Felin Wen Kiln
Llanrug

Archaeological Survey

GAT Project No. G1935
Report No. 702
October 2007

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust
Craig Beuno, Ffordd y Garth, Bangor, Gwynedd, LL57 2RT

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Prepared for Mrs Sarah Edgar and Mr Gerald Downing

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By

Andrew Davidson

Illustrations by Tanya Berks

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1. Introduction

Gwynedd Archaeological Trust has been asked by Mrs Sarah Edgar and Mr Gerald Downing to undertake a survey of the former corn drying kiln at Felin Wen, Llanrug. The survey is to be undertaken as part of a planning condition in advance of development of the building.

A brief was provided for this work by Gwynedd Archaeological Planning Service (D857), which requested a Level 3 record as defined in *Recording Historic Buildings: A descriptive specification* (RCAHMW 1996, 3rd edition).

2. Location of the kiln

Felin Wen is a former water corn mill lying on the banks of the River Seiont at NGR SH 5087 6314, and within the parish of Llanrug.

The River Seiont is a relatively large fast-flowing river which runs for some 13.5 Km from the lakes at Llanberis (Llyn Peris and Llyn Padarn) to the sea at Caernarfon. Leland says of the river that the 'Segent (i.e. Seiont) Ryver rennith hard on the farther side of Cairnarvon, as the shore side goith, and there cummith in praty shippis hard to the castle side from Meney into Sainct' (Smith 1906, 86). Hyde Hall says that the river 'after passing through the lakes of Llanberis pursues for some way its course to the north-west, when it turns to the south-west, and flowing in that direction immediately to the south of Caernarvon, passes under its walls after a short reach to the north into the Menai. That the volume of water annually borne to the sea from this region is prodigious cannot be doubted, although the rapidity of the descent never allows that density of accumulation which the lazy loitering sweeps of rivers such as the Thames present so frequently during their course. Every storm of rain here, slipping from the precipitous sides of the mountains, seems with all possible haste and hurry to scramble onwards to the sea along its channels, both main and contributory' (Jones 1952, 26). Of the parish of Llanrug, Hall says that there is a corn mill, a fulling mill and a paper mill, and of the last he says it 'is the only one in the county, and from it is sent by way of Caernarvon enough of the manufacture to make some figure in the table of exports' (Jones 1952, 181).

The river supported some twelve mills along its length: on the 1889 OS map a total of 11 mills are recorded either on the principal river, or close-by on a tributary. Four of these were corn mills, four were woollen mills and three were slate mills. Other farms (for example Glanyrafon and the estate at Glan Gwna), may also have used the river to power water wheels. The paper mill mentioned by Hyde Hall lay on the site of the later Bod-Rhual Flour mill, north of Glan Gwna.

The mill at Felin Wen lies a short distance west of Pont Rug, one of two bridges across the river (outside Caernarfon), the other being at Pont Rhythallt. Pont Rug is of early 19th century date, and was widened in the mid-19th century to take the Caernarfon to Llanberis railway. It was preceded by an earlier bridge on a slightly different alignment, as shown on the 1777 estate survey (Vaynol 4056).

3. The history of Felin Wen

3.1 Medieval history

The medieval township of Rug contained seven free gwelyau and according to the Extent of 1352 they had their own mill, and therefore did not owe suit to the Princes mill, which was situated at Dinorwic (Ellis 1838, 17). The mill is not named, though is likely to have been called Melin Rug, and its location is not known, though it was certainly located on the River Seiont.

A document of 1475 records the grant of two acres of arable land in 'Ruke' to William Gruffith, of which one end 'abutts on the river Sainte and the other on the road leading from Roseydrual to the mill of Ruke' (Llanfair and Brynodol, D14). The document is endorsed 'y velyn wenn', suggesting the mill was constructed on the two acres, and that Melin Rug lay higher up the river. Rhosydrual lies just west of Caernarfon. William Griffith can be identified as Gwilym Fychan, son of Gwilym ap Griffith, founder of the Penrhyn Estate.

In the following year William Gruffith received a grant to build a 'dike or ditch to hold and retain water in', through the land of Matho Gethyn, 'from the bank of the River Saynte' to his mill (Llanfair and Brynodol, D17).

It can be suggested, therefore, that Melin Wen was first built 1475-6 on land acquired by William Griffith in the township of Rug.

Some 80 years later, Maurice Gruffith, a descendant, was awarded a parcel of land 'lying between the place called Mur yr Onnen and the land of Gruffith Davies and between the stream called Avon y Saynt and the highway leading from the mill of Griffith Davies to Pont Ruke' (Llanfair and Brynodol D72). It has not proved possible to identify the mill of Griffith Davies, though it is likely to be either the former Melin Rug or Melin Wen.

A fulling mill (Pandy) is mentioned lying on the River Seiont in Rug next to 'Errew David' as early as the mid 16th century (Lewis and Davies 1952, 278), though identifying this mill has also not proved possible.

3.2 Later history

By the 18th century the mill and surrounding land was in the ownership of the Vaenol Estate, owned by Assheton-Smith. The mill is clearly shown on an Estate survey of 1777 (Vaynol 4056, 84-5) with its neighbouring farms of Cefntresaint, Dol Gyndal and Pont Rug. No earlier reference has been found in the Vaynol manuscripts. At that time the land accompanying the mill consisted of seven small enclosures:

C1	House and garden	0-0-24
C2		1-1-29
C3		1-2-5
C4		2-0-14
C5		1-2-37
C6	Kiln and garden	0-1-20
C7	Mills and Eisingryg	1-1-31

There are three buildings shown on the map, two lie on the location of the present mill, and one lies on the site of the present kiln. There is no building shown in plot C6. Eisingryg (Eisingrug) is a mound of husks (Eisin = husks; crug = mound) (described in one 19th century dictionary as a 'heap of bran' (Lewis 1815). This is further discussed below.

Unfortunately few other references have been found within the Vaynol manuscripts. The property is not included within the estate surveys of 1823 and 1848. It is included within a survey of 1866 (Vaynol 4083), when David Owen was the tenant. At that time the property consisted of:

A1	Cae'r Bont	Pasture
A2	Cae'r pig	Ditto
A3	Yr allt odyn	Ditto
A4	Felinwen buildings and yard	
A5	Ynysoedd and mill stream	Pasture
A6	Pen y felin wen: two cottages	
A7	Cae tan y ty	Ditto
A8	Cae Bach y Bont	Ditto
A9	Plantation	Wood
A10	Ynys	Wood and rough
A11		Ditto.

The map to accompany the survey description was not available for consultation, so the exact location of the enclosures cannot be certain.

On later maps, in particular the OS County Series maps of 1889 and 1900 the kiln is clearly shown with two extensions on the west side. Whilst these were probably for storage, there is now no evidence for their existence.

The mill was sold by the Vaynol estate in 1920, and it is thought the mill had ceased working by this time. Following its sale, a pottery kiln was erected on the site, and a pottery was run from here for several decades, owned by Bonnor's of Bryn y Gwalia (Llangedwyn, Denbighshire), who also owned Bryn Rhodion Pottery Ltd. John Haughton Maurice Bonnor (1875 – 1916) was an Arts and Crafts designer and sculptor, who worked in jewellery, stained glass and wood (Hubbard 1986, 214). It has not been possible to establish if he founded the pottery, but it must have been owned by his descendants, or descendants of his immediate family. The pottery kiln still stands next to the former mill at Felin Wen, and the present owners have postcards showing examples of the wares made there, which appear to consist of primarily utilitarian bowls and dishes for use in the dairy and kitchen.

Throughout most of the life of the pottery the corn drying kiln was in separate ownership, owned by the residents of the former mill house at Felin Wen which became a small farm (now the restaurant). The kiln and former mill were only reunited under a single owner in the 1970's (information from deeds in possession of present owners).

4. Survey and description of the kiln

4.1 The building

A kiln is shown on the 1777 survey in the same place as the existing building, and on the same alignment. A building is similarly shown here on the 1840's tithe map, and on the first edition OS map of 1889, where there are two extensions to the west. These are still shown on the 1914 map, though have been subsequently removed.

The kiln is a rectangular stone-built structure of two storeys measuring 13m by 5m and aligned north-south. The ground slopes steeply down to the river at the south end of the building, and the north half is terraced into the slope, allowing access to the kiln at first floor level through the north gable wall. The mill leat carrying the water to the mill wheel passes alongside the south gable wall. The building is currently roofless, though parts of the roof remained up to the 1980's. The south gable wall stands to its full height, but the north gable and a former cross wall have been partly reduced.

The building is of three bays, the north part contains the drying kiln, the central section is largely taken up by a cross passage formed by opposing doors in each of the longitudinal walls, and the southern bay is further sub-divided by a north-south cross wall. The building also extended further north, where there was an outer bay or porch at first floor level, which led into the drying floor.

