Report No: 2013R062

Bartle's Foundry, Pool, Cornwall

Historic building survey

Historic Environment Projects

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This study was commissioned by John Foskett of Parsons Brinkerhoff on behalf of Cornwall Council (Strategic Planning and Transportation) and carried out by Historic Environment Projects, Cornwall Council.

The Project was managed by Jo Sturgess.

The views and recommendations expressed in this report are those of Historic Environment Projects 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.

Historic Environment, Cornwall Council is a Registered Organisation with the Institute for Archaeologists

Cover illustration

East side of buildings 5 and 17 looking north.

Contents

List of Figures

Abbreviations

CRO	Cornwall County Record Office
HER	Cornwall and the Isles of Scilly Historic Environment Record
HE	Historic Environment, Cornwall Council
MCO	Monument number in Cornwall HER
NGR	National Grid Reference
OD	Ordnance Datum – height above mean sea level at Newlyn
OS	Ordnance Survey

1 Summary

Between March 2013 and May 2013 Historic Environment Projects (HE Projects), Cornwall Council carried out an historic building record at the former Bartle's Foundry on Dudnance Lane in Pool, centred at NGR SW 6653 4096 (Figs 1 and 2). The work was commissioned by Cornwall Council (Strategic Planning and Transportation) and carried out in order to satisfy several conditions for planning consent to demolish the historic buildings to make way for the construction of a new road and for the widening of Dudnance Lane.

The building record was part of a staged approach to the archaeological mitigation and followed the production of an archaeological assessment undertaken by HE Projects (Sturgess 2008). Fieldwork in 2013 included a laser scan survey (undertaken by Sumo Services Ltd), a photographic survey, analysis of the buildings and historical research.

The proposed development lies within Cornwall's principal mining area and part of it occupies the site of a former 19th century works known initially as 'Basset's Foundry' and later as 'Bartle's Foundry'. The foundry was established in *c*1860 by Bartle, Dunkin, Tregoning and Lugg to supply the nearby mines with engines and equipment. In 1884 Francis Bartle and his sons (Charles and William) bought out the other partners and the business became known as F. Bartle and Sons of Carn Brea. The foundry continued in use until 1951 when the site and buildings were bought by Holman Brothers Ltd and the Bartle's business moved to the old Redruth Foundry in North Street, Redruth.

At a later stage the former Bartle's foundry site was taken over by the local authority and became a council depot. In recent years the northern buildings have been leased to Coastline Services Ltd.

During its peak of prosperity the foundry manufactured and engineered a wide variety of cast-iron and brass goods for clients widely spread across Cornwall. Not only did it produce machinery and parts for the mines and their ancillary industries but it also supplied the tin streaming and china clay industries as well as manufacturing items such as street furniture and water wheels for mills.

Bartle's Foundry retains an almost complete and extensive group of specialised industrial buildings associated with the production and finishing of iron and brass parts for industrial use. Unfortunately the main casting shop/foundry building was demolished in the later 20th century but the surviving buildings within the complex include former pattern stores, pattern shops, a moulding shop, a machine (and erecting) shop with associated chimney, a blacksmith's shop, a boiler house and various other buildings of unknown function.

Detailed building analysis along with measured survey and map regression has enabled the historic development of the foundry complex to be understood (see phase plan Fig 13). The study has identified seven major phases of new builds and extensions and alterations to existing buildings indicating a complex history of a flourishing and constantly expanding business. It has also provided the opportunity to record a good example of a small Cornish foundry established at the height of the industrial revolution within the heart of Cornwall's most intensive mining region.

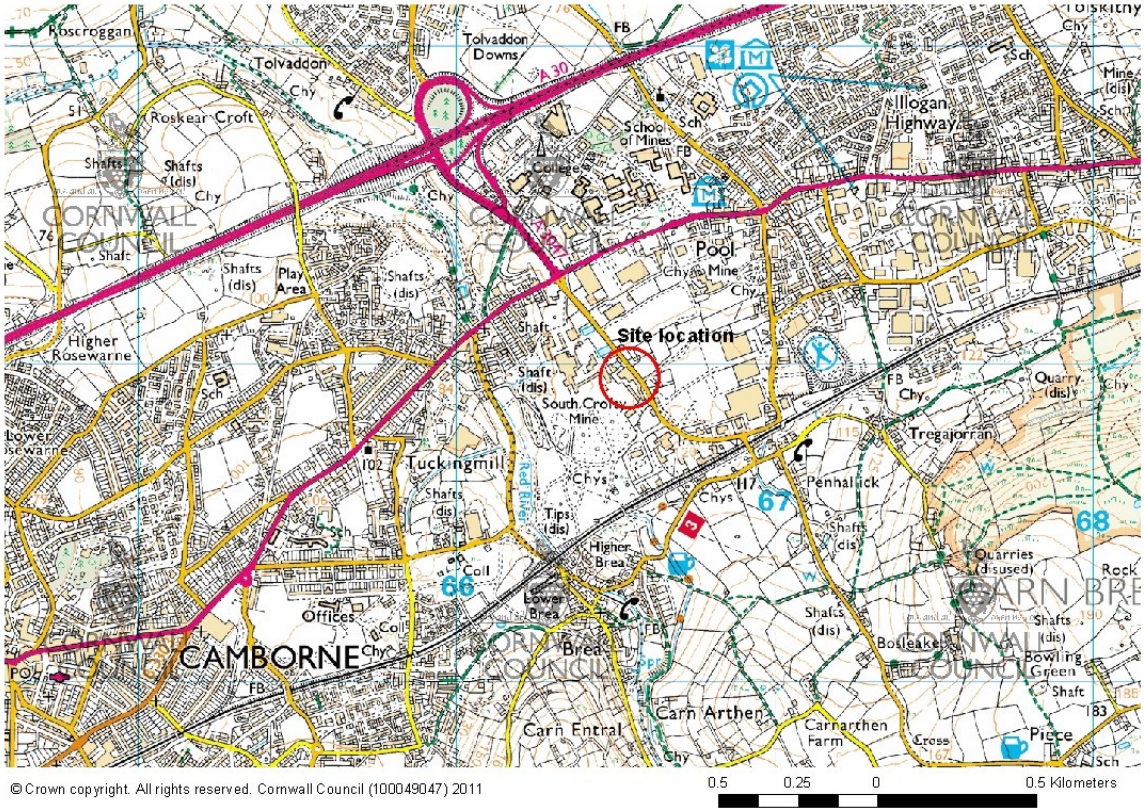

Fig 1 Location map

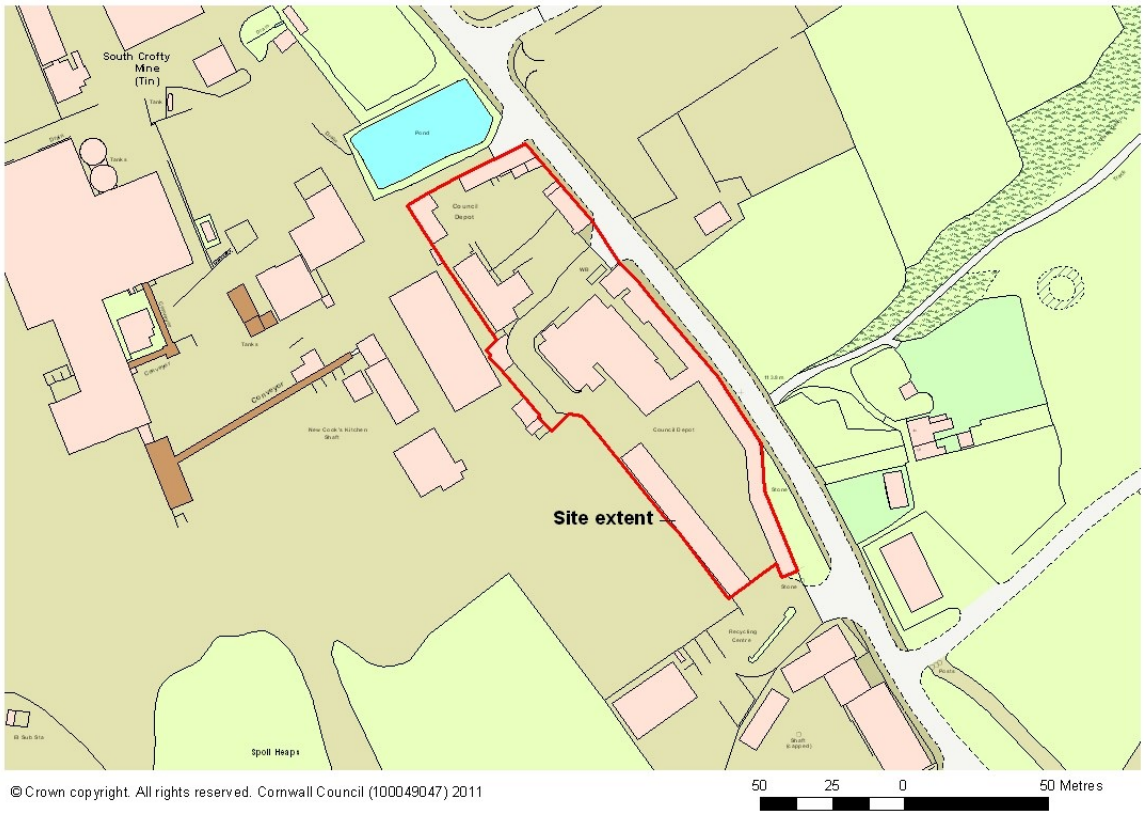

Fig 2 Site extent

2 Introduction

2.1 Project background

Historic Environment Projects were commissioned by Parsons Brinckerhoff on behalf of Cornwall Council (Strategic Planning and Transportation) to carry out archaeological work including an historic building survey, an excavation and an archaeological watching brief at the site of the former Coastline and Council depots on Dudnance Lane in Pool. This work was undertaken in advance of the proposed Camborne, Pool and Redruth road scheme involving the widening of Wilson Way, Station Road and Dudnance Lane and insertion of a new section of road at the northern end of the site. Both the Coastline and Council depots occupy the site and buildings of what was originally Basset Foundry which later became Bartle's Foundry.

Planning application 08/00355/CCENV was submitted on the 23rd July 2008 for highway improvement works (including widening) on Dudnance Lane, Station Road and Wilson Way and the adjacent side roads and to construct a new road between Station Road and Wilson Way at Carn Brea Lane. The proposal included a design to dual the road along Dudnance Lane, so that the route corridor includes the former foundry site. These development proposals require demolition of most of the structures within the study area. The application was approved subject to 11 conditions. Condition 6 states:

Prior to the commencement of development (including any site preparation works), the applicant shall have submitted to and had approved in writing by the CPA a programme of archaeological recording in accordance with a written scheme of investigation within the area of the approved site (to include details of the identification and method of recording of any sites and features of archaeological interest).

In 2008 an archaeological assessment of the foundry complex was undertaken by HE Projects (Sturgess 2008) which set out recommendations for further archaeological work at the site. As the majority of the surviving foundry buildings were found to be of historic significance, a brief dated 28/11/2012 outlining requirements for an historic building record and archaeological work including an area excavation was issued by Phil Markham, Historic Environment Planning Advice Officer, Cornwall Council (see Appendix 1). HE Projects were requested to provide a quotation and Written Scheme of Investigation (see Appendix 2) for the work. This report sets out the results of the historic building record.

2.2 Aims

The principal aim of the work was to gain a full archaeological record of the site and buildings. This included an historic building record and measured survey of the buildings associated with the foundry complex prior to their demolition. Specific aims were to:

- To establish the nature of the activity on the site.
- To provide further information on the history and development of Bartle's Foundry and the Bartle's site in general.

2.3 Methods

All recording work was undertaken according to the Institute for Archaeologists *Standards and Guidance for Archaeological Investigation and Recording.* Staff followed the IfA *Code of Conduct* and *Code of Approved Practice for the Regulation of Contractual Arrangements in Archaeology.* The Institute for Archaeologists is the professional body for archaeologists working in the UK.

The work programme followed three stages: fieldwork; archiving, and archive report production.

2.3.1 Historic building record

The fieldwork undertaken conformed to an English Heritage Level 2-4 survey (see English Heritage 2006). Only the buildings directly associated with the use of the site as a foundry (*c*1860-*c*1950) were given full descriptive records. The later 20th century buildings associated with the use of the site as a council depot were included in the photographic record but were not fully described. Since there were no existing measured surveys of the site, a laser scan survey was undertaken by Sumo Services Ltd. This provided a measured 3D model of the entire site. The interior of the main central block of adjoining buildings (buildings 5, 7, 8, 15, 16 and 17) was also included in the laser scan survey which enabled a ground plan to be extracted from the survey and provided a detailed interior survey of the most complex part of the site. Elevations of all the historic buildings associated with the site's use as a foundry were also created from the scan data. Analysis of the buildings and structures was undertaken on site (recorded as notes and measured annotations to photographs of elevations). A photographic survey of all the buildings was also undertaken including black and white archive photography and colour digital photography.

The photographic record comprised:

- General views.
- Internal and external elevations.
- Examples of structural and architectural detail.

2.3.2 Post-fieldwork

The site archive was prepared for long term storage. This included:

- Preparation of finished drawings.
- Archiving of drawings, photographs, paperwork and digital files.
- Production of this report.
- Completion of the English Heritage/ADS OASIS online archive index.

3 Location and setting

The Bartle's Foundry site covers approximately 0.9 hectares and is centred at NGR SW 6653 4096 on the western side of Dudnance Lane in Pool. The site includes the property known as Bartle's Foundry (originally Basset Foundry) owned by Cornwall Council.

Tuckingmill (to the west of the development area) is considered as one of the best places in Cornwall to get a feel for the incorporation of past industrial activity within the urban environment and there are few other places where the visible remains of a whole range of industries can be discerned (Herring *et al* 2005, 66). The layout of the 19th century industrial settlement and its associated mine sites and factory complexes, and the openness of the Red River Valley form the dominant components of the area's historic character (Dudley 2008, 14).

The development area is surrounded on all sides by tin and copper mines of various dates. Its immediate neighbour is South Crofty mine (formerly part of New Cook's Kitchen mine) and the foundry is dominated visually, by the head frame of South Crofty, which until 1997, lay at the core of the last working mine in Cornwall. To the south-west of the site lay the original part of New Cook's Kitchen mine and to the north lay Long Close mine. Until the mid 19th century the Bartle's site was farmland, although some early prospecting and mining may have taken place here. Some of the greatest early copper mines in Cornwall were located in this area; their setts were later incorporated into South Crofty mine.

In recent decades there has been much urban development in the surrounding area, principally marked by the construction of industrial and commercial estates, leaving only a few areas of undeveloped ground, often parcels of mine waste which still contain mine shafts. There are also isolated terraces and houses and industrial buildings dating to the 19th century.

Geologically, the site is based on Mylor slates and mudstones of Upper Devonian age, though these are locally much metamorphosed. The British Geological Survey also record an east-west trending felsite dyke which passes near New Cook's Kitchen Shaft. The soils are derived from the Mylor slates and mudstones and tend to be mildly acidic. A number of broadly east-west trending copper and tin lodes cross to the south and north of the area.

The site slopes down gently to the north and lies at a height of approximately 115m OD.

4 Designations

There are no statutory historic designations within the assessment area.

4.1 Scheduled Monuments and listed buildings

There are no Scheduled Monuments or listed buildings within the assessment area.

4.2 Conservation Areas

The assessment area is not within a Conservation Area.

4.3 Cornish Mining World Heritage Site

The assessment area itself does not lie within the Cornish Mining World Heritage Site. However, it is surrounded on all sides by mines and related structures which have been included within the World Heritage Site and has clear historic mining related links to the rest of the area.

5 Site history

5.1 Historical Background

(Reproduced, with minor edits, from Sturgess 2008)

Documentary records dating to the 16th and 17th centuries show that there were early mining operations in the Pool and Tuckingmill area, most probably as lodeback workings exploiting ore found close to the surface, and stream works exploiting tin rich material deposited in the valleys (Buckley 1997, 9).

Basset Foundry, named after the Pendarves Bassett family of Tehidy who originally owned the land as part of the Tehidy Estate, was established in the northern half of the development area in the mid 19th century. In the early 20th century the foundry expanded southwards to encompass the whole of the development area. The following is an extract concerning the history of the foundry (later in the 19th century known as 'F Bartle and Sons of Carn Brea' after the owners of the company) from an article in the Cornish Methodist Historical Association Vol. 9 (1977-2002) titled 'The Jack and Edgar Bartle Fund for the village of Tuckingmill, Camborne' by Russell Webber:

> *'The foundry was established in about 1860 by Messrs Bartle, Dunkin, Tregoning and Lugg… Iron work and general castings were required by the mines in the Camborne- Redruth area and Carn Brea was chosen as the site… The retirement of Mr Lugg saw the three remaining partners build up a very successful foundry ('Basset Foundry') but disagreements in 1884 led to the collapse of the*

> *partnership. This resulted in Mr Francis Bartle purchasing the business and with his sons, Mr Charles David Bartle and Mr William Bartle carrying on the business under the title of F. Bartle and Sons.*
>
> *Between 70 to 100 workers were employed at one time and the manufacture of the Murdock Rock Drill, Tuke Mills, Pulverizers and Slime Dressing machinery kept them very busy. The firm held the patents for the production of Tuke Mills and the Michell and Tregoning Pulverisers and many of these were made and distributed far and wide to the mines of Cornwall (see Advert 'The Cornish Post and Mining News' 2/1/1892)… Bartles Foundry was not so well known as the larger foundries like Harvey's and Copperhouse Foundries of Hayle, but it was kept very busy supplying mines and stream works with numerous castings and machines. In 1885 Bartle's of Carn Brea exhibited its 'Basset Rock Drill' at the Royal Polytechnic Society's Annual Exhibition.'* (Webber, 1977-2002)

In 1881 the Bartle family lived at Eton House, Tuckingmill, Illogan. Francis Bartle (one of the original founders) had four sons all of whom became part of the family business. Three sons eventually moved to South Africa to continue their business in mine engineering. One of them, James Oliver Bartle, established an engineering firm called Bartle and Company which represented numerous British manufacturing companies during the later part of the 19th century to supply the gold mining industry in Johannesburg, South Africa (Webber, 1977-2002).

The foundry continued in use until 1951 when the site and buildings were bought by Holman Brothers Ltd and the Bartle's business moved to the premises of the old Redruth Foundry in North Street, which later became part of the British Iron and Steel Corporation (Michell, 1978, 222). Basset and later Bartle's Foundry specialised in mine machinery and engineering. The following paragraphs give an insight into some of the goods that the foundry manufactured.

In 1880 Michell & Tregonning invented the barrel pulveriser (forerunner to the ball mill) which was patented and produced at Basset Foundry (Cornish Mining World Heritage Site website).

In both the mining and china clay industries the removal of water from the immediate workings is of paramount importance and in the 19th century this led to the development of the Cornish Pitwork, a pump constructed from cast-iron which lifted water in stages. The best surviving pump was manufactured by Bartle and Co and now stands on the forecourt of Wheal Martyn China Clay Museum (Ferguson 2000, 41-42).

The firebox doors of the Tolgus Brunton Calciner are marked 'Bartle Bros. Carn Brea' (Ferguson 2000, 55).

Ferguson reports on the presence of a cast-iron lavatory which was broken and incomplete during a visit to the Bartle's Foundry site. This was a rare find since as far as Ferguson is aware there are no other surviving cast-iron lavatories in Cornwall (Ferguson 2000, 60). Unfortunately during the site visit this item was not found.

Bartle and Sons made drain pipe covers and manhole covers amongst other street furniture (Ferguson 2007, 66).

The village of Coverack at one time boasted three mills. The last to grind grain was that of Richard Roberts, who was in addition a corn, flour, and coal merchant, and also a farmer. The sad remains of his premises still stand, although hardly recognisable as such, where a small ten-foot overshot wheel can be seen, constructed by F. Bartle & Sons. Iron founders of Carn Brea (Unwin 1977).

The waterwheel of Big Wheel china stone mill at Tregargus Valley, St Stephen was made by T. Bartle and Son, Carn Brea (Cole, 2004).

The listings of the foundry in the trade directories of the late 19th and early 20th centuries are as follows:

Harrod's Directory 1878: 'Bartle Francis and Company. Iron and brass founders, Basset Foundry'.

Kelly's Directory 1883: 'Bartle Fras. and Co. brass and iron founders'

Kelly's Directory 1893 and 1897: 'Bartle F. and Sons, brass and iron founders, manufacturers of mining machinery, specialité in pulverizers, Basset Foundry '.

Kelly's Directory 1902: 'Bartle F. and Sons, brass and iron founders, Basset Manor of Tehidy dated 1737 which shows part of the estate of John Pendarves Bassett Foundry '.

Kelly's Directory 1923: 'Bartle Brothers Ltd, iron founders, Basset Foundry '.

Kelly's Directory 1939: 'Bartle's foundry and engineering works, mining engineers, Basset Foundry '.

During WWII the foundry played an important part in the war effort supplying the forces with castings and other components for military use, especially in the run up to D-Day (Adam Sharpe pers. comm.).

In 1951 the foundry was sold to Holman Brothers. It is unclear whether Holmans continued to use the site as a foundry although this does seem likely. At some point after this date the site was acquired by the local District Council. The buildings were then converted to become a council depot which included a mechanics workshop, light industrial use and storage.

