, and was arguably the greatest, with its close association with Trevithick and other great engineers such as William West. The decline and dissolution of the Cornish foundries was due solely to the collapse of Cornish mining in the later years of the century, and did not represent a loss of workmanship or skill.

The scant remains of Harvey's in Foundry Square are thus doubly significant. They are a monument to Cornish skill and enterprise in the heat of the Industrial Revolution that was, for some fifty years, pre-eminent in the world; they also represent the very reason for Hayle's

existence. The excellent conservation and presentation of the Hammer Mills by the Hayle Town Trust should serve as an inspiring model for the rest of the site; there has been to date little acknowledgement within the county of the stature of the Foundry site, which is well recognised elsewhere in Britain and throughout Europe. Harvey's already serves as a significant attraction for international tourism. Too much has already been lost; the fragments that remain deserve, and demand, a sympathetic and imaginative response from planners and developers alike.

5. The Foundry Today

The study area affected by the proposed development represents only a small part of the works of Harvey & Co, which covered many acres at this end of Hayle. Within the area affected by the proposed development, surprisingly little survives of the Foundry as it was circa 1880. The structures which do exist are all the more precious as they represent a direct link to the time of Henry Harvey and Trevithick; they also include the bulk of the surviving remains of the engineering works, the below-ground remains of the Foundry, and the transport section (Foundry Farm).



The Farm and its associated buildings are essentially intact, though they are abandoned and in poor repair: this group includes two Stable Blocks, another set of Stables with Cart Bays, a Wagon Shed and access to the Granary on the top floors of the Foundry Barn, all grouped around a well-preserved cobbled Yard. This section is a purpose-built industrial

complex, designed to house the teams of draught horse which each day would have made deliveries through West and Mid-Cornwall.

The Casting Shops and Furnaces are all now overbuilt with recent industrial development. The Foundry Barn is complete, though in poor repair with collapsed roof and floor timbers choking the interior and rendering access difficult and dangerous. The name "Barn" is somewhat misleading, as the structure would appear to pre-date 1815 and was then part of the engineering works before the building of the stable blocks to the rear; after 1840 the upper floors would appear to have been reused as provender storage for the horse teams. At the northern end the Engine House and Boiler House survive against the stub walls of the Boring Mill; at the rear of the Boiler House is the truncated Chimney Stack. The rear wall of the Boring Mill is intact and forms the perimeter of a tarmac car-parking area.

Immediately to the south of the railway viaduct, the Pattern Shed with Cart Shed at the rear is roofed and in good condition; on the opposite side of the lane is another building identified as Trevithick's Stores, in good condition and occupied for industrial use. Along the Helston Road, a mound of collapsed masonry is the demolished Fitting Shop. The former yards are covered in debris and vegetation. The Offices, Retail Shops and Stores fronting onto Foundry Square survive in good condition and are all at present occupied.

The site as it exists today presents a great challenge to planner and developer alike; it should be seen as an exciting opportunity to conserve the best of the old within a new and sympathetic framework. Given the historic context and present-day industrial reuse of the casting shop area, the suitability of the site for housing development may be open to question. Much of the site fronting the Helston road is on made-up ground with deep stratigraphy containing pipes and tunnels; removal of this ground to provide a stable building platform would severely damage the archaeological potential of the site. From the historical perspective, the proposed housing may block views and access to the Foundry Barn and Engine House from the conserved Hammer Mills, effectively destroying the visual links between the two. The proposed demolition of the Foundry Barn is unacceptable on historic grounds.

6. The Potential for Survival Below Ground

Within the development area, any ground disturbance is likely to impinge on archaeological remains from the Foundry period. The Foundry has a long and complex history which is not yet fully understood; there are likely to be many episodes of development on certain parts of the site which will be evident in the sub-surface stratigraphy.

Certain areas have greater potential for archaeological excavation than others; they include the following:

- ◆ Beneath the floor level of the Fitting Shop (demolished). This building was erected on the site of earlier Smith's Shops; there is some chance that the bases of the smith's hearths and forced draught system survives below ground.
- ◆ Within the new Erecting Shop (demolished). Examination of successive working levels here should clarify the history of site use.
- ◆ Close to the eastern wall of the Foundry Barn, within the Boiler Shop (demolished). The aim here would be to examine the relationship between the lower levels of the Barn and buildings which abutted it.
- ◆ The interior of the Engine House. The object of excavation would be to examine the floor for evidence of the engine installation and subsequent reuse.

Because the full history of the site is not fully documented or adequately researched, trenching or disturbance almost anywhere on the site could have a serious impact on the archaeology. Any such development should take place within a context of close liaison with an approved archaeological consultant, and provision should be made for any contingency Watching Briefs and Site Recording work which may be required.