There are identifiable changes within the nature of the masonry, though it is not always possible to link these to specific building phases. The most noticeable change is the use of rounded field boulders at the north end of the building, to rectangular quarried blocks at the south end. There is no clear dividing line, though it occurs south of the cross-passage. At this point there are two large boulders on either side of the building, which protrude inside, and these seem to indicate the line of an earlier south end. The present south gable is of one build, of largely quarried stone, with the exception of a late phase when the eaves were raised, and bricks were incorporated.

The stone wall which crosses in front of the kiln, and which formerly stood to eaves height, has now been reduced to first floor level, so that it stands level with the kiln floor. Photographs show the wall contained substantial quantities of brick, and the remaining lower wall is of largely quarried stone. The wall is butt-jointed to the two longitudinal walls.

The kiln is built into the ground floor of the north end of the building. It is of brick with slate conical sides and slate lintels. The fire box is accessible from the south side, and consists of a fire box with a hinged iron door, and ash pit below. The fire box is set into the base of an inverted funnel, of which only the south side is visible, as the other three sides are hidden within the brick and stone structure. The south side of the inverted 'funnel' is made up of long horizontal slate slabs supported on the brickwork.

The kiln has a floor of pierced tiles, presumably supported on an iron framework, though this is not readily visible. There were, apparently, the remains of two wooden chutes at the front of the kiln, which could have been used for bagging the dried grain.

The cross-passage has a floor of re-used kiln tiles, which is a clear indication that the current layout is not the original one, but a later rebuild.

The south end of the building is divided by a north-south wall. This appears to have supported ceiling joists for a half loft between it and the west wall. The holes for the joists are clearly visible in the west wall. There are none visible in the east wall, so it would appear the loft floor did not extend the full width of the building. The floor level in the eastern space is raised by some 0.3m. In the south gable is a blocked window, which is partly obscured by the internal wall. There is also the remains of a small rectangular horizontal opening below the window, which is also partly obscured by the cross-wall. Small quantities of brick has been used in the building of the internal wall. At a relatively late date, the eaves of the south gable have been raised, again utilising small quantities of brick.

4.2 The kiln tiles

There are three types of tile found at Melin Wen, the arrangement and differences clearly shown in fig. 00. For the purposes of this report, the tiles have been divided into Types 1, 2 and 3. A classification system and catalogue of known kiln tiles has been created by

Peter Crew, who kindly supplied the author with a copy of his report, and that system has been applied to the tiles from Melin Wen in the descriptions below (Crew 2003).

Each of the tiles measures approximately 30cm (12") square. The Melin Wen type 1 tile included the only stamped tile to be found, clearly marked 'Catheralls', a pottery founded by Jonathan Catherall (1689 – 1761), and developed by his grandson, also Jonathon (1761 – 1833). The company made increasing amounts of brick and tile. The pierced holes are made up of 9 small pinholes in a diamond pattern. It falls into Crew's classification as 9D, 7+6Ax13=85 cells. The tiles are regular in shape, and almost certainly machine made.

Type 2 tiles are also regular in shape, suggesting a machine made tile. Each cell contains 5 pinholes, and there are 8x8 rows of cells giving a total of 64 (classified as 5S, 8x8=64 cells).

Type 3 tiles are more irregular, and appear hand made. They have a simple even patterning of 4 pinholes per cell, and 10x10 rows of cells, giving a total of 100 (classified as 4S, 10x10 = 100 cells).

The drying floor is approximately 3.65m (12 ft) square, allowing for 12 rows of 12 tiles, though 11 tiles are the maximum number now to be found in any one row. The drying floor when in use would therefore have been made up of approximately 144 tiles, with an area of approximately 13.3 sq m (144 sq ft). Some 95 identifiable tiles remain in the kiln floor, of which 18 are type 3, 30 of type 2 and 47 of type 1. On the floor below, the cross-passage is made up of some 66 tiles, of which 5 are type 3, 54 are type 2 and 7 are type 1. It is interesting that the tiles that appear to be the earliest, hand made tiles, (type 3) are almost exclusive to the kiln floor.

5. Discussion

The changes in masonry, and the re-use of three types of kiln tile, point to several phases of construction. These are not clear-cut, but the following is offered as a possible sequence.

Phase 1 A rectangular stone building with walls of rounded field stone, probably shorter than the present building. This is thought to be the building shown on the 18th century estate map.

Phase 2 The building was extended to the south with quarried stone. The window and horizontal opening in the south wall belong to this phase, as may the doors creating the cross passage. This phase may date from the early to mid 19th century.

Phase 3 The internal north-south wall was built, and a loft inserted between the west wall and internal wall. The roof was probably raised at this time, and the end window blocked. This phase may date from the end of the 19th century.

The present kiln floor dates from either phase 2 or 3, but possibly phase 3, as the doors of the upper floor, now demolished, but visible in earlier photographs, show quantities of brick in the reveals, similar to the brick used to extend the height of the eaves, and in the internal wall.

Whether the three types of kiln tile relate to three phases of kiln structure is not known. The tiles are laid dry on iron runners, so could be lifted up individually and changed around. Many of the tiles built into the floor are badly crazed, and appear to have been burnt. If this is the case, then a fire or over-heating may have resulted in a kiln with a floor of predominantly type 2 tiles being rebuilt with a mixture of types 1, 2 and 3.

6. Melin Wen kiln in context: the use of corn drying kilns

The topography and soils in the parish of Llanrug were more suited to the cultivation of oats and barley than wheat: Hyde Hall says 'oats and barley are the only grains raised', and emphasises the large areas of heath, large quantities of which were used for fuel (Jones 1952, 181). Oats would have been grown as the main crop from at least the 17th century, and possibly from late medieval times. Oatmeal, the principal ingredient of oatcakes (*bara ceirch)* and porridge (*uwd),* formed a key component of the staple diet on upland farms (Jenkins 1976, 147-50). However, when required for human use, as opposed to animal fodder, the husk had to be removed before grinding. Oats have a high husk to grain ratio (some 50%, compared with 30% for wheat), and it is difficult to remove, requiring drying or parching of the grain before being ground between millstones, where the upper stone was lifted sufficiently to ensure removal of the husk, but not too close to damage the kernel. The grain was then winnowed to remove the husk, followed by grinding to obtain the oatmeal. This process was necessary even when the grain was harvested during a dry spell, and was also used to help remove the husks from Barley. A different process involved the removal of moisture from wheat and barley that were too wet when harvested.

Corn drying kilns have a long history, and examples of late prehistoric and Roman examples are known. However up to the mid-18th century corn was usually dried by the farmer on the farm, using field kilns consisting of a flue with a stoke hole at one end and a platform of wood and straw at the other. Following the introduction of kiln tiles in the 18th century, many of the corn mills built a kiln adjacent to the mill (see Davies 1997, 86-7; Bowie 1979, 7). This was particularly the case in oat growing areas, because of the need for milling both before and after the drying process (Jones and Major 1973, 137). As late as the early 19th century, however, at Cwm Eithin, Hugh Evans says 'there were two kinds of kilns in use at the time, one being called a straw kiln and the other a tile kiln' (Evans 1948, 118). Kilns, like smithies, were popular meeting places on Winter evenings, and in medieval times space was often allocated for sleeping within the kiln.

The basic method of operating all kilns was roughly similar, though inevitably there were minor variations. Typically the grain was spread out over the floor to a depth of 4". The

fire was lit in the grate using peat, wood, chaff, charcoal or coke, and the warm air rose through the floor and grain, and out through a roof ventilator or the door. The grain was turned frequently, usually with a wooden shovel (*corlac*). Estimated drying times vary depending on the type of grain and its moisture content. At Felin Lyn, Davies estimates 3 – 4 hours, turning every 20 minutes at a temperature of 100 - 150^0, and leaving to cool for 12 hours. A similar time span is given by Wiliam for Melin Bompren, who says oats were dried for three hours and left to dry for 12 hours (Wiliam 1977, 17-18). Other sources suggest longer times were sometimes required (Jones and Major 1973, 137; Crew 2002, 84). Once dried, the grain was bagged through chutes into sacks below. The work was at least a two-person operation, as one had to turn the grain, whilst the other kept the fire at the correct level.

At many mills it was customary for the farmer to supply his own fuel for the kiln, and he could also use his own labour. Wiliam (1977) records the practice in Cardiganshire of sending a servant and maid to carry out the work, though in other areas the farmer is more likely to have employed the regular '*craswr'* (literally 'baker').

Kilns were also used for malting barley, and in the north of England for oat seed germination. It is not known if either malting or seed germination was undertaken at Felin Wen.

The Felin Wen kiln is typical of those found in much of north-west Wales, and though no systematic survey has been undertaken, the majority of corn mills, both wind and water powered, in the former counties of Anglesey and Caernarfonshire would have possessed a kiln of this type, though the flooring may occasionally have been of punched metal rather than tile. A slightly different type of kiln, though operating on the same principal, but of three bays with the kiln in the centre bay, is found in Merionethshire (for an example of this type see Davidson & Dutton 1997; Crew 2002). A discussion of other types of kiln can be found in Jones and Major 1973 and Bowie 1979. Whilst kilns that lie immediately adjacent to the mill have little additional space, those that stand independently have greater storage. In the case of Melin Wen, the north porch may have provided storage for grain to be dried. This was then bagged off below, and stored in the space at the south end of the building. A part of this space, probably the area east of the dividing wall, would have been used for storing fuel for the fire.