The northern half of the site is now leased to Coastline Services Ltd whilst the southern half of the area was until recently used by Cornwall Council (formerly Kerrier District Council) as a depot.

5.2 Cartographic and photographic evidence

(Reproduced, with minor edits, from Sturgess 2008)

The earliest map to show the assessment area in any detail is a plan of part of the Manor of Tehidy dated 1737 which shows part of the estate of John Pendarves Bassett (Fig 3). It shows the area at this date divided into two fields both called 'Lane Close' with Dudnance Lane bordering it to the east and marking the extent of John Pendarves Bassett's land. Boundary stones set along the roadside shown on later maps define the eastern boundary of John Pendarves Bassett's land here. A leat is also shown running from north-east to south-west through roughly the middle of the assessment area.

The assessment area is not shown in any detail again until it is depicted on the Tithe map of *c*1840 (Fig 5) which shows the land divided into the same two undeveloped fields that were mapped in 1737. Cook's Kitchen Mine is shown to the south-west of the site at this date and Long Close Mine to the north.

Symons and Son's *Mining map of Camborne, Illogan, Redruth and Gwennap mines* of 1870 recorded the same landscape, with two open fields, as that recorded in *c*1840. However, Basset's Foundry was established in *c*1860 (Ferguson 2000, 29) but does not appear on this map. It is likely that Symons was using an earlier base map (possibly the Tithe Map), which is why the foundry is not depicted (Adam Sharpe pers. comm.). However, he does show mineral lodes present in the southernmost part of the area.

On the First Edition OS map of *c*1880 (Fig 6) Basset foundry is represented by the depiction of many buildings enclosed within the northern half of the assessment area (the foundry was only extended into the southern half of the yard at some point after 1907 but before 1946). The following buildings with numbers allocated during the 2008 assessment (see Fig 12 for locations) were present at this date and are depicted on the *c*1880 OS map: 5, 7, 8, 10, 16, 22 and 26 (Fig 6).

The Second Edition OS map of *c*1907 shows the foundry complex still located within the northern half of the site. The following structures were added to the foundry between *c*1880 and *c*1907 and are shown on this map as additions to those shown on the *c*1880

OS map. They are: extension to 5, extension to 7, 9, 13, 17 and 19 (see Figs 7 and 12).

An aerial photograph of New Cook's Kitchen mine with Bartle's Foundry shown in the foreground taken in 1924 shows that Building 1, 2, 3, extension to 7, predecessor to 11 and 12, 14 and 15 had been added by this date (see www.britainfromabove.org.uk/image/epw009938 and Fig 12).

A vertical RAF aerial photograph of the foundry site taken in 1946 (Fig 8) shows that little change had occurred on the site since 1924. The photograph also shows that the large foundry building (22) was still standing at this date.

A photocopy of a late 20th century pencil sketch plan of the foundry was given to HE by John Woodward whose father had worked at the site. The sketch (Fig 9) is not to scale and not dated but states the functions of most of the buildings during the use of the foundry. The functions are as follows (see Fig 12 for site locations):

Pattern store: **Buildings 1, 2, 3, 9**

Coal pile: east of **Building 15**

Machine shop containing steam engine: **Building 7**

Pattern shop (pre-1945): **Building 10**

Drawing office: on the site of **Building 11**

Main office: on the site of **Building 12**

Later day pattern shop: **Building 13**

Crofty Dry and air raid shelter (1940): **Building 14**

Boiler house for steam hammer: **Building 15**

Blacksmith shop, steam hammer and coal and coke store: **Building 5**

Small castings cleaning shop: on the site of **Building 20**

Cast-iron foundry with furnace platform, brass and bronze foundry: **site 22**

6 Foundry processes and building functions

Typically the major Cornish foundry works had four main departments which were the foundry/casting shop, the forge or smithy, the machine shop and the fitting or erecting shop. The trades associated with a foundry included pattern maker, moulder, founder and fettler. For each article to be made in a foundry a pattern is made (usually from wood) based on a working drawing (Ferguson 2000).

The moulds for casting were made from fine sand with sufficient clay content to bind it together. There are two main types of mould, open and closed. The open mould is usually made directly on the foundry floor, when the pattern is pressed into a bed of sand, leaving an impression into which the metal is poured. The closed mould is made in an open ended moulding box or flask which is made in two or more parts fixed together with pins and eyes after the removal of the pattern. Once the castings have cooled they are sent to the fettler who removes any waste metal and sand before they are machined or polished (Ferguson 2000).

Cupolas (vertical shaft furnace) were normally used to melt metals but some foundries also used air furnaces. In the cupola melting was carried out in the main cylindrical structure which could be constructed to any size. Typically a foundry may have had several cupolas of different capacities. In order to produce large pieces of wrought iron suitable for some engine parts, faggoting was used. In this process suitable scrap iron was welded under a power hammer. The steam hammer was developed by Nasmyth in 1839 and was used in Cornwall soon after its development (Ferguson 2000).

The following descriptions indicate the variety of buildings known to have existed within the Bartle's Foundry and their functions.

Offices are likely to have been situated to the south of the main entrance gate. Both the **Main Office** and the **Drawing Office** are shown here on the sketch plan. They are no longer standing and have been replaced with Buildings 11 and 12.

Pattern Shops and Stores produced the wooden patterns, templates, mould boxes, and core boxes from which the moulds were made for all the foundry's castings. Buildings which have been used as pattern shops and stores at different dates include Buildings 1, 2, 3, 9, 10 and 13.

The Moulding Shop may have once been located in Building 22 or 5 but was later relocated to Building 2. Here the sand and clay moulds were made for the castings.

The Iron Foundry with adjoining Brass and Bronze Foundry (Building 22) consisted of two main areas, each with its associated furnace. The **Iron Foundry** would have used mould boxes for casting as well as using pits dug into the floor itself for very large castings using templates rather than patterns in most cases. At a later date there was an air compressor installed to fan the furnace but this must have replaced an earlier engine providing power for compressed air. The **Brass and Bronze Foundry** was used to produce the non-ferrous smaller parts.

The small castings cleaning shed to the west of Iron Foundry (now demolished) dealt with the finishing and polishing of small castings such as brass and bronze parts. Building 20 now stands on the site.

The Blacksmith's Shop dealt with the forging of wrought iron and steel. During the mid 20th century the Blacksmith's shop was located in building 5 and contained a steam hammer for the forging of heavy items.

The Machine Shop (Building 7) dealt with the finishing of castings and forgings, also the turning of small parts from solid metal. A horizontal steam engine was located inside this building to power the machinery in both Buildings 7 and 5. The building would have contained lathes, drilling machines, boring machines, grindstones, and workbenches with hand tools. The machinery was all driven by overhead line-shafting. There may also have been an erecting and fitting area, where parts would have been assembled, likely to have been located in Building 5.

Stables are likely to have existed for the foundry's horses (used to haul wagons to deliver products to customers), although their location is unknown. A possible site (now demolished) is Building 26 which ran along the original southern boundary of the site before the yard was extended to the south.

Transport around the works would seem to have originally been by horse-drawn cart and an internal tramway marked as '**Rail Ramp**' on the sketch plan. A site of a crane is also shown on Fig 6.

The foundry was located close to the Pool to Portreath branch line and Crofty branch of the Hayle Railway which was established to connect the mines to the coast for import and export. The railway was essential for supplying the foundry with coal (for the smiths' hearths, boilers and furnaces), pig iron and limestone (for the furnaces and cupolas), sand and clay (for the moulding shop), and bricks (for furnace linings) (Smith 1990).

7 Historic building record results

To simplify describing buildings in this report north-west is taken to be north.

Only the buildings directly associated with the use of the site as a foundry (*c*1860-*c*1950) were given full descriptive records. The later buildings associated with the use

of the site as a council depot were included in the photographic record but were not fully described.

7.1 Brief overview of the buildings

The industrial building complex set within a walled yard dates from *c*1860 when Basset Foundry was first established. Throughout the 19th century and first half of the 20th century the foundry complex underwent many alterations, extensions and additions. The use of the site as a foundry was abandoned after 1951 when Bartle's foundry moved to premises on North Street in Redruth and the site was then taken on as a council depot after a short length of time under the ownership of Holman Brothers Ltd. Its ownership in the hands of Kerrier District Council involved major remodelling including the conversion of many of the buildings, the demolition of the foundry building, the demolition of other structures and the construction of newer buildings.

This study has focused on those structures relating to the use of the complex as a foundry site between *c*1860 and 1951. The building numbers used in this report replicate the site numbers used previously in the assessment report (Sturgess 2008).

The surviving foundry buildings comprise single-storey workshops set around the edges of the yard and a large amalgam of adjoining buildings including the machine shop and moulding shop/blacksmith's shop in the centre of the yard. The foundry's casting shop itself (building 22) was located in the northern half of the yard but was demolished in the later 20th century. The surviving buildings range in date from the mid 19th century to the mid 20th century. They include the following; a machine shop with associated chimney where cast objects were finished, a boiler house for a steam hammer, a blacksmith's shop, coal and coke stores, pattern shops where wooden patterns were made for casting moulds, pattern stores, a moulding shop and offices. There is a surviving overhead gantry inside the southern half of the blacksmith's shop/moulding shop (Building 5) used for moving large objects within the room. In the northern part of the machine shop (Building 7) sections of cast-iron rising mains made on site have been used as pillars to support the roof structures of various phases of extensions.

Generally the walls of the buildings and yard are constructed from stone rubble, much of it recovered from mine waste. Other materials such as granite and brick were used for quoins and jambs. Early mortars used in the walling incorporate a variety of earth and lime mixes. All the buildings would originally have had slate roof coverings but most have since been re-covered with corrugated sheeting or asbestos tiles.

7.2 Buildings 1, 2 and 3

(Figs 12-25 and elevations Fig 83)

This range of buildings was constructed during phase 4, at some point between 1907 and 1924. They appear to have all been built at the same time when the foundry complex was extended to the south and more yard space was gained. These buildings were purpose-built to house new pattern stores to the north and a moulding shop to the south. The northern end of the range adjoins building 9, the earlier pattern shop. Buildings 1, 2, and 3 combine to form a single-storey and single depth building constructed along a former yard wall which has been used to form the east wall of the building. The roof is gabled at the southern end and has a modern asbestos slate covering. The front elevation faces west onto the foundry yard.

<u>Exterior</u>

The east, rear, roadside wall reuses an existing mine waste rubble-built yard wall to which a few courses of masonry have been added to achieve the required height. Within the mine waste rubble there are occasional pieces of copper ore now oxidised to become green and the rubble is bonded with earth mortar with occasional lime flecks. The north end of the range (building 3) adjoins building 9 (a pre-existing building). It seems that the southern wall of building 9 was demolished when the new range was

built to allow access through. The front (west) elevation of the range (Fig 83) has undergone several phases of remodelling but appears originally to have been constructed from mine waste rubble containing granite and slate with a series of workshop windows and several door openings. All jambs were originally brick built and lintels were timber. The west elevation of Building 1 has a wide door opening at the southern end (1c) with brick jambs. To the north of this the west wall of the building (1b and 1a) is entirely modern comprising concrete pillars between 5 double garage doors. It is possible that this part of the range was originally open-sided, but the wall may equally have been demolished to provide garage openings. At the south end of building 2 (2a) in the west wall there are two intact workshop windows with brick jambs and timber lintels and an inserted door opening where the range changes alignment. The west elevation of building 2b has been rebuilt in concrete with shuttered concrete pillars and has three window openings with reused original workshop windows and a double door opening at the south end. This section of wall may also have been open-fronted originally. The west elevation of building 3 is the original stone rubble wall. It has five window openings, some with surviving workshop windows and overlapping glazing. These all have reused timber lintels and brick jambs. There is also a wide double door opening just to the south of centre which has brick jambs and a replacement steel lintel. The southern wall of the range (Building 1c) is built up against the existing yard wall. It is original stone rubble gable with a wide double door opening with brick jambs on the west side (now blocked). The apex of the gable was originally timber clad but has now been replaced with corrugated plastic.

Interior

Originally the internal space of the range was divided into three long rooms. Building 1 has now been divided into 3 small rooms (1a, 1b and 1c) with inserted concrete block partition walls. Building 2 is divided into 2 rooms (2a and 2b); 2a originally formed a single room space with 1a, 1b and 1c and was divided from 2b by a stud partition (now removed). Building 3 originally shared a single room space with Building 9 but there is now a concrete block wall dividing the two buildings. There is an original stone wall dividing building 2 from building 3 with a wide centrally set door opening and above it a hatch door giving access to a loft space in building 3. Both openings are original and have brick jambs and reused timber lintels.

Throughout the range there are modern inserted cement floors and at the dividing point between 2a and 2b the floor level steps up to the south. All of the walls are lime-washed. The original timber, braced and nailed trusses survive in all three buildings although the rest of the roof structure is modern with an asbestos slate covering. All original interior fittings such as workbenches etc have been removed. Written in chalk on one of the trusses in 2a is 'moulding shop'. Since 2a was originally part of the same room as 1a, 1b and 1c it seems likely that this whole southern end of the range was used as a moulding shop during the early 20th century. In building 2b several wood and iron patterns were found resting on the top of the east wall under the roof (Fig 21). This suggests (as does the 20th century plan of the foundry Fig 9) that the northern part of the range was used as a pattern store. Building 3 retained its original light fittings and enamelled lamp shades that hung from the apex of the roof.

7.3 Building 4

(Figs 12, 13 and 26)

This building is associated with the use of the site as a council depot and therefore did not undergo detailed analysis. It is a modern portal frame building with a corrugated cement asbestos roof covering which has plastic skylights on the west pitch. It is constructed from concrete block-work and has nine bays. The northern and southern bays are closed off but the rest of the building is open to the yard.

7.4 Building 5

(Figs 12-13, 27-34 and plan and elevations Figs 81 and 85)

This building contains elements of one of the earliest buildings on site. It was originally constructed during phase 1 in *c*1860, and was one of the first foundry buildings. During phase 2 (between 1860 and 1880) buildings 16, 17e and 7a and a predecessor to 7b were constructed adjoining it to the west, east and north. It was later extended to the south, west and east during phase 3 (1880-1907) and extended again to the south during phase 4 (1907-1924) to form the large building that exists today. The original building was a tall gable ended structure built from un-coursed mine waste rubble bonded with earth mortar. When it was extended between 1880 and 1907 the south gable was removed to extend the building to the south and most of the east and west walls were removed to extend slightly to the east and create a lean-to to the west. The earliest function of the original building is unknown but it seems likely that it had become an erecting or moulding shop by the time building 7 had been added to the north (at some point between 1860 and 1880 during phase 2) since a cast-iron gantry associated with this phase remains *in situ* (Fig 34). During the first half of the 20th century the main part of this building was used as a blacksmith's shop (as shown on Fig 9) and a steam hammer was located at the northern end. At this date the lean-to extension on the western side was used for storing coal and coke. After the site was abandoned as a foundry after 1951 building 5 was converted to become a garage. This involved the excavation of large inspection pits in the floor, the rebuilding of the west elevation with large openings containing upward sliding doors, construction of a new steel roof structure and insertion of two small interior room spaces built with stud walling.

<u>Exterior</u>

Survival of the walls of the original building is limited to the north gable end and short sections adjoining the gable of both the east and west walls. The original gable is now visible inside building 7a. Here two blocked door openings at either end of the wall have been inserted at a later date. The one to the east has a timber lintel and is filled by mine waste rubble and the one to the west has brick jambs and an iron lintel and has been infilled with concrete blocks. In the centre of this wall at ground level there is a large blocked square opening associated with the transmission of power from a horizontal steam engine which was located at the south end of building 7a. Higher up in the wall above this is another smaller blocked opening presumably for a bearing supporting line-shafting. The remaining original section of the east wall has a tall, narrow recess internally close to the gable end. This feature is a blocked opening associated with the interior function of building 17d which adjoins it. Inside 17d the opening is the height of the lean-to room and was likely to have been inserted so that power from building could be transmitted into the lean-to via a belt drive or engine flywheel. In the remaining original section of the west wall where building 16 now adjoins it, there is an original, large, blocked window.

The rest of the east wall dates to the phase 3 (1880-1907) extension of the building and is constructed from mine waste rubble with occasional brick. The eastern extension wall was constructed adjoining the south wall of building (lean-to) 17d. At the northern end of it there is a door opening with a granite jamb to the south and timber lintel. Directly above it is a long blocked opening (possibly an earlier window or vent). To the south of this at ground floor level there is a large wide blocked double door opening. South of this again at the southern end of this wall is an inserted blocked door opening which was created to give access to building 8.

The south wall (phase 4) is now a gable end but originally had a half-hipped roof. This is evidenced by the rendered block work infill at the top of the wall. There are two tall narrow windows with slate and brick jambs, cast-iron lintels and slate sills. The building 5 lean-to on the west side appears to have used the rubble wall of an earlier range of buildings (building 26- demolished during phase 4) as its base. The walling above this

is rendered with cement. An earlier lean-to roof line is visible continuing down at the same angle as the main roof structure. This has been heightened to allow for inserted garage doors in the west elevation during the second half of the 20th century.

The west wall is a mid/late 20th century replacement. Remains of an earlier rubble wall that it replaced are visible at the far south end. It is now a rendered concrete block-built wall with four large garage door openings, three of which retain their original upward sliding doors.

The roof covering is modern corrugated iron and has plastic skylights on both pitches.

Interior

The building now comprises a single large room space with two inserted mid to late 20th century rooms partitioned off along the eastern wall with stud walling. The mine waste rubble walls are lime-washed and the floor is concrete and contains inspection pits and channels associated with the building's later use as a garage. Steel roof trusses were just visible at the time of the survey through small holes in the *c*1970s ceiling tiles.

An early cast-iron gantry survives *in situ* within the area of the original phase 1 building (Fig 34). This runs the length of the earlier building from north to south and would have been used for moving large heavy objects along the room. Only the north wall and northernmost sections of the east and west walls survive from this phase 1 building. During phase 2 (before 1880) Building 16 was added to adjoin the northern end of the west wall, Building 17d was added to the northern end of the east wall and Building 7 was added adjoining the north wall. It seems likely that at this stage a steam engine was installed at the southern end of Building 7 and openings made in the north wall of building 5 to convey power through to this building. During phase 3 (1880-1907) the south, east and west walls of the phase 1 building were mostly removed and the building extended in all three directions. This involved the addition of a lean-to running the length of the western side. Although this lean-to has been greatly modified in the second half of the 20th century to allow access for garage use a single cast-iron pillar used as a roof support for this side of the building survives *in situ*. The northern end of the lean-to is formed by the south wall of Building 16. During phase 3 this wall had two openings inserted for the purpose of transferring power through to the newly extended building. During phase 4 the building was extended southwards again involving the demolition and rebuilding of the south end.

7.5 Building 6 (Council Depot)

(Figs 12, 13 and 35)

This building is associated with the use of the site as a council depot and therefore did not undergo detailed analysis. It is a small single-storey building comprising rendered concrete block work and a flat roof. It adjoins and post-dates building 15. Internally it is sub-divided into two rooms and has two Crittal windows. It was probably built as a transformer building. There is an oil tank on the roof which once contained engine oil and probably relates to the use of building 5 as a vehicle workshop.

7.6 Building 7

(Figs 12-13, 36-47, plan and section Figs 81-82 and elevations Fig 85)

This large, three bay building has evolved through several phases of extension and remodelling. It is marked on the sketch plan of the foundry as 'machine shop'. The walls are constructed from un-coursed mine waste rubble bonded with earth mortar and there are large cast-iron columns separating the bays and supporting three hipped roofs on massive load-bearing support timbers. The roof covering is all modern asbestos slates. At the south-west corner of the central bay there are the remains of a chimney stack (which survived to its full height until very recently).

This building contains elements of a phase 1 building at its north end (north part of 7a and 7b). Here there was originally a hipped roof building aligned east-west but only the eastern end of it remains *in situ* where building 7a steps out slightly to the east (Fig 36). This early section of walling shows that this building was constructed from mine waste rubble (granite and killas) bonded with earth mortar and had granite quoins and jambs. In the east wall of this early section there is a large, partially blocked original window opening and to the south of it an original blocked door opening. The height of the phase 1 building is also visible here and in the north wall at this corner at a lower level than the present building. Here courses of masonry have been added to the top of the original build during phase 3 (1880-1907) to create a higher hipped roof at the north end. Phase 2 (1860-1880) involved the extension to the south of the phase 1 building (7a and 7b). This was designed to fill an open area between the phase 1 building at the northern end of 7a and 7b and Building 5. The phase 2 extension comprised a tall building aligned north-south with an adjoining, much narrower, pitched roof structure along the length of its western side (building 16 is a surviving fragment of this). Both structures (7a and 7b) formed a single open space internally divided by cast-iron support pillars along the line of the roof valley. Also associated with phase 2 is a chimney located immediately outside the south-west corner of building 7b. During phase 3 (between 1880 and 1907) the building was remodelled and the south and west walls of the phase 1 building removed. The slightly lower pitched roof structure (7b) was remodelled by extending it slightly westwards and heightening the roof (which was hipped) so that it resembled Building 7a in dimensions. Building 16 is the remaining southern section of this building and was excluded from the remodelling because of the location of the chimney immediately west of it. The lower courses of the chimney have been incorporated within the phase 3 extension to 7b.