7. Gazetteer of Surviving Structures

The key surviving features located within the area affected by this application are described below and located on the Key map:

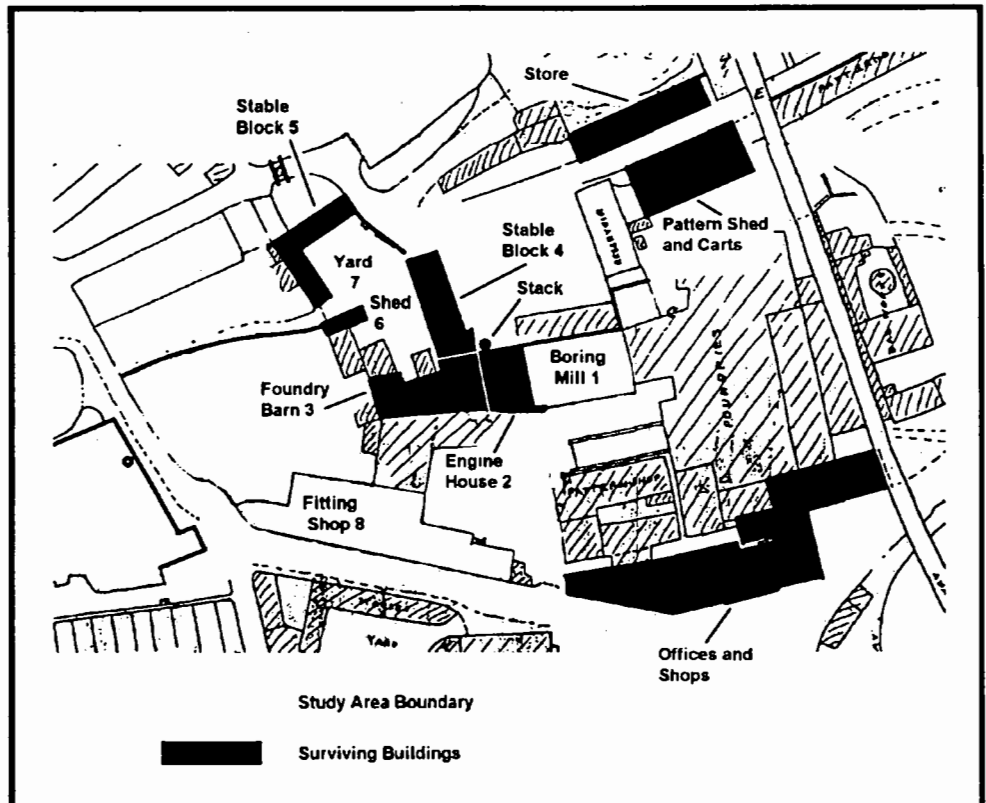
1. Boring Mill

The south wall, with its massive buttress, survives as does the rear wall. The walls are of granite rubble masonry with ashlar blocks in the quoins and openings. The floor space of the original building is now tarmac and in use as a car-park. This building was the second Boring Mill on the Foundry site, and replaced the earlier water-powered Boring Mill in the Hammer Mill complex. Here large cylinders (up to 144 inches) were bored to finished size.

2. Engine House and Boiler House

Now forms the northern end of the building known as the Foundry Barn. Originally this was part of the Boring Mill and former Erecting Shop,

and should be interpreted as part of that structure. Ivy on the walls obscures a fine arched window to the front of the Engine House; inside there is clear evidence of the flywheel position, supporting cross beam for the Bob, and the flue of the boiler house leading to an external chimney stack, of which the base survives at the rear. The floor above the boiler room may have been offices; there is lineshafting to convey power from the engine on the upper floors. The power from the beam engine was transmitted from here directly to the Boring Mill and via lineshafting to lathes, drills, and milling machines throughout the works. The engine would appear to have been far larger than was necessarily required for this purpose, and it is assumed that the engine formed a Foundry showpiece to be shown to potential customers.



3. Foundry Barn

This building is impressive for its height and typical late 18th - early 19th century industrial design. At ground level there is a series of arched openings which lead into vaulted chambers, whose function is unclear at present. It would appear from the map evidence to date from ca 1815, and was then perhaps an engineering shop and part of the early Foundry complex. After ca 1840 the upper floors were used to store feedstuff (oats, hay, and straw) for the Foundry horse teams, and there is access from the Farm Yard and Stables at the rear. Lineshafting on the upper floors probably provided power for sack hoists. Vegetation on the walls currently obscures many fine architectural details, including surviving cast-iron window frames.