7. Conclusion and Recommendations

To conclude, Melin Wen was a water powered corn mill, possibly first established in 1475-6, which continued in use up to the early 20th century. A corn drying kiln was built a short distance from the mill, and though the date of its construction cannot be established, it was certainly present by the time of the estate survey of 1777. The kiln building was later extended, and the drying floor rebuilt on several occasions. The present drying floor is thought to date from the late 19th century, though it utilises tiles from an earlier structure. The principal use of the kiln is likely to have been drying oats prior to shelling, though it could also have been used for drying barley and wheat, and possibly malting barley.

There are still aspects concerning the construction of the kiln that are not fully understood, and which could not be recorded as access below the drying floor was not readily possible. It is therefore recommended that a watching brief and time for survey are incorporated into works that will allow a better understanding of the construction and phasing of the kiln and drying floor, in particular the construction of the fire box and funnel, and the supports for the tiles.

8. List of Sources Consulted

8.1 Archive Sources

NLW Llanfair and Brynodol Mss

UWB Vaynol Mss, in particular Vaynol 415; 4056; 4069; 4083; 4193; 1641.

Tithe map of Llanrug (Gwynedd Archives)

OS County Series maps Caernarfonshire Sheet XVI.01, editions of 1889, 1900, 1919.

Deeds and other information in the possession of the current owners.

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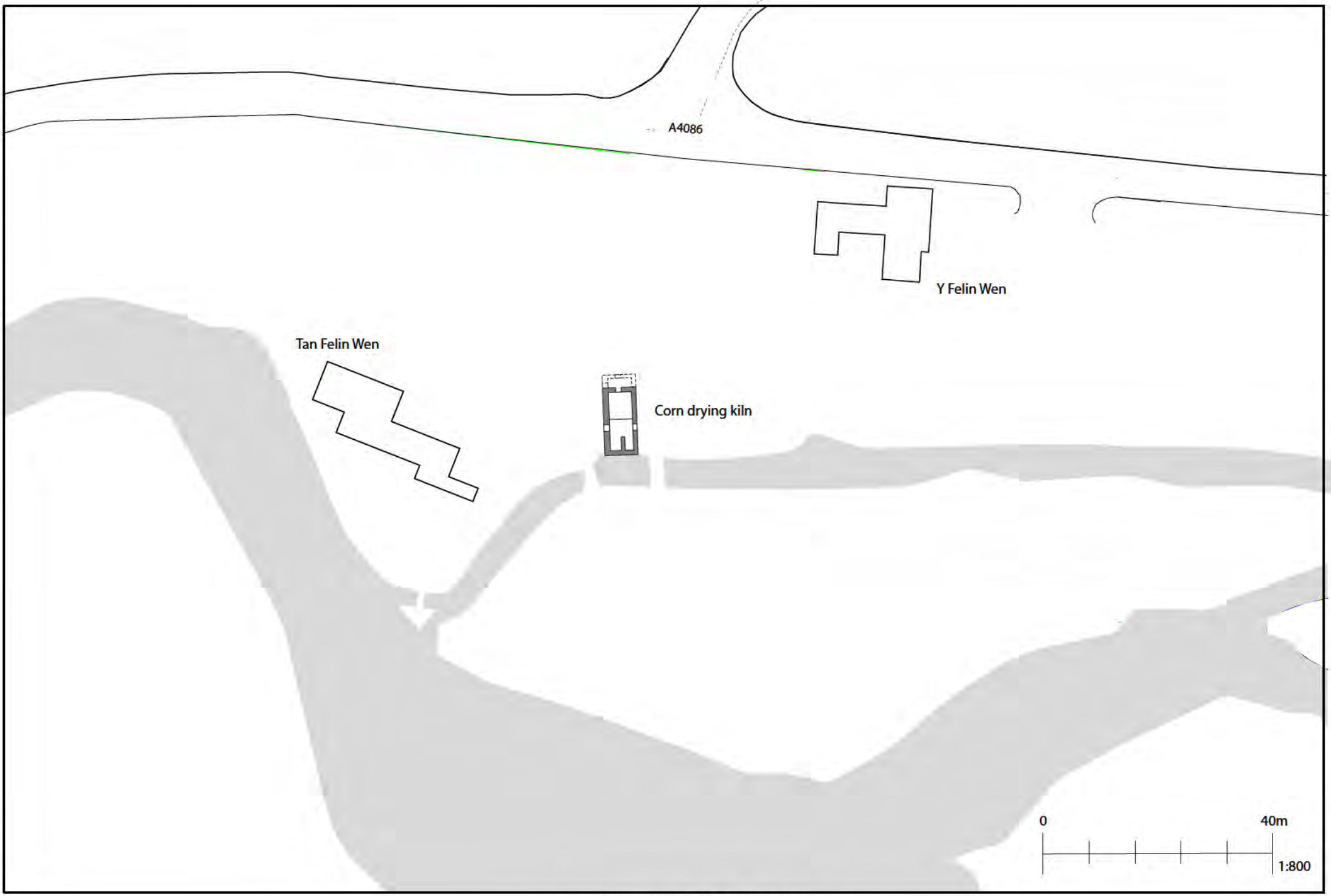


Figure 1. Location of Felin Wen Kiln, Llanrug

Figure 2. 1777 Estate Survey, UWB Vaynol Mss 4056.