The building was again extended to the west during phase 4 (1907-1924) to create the three bay structure that exists today. During this phase internally Building 7 would have formed a single open room space used as a machine shop. The 20th century sketch plan (Fig 9) shows that a steam engine was installed at the southern end of 7a.

<u>Exterior</u>

Survival of the walls of the original building is limited to the north part of the eastern wall and short sections of original south and north walls adjoining this protruding east wall. Here, in the east wall of this early section, there is a large, partially blocked original window opening and to the south of it an original blocked door opening both with granite jambs. The height of the phase 1 building is also visible here and in the north wall at this corner at a lower level than the present building where the granite quoins stop.

The surviving phase 2 walls include the rest of the east wall which is now adjoined by Building 17 and the eastern half of the north wall. The east wall of the phase 2 building has a series of four original window openings all of which have been altered or blocked at a later date (Fig 41). It appears that all the phase 2 window openings (unlike phase 1) have brick jambs and timber lintels. In the north wall the large wide door opening is a phase 2 or 3 feature which has been widened and heighted during the 20th century. The original height of this opening is visible where there is a trench in the wall for an earlier sliding door. To the west of this large door opening there is a phase 2 or 3 window opening with brick jambs. Building 16 was originally part of Building 7b but has been described separately below. The chimney immediately west of this is also part of the phase 2 build and was constructed as an external feature. The top of the chimney is now missing but it is square in plan at the base which is constructed from large, dressed granite blocks and circular in plan higher up where it is constructed from mine waste rubble (Fig 64).

During phase 3 building 7b was extended to the west and heightened slightly. The removal of the phase 2 west wall is visible in scarring in both the north and south walls. The north face of the base of the phase 2 chimney was incorporated into the south wall of the phase 3 structure (Fig 46). In the north wall there is a window opening in this

phase of the wall which was created to match the phase 2 window to the east of it. During phase 4 (1907-1924) the west wall of the phase 3 structure was removed and the building again extended to the west. This phase of construction mimicked the existing building. The walls are constructed from mine waste rubble and all openings had brick jambs to match the existing and timber lintels (all reused). In the west wall there is a large, partially blocked, double door opening and three window openings. In the north wall there are two further windows in this part of the extension and there are also two window openings in the south wall although the westernmost window has been altered to create a door opening when Building 15 was added.

Interior

The building now comprises two large room spaces divided by an inserted concrete block wall between 7a and 7b. The mine waste rubble walls in both rooms are lime-washed and the floors are concrete. In 7a the phase 2, kingpost timber roof trusses survive (Fig 42), although one or two have been replaced with phase 4 (1907-1924) tie beam trusses. In 7b and 7c the roof trusses are all phase 4 tie beam trusses and the roof valley between the two roof structures is supported by the stub ends of the phase 3 west wall and a cast-iron support pillar. This pillar is a section of cast-iron rising main which was made at the foundry and bears the name 'F. Bartle and Sons' (Fig 44). Two layers of massive horizontal timbers support the roof valley between 7a and 7b and are also supported by cast-iron pillars (Fig 43). The upper timbers are an original part of the phase 2 roof structure and the ends of the original 7b trusses are visible as sawn off ends on the west side of the timbers. The lower layer of timbers was inserted during phase 3 along with cast-iron support pillars when 7b was extended to the west (these are sections of cast-iron rising main presumably also made here). The roof trusses in all three sections of the building have cut outs for line-shafting and rope wear across the tops of the tie beams.

During phase 2, Building 16 was part of building 7b, and when 7b was extended to the west during phase 3, its southern end (now Building 16) was left as it was but the main part was re-roofed with a hip added to the north end. There is now a concrete block wall dividing Building 16 from 7 which may replace an earlier timber division (Fig 46). The floor in Building 16 is roughly 0.4m higher than that in building 7 suggesting either that the floor level in building 7 was reduced at some point either during or after phase 3, or that machinery was based within Building 16 that needed a plinth foundation.

Building 7, marked as the 'machine shop' on the sketch plan (Fig 9), is known to have housed a steam engine which was located at the southern end of 7a. Two inserted, blocked openings in the south wall (north wall of Building 5) indicate that power from the engine was used to drive machinery not only in Building 7 but also in Building 5. Another two similar blocked openings are visible in the south wall of Building 16.

7.7 Building 8

(Figs 12-13, 48-49, plan Fig 81 and elevation Fig 84)

This small square pitched roof building is first shown on the *c*1880 OS map adjoining the eastern end of building 26 (now demolished). It was probably constructed during phase 2 (pre-1880) but may have been part of the original phase 1 complex. During phase 3, Building 9 was added to adjoin the eastern wall of Building 8. During phase 4 (1907-1924) Building 26 was demolished and Building 5 was extended eastwards to adjoin the western wall of Building 8. On the 20th century sketch plan it is not shown but physical evidence suggests that it may have served as an engine house. It has been used during the later part of the 20th century as a kitchen and most recently as a poison store. The walls are constructed from un-coursed mine waste rubble bonded with earth mortar with granite quoins and brick jambs. It is rendered with cement mortar on much of the exterior and has a modern asbestos slate roof covering.

Exterior

The south wall is formed by the original yard wall which was heightened when the building was constructed. The east wall is now a concrete blockwork insertion but the original east wall lies 2.8m to the west of this and is a thick stone rubble wall with granite quoins. This wall has an inserted door opening at the northern end and a smaller arched, square opening at the base of the wall to the south of the door. The square opening measures 0.6m high by 0.6m wide and has an iron lintel. It is very similar in dimensions to the drive shaft openings in building 5 and suggests that this building may have functioned as an engine house. The west wall is the original stone rubble-built west wall of Building 8 and has an inserted, blocked door opening through to building 5 directly opposite the probable drive shaft opening in the original east wall. It seems likely that this door opening was inserted where there was already another drive shaft opening in this wall. The north wall is also the original phase 2 wall and has a wide, blocked double door opening fronting the yard. At the base of this opening are the remains of brick jambs but the upper part of the wall has been replaced with concrete.

Interior

Originally Building 8 formed a single room space. The interior has been sub-divided during the late 20th century into three rooms and a hall space by insertion of concrete block walls. Inside the stone rubble walls are lime-washed, there is a modern suspended ceiling and the floor is concrete. The roof trusses are not visible and modern kitchen units have been inserted in the two western rooms.

7.8 Building 9

(Figs 12-13, 50-54, elevations Figs 83-84)

Building 9 was constructed during phase 3, at some point between 1880 and 1907 to infill a space in the south-east corner of the yard between existing Buildings 8 and 10. This building was designed as a workshop with large window openings in the yard side wall allowing maximum light to enter the building. On the 20th century sketch plan it is not shown clearly but would appear to be part of the pre-1945 pattern shop. The northern end of the building adjoins Building 10, the southern end adjoins Building 3 and the southern end of the western wall adjoins Building 8. It is a single-storey and single depth building constructed along a former yard wall which has been used to form the east wall of the building. The roof is continuous with that of Buildings 3, 8 and 10 and has a modern asbestos slate covering. The front elevation faces west onto the foundry yard. The walls are constructed from un-coursed mine waste rubble bonded with earth mortar with brick jambs.

Exterior

The northern half of the east, rear, roadside wall reuses an existing mine waste rubble-built yard wall to which a few courses of masonry have been added to achieve the required height. Within the mine waste rubble there are occasional pieces of copper ore now oxidised to become green and the rubble is bonded with earth mortar with occasional lime flecks. The southern half of this wall within 9a has been removed and replaced with a concrete block built wall which is stepped back from the yard wall. Within this replacement section there are six iron lintelled window openings (now blocked). The south wall of the building was demolished when Building 3 was constructed (between 1907 and 1946). The northern wall of Building 9 is formed by the southern (originally external) wall of Building 10 and has an inserted door opening with brick arch and jambs. The front (west) elevation (Figs 51 and 84) is constructed from mine waste rubble containing granite and slate bonded with earth mortar. It has an original, wide door opening with granite jambs at the north end with a series of three, large, workshop windows divided by brick pillars and originally a fourth at the southern end which has since been altered to form a door opening.

Interior

Building 9 was designed as an extension to link Buildings 8 and 10. Originally Building 9 formed a single room space. The interior has been divided during the mid/late 20th century into two rooms (9a and 9b) by the insertion of a chipboard stud wall. Inside the walls are lime-washed, there is a modern chipboard ceiling in 9b and the floor is concrete. The roof structure comprises simple braced trusses which dog-leg to the west and continue through into Building 8.

7.9 Building 10

(Figs 12-13, 50, 55 and 56, elevations Figs 83-84)

Building 10 was constructed as a stand-alone building most probably during phase 2 (pre-1880) although there is a possibility that it was constructed during phase 1. During phase 3, at some point between 1880 and 1907, Building 9 was added to adjoin the south end and infill a space in the south-east corner of the yard between existing Buildings 8 and 10. In the second half of the 20th century Building 11 was added to adjoin the north side replacing an early 20th century extension to the range. On the 20th century sketch plan (Fig 9) Building 10 is labelled as the pre-1945 pattern shop. It is a single-storey and single depth building constructed along a former yard wall which has been used to form the east wall of the building. The front elevation faces west onto the foundry yard. The walls are constructed from un-coursed killas and granite mine waste rubble bonded with earth mortar. Brick piers separate the front windows and the building has a modern asbestos slate roof covering.

Exterior

The east, rear, roadside wall reuses an existing mine waste rubble-built yard wall to which a few courses of masonry have been added to achieve the required height. There is a small area of brick infill at the north end of this where the original, returning north wall of the building has been removed. This north wall was replaced with a modern concrete block built wall when Buildings 11 and 12 were constructed. The original, exterior, stone rubble-built south wall of the building remains *in situ*. It is constructed from killas and granite bonded with earth mortar and contains an arched door opening set slightly off-centre. The west wall of Building 10 is has undergone various phases of modification although an original section remains at the southern end where the lower half of the wall is constructed from mine waste rubble bonded with earth mortar and the upper half comprises two large window openings divided by brick piers. To the north of these window openings there is a door opening which has been reduced to accommodate a window. To the north of this the walling is modern concrete blockwork and there is a wide, double door opening at the north end.

Interior

Building 10 was designed originally as an isolated structure. The interior is a single open room space with lime-washed walls. The simple braced and nailed trusses appear to be original and they show signs of equipment/machinery being bolted to them (possibly line shafting). One truss bears the initials 'H.I.S' carved into the tie beam. The floor is concrete.

7.10 Buildings 11 and 12

(Figs 12-13 and 57)

These buildings are associated with the use of the site as a council depot and therefore did not undergo detailed analysis. They are entirely modern and occupy the site of an earlier 20th century building shown on the 1946 RAF aerial photograph (Fig 8). The sketch plan labels the predecessor of Buildings 11 and 12 as the 'Drawing Office' and 'Main Office' and immediately west of them on the drawing a 'test pit, pumps etc' is shown which may relate to the feature shown here on the *c*1880 OS map.

7.11 Building 13

(Figs 12-13, 58-60, elevations Fig 86)

This building, located along the northern boundary of the yard is first shown on the *c*1907 OS map. It was constructed during phase 3 (1880-1907). On the 20th century sketch plan (Fig 9) it is labelled 'Later Day Pattern Shop'. It has been used during the later part of the 20th century as a workshop for light industry with sound proofing tiles added to the internal wall faces. The walls are of several different phases. It appears that the central section of the building was originally open fronted whilst the east and west ends comprised enclosed rooms. The original build comprises granite and killas rubble bonded with earth mortar and has granite quoins and jambs. Later walling added to infill the former open front comprises un-coursed killas rubble bonded with earth mortar and has brick jambs. Towards the eastern end of the building there is a post-war concrete block-built lean-to adjoining the frontage. The trusses are original simple nailed and braced trusses and the rest of the roof structure is modern with an asbestos slate roof covering. The floor is concrete.

Exterior

The north and east walls are formed by the original yard wall which was heightened when the building was constructed. These comprise granite and killas mine waste rubble which has been heavily repointed with cement mortar. There is a single, small inserted window opening at the east end of the north wall but apart from this there are no other openings in either wall. At the north-east corner of the building there is a granite-built quoin. The west wall is the original phase 3 granite and killas rubble wall with a granite-built quoin at the southern corner and no openings. There was once a lean-to that adjoined this wall, the remains of which can be seen in the yard wall to the west. The front (south) wall is original at the far west end. Here there is an original door opening and an original window opening. To the west of the door, built into the walling is a fragment of a granite grindstone, and just to the east of the window opening, where the stone wall returns internally to form a room at this end of the building, is an original granite jamb. The walling to the east of this is later killas rubble infill of an original wide open frontage. In this section of walling there are two inserted, blocked window openings and to the east of these a wide inserted double door opening which has a brick jamb to the west and reuses an original granite jamb to the east. To the east of the granite jamb the walling is all part of the original phase 3 build. Covering the western half of this section of original wall is a concrete block-built lean-to which conceals an inserted window opening in the wall behind. East of the lean-to is a blocked inserted door opening. The original walling at this end comprises granite and killas mine waste rubble bonded with earth mortar and re-pointed with cement mortar. At the eastern end this wall abuts the yard wall.

Interior

The interior originally appears to have been divided into three room spaces with a small office or pattern store at the west end, a large, open fronted pattern workshop area to the east of this and a partitioned-off workshop or store at the east end. It was converted for light industrial use after 1950 and is now divided (during the late 20th century) into six rooms by the insertion of concrete block-built walls. An original granite and killas rubble wall at the east end divides off the former office/pattern store. Inside the stone rubble walls are lime-washed, and the two eastern rooms have been lined with fibreboard and gauze metal tiles. In the original rear wall there are wooden pegs for shelving relating to the phase 3 building. In the western room (office/pattern store) there is a keeping place at the west end of the front wall. Internally there is clear evidence that the floor level has been reduced by 0.4m throughout the building where the footings are exposed in the original walls. The floor covering is now concrete. The original nailed trusses with struts survive although the rest of the roof structure is modern and has an asbestos slate covering.

7.12 Building 14

(Figs 12-13 and 61)

This is the eastern wall of a South Crofty building constructed during phase 4 (1907-1924), the rest of which has now been demolished and replaced with a 1980s miner's dry and two small structures at the south end. It is visible on the 1946 RAF aerial photograph and is marked on the 20th century sketch plan as 'Crofty Dry' with a building at its south end marked as 'air raid shelter 1940'. The wall is constructed from mine waste rubble and has seven evenly spaced blocked window openings with brick jambs and timber lintels. There is now a concrete block-built lean-to (toilet block) at the southern end. The area in front of the wall to the east was used as a refuelling area after 1950 and two fuel pumps dating to the 1960s/70s remain *in situ*.

7.13 Building 15

(Figs 12-13, 50, 55 and 56, elevations Figs 83-84)

This small lean-to building was added during phase 5 (pre 1924) to the south wall of the phase 4 (1907-1924) extension of Building 7 (7c). On the 20th century sketch plan it is marked as 'Boiler House for Steam Stamps' but has most recently been used as a forge. The walls are constructed from un-coursed mine waste rubble bonded with lime mortar except for a large area of the south wall which has been replaced with concrete blockwork (after removal of the boiler). It is rendered with cement mortar on the exterior and has a corrugated asbestos lean-to roof. At the north-east corner the remains of the earlier (phase 2) chimney stack have been incorporated into the east wall.

<u>Exterior</u>

The north wall is formed by the original external wall of Building 7c. It has two phase 4 original window openings, both of which have been altered. The western window was altered to form a door opening when Building 15 was added and the east window has been partially blocked and a smaller workshop window inserted. The west wall of the lean-to has a double door opening and a curved south-west corner for the ease of passing vehicles in the yard. The mine waste rubble-built western end of the south wall remains intact with the surviving corner of a window opening, but the rest of the south wall and half of the east wall were demolished in order to remove the boiler when the foundry was moved to Redruth in the 1950s. The south wall and southern half of the east wall were then rebuilt in concrete block-work. The remainder of the east wall incorporates the granite-built western face of the chimney at the northern end of the wall and some brick infill to the south of it. Within the base of the chimney stack at this end there is an original exhaust opening measuring 0.6m high by 0.6m wide with granite jambs and lintel.

<u>Interior</u>

Inside the walls are lime-washed in the single open room space, there is a modern suspended ceiling and the floor is concrete. At the north-east corner there is a 20th century (probably 1960s) forge built against and reusing the flue opening in the chimney stack.

7.14 Building 16

(Figs 12-13, 65 and 66, plan Fig 81 and elevation Fig 85)

Building 16 is a small remaining fragment of Building 7b as it was during phase 2. Building 7 during phase 2 comprised a tall building aligned north-south (7a) with an adjoining, much narrower, pitched roof structure along the length of its western side (building 16 is the surviving southern fragment of this). On the 20th century sketch plan it is not labelled but appears at some point to have been used as an engine house since there are drive shaft and machine openings in the south wall through to Building 5. The

original function is unknown but its large original windows suggest it is likely to have been built as part of the machine shop along with 7a and 7b. The walls are constructed from un-coursed mine waste rubble bonded with earth mortar and have been rendered with cement mortar externally during the 20th century. The phase 2 pitched roof has a scantle slate covering; apparently this is the only building within the Bartle's site that has retained some of its original roof covering. Internally the building is now divided into two room spaces by an inserted concrete block-built wall.

Outside the north-west corner are the remains of the phase 2 chimney stack.

Exterior

The north wall and northern half of the east wall are modern concrete block-built insertions and before these were inserted, building 16 formed part of a single, internal room space with 7a and 7b. Within the northern concrete block wall there is a door opening giving access through to Building 7b and within the northern half of the eastern wall there is a door opening through to Building 7a. The southern half of the eastern wall is the original external wall of Building 5 and contains a blocked window opening associated with phase 1 of Building 5. The south wall of Building 16 is the original southern end of the phase 2 building and has two inserted openings associated with later transmission of power into Building 5. One large square opening lies at the base of the wall and the other, smaller rectangular opening is located higher up for line-shafting. The west wall is the original frontage and has two very large window openings with timber lintels divided by a brick-built pier. To the south of these at the south end of the wall is a tall door opening.

Interior

The interior floor level in Building 16 lies approximately 0.5m above the floor level in building 7 which suggests either that the interior of Building 7 has been taken down and levelled at a later date, or that Building 16 once contained machinery that required a plinth foundation. The interior of Building 16 has been divided into two room spaces by the insertion of a concrete block wall during the late 20th century. The original stone rubble walls are lime-washed and the original phase 2 trusses survive although a hip has been added at the northern end during phase 3. The floor is concrete.

7.15 Building 17

(Figs 12-13, 67-71, plan and section Figs 81-82 and elevation Figs 85)

Building 17 comprises a series of lean-tos of various phases added to the east sides of Building 5 and 7a. Building 17e, the lean-to adjoining building 5, is the earliest structure and was added during phase 2. It is built from granite rubble bonded with earth mortar and has a wide blocked door opening into the yard. It has a corrugated iron roof covering which is at a higher level than the other Building 17 lean-tos and is marked on the 20th century sketch plan as the 'blacksmith shop' although it may previously have had a different function. During phase 3 (1880-1907) the rest of Building 17 (a, b, c and d) was constructed adjoining the northern end of 17e and east side of 7a. Originally this appears to have been two adjoining buildings but has since undergone several phases of modification so that it is now separated into four room spaces. The south end Building 17d has a remnant of its original mine waste rubble wall surviving at the south end of the east wall. To the north of this the wall has been replaced with brickwork and further north it has been replaced again with concrete blocks. Buildings 17c and 17b further north have concrete block-built walls and building 17a at the north end is constructed from brickwork on top of a stone rubble plinth. Building 17a originally appears to have been fronted with narrow cast-iron pillars supporting the roof, one of which survives. These buildings may have been used originally for storage of coke and coal. In recent years 17a has served as a lawnmower store, 17b as a drying room, 17c as a changing room, 17d as a workshop and 17e as an office.

Exterior

The southern lean-to wall of Building 17e is an original phase 2 wall. It comprises random stone rubble bonded with earth mortar and has a granite quoin at its east end. In the east wall of building 17 several construction phases are evident. The earliest of these is the phase 2 wall of Building 17e at the south end which is constructed from random stone rubble bonded with earth mortar and has a granite quoin at its south end. Set centrally in the east wall of Building 17e is a large, blocked double door opening. This lean-to is approximately 0.5m higher than the others. To the north of 17e the southern part of the eastern wall of 17d comprises random slate rubble repointed with cement mortar. This is a remnant of the phase 3 structure. There is an original window opening at this end associated with it. To the north of this the next section of wall has been rebuilt in brick and beyond this the northern half of building 17d and Building 17c has been rebuilt in concrete block to include two reused 12 pane sash windows. A separate phase of concrete blockwork has been used to replace the east wall of Building 17b. This has a door opening giving access to this room from the yard only. To the north of this the east wall of Building 17a is constructed entirely of brickwork. It has a centrally set blocked door opening with 16-pane windows either side of it. The north wall of 17a is also constructed from brickwork and there is a smaller window opening in this elevation. It is also noticeable that the roofline of 17a has been heightened slightly.