4. Main Stable Block

This building abuts the Foundry Barn at right angles, and is of brick and stone construction, partly roofed. It is again a typical early 19th century purpose-built range for the accommodation of horses and wagons, and displays some excellent architectural detailing to the front, with arched openings. These buildings around the Yard would have accommodated the Foundry's numerous draught horses, which each working day delivered to the whole of West and Central Cornwall. Huge engine beams and boilers were transported in this fashion to mines in the area, and to the harbour for shipment overseas.

5. L-shaped Stable Block

Built of brick with galvanised iron roofs, these are stables and are also pre-1841 in date. They are of lesser quality than (4) but nonetheless add character to and enclose the Yard space.

6. Cart Shed

A stone-built single-bay shed, with a slate roof. Post-1841 in date, but with great charm and contributing to the character of the yard.

7. Yard

The yard is well-preserved, with a fine stone-cobbled surface.

8. Fitting Shop (demolished)

The Fitting Shop was demolished in 1984, and the rubble, which includes a large quantity of dressed granite masonry, is now piled at the front of the site. The loss of this structure was one of tragic proportion, as it was undoubtedly one of the finest (and most famous) 19th century industrial buildings in Europe.

8. Recommendations for Archaeological Evaluation and Mitigation Work

In view of the historic importance of the site, and on advice from the Cornwall Archaeological Unit, the District Council made their consent to the Outline re-development of the site conditional upon the carrying out of a detailed historical/archaeological evaluation and recording programme.

The purpose of this will be:

- ◆ To collate information on the history and significance of the site.
- ◆ To identify the sequence of buildings and other features in areas affected by development, and their functions.
- ◆ To provide a record of all upstanding buildings which are to be affected during the course of the development.
- ◆ To assess the impact of the development on the below-ground archaeological layers.
- ◆ To reassess the statutory protection of the above ground and below ground remains.
- ◆ To provide the essential framework within which decisions can be made regarding the detailed layout, form, and scale of the development as outlined in PPG16 (Dept of the Environment 1991).

In order to complete this the following work will need to be carried out:

1) Documentary Research

The study should commence with a careful inspection of the Harvey's Foundry archive at the Cornwall Record Office, which includes many maps, photos and documents relating to the development of the foundry. Enquiries should also be made at the Local Studies Library in Redruth and the Library of the Royal Institution of Cornwall in Truro, and any relevant material at these archives, together with other published material should be included in the study.

The aim of this work will be to identify the date and function of all of the buildings which either occupy, or have occupied, the area to be redeveloped.

2) Site Recording

All surviving historic buildings should be recorded in detail, in plan and elevation, at a scale of 1:50. This should include all external, and where appropriate, internal details of the structures. It will be necessary for this to be preceded by careful clearance of ivy from some of the walls, and in some cases, removal of debris from interiors. Such preparatory work should only be carried out under archaeological supervision. Recording should commence with an EDM survey of the structures which will subsequently be annotated to show all archaeological/historic detail.

The building survey can be provided by the Developer's own architects, or the archaeological consultant can arrange for this to be included as part of the recording project.

A photographic survey should be carried out, both before clearance of vegetation, and in greater detail following clearance. This should include external and internal elevations of all structures and close-ups of architectural detail. Photographs should be archive quality black and white prints.

3) Site Investigations

On-site investigations will confirm the extent of survival of buildings known to have existed from documentary sources and reveal the nature and significance of any stratified deposits which might survive below ground. This should demonstrate the archaeological impact of the proposals, and indicate what, if any, further excavation would be called for in advance of redevelopment, or to what extent the siting of proposed buildings could be modified to minimise their impact on significant buried stratigraphy.

It will not be possible to investigate some areas of the site unless the rubble which at present covers these areas has been moved.

4) Evaluation Report and the Project Archive

The report should provide an archaeological history of Harvey's Foundry at Hayle, outlining the major structural phases which the works went through, and relating this to changes in the nature of the technologies involved, and to the overall organisation of the foundry complex.

The results of the trial trenching should be summarised and their implications discussed in the context of the redevelopment plans. If necessary, the report should include recommendations for further excavations, or the modification of proposals for the siting of new buildings to avert any need for additional work. The report will be of considerable assistance to the company in framing its detailed proposals for planning consent.

CAU July 1993

9. Bibliography

- Barton, DB, 1969, The Cornish Beam Engine, 149 *et seq*
Penwith District Council, 1991, Planning Application 1/91/H/0054/F
Smith, JR, 1990, Perran Foundry, Cornwall Archaeological Unit