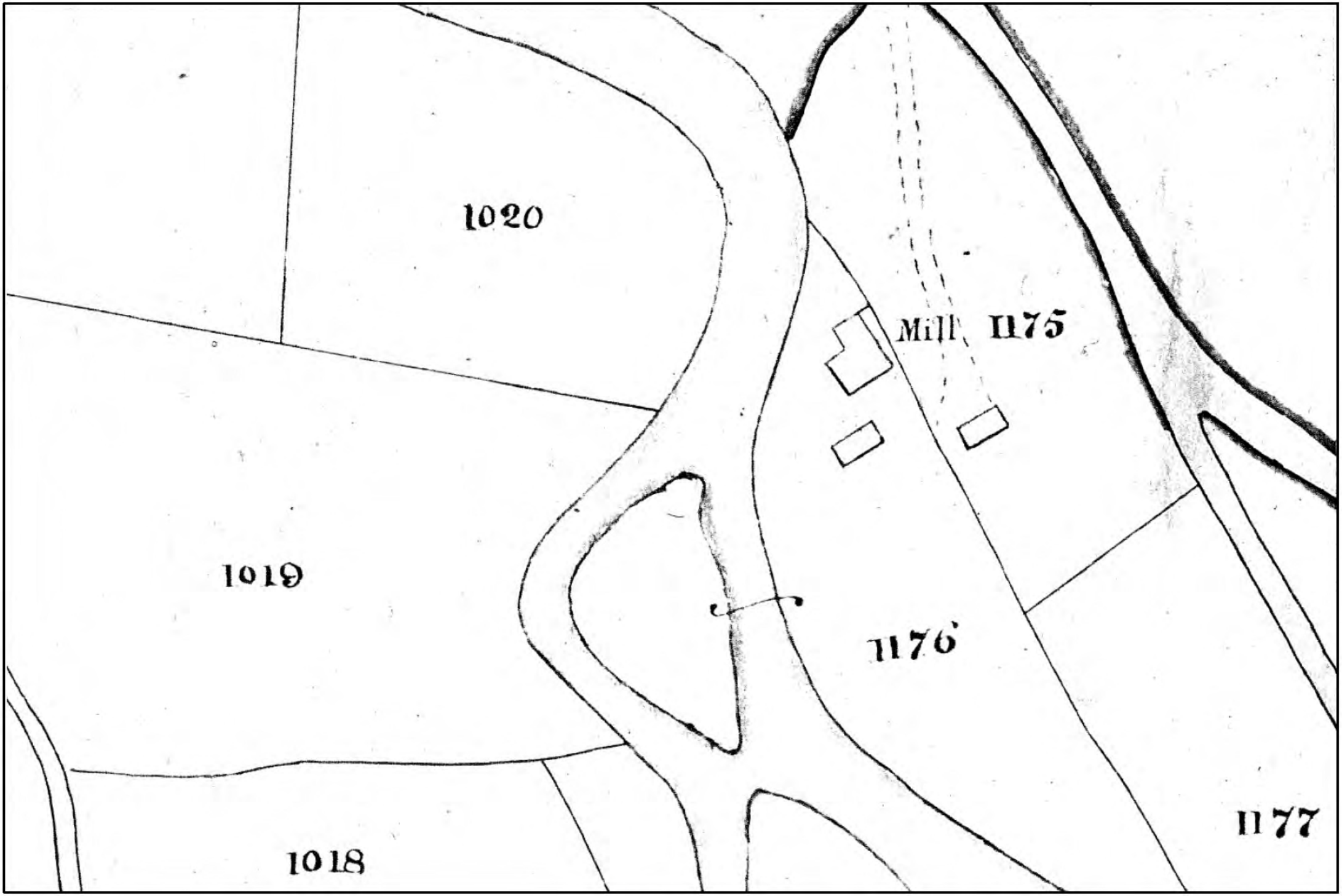


Figure 3. Llanrug Tithe Map

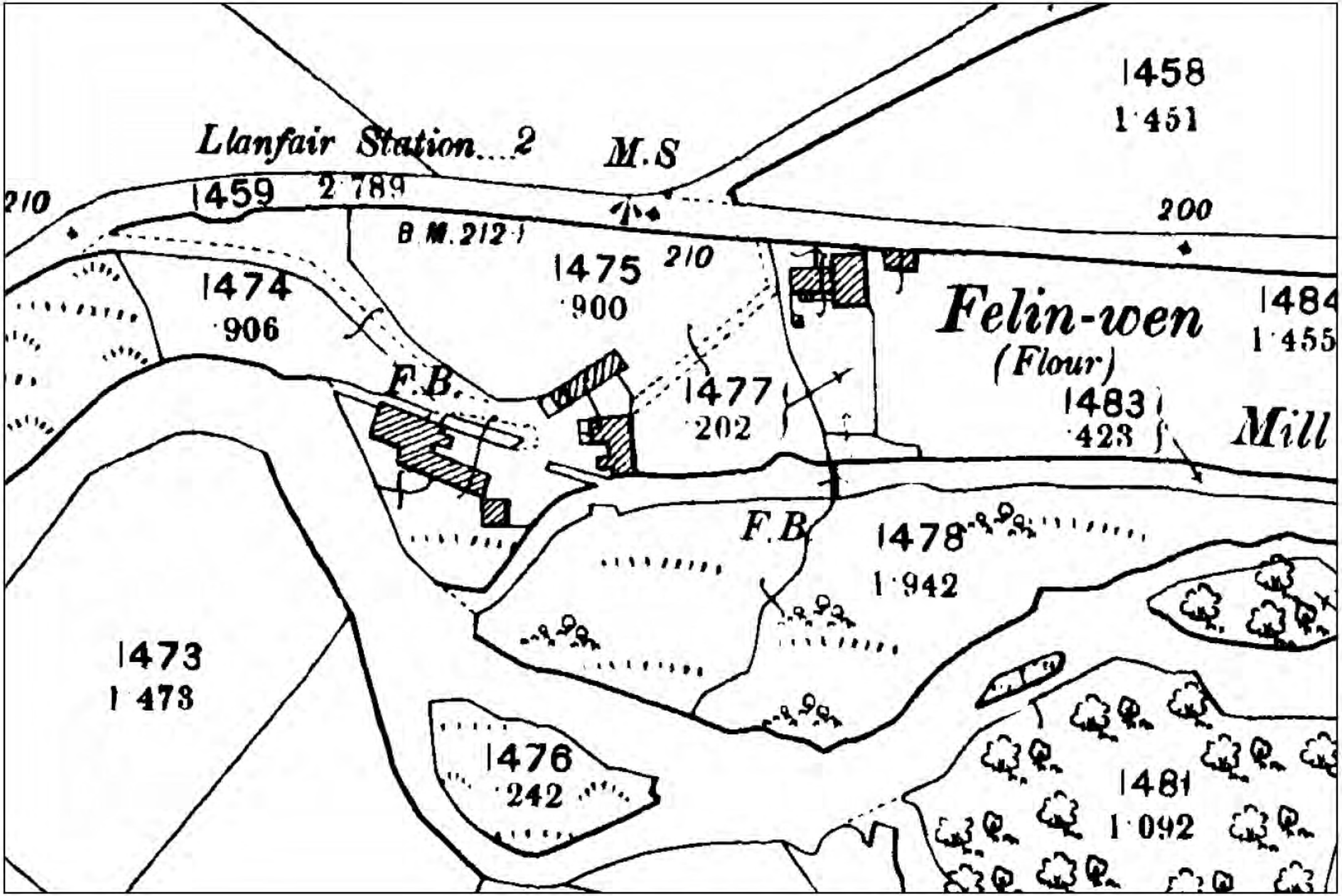


Figure 4. 1900 Os County Series maps Caernarvonshire sheet XVI.01.

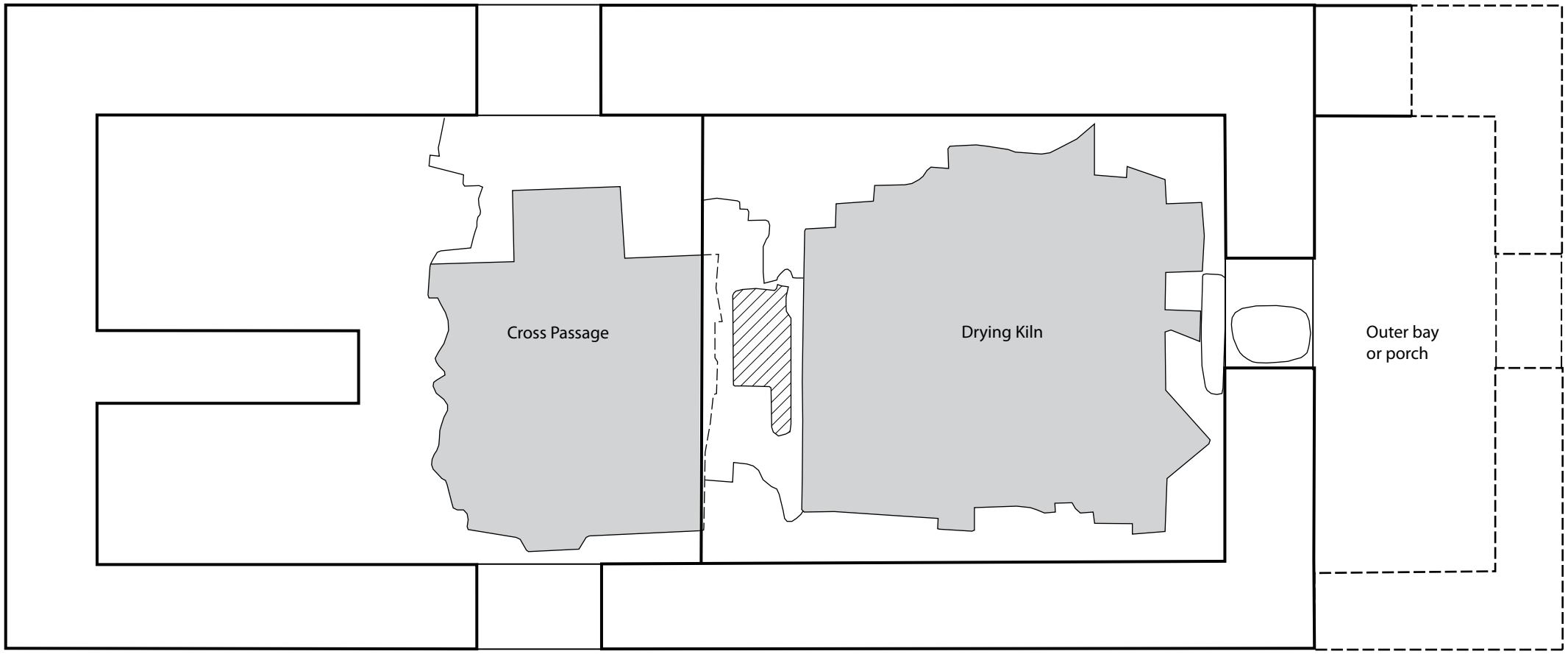
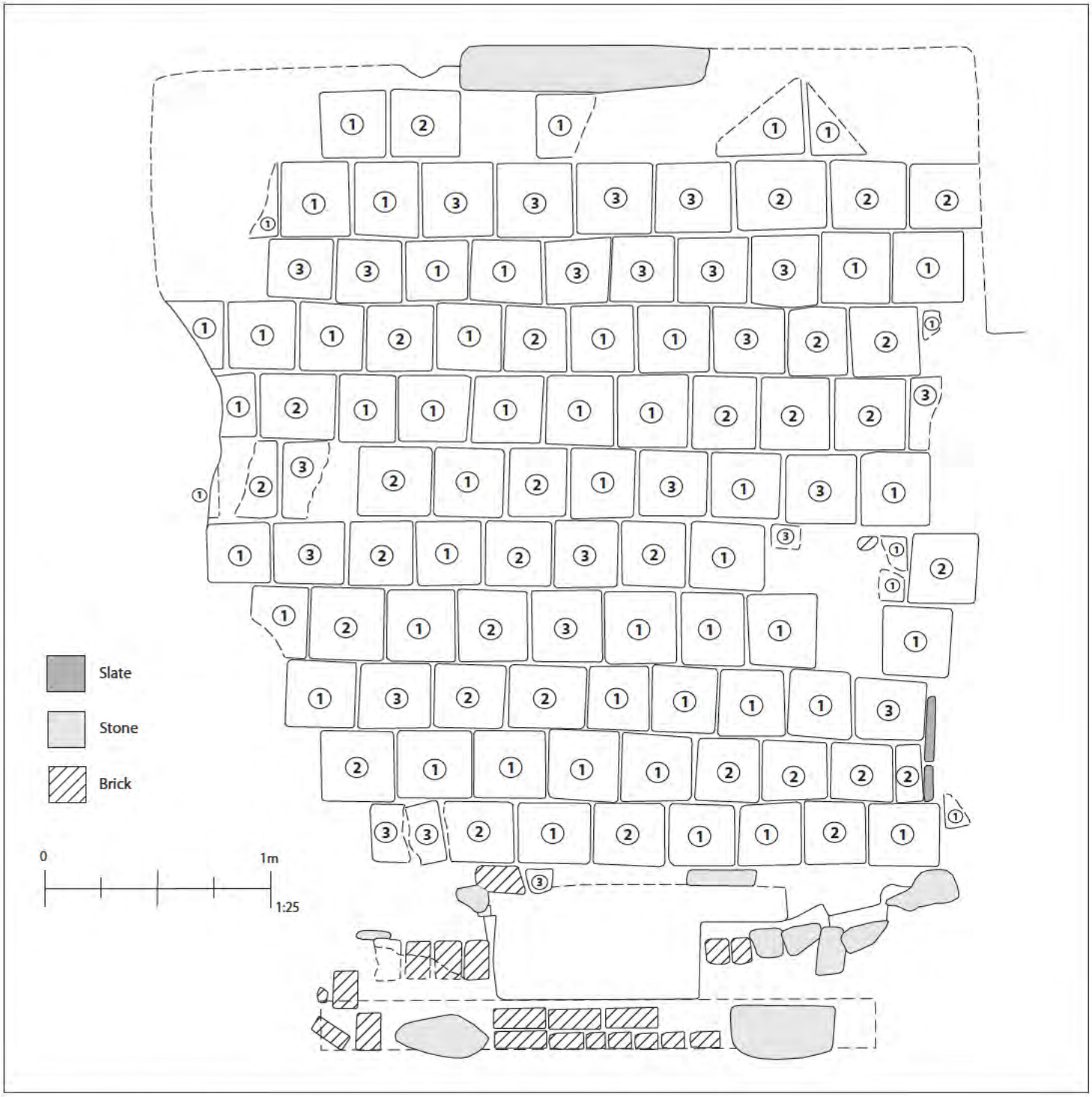