Because Building 17 was constructed as a series of lean-tos, the west wall of 17a, 17b, 17c and the north half of 17d is actually the original exterior wall of phase 2 Building 7. This contains a series of four phase 2 window openings, all of which have been altered at a later date. Two have been breached to create door openings into Buildings 17a and 17d. The west wall of 17e and the southern half of 17d is actually the original phase 1 exterior wall of Building 5. In the southern half of Building 17d this wall contains a tall narrow opening which has been blocked with brickwork. This blocked opening is also visible as a tall recessed inserted cupboard at the north end of the wall inside Building 5. The function of the opening is unknown but it appears to reach the full height of Building 5 and measures 0.8m wide. It may have functioned as a flue.

Interior

The interior of Building 17 has been divided into five room spaces by the insertion of several concrete block walls during the second half of the 20th century which replaced one or two earlier partitions. The original stone rubble walls are lime-washed and 20th century roof timbers replace earlier ones. The floor in every room is concrete. Building 17b includes an inserted cupboard space to the west and has an inserted low shuttered concrete ceiling with storage space above. In the south wall there is an opening for a wood burner with a flue opening in the ceiling close to the east wall. Building 17c also has a bricked in opening for a wood burner on the other side of this wall. In Building 17d there is a long timber work bench against the west wall.

7.16 Building 18

(Figs 12-13 and 72)

This building is associated with the use of the site as a council depot and therefore did not undergo detailed analysis. It is a mid 20th century concrete block building constructed after 1946. The construction has incorporated the original roadside boundary wall of the foundry complex. This area was used as a coal/materials yard on the 1946 air photo (Fig 8) and is shown as undeveloped on the 20th century sketch plan (Fig 9).

7.17 Building 19

(Figs 12-13, 73-78, elevations Fig 87)

This building is owned as part of the South Crofty site by Western United Mines. It was originally built as part of the Bartle's foundry complex during phase 3 (1880-1907) but became part of the New Cook's Kitchen site as part of South Crofty before 1946. The original function of the building is unknown but after 1924 (and before 1946) the building underwent major remodelling to create a blacksmith's workshop which involved both its north and west walls being entirely rebuilt from concrete blockwork, the insertion of forge chimneys at the north end and addition of a concrete block-built lean-to on the east side. There is evidence from the two remaining walls of the original structure that it originally had a first floor level, and that it fronted and opened onto the foundry yard. The original (phase 3) east and south walls are constructed from un-coursed stone rubble bonded with earth mortar and have been repointed with cement mortar externally during the 20th century. The north and west walls are mid 20th century concrete blockwork (phase 6 (1924-1946) and the hipped roof structure is also of this date comprising braced tie bar trusses and a clerestory ventilator which runs the length of the apex. The roof covering is corrugated cement sheeting. Internally the building is now a single open room space with an adjoining small lean-to. The floor covering is concrete.

Exterior

Both the east and the south walls are the surviving parts of the original building and are constructed from mine waste rubble bonded with earth and lime mortar with granite quoins and jambs. The east wall has a partially blocked original door opening towards the northern end which now gives access into the later (mid 20th century) lean-to, but originally led out into the foundry yard. Either side of this door opening, at the north end of the east wall, there are two original blocked window openings and towards the southern end there is an original wide blocked double door opening approximately 3m wide by 2.5m high, although the ground level in the yard has been raised by approximately 1m and now obscures the lower half of it. The concrete block-built lean-to adjoining the northern end of this wall was added when the building was converted to a forge in the first half of the 20th century. It has a brick chimney and single centrally set window opening. A brick and concrete block-built chimney of the same date has been added adjoining the central part of the original east wall. The south wall of the building has two original blocked window openings at either end, both with granite jambs. The west and north walls of the building are both mid 20th century concrete block-built replacements of the original stone walls, which were almost certainly demolished and replaced so that access could be gained from the South Crofty site to the west. The west wall has three window openings and a doorway towards the southern end whilst the north wall has two concrete block and brick-built stacks for the furnaces built up against it.

Interior

Internally the ground floor level is now approximately 1m lower than the present ground level in the foundry yard. This is due to the level in the yard being raised substantially (presumably when the large casting shop was demolished). There is a single large room space within the main building adjoined by a separate small room occupying the mid 20th century lean-to which was designed as an office.

The interior of the main building was converted to a forge in the first half of the 20th century leaving little evidence to determine the function of the original building. From the elements that remain intact of the 19th century building (essentially the east and south walls) it is clear that this was a two-storey hipped roof structure fronting the foundry yard. In the two remaining walls a ledge is visible approximately 1m down from the tops of the walls showing the position of the earlier first floor. Above this, sockets where the earlier roof trusses have been removed are also visible including those for a removed hipped end in the south wall. Original window and door openings in these two walls have cast-iron lintels.

There are now two brick-built forges at the north end of the room, the floor has a concrete covering and the roof structure comprises mid 20th century tie bar trusses. The room (abandoned in 1998 when South Crofty closed) has been left exactly as it was on its last working day as the mine forge. The machinery (including a hydraulic press and large hacksaw), tools and materials have all been left *in situ*. Towards the north end of the east wall there is a reduced width door opening through to the office in the lean-to. Inside the office there is a blocked fireplace in the north wall and the floor is concrete. The office too has been left exactly as it was when the mine closed.

7.18 Building 20

(Figs 12-13 and 79)

This is the site of a building shown on the *c*1907 OS map and noted on the sketch plan (Fig 9) as the small castings cleaning shop. There is now a modern building on the site.

7.19 Building 21

(Figs 12-13 and 80)

This building is associated with the use of the site as a council depot and therefore did not undergo detailed analysis. It is a modern cement-rendered blockwork building.

7.20 Building 22

(Figs 12-13 and 8)

This building does not survive. It was demolished sometime between 1963 and 1979 and was the main casting shop of the foundry site. It is first shown as three adjoining buildings on the *c*1880 OS map and appears unchanged in *c*1907 and 1946 (Figs 6, 7 and 8). It is likely to have been first built during phase 1 (*c*1860). The sketch plan (Fig 9) shows that this was the cast-iron foundry with an annexe containing the brass and bronze foundry on its north side. The sketch also shows the position of the air compressor for the furnace, the furnace platform and the crane within the building and a rail ramp on the west side of the building. This ramp is likely to have been used for charging the furnace.

7.21 Weighbridge 23

(Figs 12-13)

The site of the present modern weighbridge (made by Avery of Birmingham) just inside the main gates is also the site of an earlier structure shown on the *c*1907 OS map (probably an earlier weighbridge).

8 Chronology/dating evidence

Detailed building analysis along with measured survey and map regression has enabled the historic development of the foundry complex to be worked out (see phase plan Fig 13). The northern half of the complex is the earliest part with the southern half of the yard being added in the early 20th century. Seven major phases of new builds and extensions and alterations to existing buildings have been identified.

The earliest buildings remaining on site (phase 1: *c*1860) are the north-eastern part of Building 5, the north-eastern part of Building 7 and possibly Building 10. It seems likely that the casting shop (foundry), Building 22 (or at least part of it) was also constructed during phase 1.

During phase 2 (pre 1880) building 7 was extended to the south and west to adjoin the northern gable end of building 5. This included the construction of 7a with adjoining narrower building on the site of 7b, the southern remnant of which still survives as building 16 along with the chimney immediately to the west. Building 17e was

constructed as a lean-to adjoining the eastern side of building 5. Also during phase 2 a range of buildings was constructed along what was the southern boundary of the yard at this date. Building 8, at the eastern end of this range, is the only part which still survives (the rest was demolished during phase 4 (1907-1924)). Building 10 was also built between 1860 and 1880 but it is unclear whether this was during phase 1 or 2.

Phase 3 spans the period between 1880 and 1907. During this time Building 7 was extended again to the west to form building 7b, which involved the demolition of most of the narrow phase 2 building which had adjoined the west side of building 7a and the demolition of most of the phase 1 structure of 7a leaving only the eastern end intact. Building 5 was also extended to the south, west and east during phase 3. This involved the demolition of the phase 1 south gable of building 5 and most of the east and west walls leaving just the northern ends of these walls intact as well as the north gable end wall. The Building 5 extension formed a much larger building with a lean-to structure running the length of the western side. At this date the extension adjoined the former range of buildings (site 26 and Building 8) along the southern yard boundary. The gap between lean-to 17e and the protruding phase 1 part of Building 7a was filled at this date with a range of lean-tos (17a, 17b, 17c and 17d). Building 9 was also added adjoining the south side of Building 10. Also during phase 3 Buildings 13 and 19 were constructed in the northern part of the yard.

During phase 4 (1907-1924) building 7 was extended to the west again, to form Building 7c. This involved the demolition of the west wall of 7b to create a single space internally for the whole of Building 7. At the same time the property expanded into the field to the south creating a large yard which extended much further to the west than it does today (just beyond the location of the now demolished Holman Brothers building). In order to gain access to this new area the long range of phase 2 buildings along the original southern boundary were demolished, leaving only Building 8 *in situ*. After the demolition of this range, Building 5 was extended southwards up to the point of the original southern boundary. Within the new southern yard a new range of buildings (Buildings 1, 2 and 3) were constructed along the eastern edge, presumably to replace the demolished range and another long range was constructed along the far western boundary. Other buildings constructed during phase 4 include Building 14 (South Crofty Dry) and the main office and drawing office adjoining the north end of Building 10 which have since been demolished and replaced with Buildings 11 and 12.

Phase 5 occurred before 1924 when the boiler house for the steam stamps (Building 15) was added to the south side of the phase 4 building 7 extension. A lean-to was added at this date along the length of the south wall of building 13.

During phase 6 (1924-1946) Building 19 appears to have been taken on by South Crofty (New Cooks Kitchen shaft complex) since the north and west walls were demolished and rebuilt in blockwork to front the South Crofty site, and all the original openings in the east wall fronting the foundry yard were infilled so that access could no longer be gained from this side. In addition the building was converted for use as a forge and a concrete block lean-to added as an office on the east side. In the western half of the southern yard two large adjoining sheds were constructed. The sheds had originally been built as part of the final phase of construction of the Dolcoath mine dressing floors. In about 1940, new premises were needed by Bartle's to fulfil orders received as part of the growing war effort and the sheds were dismantled at Dolcoath mine and re-erected at Bartle's. They were used to provide additional covered space for the fabrication of military material as part of the war effort (Sharpe 2007). The sheds in 1951 passed into the ownership of Holman Brothers Ltd along with the rest of the Bartle's site.

During phase 7 (after 1951-present) the site was taken over by Holman Brothers Ltd for a short period before passing into the hands of the local District Council (which was absorbed into Kerrier DC from 1974 and is now part of Cornwall Council). Buildings associated with this period of the site's history include Buildings 4, 6, 11, 12, 18, 20, 21, 23 and 32.

9 Significance

The appearance of foundries in Cornwall in the late 18th century and 19th century was largely a direct result of the demand for engines, pumps and other equipment for the mining industry. Previously parts for steam engines had been made in foundries outside Cornwall, but as mining became more capital intensive more foundries were established locally. From about 1820 the Cornish mines were able to buy locally made engines and parts and by 1840 Cornish engines and engineers were the most distinguished in the world. As new supplies of minerals were discovered elsewhere in the world during the 19th century Cornish engines and drills were exported to places such as South America, Australia, Ireland and South Africa (www.cornish-mining.org.uk).

Basset (later Bartle's) Foundry lay at the heart of the Camborne and Redruth mining district and was responsible for supplying many of the surrounding mines. According to one directory 'F Bartle and Sons' produced general mining machinery, tube mills and pulverising and slime dressing machinery (Whitaker's Red Book 1914). Not only did it supply the mines and their ancillary industries with machinery and parts but it also supplied the tin streaming, china-clay industries and mills with waterwheels and other manufactured items. Like other foundries Bartle's also manufactured items of street furniture. The area focused around Carn Brea was the most important and complex of the mining districts in Cornwall and West Devon, containing the majority of its most significant mines and key industrial enterprise. It was also the home and workplace of many of the key figures in the development of mining and allied technologies (www.cornishmining.net). The foundry was located close to the Pool to Portreath branch line and Crofty branch of the Hayle Railway which was established to connect the mines to the coast for import and export. The railway was essential for supplying the foundry with coal (for the smiths' hearths, boilers and furnaces), pig iron (for the furnaces and cupolas), limestone (for the furnaces and cupolas), sand and clay (for the moulding shop), and bricks (for furnace linings).

Bartle's Foundry retains an almost complete and extensive group of specialised industrial buildings associated with the production and finishing iron and brass parts for industrial and other use. Although the casting shop and one or two later building were demolished in the later 20th century most of the buildings in the complex remain *in situ*. The surviving buildings show a complex history of a flourishing and constantly expanding business. Seven major phases of new builds and extensions to existing buildings have been identified within the complex indicating major investment during the late 19th century and early 20th century. This history of phased expansion and the survival of most of the buildings has provided the opportunity to record a good example of a small Cornish foundry established at the height of the industrial revolution within the heart of Cornwall's most intensive mining region.

10 Conclusions/discussion

The historic building record has allowed a much clearer understanding of the history and development of the foundry complex and its relationship with contemporary mining industries. The work has resulted in a full record and analysis of the buildings prior to demolition. The study included all of the buildings associated with Basset/Bartle's Foundry and to a lesser extent the buildings associated with the later use of the site as a council depot.

Seven major phases of new builds and extensions and alterations to existing buildings have been identified and it is clear that many of the early buildings survive with later additions and alteration.

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Ordnance Survey, 1809. *1 Inch Map*

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Ordnance Survey, 2003. *LandLine Digital Mapping at 1:2500*

Royal Air Force, 1946. *Vertical Black and White aerial photograph A8 50041* (CC Technical Services)

1924 aerial photograph of New Cooks Kitchen mine and Bartle's foundry (Britain from above website- English Heritage)

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Sketch plan of 'Bartle's' produced in the late 20th century (supplied by John Woodward)

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11.3 Websites

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http://www.cornishmining.org.uk/pdf/downloads.htm#Management%20Plan%20Downloads Cornish Mining World Heritage Site Management Plan 2005-2010 documents

http://www.britainfromabove.org.uk/image/epw009938 (1924 aerial photograph of New Cooks Kitchen mine and Bartle's foundry)

12 Project archive

The HE project number is **146241**

The project's documentary, photographic and drawn archive is housed at the offices of Historic Environment, Cornwall Council, Fal Building, County Hall, Treyew Road, Truro, TR1 3AY. The contents of this archive are as listed below:

1. A project file containing site records and notes, project correspondence and administration.
2. Electronic drawings stored in the directory ..\CAD ARCHIVE\Sites C\CPR road scheme\Bartle's Foundry
3. Black and white photographs archived under the following index numbers: GBP 2299, 2300, 2301 and 2302
4. Digital photographs stored in the directory ..\Images\Sites A-D\CPR road scheme\Bartle's Foundry
5. English Heritage/ADS OASIS online reference: cornwall2-158697

This report text is held in digital form as: ..\HE Projects\Sites C\CPR Highway Scheme 2013\Bartle's\Bartle's mitigation report 2013

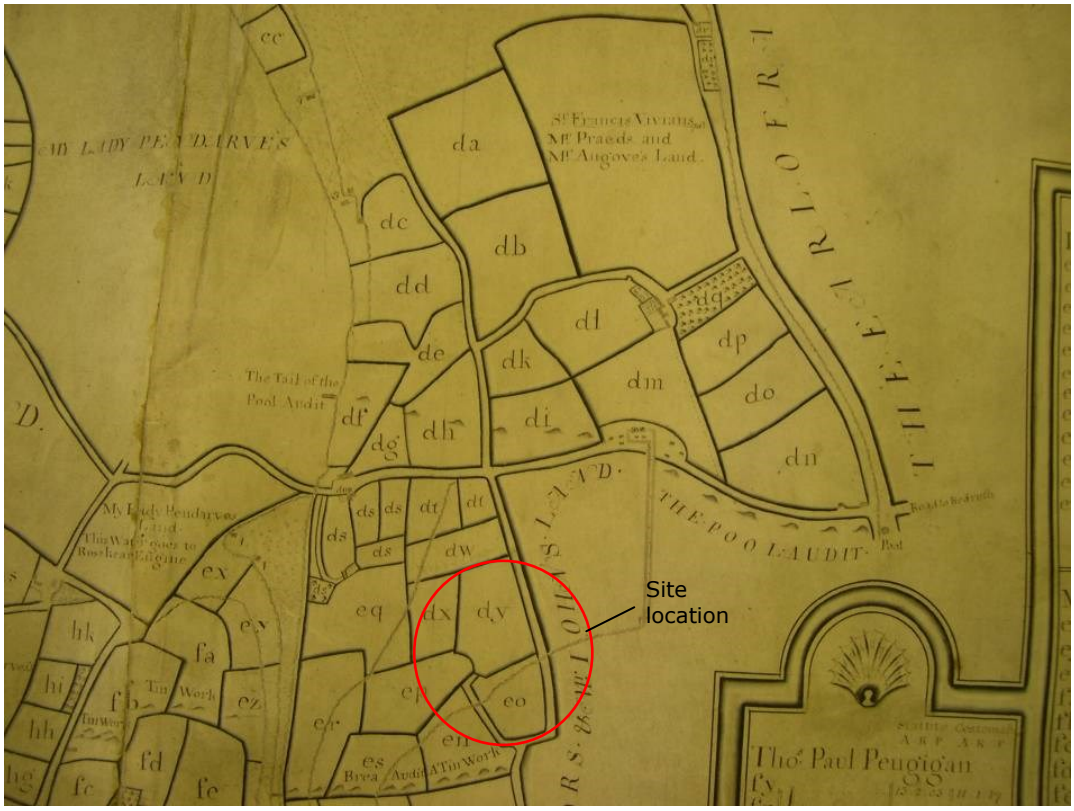


Fig 3 A Plan (dated 1737) of Part of the Manor of Tehidy lying in the Parish of Illogan and Camborn, being Part of the Estate of John Pendarves Bassett Esq.

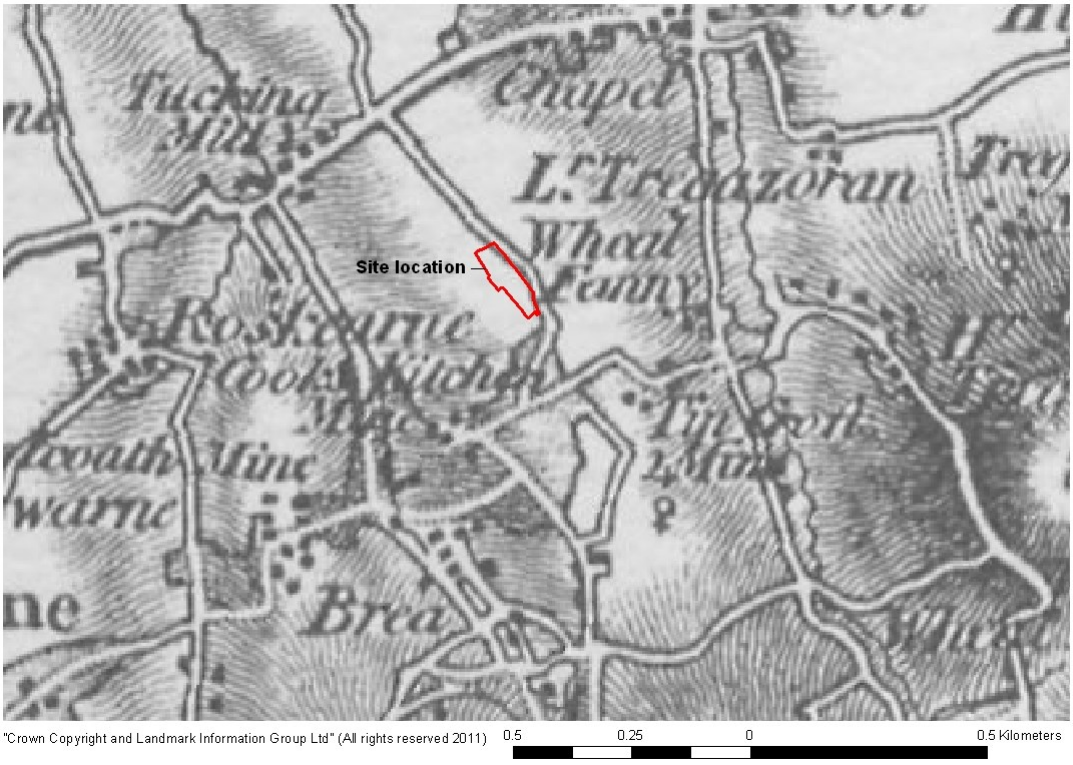


Fig 4 Extract from the OS First Edition One Inch Map c1809

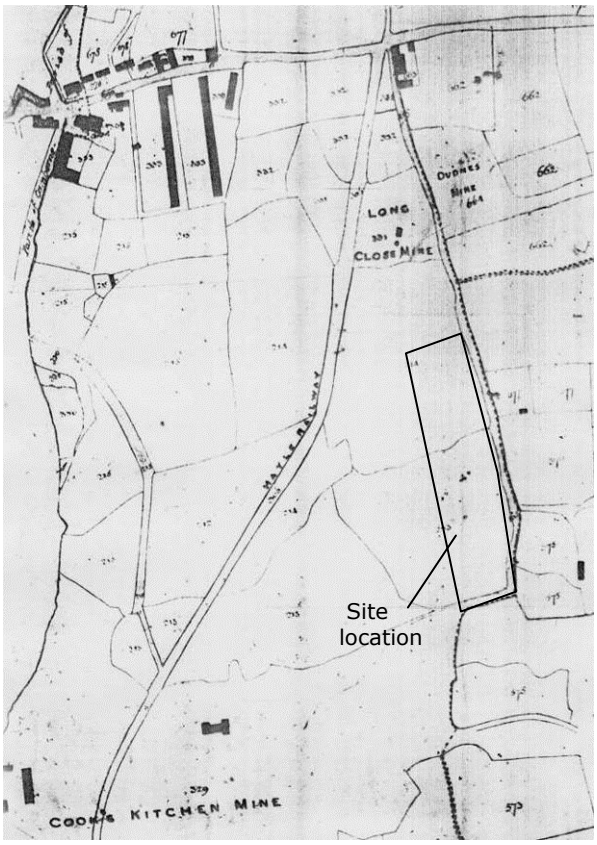


Fig 5 The Tithe Map of the Parish of Illogan c1840.

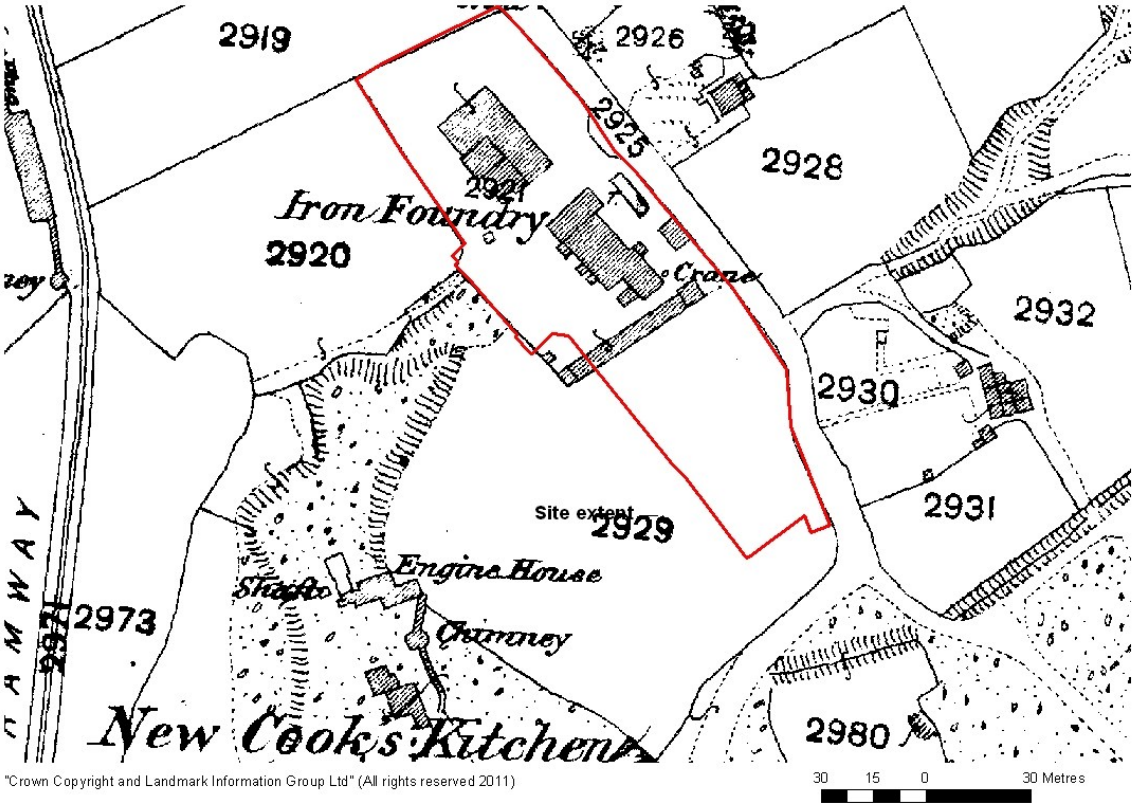


Fig 6 First Edition of the Ordnance Survey 25 Inch Map, c1880

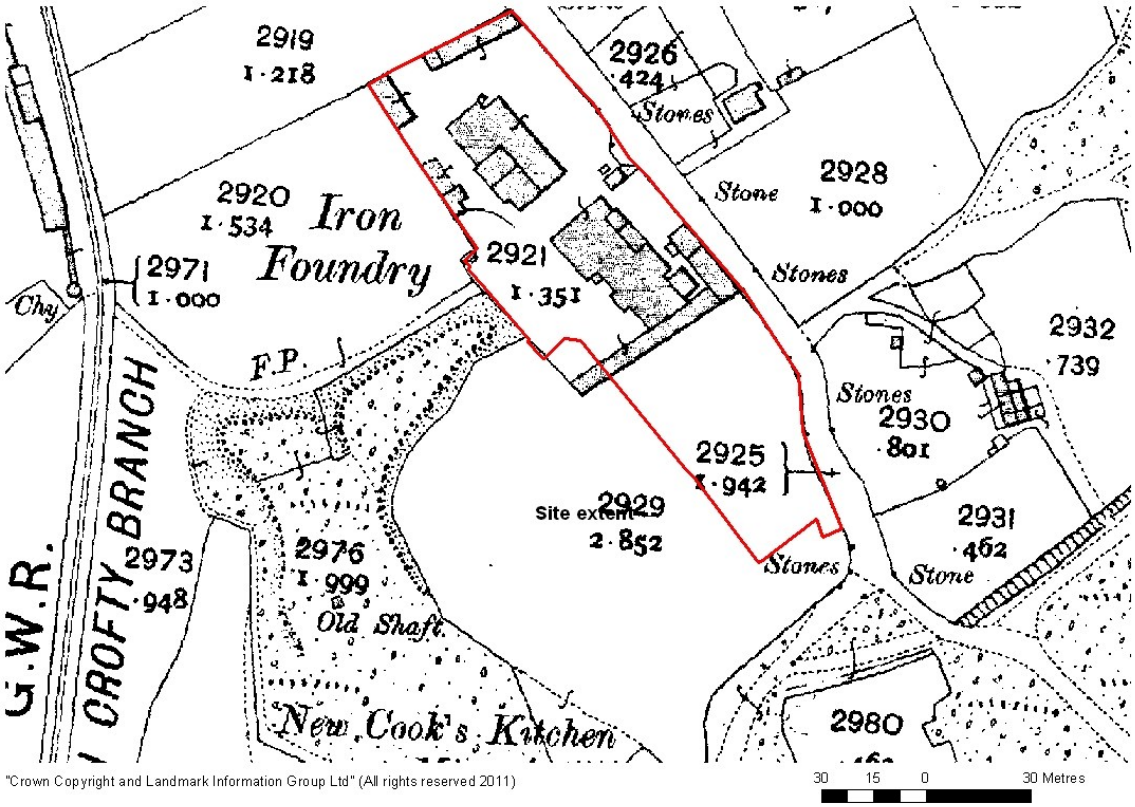


Fig 7 Second Edition of the Ordnance Survey 25 Inch Map, c1907

Fig 8: 1946 RAF vertical aerial photograph A8 50041 (© Cornwall Council)

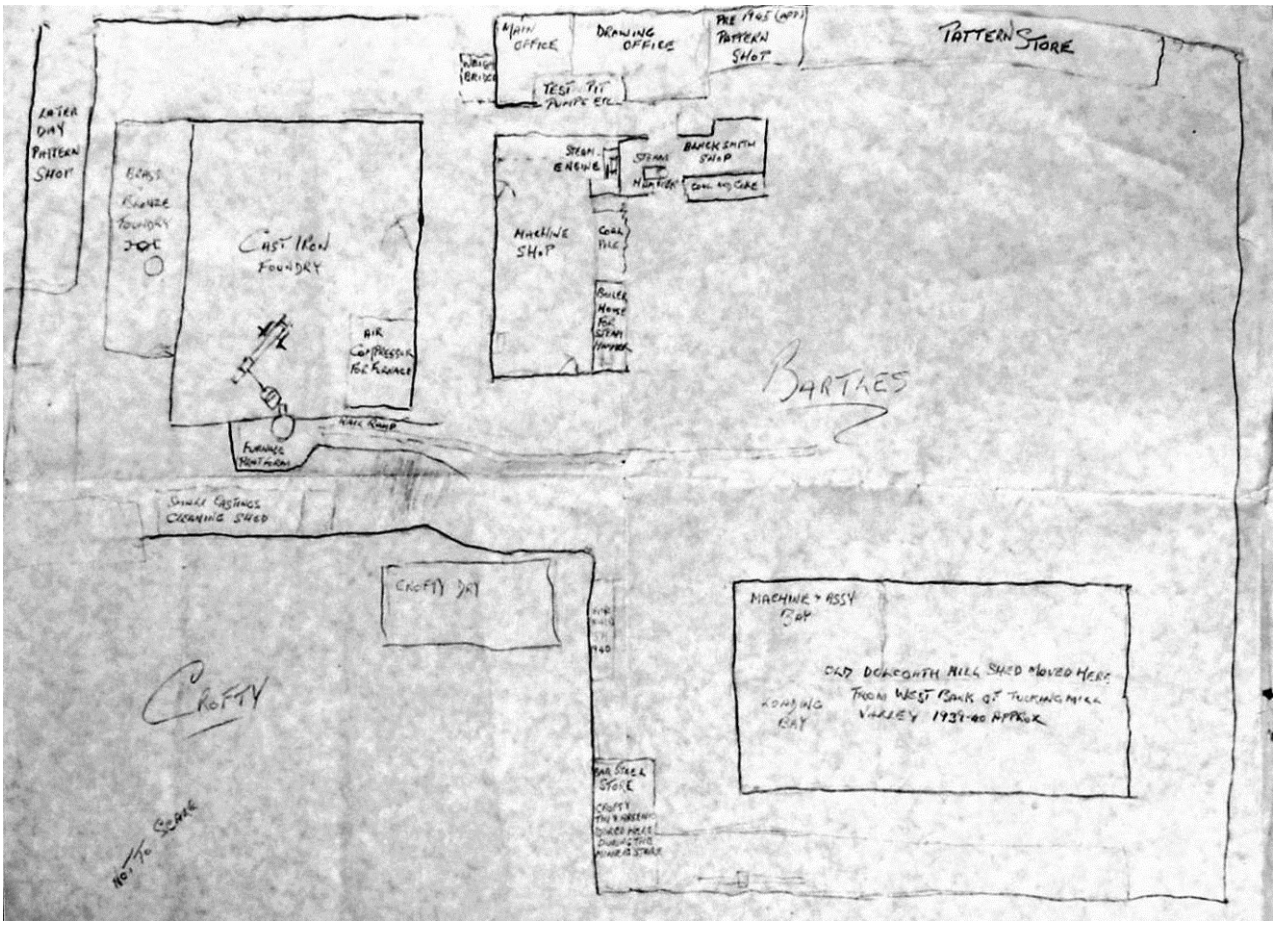
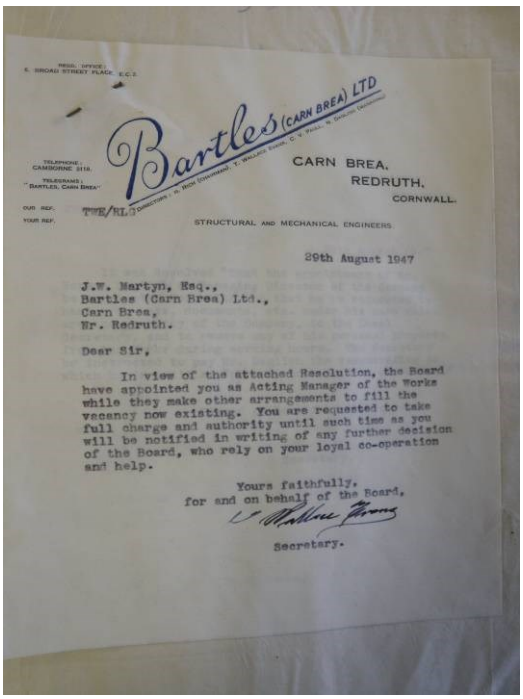


Fig 9: Sketch plan of 'Bartle's' produced in the late 20th century (supplied by John Woodward)



REGD. OFFICE:
5, BROAD STREET PLACE, E.C.2

TELEPHONE: CAMBORNE 3116.
TELEGRAMS: "BARTLES, CARN BREA"

OUR REF: TWE/RL
YOUR REF:

Bartles (CARN BREA) LTD
Consulting Engineers: G. Rice Stephenson, T. Michael Evans, C. V. Ellis, G. Francis Stephenson

CARN BREA,
REDRUTH,
CORNWALL.

STRUCTURAL AND MECHANICAL ENGINEERS

29th August 1947

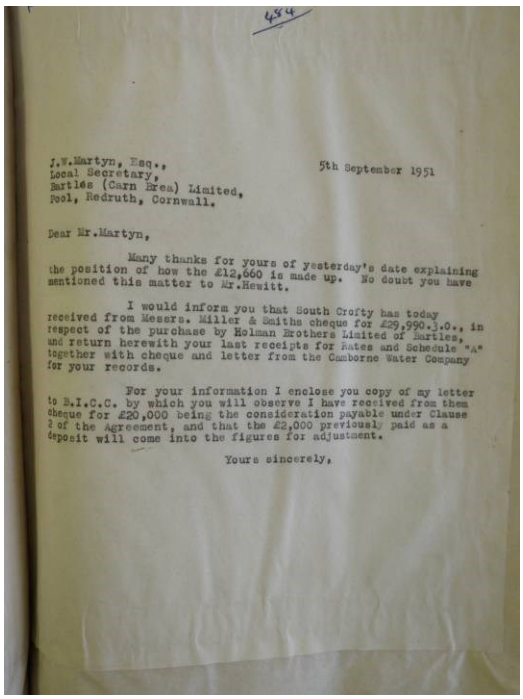
J.W. Martyn, Esq.,
Bartles (Carn Brea) Ltd.,
Carn Brea,
Nr. Redruth.

Dear Sir,

In view of the attached Resolution, the Board have appointed you as Acting Manager of the Works while they make other arrangements to fill the vacancy now existing. You are requested to take full charge and authority until such time as you will be notified in writing of any further decision of the Board, who rely on your loyal co-operation and help.

Yours faithfully,
for and on behalf of the Board,

Secretary.



454

J.W.Martyn, Esq.,
Local Secretary,
Bartles (Carn Brea) Limited,
Pool, Redruth, Cornwall.

5th September 1951

Dear Mr.Martyn,

Many thanks for yours of yesterday's date explaining the position of how the £12,660 is made up. No doubt you have mentioned this matter to Mr.Hewitt.

I would inform you that South Crofty has today received from Messrs. Miller & Smiths cheque for £29,990.3.0., in respect of the purchase by Holman Brothers Limited of Bartles, and return herewith your last receipts for Rates and Schedule "A" together with cheque and letter from the Camborne Water Company for your records.

For your information I enclose you copy of my letter to B.I.C.C. by which you will observe I have received from them cheque for £20,000 being the consideration payable under Clause 2 of the Agreement, and that the £2,000 previously paid as a deposit will come into the figures for adjustment.

Yours sincerely,

Fig 10: Letters in Bartle's letterbook- CRO Ref: SC1134 (the one on the right discusses the purchase of the site by Holman Brothers Ltd)

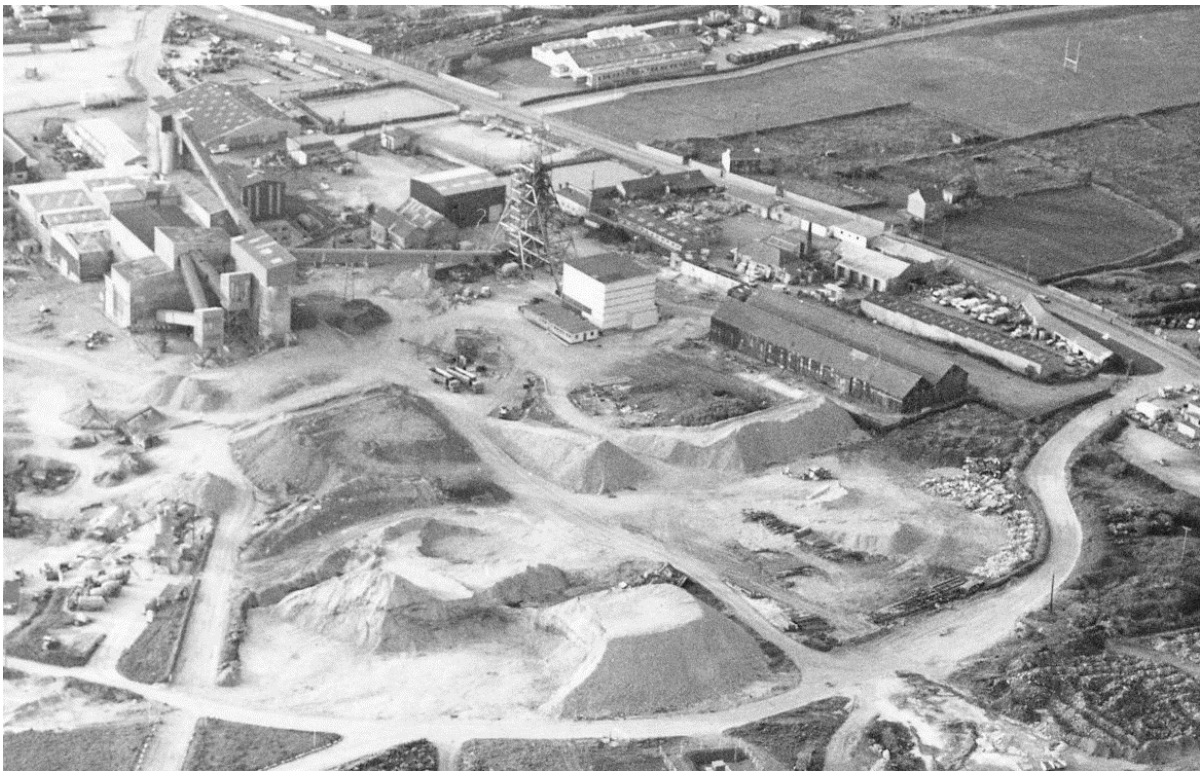


Fig 11 Aerial photograph taken in the 1980s showing Basset (Bartle's) Foundry and South Crofty (© Historic Environment Cornwall Council F7 135)

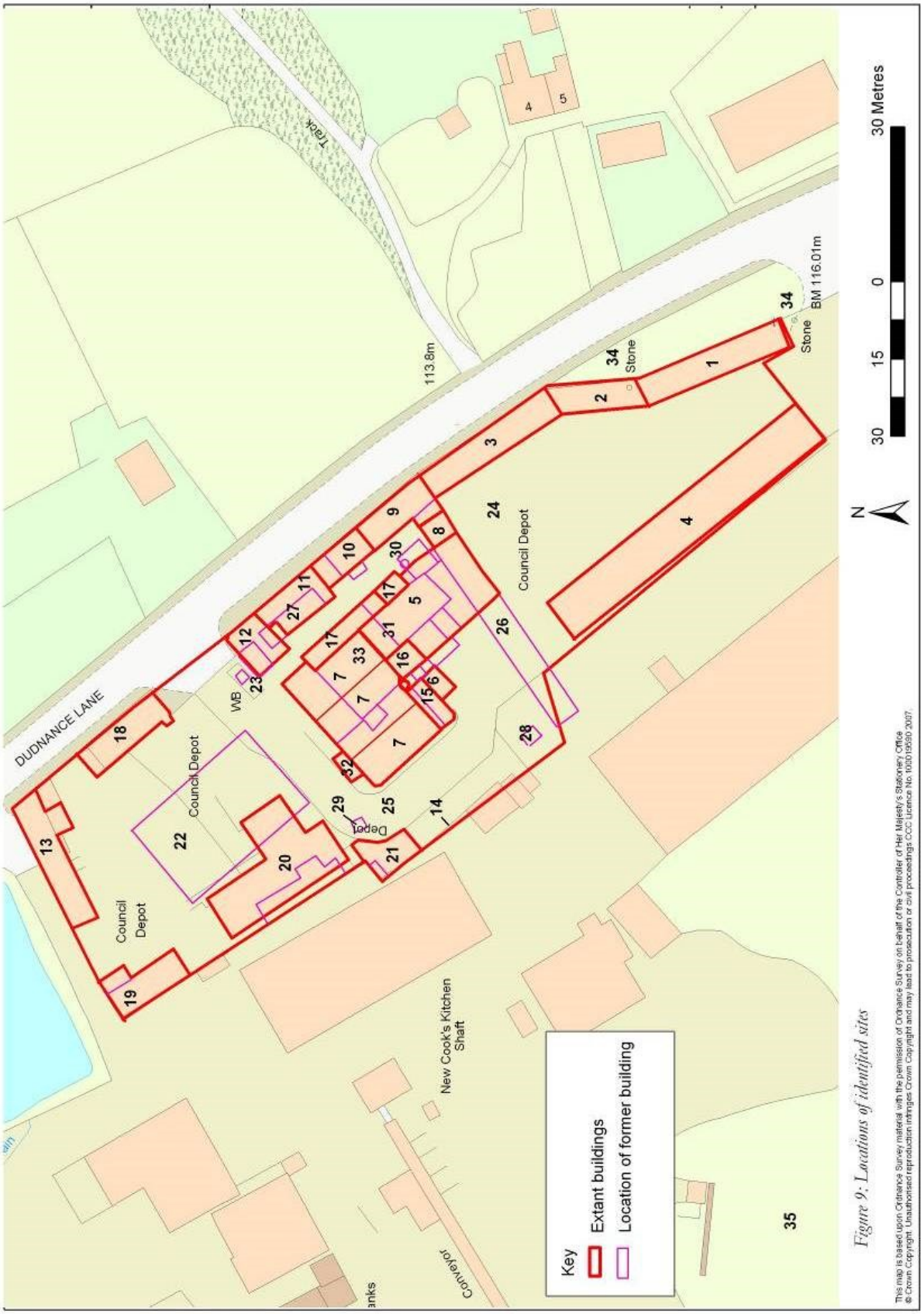


Fig 12 Locations of sites listed in the 2008 assessment. The same numbers are used to identify buildings and structures in this report.