Figure 5. Plan of Felin Wen Kiln with the location of the tiled floor



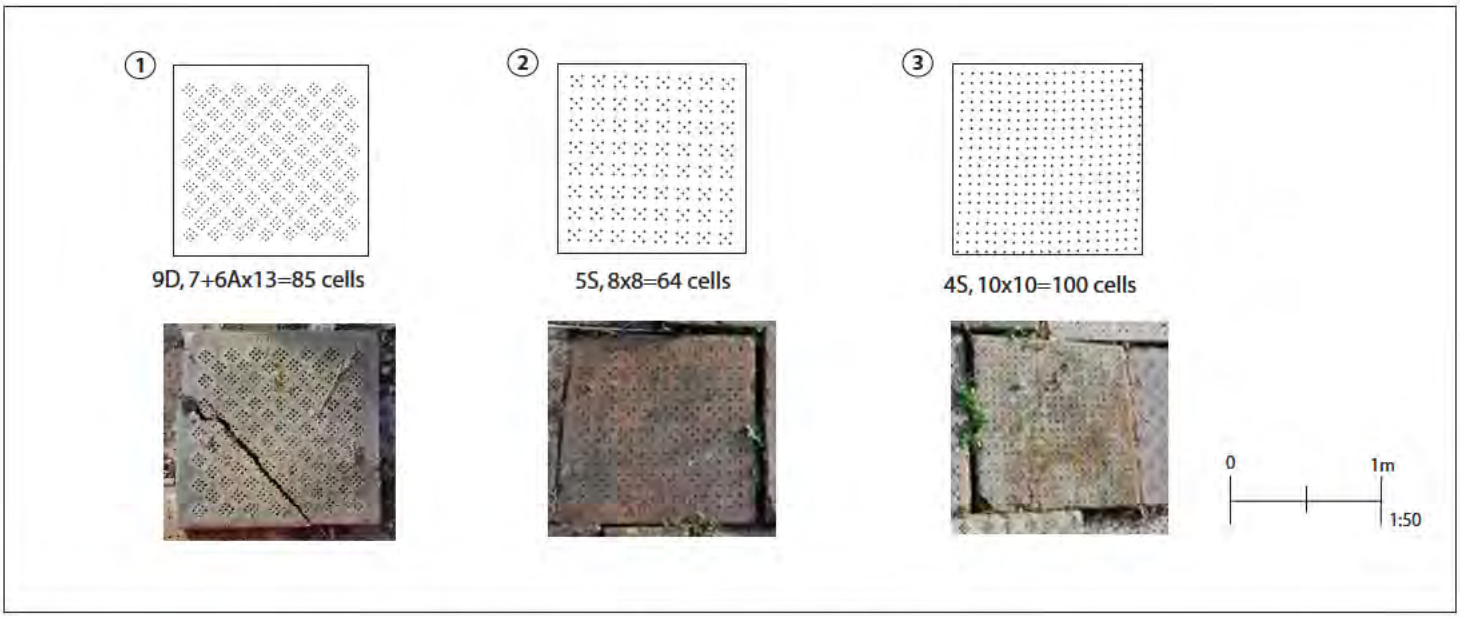
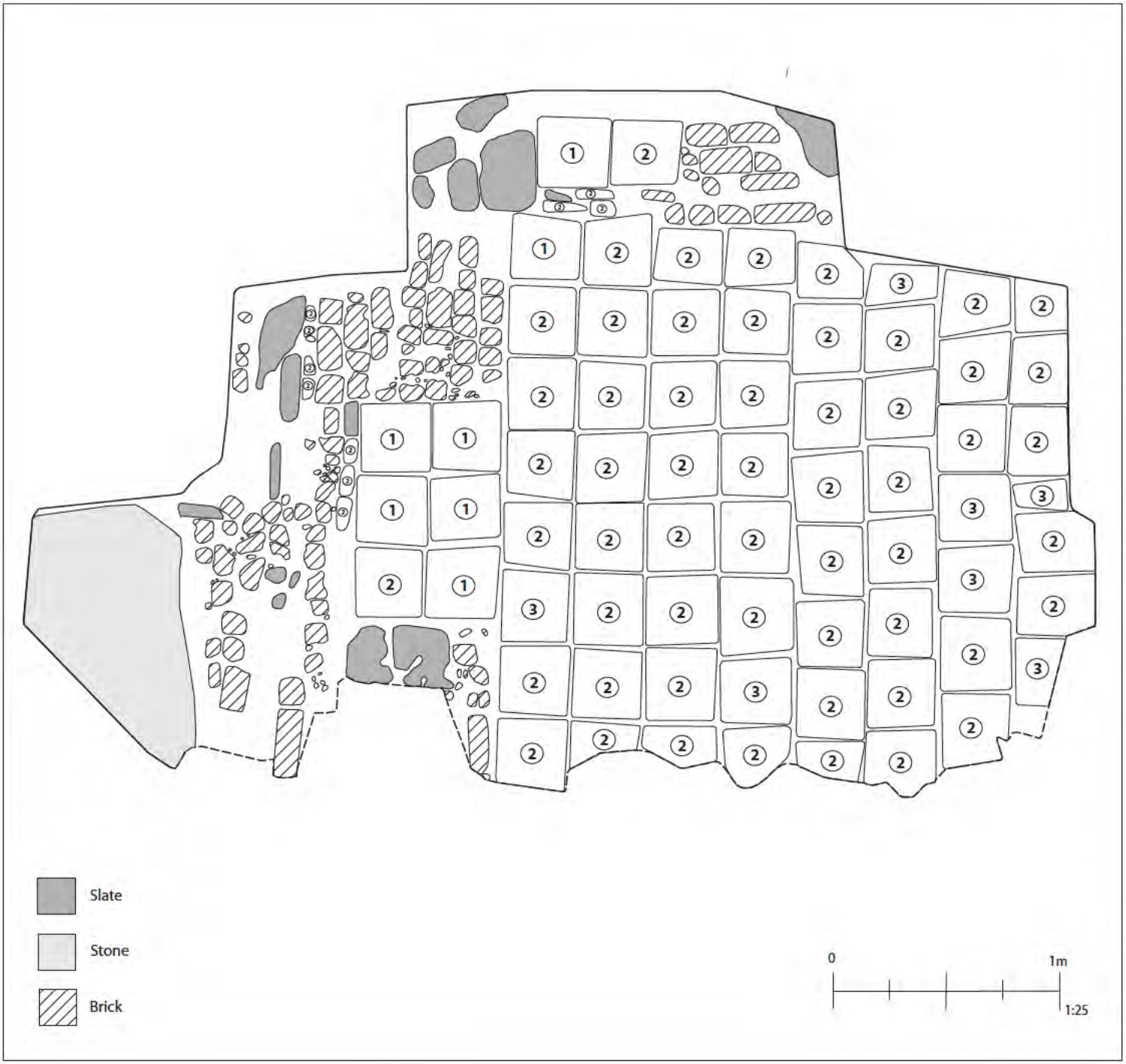


Figure 6. Plan of the tiles within the kiln drying floor



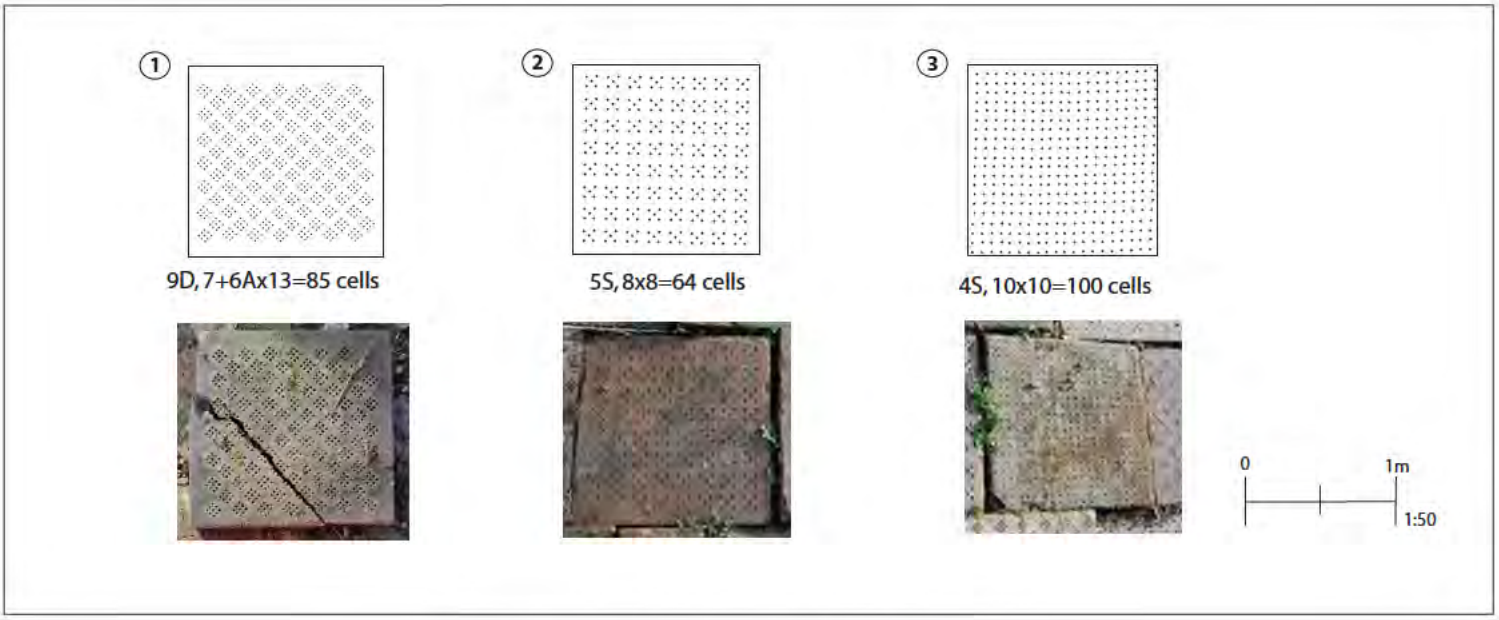


Figure 7. Plan of the tiles within the cross passage

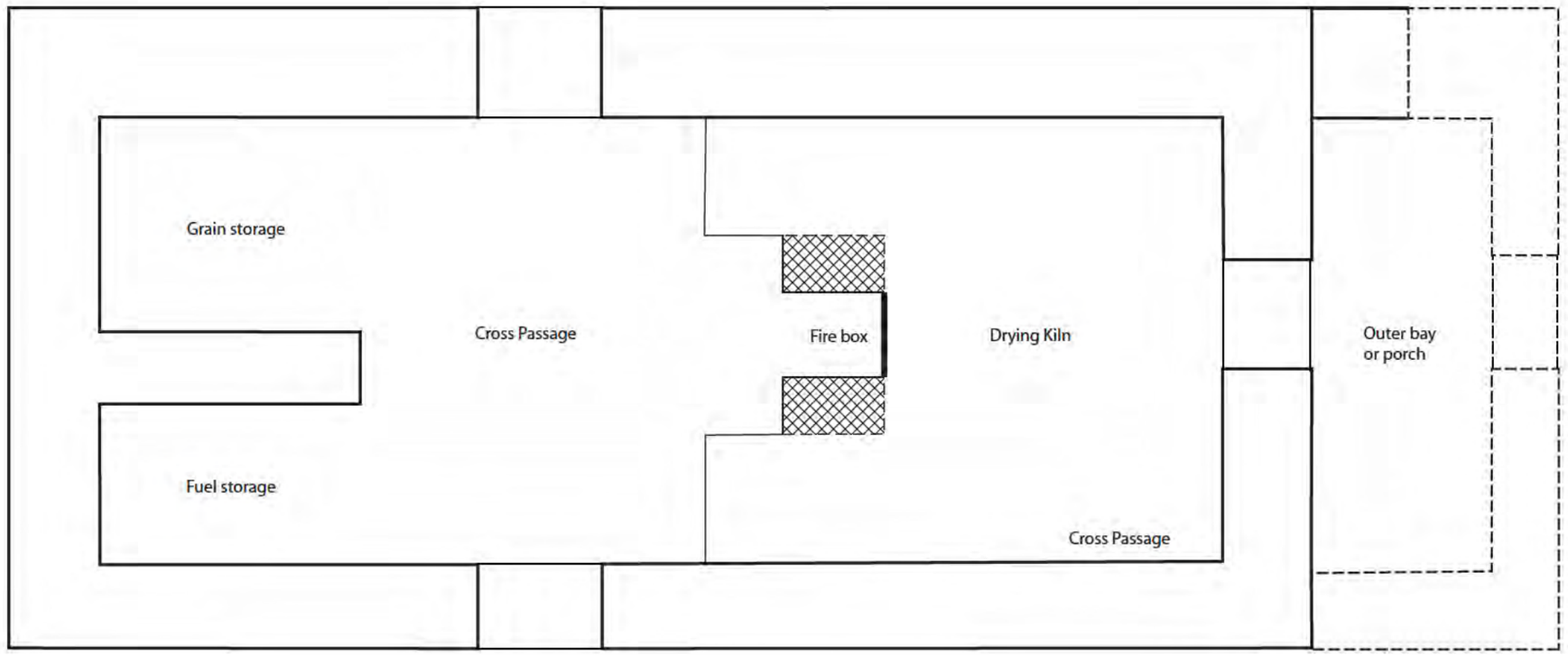


Figure 8. Plan and section showing the drying kiln

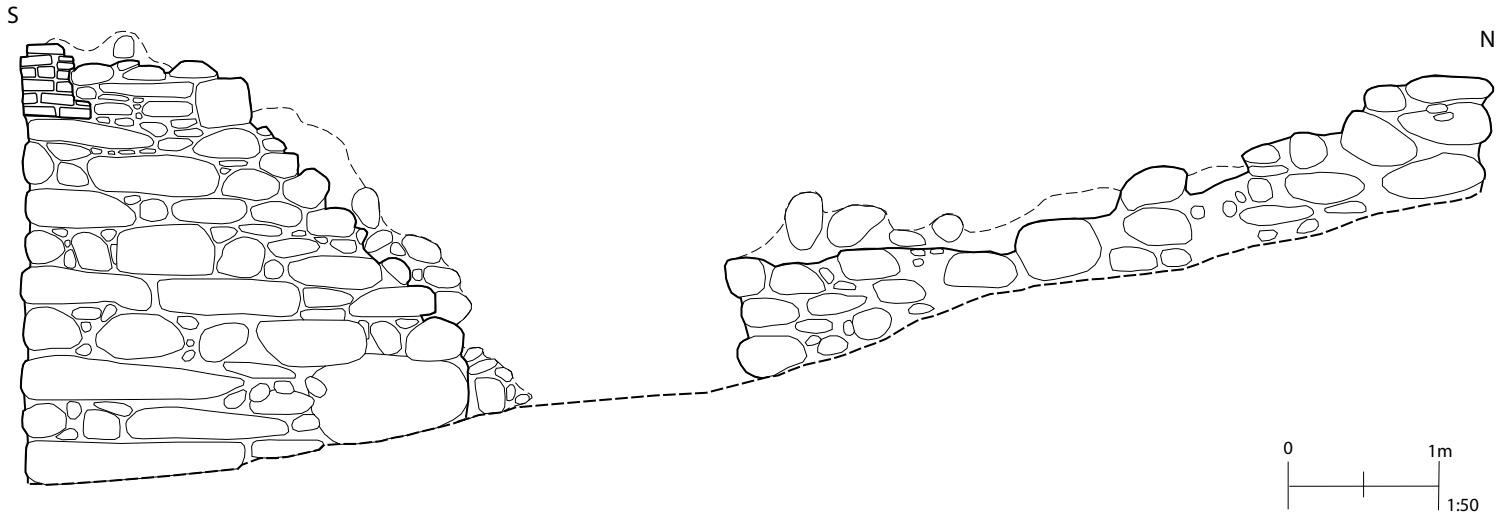