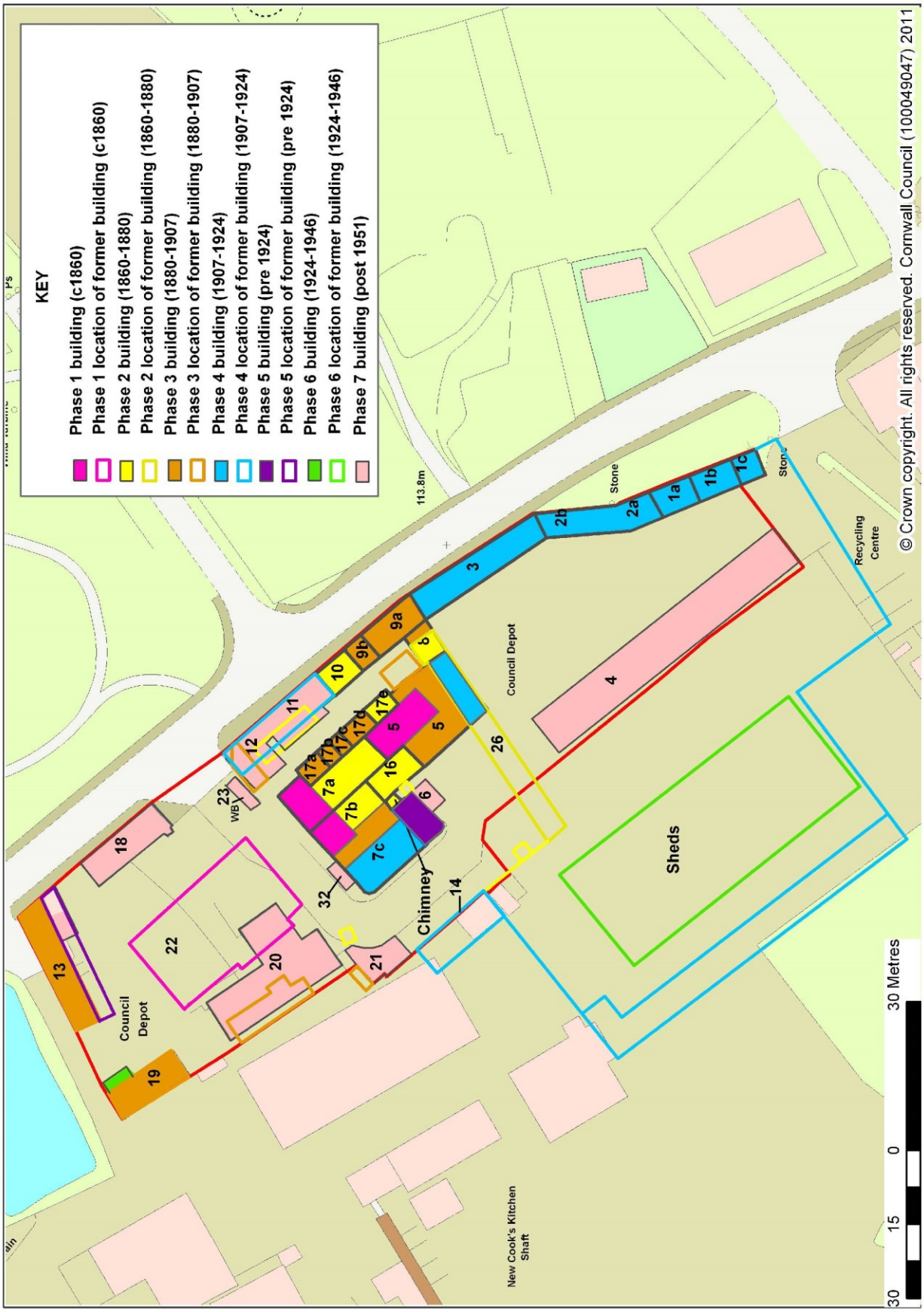


Fig 13 Phase plan of buildings

Fig 14 Building 1a and 1b west elevation

Fig 15 Building 1a interior looking south

Fig 16 Building 1b interior looking north-east

Fig 17 Building 1b roof structure

Fig 18 Building 2a west elevation

Fig 19 Building 2b west elevation

Fig 20 Building 2b interior looking north

Fig 21 Patterns for moulds found in Building 2b

Fig 22 Building 3 east elevation

Fig 23 Building 3 west elevation

Fig 24 Building 3 interior looking south

Fig 25 Building 3 interior looking north-west

Fig 26 Building 4 east elevation

Fig 27 Building 5 west elevation

Fig 28 Building 5 south elevation

Fig 29 Building 5 east elevation

Fig 30 Building 5 interior looking north at phase 1 gable end

Fig 31 Building 5 interior north end looking west at blocked phase 1 window

Fig 32 Building 5 interior looking south at cast-iron pillar between main building and lean-to

Fig 33 Building 5 interior looking south

Fig 34 Building 5 overhead gantry

Fig 35 Building 6 south elevation

Fig 36 Building 7a east elevation of phase 1 building

Fig 37 Building 7a and 7b north elevation

Fig 38 Building 7b and 7c north elevation

Fig 39 Building 7c west elevation

Fig 40 Building 7a interior looking south to phase 1 gable of building 5

Fig 41 Building 7a interior showing altered phase 2 window openings in east wall

Fig 42 Building 7a phase 2 king post trusses

Fig 43 Building 7b interior showing cast-iron pillar supporting the roof valley between 7a and 7b along with inserted concrete block-built wall

Fig 44 Building 7b and 7c interior showing cast-iron pillar baring the name F Bartle and Sons (Carn Brea) supporting the roof valley

Fig 45 Building 7b interior north wall

Fig 46 Building 7b interior north wall showing chimney base to right

Fig 47 Building 7c interior west wall

Fig 48 Building 8 north elevation

Fig 49 Building 8 interior original east wall with blocked opening to the left of the scale

Fig 50 Buildings 9 and 10 east elevation

Fig 51 Building 9 west elevation

Fig 52 Building 9a interior looking north

Fig 53 Building 9b interior looking north

Fig 54 Building 9b interior looking west

Fig 55 Building 10 west elevation

Fig 56 Building 10 interior looking south

Fig 57 Buildings 11 and 12 east elevation

Fig 58 Building 13 south elevation

Fig 59 Building 13 east elevation

Fig 60 Building 13 interior roof structure

Fig 61 Building 14 east elevation

Fig 62 Building 15 west elevation

Fig 63 Building 15 interior looking east

Fig 64 exterior face of chimney looking north

Fig 65 Building 16 (centre) west elevation

Fig 66 Building 16 interior looking south-west

Fig 67 Building 17 east elevation looking south

Fig 68 Building 17 east elevation looking north

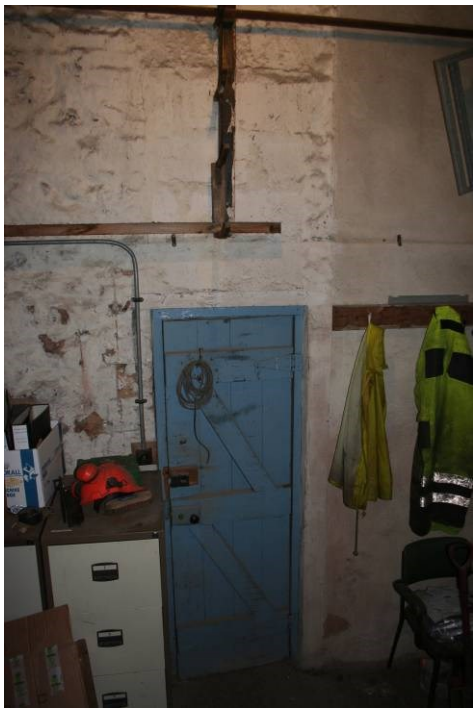


Fig 69 Building 17a blocked window in east wall of 7a with inserted door opening

Fig 70 Building 17b east elevation

Fig 71 Building 17d interior looking north

Fig 72 Building 18 east elevation

Fig 73 Building 19 east elevation

Fig 74 Building 19 south elevation

Fig 75 Building 19 west elevation

Fig 76 Building 19 interior looking south

Fig 77 Building 19 interior looking north

Fig 78 Building 19 interior of lean-to office looking north

Fig 79 Building 20 east elevation

Fig 80 Building 21 east elevation

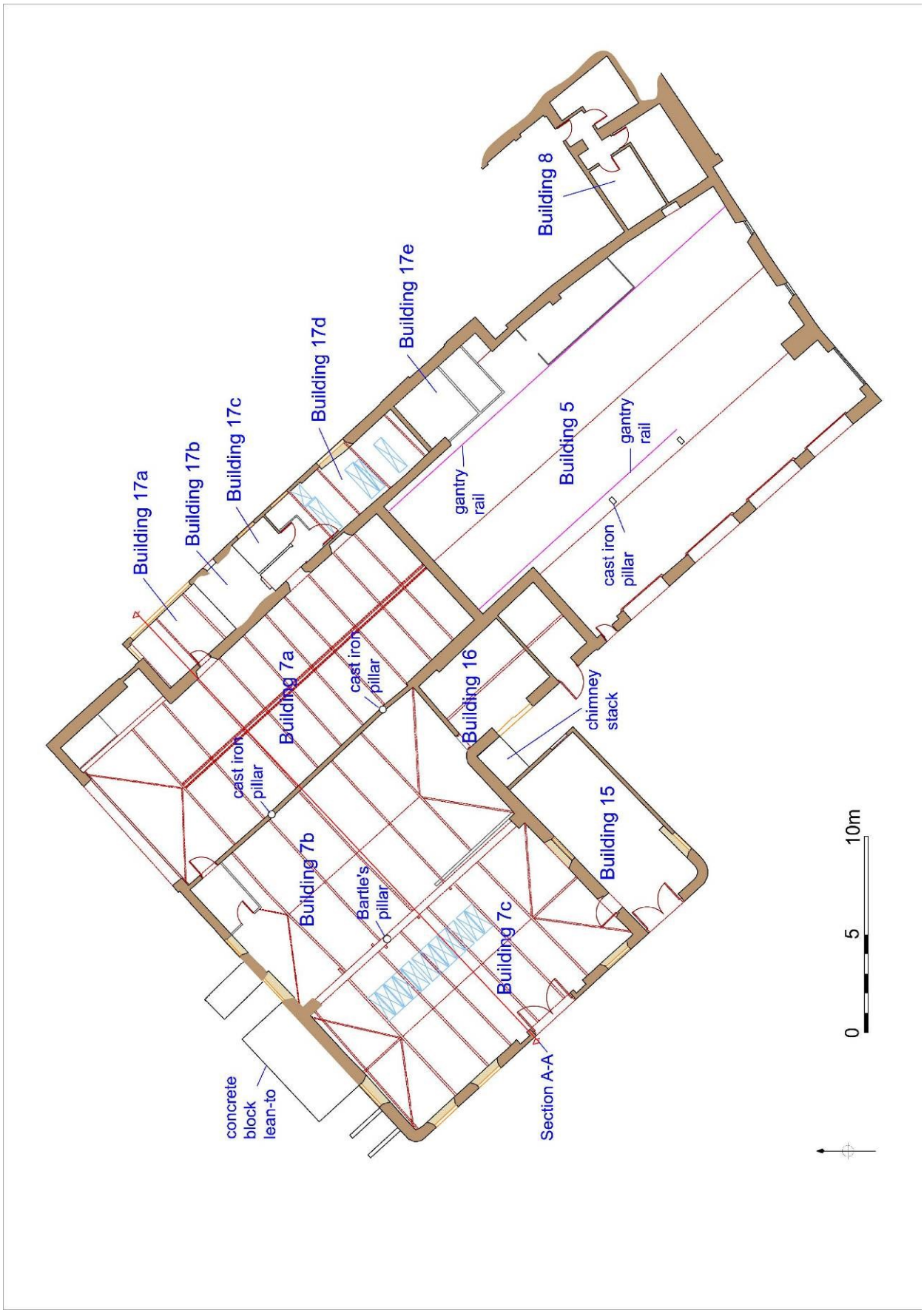


Fig 81 Plan of buildings 5, 7, 8, 15, 16 and 17

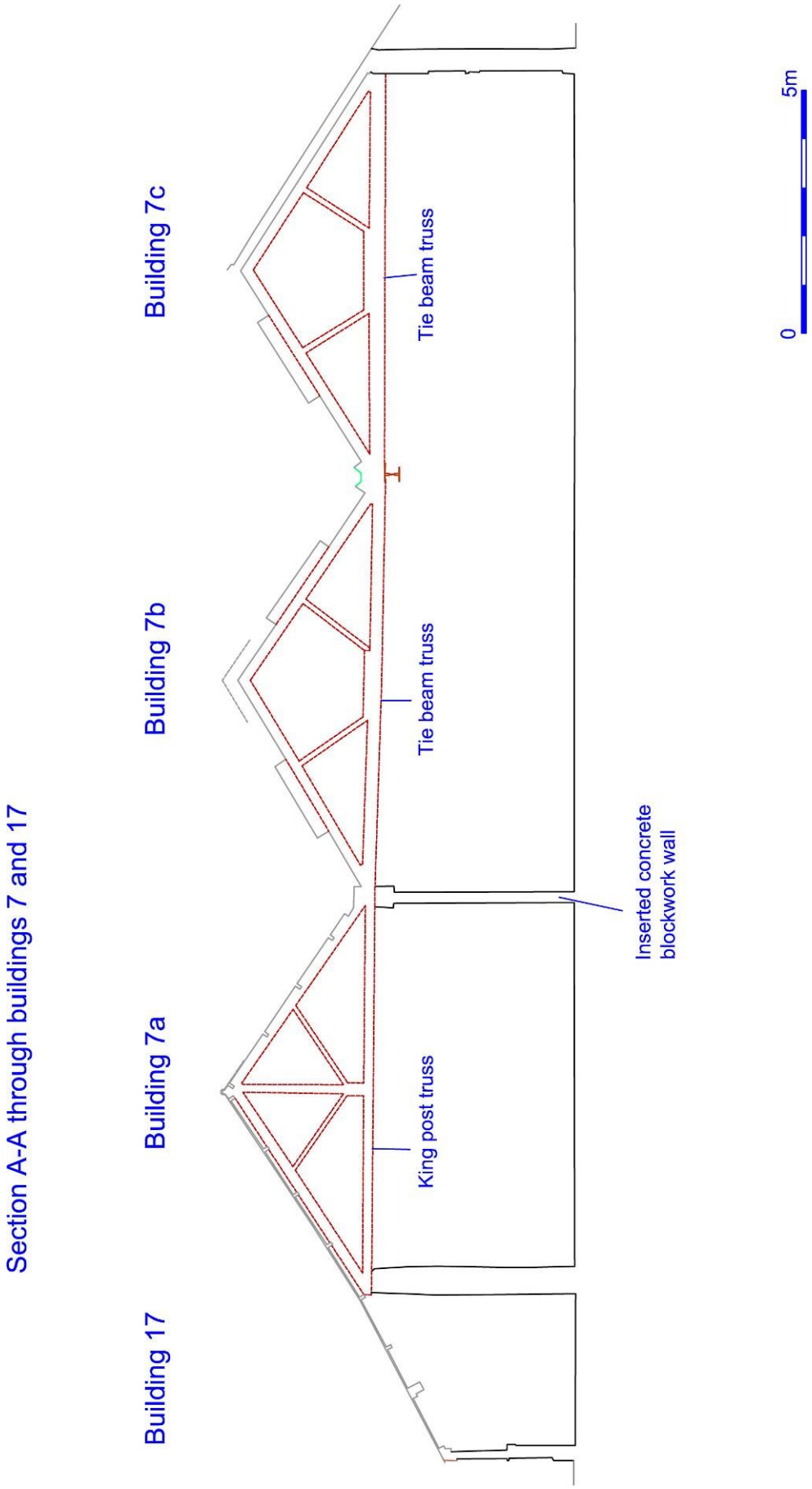


Fig 82 Section A-A through buildings 7 and 17

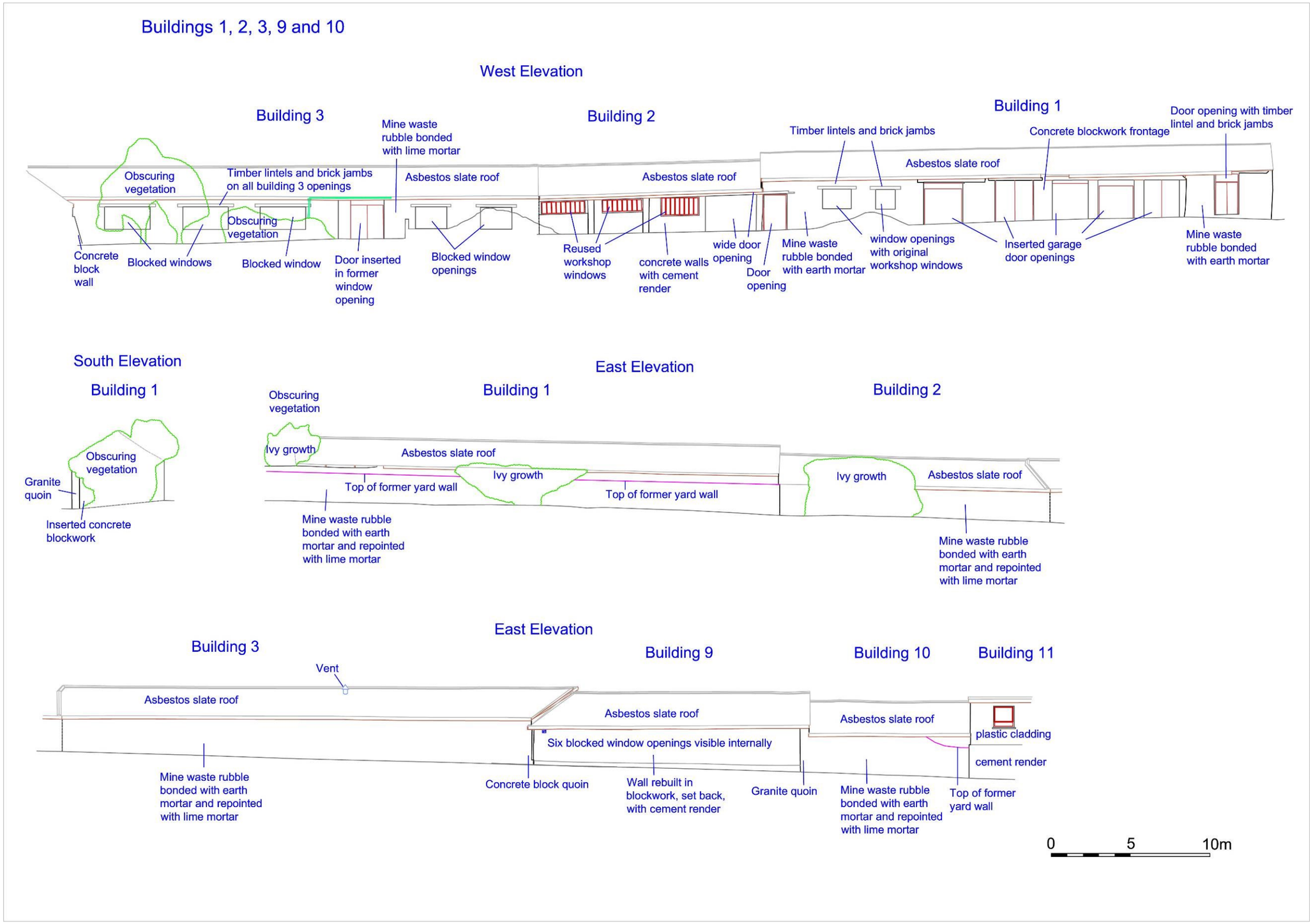


Fig 83 West elevations of buildings 1,2 and 3 and east elevations of buildings 1, 2, 3, 9 and 10