Figure 9. East elevation of the drying kiln

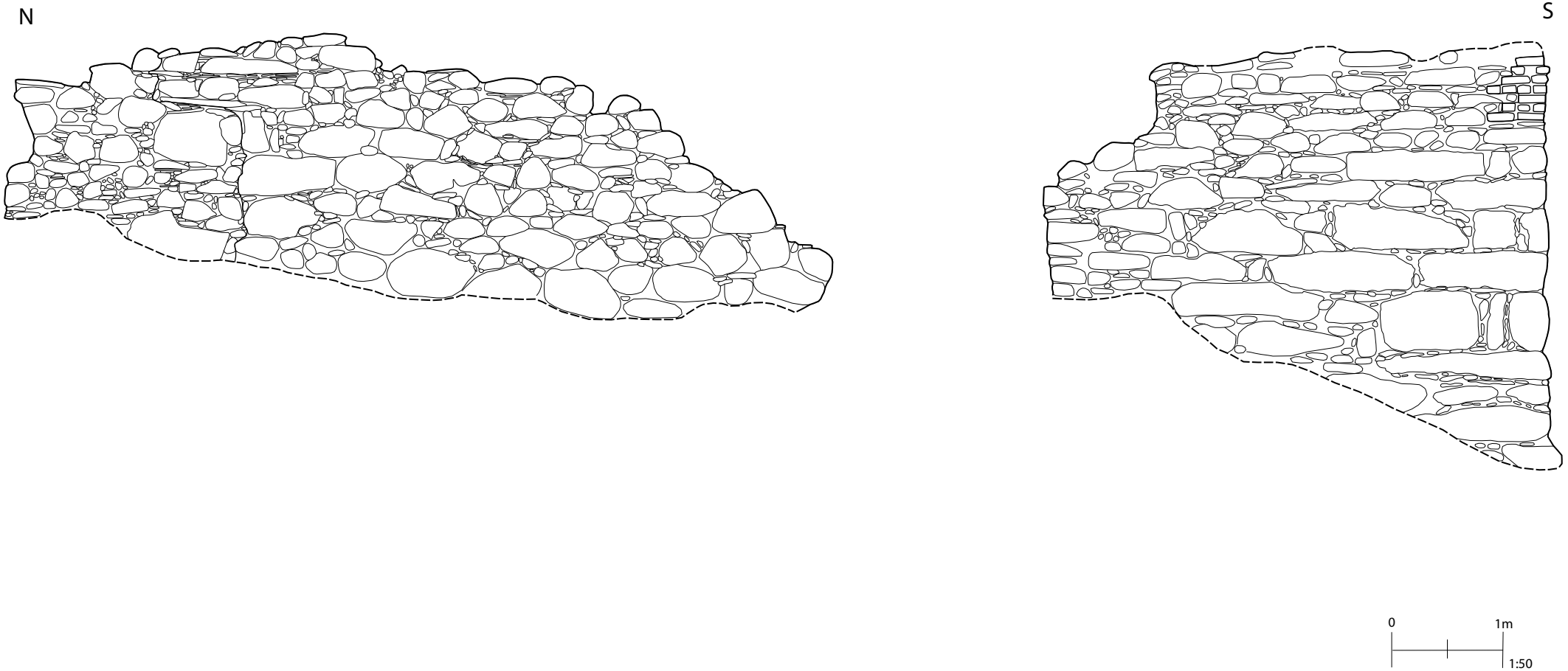


Figure 10. West facing elevation of the drying kiln

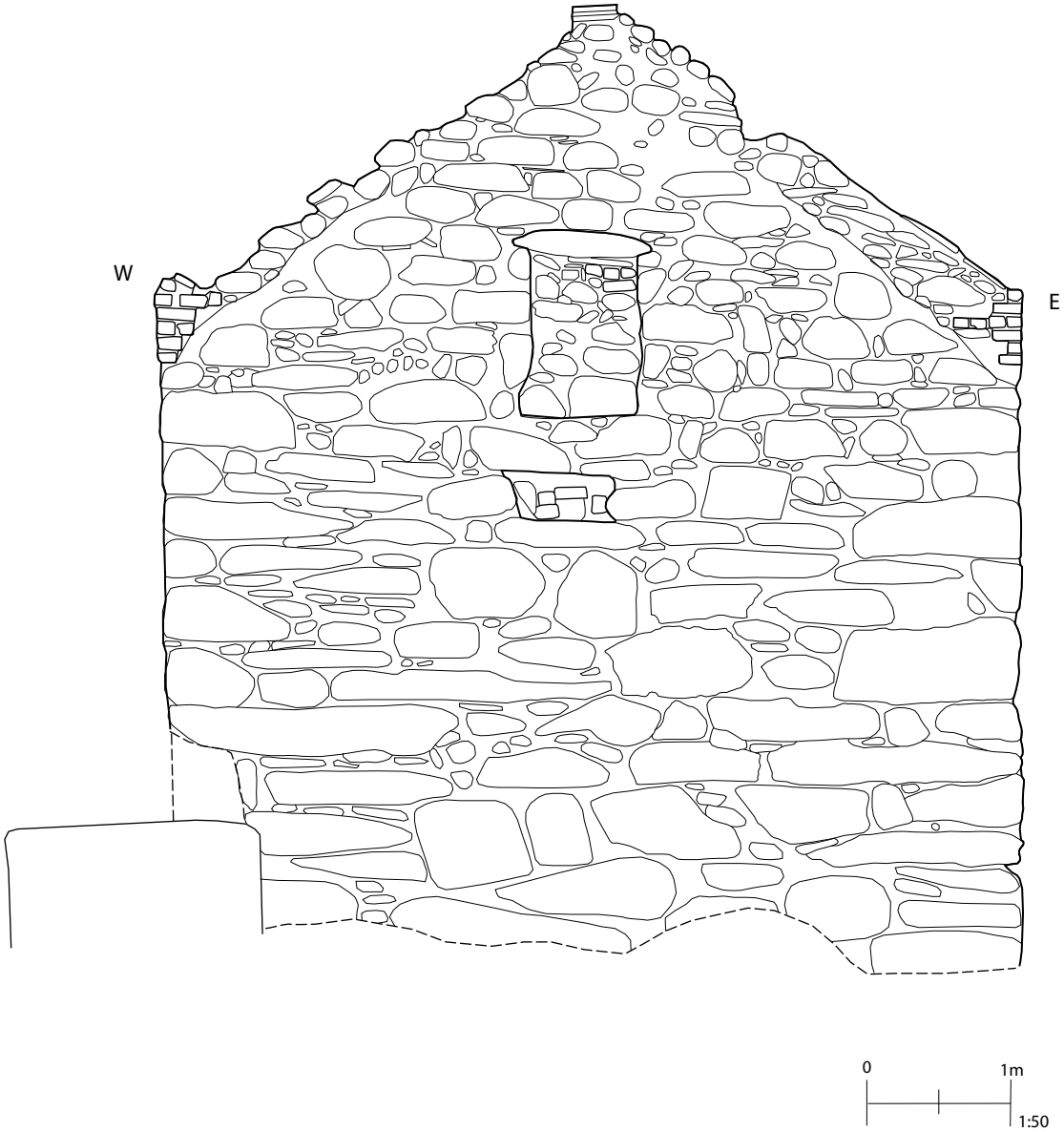


Figure 11. North facing internal elevation of the drying kiln showing the dividing wall