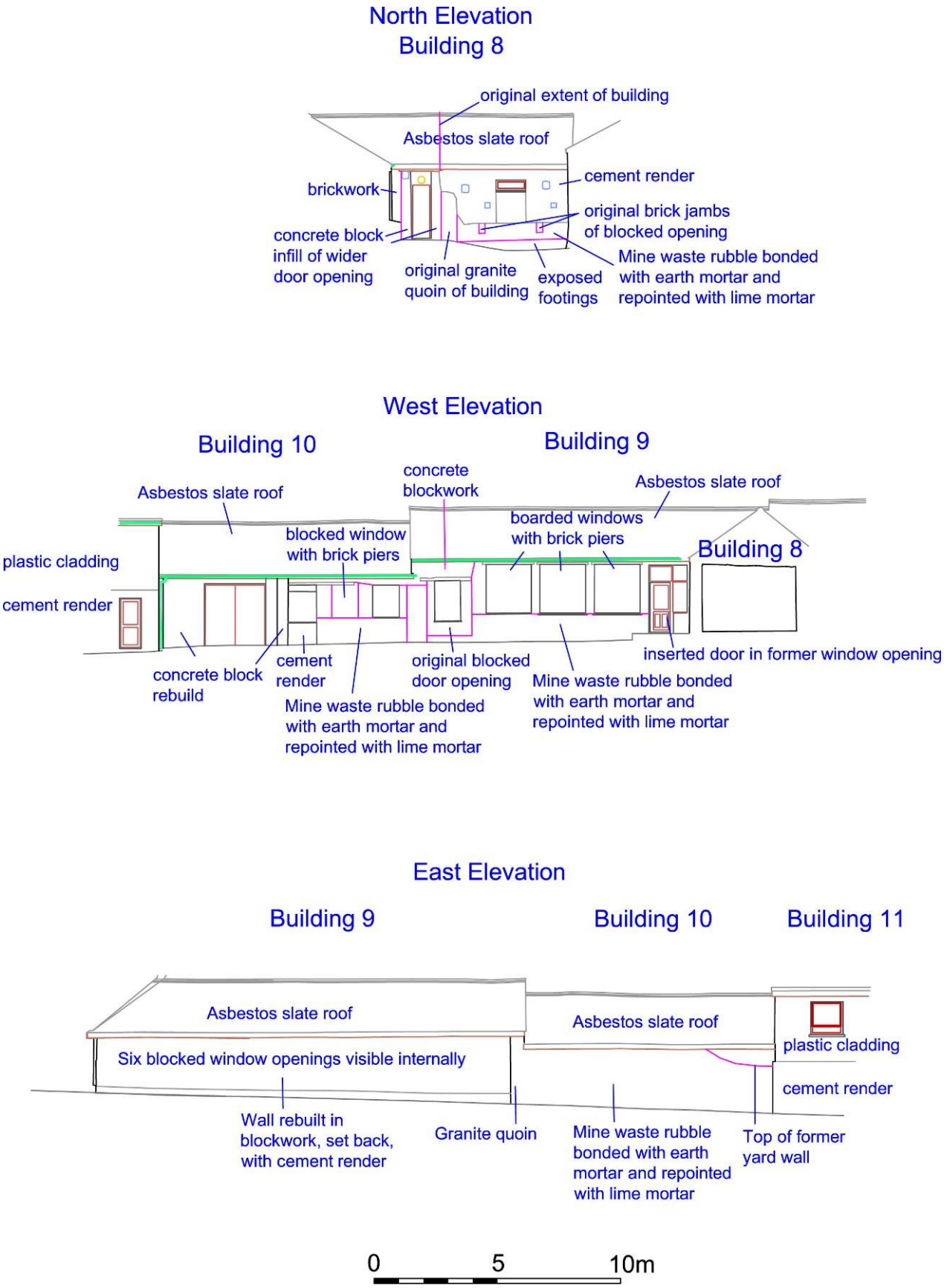


Fig 84 Elevations of buildings 8, 9 and 10

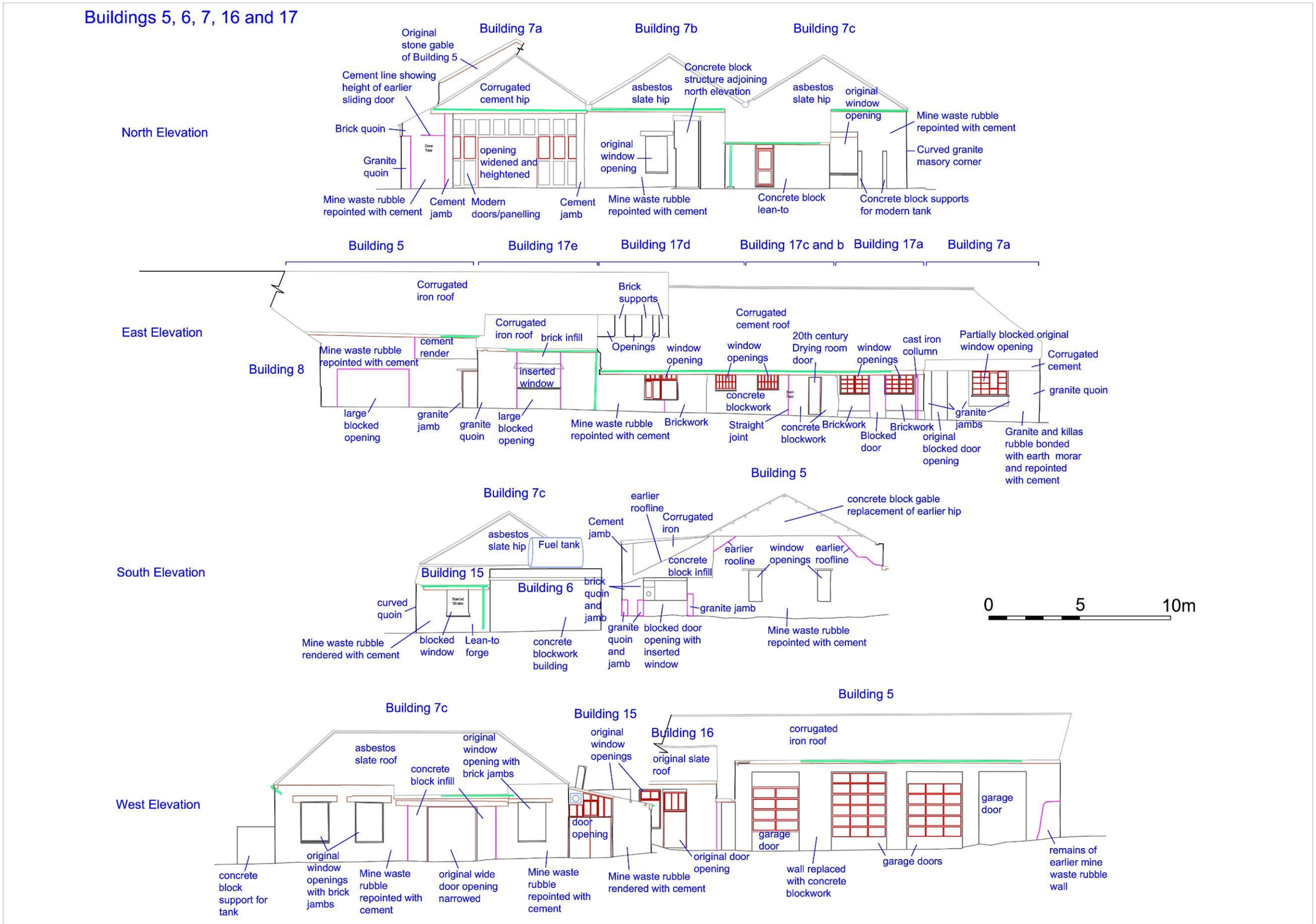


Fig 85 Elevations of buildings 5, 6, 7, 15, 16 and 17

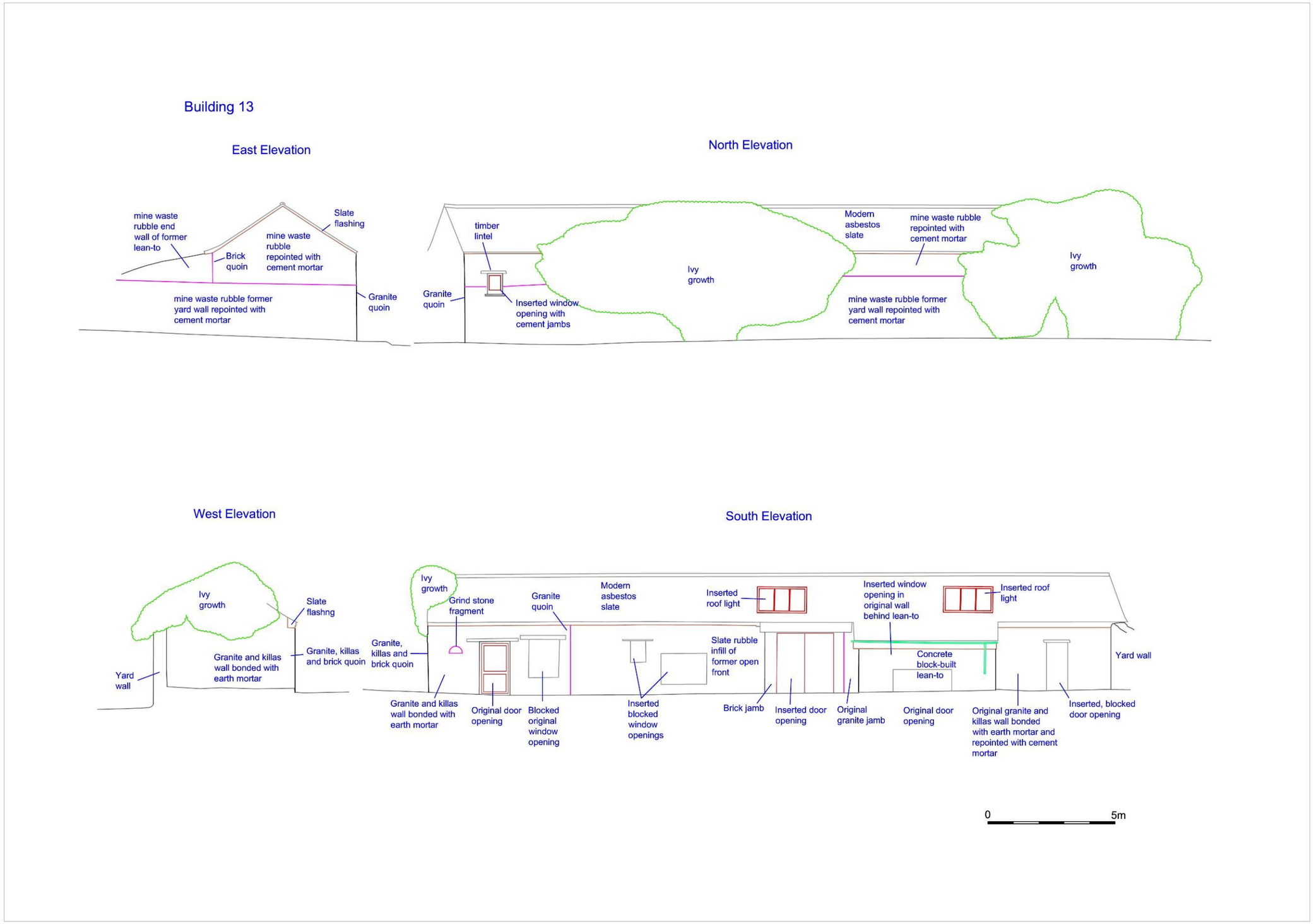


Fig 86 Elevations of building 13

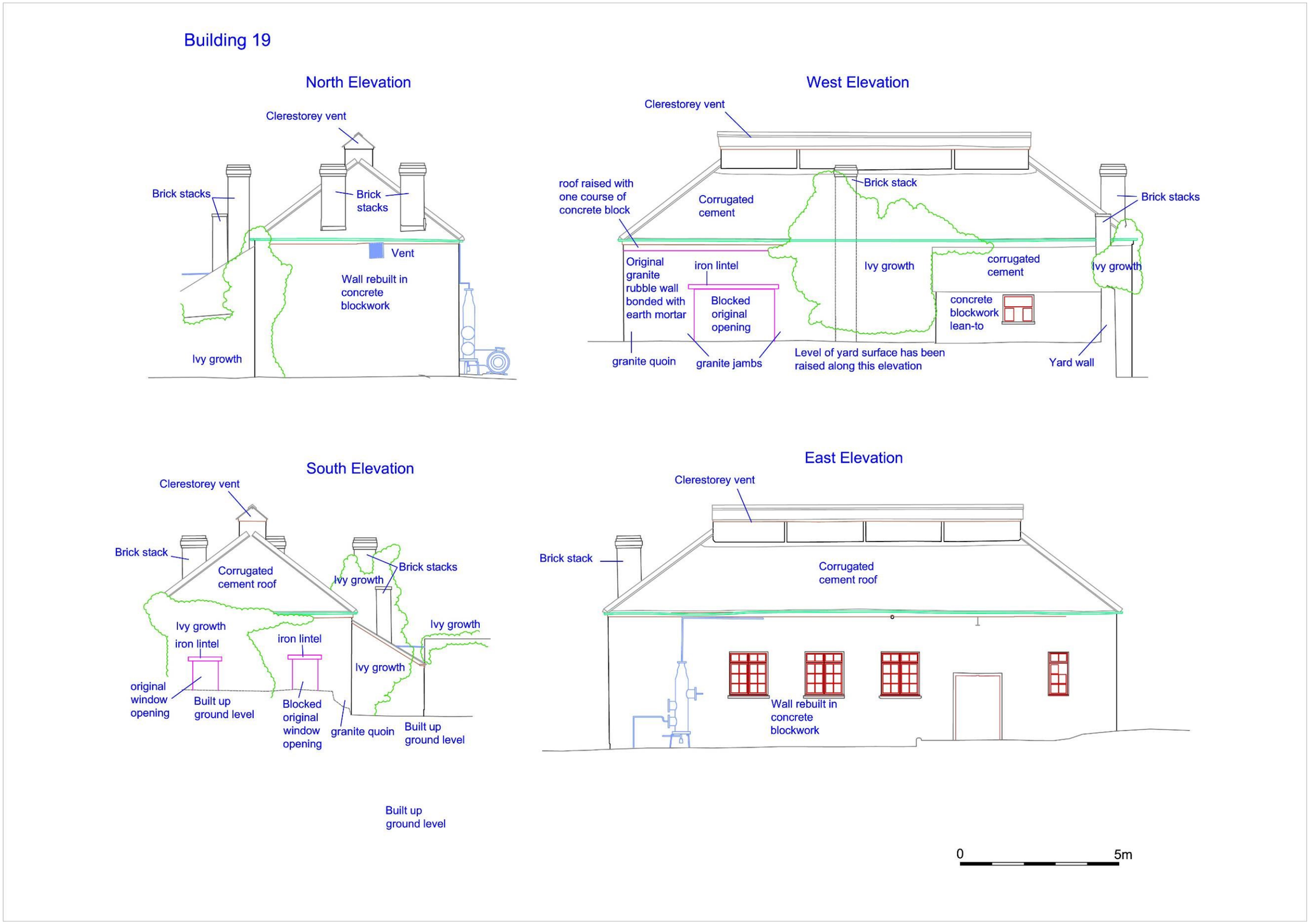


Fig 87 Elevations of building 19

Appendix 1: Planning brief

BRIEF FOR HISTORIC BUILDING RECORDING AND ARCHAEOLOGICAL INVESTIGATION BASSETS/BARTLES FOUNDRY, DUDNANCE LANE, POOL

Date: 28th November 2012

Scheme: CPR East – West Link Road Phase 1 Dudnance Lane, Station Road and Wilson Way, Pool

Site: Bartle's (Basset's) Foundry, Dudnance Lane, Pool

Application: PA09/01295/F & 08/00355/CCENV

HBSMR: CCO5347

Applicant: Cornwall Council Executive (Strategic Planning and Transportation)

Agent: Mouchel, 2 North Crofty, Tolvaddon Energy Park, Camborne TR14 0HX

Historic Environment Planning Advice Officer: Phil Markham, Cornwall Council, Historic Environment Service, Kennall Building, Old County Hall, Truro TR1 3AY. t. 01872 322546 e. pmarkham@cornwall.gov.uk

Local Planning Authority Officer: Chantal Mclennan, Cornwall Council, Planning & Regeneration, Dolcoath Avenue, Camborne TR14 8SX t. 01209 616965

e. Chatal.Mclennan@cornwall.gov.uk

This brief is only valid for six months. After this period the Historic Environment Planning Advice Officer (HEPAO) should be contacted. Any written scheme of investigation (WSI) resulting from this brief shall only be considered for the same period. The contractor is strongly advised to visit the site before completing their WSI as there may be implications for accurately costing the project.

Contractors Written Scheme of Investigation (WSI)

No ground works are to be undertaken until the HEPAO and the Local Planning Authority (LPA) have approved the archaeological contractor's WSI.

1 Introduction

1.1 This brief has been written by the HEPAO and sets out the minimum requirements for archaeological recording at the Bassets/Bartles Foundry site.

2 Site Location and Description

2.1 The Bassets/Bartles Foundry site covers approximately 0.9 hectares and is centred on Ordnance Survey Grid Reference SW 6653 4096 on the western side of Dudnance Lane in Pool.

3 Planning Background

3.1 Planning application 08/00355/CCENV was submitted on the 23rd July 2008 and was for highway improvement works (including widening) on Dudnance Lane, Station Road and Wilson Way and the adjacent side roads and to construct a new road between Station Road and Wilson Way at Carn Brea Lane. This application has been approved subject to 11 conditions. Condition 6 states:

3.2 *Prior to the commencement of development (including any site preparation works), the applicant shall have submitted to and had approved in writing by the CPA a programme of archaeological recording in accordance with a written scheme of investigation within the area of the approved site (to include details of the identification and method of recording of any sites and features of archaeological interest).*

3.3 *Reason: In the interests of archaeological investigation and recording*

Relevant Policies: Cornwall Structure Plan Policy 2.

4 Historic Buildings/Archaeological Background

4.1 This area of the proposed development lies in the mining heartland of the surrounding area and occupies the site of the former 19th century works known as 'Basset's Foundry' and 'Bartle's Foundry' established to supply the nearby mines. Tuckingmill and Pool were areas of major manufacturing complexes in the 19th century including some of the best known companies in Cornwall, including Bickford-Smith, Vivian, Bartles, Holman, Bennet and the Climax Rock Drill Company. These companies were amongst the most innovative in the industry, with worldwide reputations. Exceptionally important groups of buildings associated with these industries still survive. This is certainly the case with Bartle's where the majority of the buildings relating to the foundry complex survive intact. Basset (Bartle's) Foundry (c1860-1951) specialised in mine machinery and engineering. It manufactured and engineered an assortment of both cast-iron and brass goods for clients widely spread across Cornwall. This area is also adjacent to the site of an Iron Age round indicating the potential for related unenclosed settlement and other prehistoric activity in the vicinity.

4.2 Reference: Sturgess, J. 2008. Basset (Bartle's) Foundry, Pool, Dudnance Lane, Pool – Archaeological Assessment. (Project 2008R047). Historic Environment Service, Cornwall County Council for Mouchel Group plc

5 Building Recording Aims & Methodology

5.1 The present proposals will culminate in the destruction of historic environment assets. It is therefore important that theses are recorded to an appropriate level; and that the results are made available to interested parties. An English Heritage level 2-4 record for all sites and buildings of historic merit or that add character to the area will be required. Any architect/applicant drawings may be used or adapted as required. The recorder(s) will need to consider the following as a minimum:

- Site layout and organisation
- Ground make up of the surface (concrete, foundation remains, stub walls, metal, ceramic etc.) and dumped material.
- Character
- Function
- Materials, methods of construction
- Internal arrangement details of any foundations
- Fenestration
- Original fixtures and fittings
- Subsequent fixtures and fittings
- Evidence of use and status
- Relationship/relevance to the Outstanding Universal Value (OUV) of the Mining World Heritage Site
- Date/period of initial builds and subsequent alterations
- The mapped recorded features will be linked to earlier mapped features and photographic evidence where possible.

5.2 The photographic record shall be a comprehensive record to archive standard of the existing buildings and structures, both externally and internally. The photographs will be taken with black and white 35mm or medium format film producing archive quality prints and negatives. Colour photography may be utilised for general shots and where it is appropriate for detail shots. For both general and specific photographs, a photographic scale shall be included.

5.3 The drawn record will be comprehensive where required and act principally to support the photographic and written descriptive record. Where appropriate it should include measured plans of all floors, a site plan at 1:500, a phased plan if the buildings constructional complexity warrants this and a plan annotated to show the location, shot number and direction of all photographs. If the building displays evidence more than two building phases then a phased plan should be produced.

5.4 Plans may be based on existing architectural drawings where these exist but these must be checked in the field to ensure acceptable accuracy and should be recast where necessary to standard archaeological conventions.

6 Building Recording Results

6.1 The full report including any specialist assessments shall be submitted within a length of time (but not exceeding six months) to be agreed between the applicant and the archaeological contractor, Cornwall Council Historic Environment Service and the Royal Cornwall Museum. It would probably be appropriate for there to be a single report including the building recording and the archaeological recording. A further digital copy shall be supplied on CD-ROM preferably in 'Adobe Acrobat' PDF format.

6.2 The archaeological contractor will undertake the English Heritage/ads online access to the index of archaeological investigations (OASIS).

6.3 This report will be held by the Cornwall and Scilly Historic Environment Record (HER) and made available for public consultation.