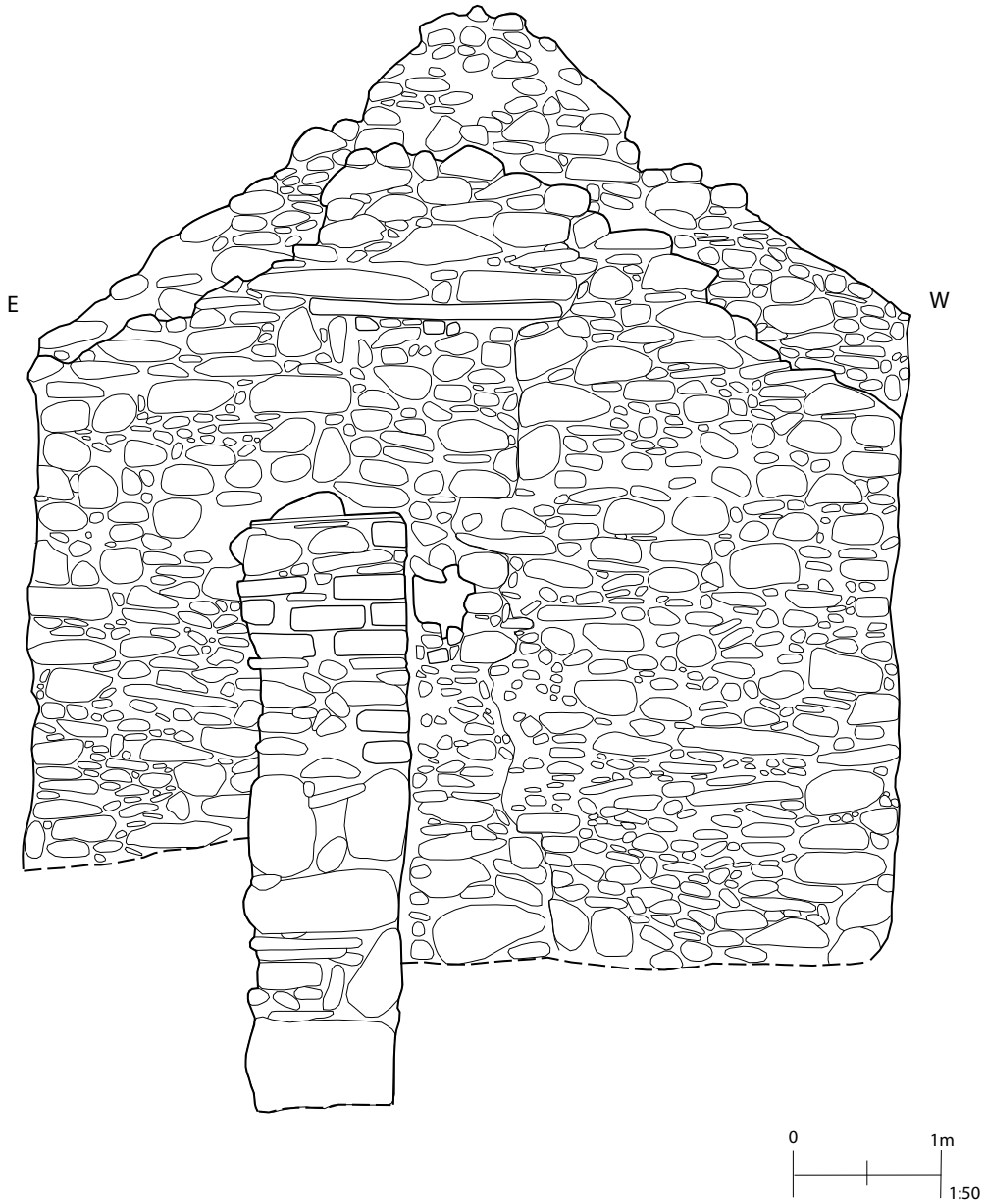


Figure 12. North facing elevation showing the dividing wall

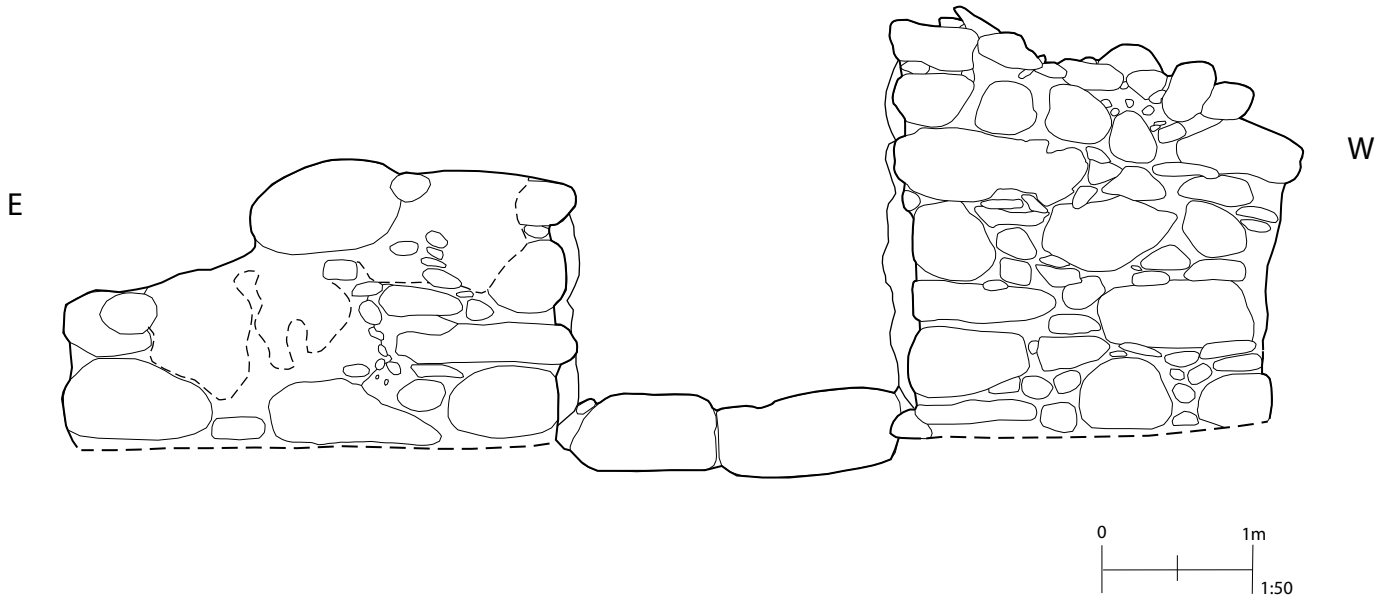


Figure 13. North facing elevation of north gable.

Plate 1. South facing image of the north gable prior to collapse.

Plate 2. West facing image of the middle gable prior to collapse.

Plate 3. South facing image of the north gable.

Plate 4. North facing image of the north gable.

Plate 5. South facing image of the tiled drying floor.

Plate 6. South facing image of the tiles in the cross passage.

Plate 7. South facing image of internal of the south gable showing the dividing wall.

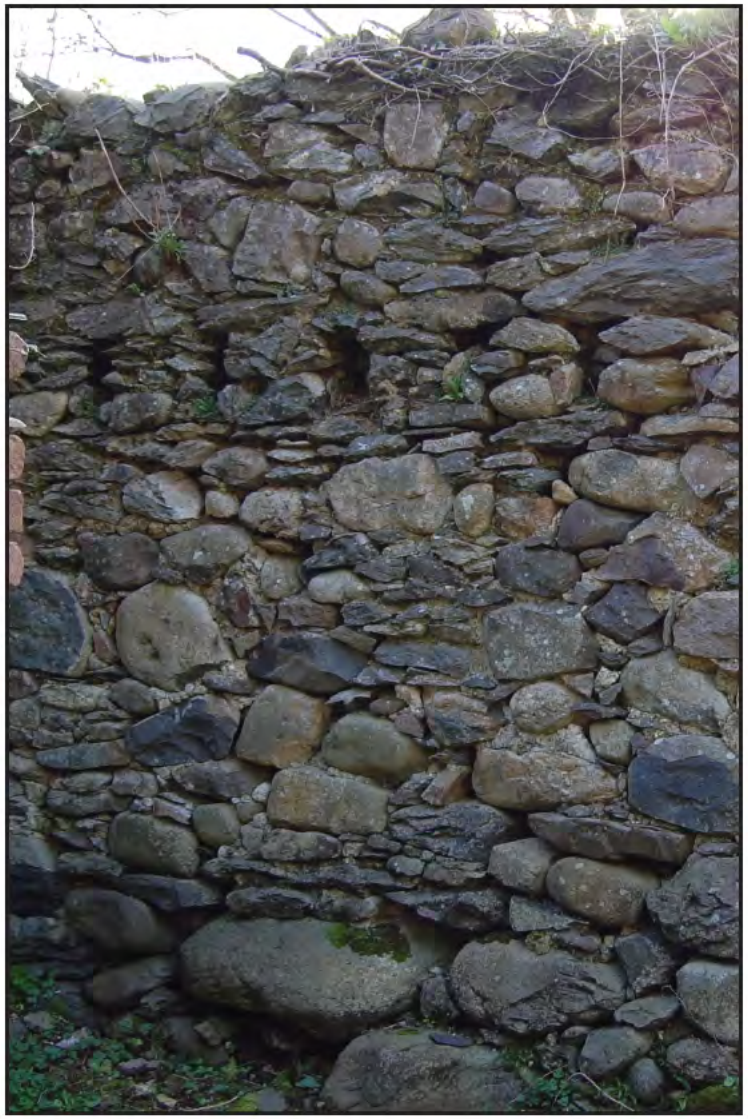


Plate 8. South west facing image showing the supporting ceiling joists for the half loft.

Plate 9. North facing image of south gable.

Plate 10. West facing image of the east elevation

Plate 11. North facing image of the fire box.

Plate 12. South west facing image of kiln.

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