6.4 The report must contain:

- A table of contents.
- The building's precise location in National Grid and address form.
- A brief history of the site.
- A concise non-technical summary of the project results.
- The aims and methods adopted in the course of the investigation.
- The date of the record, name of recorder(s) and the location and contents of the deposited archive.
- A location map, copies of any plans/drawings and copies of such photographs as necessary to illustrate the written description with appropriate annotation.
- A written description of the building and its structure, materials and layout.
- A full bibliography where external sources have been used.
- A copy of the brief and approved written scheme of investigation (WSI) will be included as an appendix.
- A digital copy of all photographs (in .TIFF format) making up the archive record to be bound into the rear cover of the HER / HEPAO copy of the report on CDR or DVDR.

6.5 A contingency shall be made within the costs for full publication in an appropriate journal. The HEPAO will notify the contractor of such a need within four weeks of receipt of the report.

6.6 The archive should follow that for the archaeological recording.

7 Archaeological Recording Aims & Methodology

7.1 Ground works associated with the development may disturb buried remains of earlier phases of the foundry (19th century) and there may also be traces of much earlier prehistoric activity on the site. The archaeological investigation will be an area excavation to record all of the surviving features and to gain an

understanding of the operation of the earlier phases of the foundry. Of particular interest are remains associated with iron, brass and bronze founding (Sturgess 2008 – building 22), smithing (ibid, building 17), and machining and boring (ibid, building 7) within the footprint of the surviving and demolished historic foundry buildings.

7.2 The site specific aims are to:

- Establish the presence/absence of archaeological remains
- Determine the extent, condition, nature, character, date and significance of any archaeological remains encountered
- To establish the nature of the activity on the site
- To identify any artefacts relating to the occupation or use of the site
- To provide further information on the history and development of Bartle's Foundry and the Bartle's site in general from any archaeological/building remains encountered

7.3 The general methodology:

7.4 All stages of the investigation shall be supported by a written scheme of investigation (WSI).

7.5 The archaeological contractor is expected to follow the code of the Institute for Archaeologists (IfA).

7.6 Details including the name, qualifications and experience of the site director and all other personnel (including specialist staff) shall be included within the WSI.

7.7 All of the latest Health and Safety guidelines shall be followed on site.

7.8 The IfA's Standards and Guidance should be used for additional guidance in the production of the WSI, the content of the report and the general execution of the project.

7.9 Terminology will be consistent with the English Heritage Thesaurus.

7.10 Prior to the commencement of on site works the archaeological contractor should familiarise themselves with the site by examining the information held by the Cornwall and Scilly Historic Environment record (HER), the Cornwall Records Office at Truro and the Cornwall Centre at Redruth, where appropriate.

7.11 A toothless ditching bucket can be used for the removal of any overburden until the first archaeological horizon is exposed. This will then be hand cleaned as appropriate.

7.12 Any surviving remains which will be disturbed or destroyed by the development shall be archaeologically excavated and recorded.

7.13 Details of how all archaeological contexts and artefacts will be excavated, surveyed, recovered and recorded shall be provided. The site will be tied into the national grid.

7.14 Details of the site planning policy shall be given in the WSI. The normal preferred policy for the scale of archaeological site plans is 1:20 and sections 1:10, unless circumstances indicate that other scales would be more appropriate.

7.15 The photographic record shall consist of prints in both black and white and colour together with the negatives. Digital photography may be used for report illustration. For both general and specific photographs, a photographic scale shall be included. In the case of detailed photographs it may be appropriate to include a north arrow. The photographic record shall be accompanied by a photographic register detailing as a minimum, feature number, location and direction of shot.

7.16 If significant archaeological deposits are exposed, all works must cease and a meeting convened with the client and the HEPAO to discuss the most appropriate way forwards.

8 Finds

8.1 All finds, where appropriate, will be retained from each archaeological context excavated.

8.2 All finds, where appropriate, shall be washed.

8.3 All pottery, and other finds, where appropriate, shall be marked with the site code and context number.

8.4 The WSI shall include an agreed list of specialist consultants, who may be required to conserve and/or report on finds, and advise or report on other aspects of the work including environmental sampling.

8.5 The requirements for conservation and storage shall be agreed with the appropriate museum prior to the start of work, and confirmed in writing to the HEPAO.

8.6 Finds work should be to accepted professional standards and adhere to the Institute for Archaeologists *Guidelines for Finds Work*.

8.7 Environmental sampling should be guided by *Environmental Archaeology* (English Heritage Centre for Archaeological Guidelines. 2001/02).

8.8 Further English Heritage guidance that may be helpful includes *Geoarchaeology* (2004) and *Archaeometallurgy* (2001).

8.9 The English Heritage Advisor for Archaeological Science will be able to provide archaeological science advice if required (Vanessa Straker 0117 975 0689).

9.0 Human Remains

9.1 Any human remains which are encountered must initially be left in situ and reported to the HEPAO and the appropriate authorities (the Coroner), where appropriate. If removal is necessary this must comply with the relevant Government regulations. If burials are encountered their legal status must be ascertained and recording and/or removal must comply with the legal guidelines.

9.2 If human remains are not to be removed their physical security must be ensured, preferably by back filling as soon as possible after recording.

9.3 If human remains are to be removed this must be done with due reverence and in accordance to current best practice and legal requirements. The site must be adequately screened from public view. Once excavated human remains must not be exposed to public view.

10 Results Archaeological Recording

10.1 The full report including any specialist assessments shall be submitted within a length of time (but not exceeding six months) to be agreed between the applicant and the archaeological contractor, Cornwall Council Historic Environment Service and the Royal Cornwall Museum. It would probably be appropriate for there to be a single report including the building recording and the archaeological recording. A further digital copy shall be supplied on CD-ROM preferably in 'Adobe Acrobat' PDF format.

10.2 This report will be held by the Cornwall and Scilly Historic Environment Record and made available for public consultation.

10.3 The report must contain:

- A concise non-technical summary of the project results.
- The aims and methods adopted in the course of the investigation.
- A discussion of the archaeological findings in terms of both the site specific aims and the desk based research.
- A location map, a drawing showing those areas examined as part of the archaeological recording, and copies of any archaeological plans and sections. All plans shall be tied to the national grid.
- All specialist reports and assessments.
- A summary of the archive contents and date of deposition.
- A context register with brief descriptions shall be included as an appendix.
- A copy of the brief and the approved WSI will be included as an appendix.

10.4 A contingency shall be made within the costs for full publication in am appropriate journal. The HEPAO will notify the contractor of such a need within four weeks of the receipt of the report.

11 Archive Deposition

11.1 An ordered and integrated site archive will be prepared in accordance with: *Management of Research Projects in the Historic Environment (MoRPHE) English Heritage 2006* upon completion of the project. The requirements for archive storage shall be agreed with the Royal Cornwall Museum.

11.2 If the finds are to remain with the landowner a full copy of the documentary archive shall be housed with the Cornwall County Record Office and with the Courtney Library of the Royal Institution of Cornwall.

11.3 The archive including a copy of the written report shall be deposited with the Royal Cornwall Museum within two months of the completion of the full report and confirmed in writing with the HEPAO.

11.4 Where there is only a documentary archive this will be deposited with the Cornwall Record Office as well as the Courtney Library of the Royal Institution of Cornwall.

11.5 A copy of the report will be supplied to the National Monuments Record (NMR) in Swindon.

11.6 A summary of the contents of the archive shall be supplied to the HEPAO.

11.7 Only on completion of 11.1 to 11.5 (inclusive) and the completion of the other Phase 1 recording will there be a recommendation for the discharge of the archaeological recording condition.

12 Monitoring

12.1 The HEPAO will monitor the work and should be kept regularly informed of progress.

12.2 Notification of the start of work shall be given preferably in writing to the HEPAO at least one week in advance of its commencement.

12.3 Any variations to the WSI shall be agreed with the HEPAO, preferably in writing, prior to them being carried out.

Appendix 2: Written Scheme of Investigation

Basset (Bartle's) Foundry, Pool: Written Scheme of Investigation for historic buildings record and archaeological excavation

Client: Cornwall Council (Strategic Planning and Transportation)

Client contact: John Foskett, Parsons Brinckerhoff

Client tel: 01872 245860

Client email: John.Foskett@pbworld.com

Site history and project background

The former foundry complex is located off Dudnance Lane in Pool, Camborne at NGR SW 66507 41001. Basset (Bartle's) Foundry (*c*1860-1951) specialised in mine machinery and engineering.

Foundries were a key element in Cornwall's important contribution to Britain's Industrial Revolution. A range of machinery which influenced the development of the mining industry worldwide during the 19th century was invented and made in foundries such as Basset's. They were also a familiar part of every mining district in Cornwall, and often substantial employers (Sturgess 2008).

In this context, Basset (Bartle's) Foundry at Pool is typical of Cornwall's smaller foundries. Established during the mid-19th century to provide mining machinery and undertake general engineering work, it produced rock drills, pulverisers, calciners and grinding mills, as well as water wheels, pitwork (pump columns) and the other brass and ironwork needed by mines, tin streams and china clay works. Like other foundries it also produced lamp standards, drain covers and other street furniture. In contrast to many of Cornwall's other smaller foundries, Basset (Bartle's) was able to survive the catastrophic downturn in Cornish mining by diversifying into general engineering work, during WWII producing components for the war effort, including components essential for the success of the D-Day landings. In 1951, the company moved from its long-established premises to the old Redruth Foundry (Sharpe in Sturgess 2008).

Planning application 08/00355/CCENV was submitted on the 23rd July 2008 for highway improvement works (including widening) on Dudnance Lane, Station Road and Wilson Way and the adjacent side roads and to construct a new road between Station Road and Wilson Way at Carn Brea Lane. The proposal includes dualling the road along Dudnance Lane, so that the route corridor includes the old foundry site. The development proposals include the demolition of all the structures within the assessment area.

In 2008 an archaeological assessment of the foundry complex was undertaken by Historic Environment (Projects) which set out recommendations for further archaeological work at the site. As the majority of the surviving foundry buildings are of historic significance, a brief outlining requirements for an Historic building record and archaeological work including an area excavation has been issued by Phil Markham, Historic Environment Planning Advice Officer, Cornwall Council (28/11/2012). Historic Environment (Projects) has now been requested to provide a quotation and Written Scheme of Investigation (WSI) for the historic building record and archaeological excavation.

This document sets out HE Project's approach, methodology and arrangements for monitoring.

Project extent

The Basset (Bartle's) Foundry site covers approximately 0.9 hectares and is centred at NGR SW 6653 4096 on the western side of Dudnance Lane in Pool. The site includes the property known as Bartle's Foundry and owned by Cornwall Council.

Aims and objectives

The principal aim of the work is to gain a full archaeological record of the site and buildings. This will include an historic building record and measured survey of the buildings associated with the foundry complex prior to their demolition. The aim of the archaeological excavation and watching brief is to record below-ground features associated with the former foundry building and any features of earlier origin. Specific aims are to:

- Establish the presence/absence of archaeological remains.
- Determine the extent, condition, nature, character, date and significance of any archaeological remains encountered.
- To establish the nature of the activity on the site.
- To identify any artefacts relating to the occupation or use of the site.
- To provide further information on the history and development of Bartle's Foundry and the Bartle's site in general from any archaeological/building remains encountered.

Working methods

All recording work will be undertaken according to the Institute for Archaeologists *Standards and Guidance for Archaeological Investigation and Recording.* Staff will follow the IfA *Code of Conduct* and *Code of Approved Practice for the Regulation of Contractual Arrangements in Archaeology.* The Institute for Archaeologists is the professional body for archaeologists working in the UK.

Historic building record

An English Heritage level 2-4 record of all buildings and structures will be undertaken.

Since there are no existing measured surveys of the site, a laser scan survey will be undertaken. This will provide a measured 3D model of the entire site. The interior of the main central block of adjoining buildings will also be included in the laser scan survey which will provide a ground plan and detailed interior survey of the most complex part of the site.

As part of the building record the following aspects will be considered:

- Site layout and organisation.
- Ground make up of the surface (concrete, foundation remains, stub walls, metal, ceramic etc.) and dumped material.
- Character.
- Function.
- Materials, methods of construction.
- Internal arrangement details of any foundations.
- Fenestration.
- Original fixtures and fittings.
- Subsequent fixtures and fittings.
- Evidence of use and status.
- Relationship/relevance to the Outstanding Universal Value (OUV) of the Mining World Heritage Site.
- Date/period of initial builds and subsequent alterations.
- The mapped recorded features will be linked to earlier mapped features and photographic evidence where possible.

Analysis of the buildings and structures will be undertaken on site (recorded as notes) to allow a description to be written up at the archive stage and photographs of building elevations will be annotated to allow interpretation.

Photographic recording

To include:

1. Black and white photographs using a 35mm camera on fine grain archive quality film.
2. Supporting colour photographs taken with a digital camera (with a resolution of 5MP or higher), to be used to illustrate the report and for possible presentation purposes.

The photo record will comprise:

- general views
- building elevations
- Interiors
- examples of structural, industrial and architectural detail

Methodology for the archive standard photography is set out as follows:

- Photographs of details will be taken with lenses of appropriate focal length.
- A tripod will be used to take advantage of natural light and slower exposures.
- Difficulties of back-lighting will be dealt with where necessary by balancing the lighting by the use of flash/halogen lights.
- A metric scale will be included in all views, except where health and safety considerations make this impractical.

Area excavation and watching brief

Ground works associated with the development will disturb buried remains of earlier phases of the foundry (19th century) and there may also be traces of much earlier prehistoric/Romano-British activity on the site associated with a nearby enclosed settlement.

The archaeological investigation will comprise an area excavation (measuring approximately 25m by 35m) to record all of the surviving below-ground features associated with the former foundry building (Sturgess 2008 – building 22). It will also include an archaeological watching brief (not included in the supplied estimate – Thomas 24/1/2013) undertaken to cover the rest of the area following the demolition of the surviving buildings.

The archaeological programme will follow three stages: fieldwork; archiving, and archive report production. Where significant deposits are encountered further stages of assessment; analysis; final publication may be required.

Archaeological Recording

The site works should be carried out under archaeological supervision. A mechanical excavator will be used to strip the site. Modern deposits (for example concrete or hard standing) may be removed by a toothed bucket. Once the overburden has been removed a toothless bucket will be used. Any significant archaeological features exposed in the excavated area will be carefully excavated by hand and archaeologically recorded by written description, plan, section and photographic record as appropriate by an HE Projects archaeologist.

During the archaeological recording the archaeologist will identify and record any archaeological features that are revealed in the excavated area; the level of recording will be appropriate to the character/importance of the archaeological remains.

Where necessary the detailed archaeological recording may include:

Excavation of archaeological features exposed in the excavated area and plotting them onto a base map.

Production of plans and section drawings of the excavated features and recording of features using a continuous numbering system.

Retrieval of artefacts.

Recording: general

- A location plan will be made, plotting the excavated areas/features onto the existing building plan.
- The location of features recorded during the excavation will be plotted on drafting film. Plans and sections will be created where appropriate.
- All archaeological contexts will be described to a standard format linked to a continuous numbering sequence. All contexts recorded will be recorded via the medium of HE pro forma context recording sheets.
- Registers of drawings, photographs, finds and contexts, samples will be maintained during the fieldwork.
- The excavated spoil will be carefully inspected for finds.

Site planning policy

- Site drawings (plans, sections, locations of finds) will be made by pencil (4H) on drafting film; all plans will be linked to the prepared location map and to the national grid; all drawings will include standard information: site details, personnel, date, scale and north-point.
- Site plans will be drawn at 1:20 and sections at 1:10, unless circumstances indicate that other scales would be more appropriate.
- Site drawings (plans and sections) will be digitised and converted into AutoCAD drawings.

Photographic record: excavation

- The photographic record will consist of prints in black and white together with the negatives. Digital photography will be used for report illustration.
- For both general and specific photographs, a photographic scale will be included.
- In the case of detailed photographs a north arrow will be included if appropriate.
- The photographic record will be accompanied by a photographic register detailing as a minimum, feature number, location and direction of shot.

Finds

- Significant finds will be retained (all finds pre dating 1800 and diagnostic modern find, for example pottery with makers marks, etc) from each archaeological context excavated. The collection policy will be reviewed during the excavation.
- All retained finds, where appropriate, will be washed.
- Retained finds where appropriate, will be marked with the site code and context number.

- The requirements for conservation and storage will be agreed with the appropriate museum.
- Finds work will be to accepted professional standards and adhere to the Institute for Archaeologists' *Guidelines* (IFA 2001b).

Sampling

There may be some opportunity for environmental sampling during the course of the work.

- The English Heritage Advisor for Archaeological Science will be consulted for advice if required (Vanessa Straker 0117 975 0689).
- Environmental sampling will be guided by *Environmental Archaeology* (English Heritage 2004).
- The archaeologist undertaking the excavation will assess the potential for environmental sampling.
- If suitable deposits are identified the following types of sample may be taken as appropriate:
  - Bulk sampling
  - Monolith sampling
  - Macro & Micro Flora Analysis (including pollen analysis)
  - Macro & Micro Fauna Analysis
  - Radio-carbon dating for artefact analysis

Creation of site archive

To include:

- Archiving of black and white photographs to HER standards. All monochrome photographs will be archived using the HE photo database.
- Digital colour photographs (stored according to HER guidelines and copies of images made available to the client).
- A detailed site/building description.
- Preparation of finished drawings.
- Completion of the English Heritage/ADS OASIS online archive index.

Archive report

A written report will include:

- Summary
- Project background
- Aims and objectives
- Methodology
- Location and setting
- Designations
- Site history
- Archaeological results
- Chronology/dating evidence
- Significance

- Conclusions
- References
- Project archive index
- Supporting illustrations: location map, historic maps, plans, elevations/sections, photographs

A paper copy and a digital (PDF) copy of the report, illustrations and any other files will be held in the Cornwall HER. Paper copies of the report will be distributed to the client, to local archives and national archaeological record centres.

Archive deposition

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

The archiving will comprise the following:

1. All correspondence relating to the project, the WSI, a single paper copy of the report together with an electronic copy on CD, stored in an archive standard (acid-free) documentation box
2. A2 drawn archive storage (plastic wallets for the annotated record drawings)
3. Archive standard negative holders and archive print holders, to be stored in the HE Projects system until transferred to the Royal Cornwall Museum.
4. The project archive will be deposited initially at ReStore PLC, Liskeard and in due course (when space permits) at Cornwall Record Office.

Timetable

The study is anticipated to be commenced during February 2013. HE will require at least three weeks notice before commencement of work, in order to allow to allocate field staff time and arrange other logistics.

The archive report will be completed within 4 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 Phil Markham, Historic Environment Planning Advice Officer. Where the Historic Environment Planning Advice Officer is satisfied with the archive report and the deposition of the archive written discharge of the planning condition will be expected from the local planning authority (LPA).

Monitoring points during the study will include:

- Approval of the WSI
- Completion of fieldwork
- Completion of archive report
- Deposition of the archive

Historic Environment Projects

Historic Environment Projects is the contracting arm of Historic Environment, Cornwall Council (HE). HE employs some 20 project staff with a broad range of expertise, undertaking around 120 projects each year.

HE 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

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

As part of Cornwall Council, the HES has certification in BS9001 (Quality Management), BS14001 (Environmental Management), OHSAS18001 (Health, Safety and Welfare), Investors in People and Charter Mark.

Terms and conditions

Contract

HE Projects is part of Historic Environment, 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 the HE projects team 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 a nominated Senior Archaeologist 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.

The project team is expected to include the following:

Nigel Thomas BA MIfA

Senior Archaeologist responsible for management of projects relating to historic building recording and surveys of historic landscapes. Past work has included recording

and structural analysis at Launceston and Restormel Castles, medieval chapels at Rame, Bodmin and Hall (Bodinnick), as well as landscape surveys at Lanhydrock park and Godolphin gardens. Project manager for historic building analyses at Tintagel Old Post Office, Cotehele House, St Michael's Mount summit complex and Trerice for the National Trust. Project team leader for the Lostwithiel Town Characterisation Study. Member of the IfA Buildings Group and Survey and Illustration Group.

Joanna Sturgess BA

Archaeologist with HE, responsible for undertaking the Basset (Bartle's) Foundry Archaeological assessment (Sturgess 2008) with a wide range of experience in recording historic buildings, landscapes, excavation and post-excavation. Past historic building works have included Cutmadoc Farmhouse, Lanhydrock; City Wharf, Truro; Harvey's Foundry, Hayle; Boswednack Serpentine works, Porthmeor farm and various mining sites. Other projects include Gwithian's past excavations, Lemon Quay excavation, Goonhilly Earth Station survey, Lower Boscaswell and Trevessa in West Penwith landscape surveys. Expertise includes archaeological use of CAD software and survey.

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 all material gathered as a result of the project will be reserved to the Historic Environment, Cornwall Council. Existing copyrights of external sources will be acknowledged where required.

Use of the material will be granted to the client.

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.

HE 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 HE may need to disclose any information it holds, unless it is excluded from disclosure under the Act.

Health and safety statement

HE follows the Council's *Statement of Safety Policy*. For more specific policy and guidelines HE uses the manual *Health and Safety in Field Archaeology* (2002) endorsed by the Standing Conference of Archaeological Unit Managers and also the Council for British Archaeology's Handbook No. 6 *Safety in Archaeological Field Work* (1989).

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

Insurance

As part of Cornwall Council, HE is covered by Public and Employers Liability Insurance, with a policy value of £50m. The Council also has Professional Negligence insurance with a policy value of £5m.

Jo Sturgess

Archaeologist

18/2/2013

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