

**YCCART 2024/Y4**

**A nineteenth century limekiln at Prestow Wood, Wrington  
North Somerset HER MNS1126**

**Prestow Wood Conservation Group  
YATTON, CONGRESBURY, CLAVERHAM AND CLEEVE ARCHAEOLOGICAL  
RESEARCH TEAM (YCCART)**

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Front elevation of the western limekiln at Prestow Wood before conservation repair

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Appendix 1: West lime kiln, Prestow Wood, Wrington Written Scheme of Investigation for archaeological trial evaluation (separate .pdf). Also available at YCCCART web site: [http://www.ycccart.co.uk/index\\_htm\\_files/Wrington,%20WSI%20for%20trial%20evaluation,%20West%20kiln,%20Prestow%20Wood,%202023,%20Y10,%20v1.pdf](http://www.ycccart.co.uk/index_htm_files/Wrington,%20WSI%20for%20trial%20evaluation,%20West%20kiln,%20Prestow%20Wood,%202023,%20Y10,%20v1.pdf)

Appendix 2: Prestow Wood Limekilns and Quarries Visit Record for attn. North Somerset HER (separate .pdf). Also available at YCCCART web site: [http://www.ycccart.co.uk/index\\_htm\\_files/Wrington%20%20Prestow%20Woods%20Appendix%202,%202023,%20Y10,%20v1%20.pdf](http://www.ycccart.co.uk/index_htm_files/Wrington%20%20Prestow%20Woods%20Appendix%202,%202023,%20Y10,%20v1%20.pdf)

## **Abstract**

*One of the two limekilns at Prestow Wood is about to undergo stabilisation and conservation repair. The west kiln (subject of this report) is a mid-19th century semi-industrial structure burning lime roughly from c1850 - c1920, dates which may be refined by further documentary research. The work revealed that the kiln did indeed have cheek walls with a possible roofed structure before the kiln, and a ramp behind, for the easier movement of charge to the combustion chamber.*

## **Acknowledgements**

Thanks to Enovert for supporting this work (through Landfill Communities Fund) as part of the Prestow Wood Conservation Group's programme at the site, to whom also thanks. Wrington Parish Council, the landowners, are thanked for permissions. As usual, the always patient staff of the Somerset Heritage Centre are thanked: the diggers\* (volunteers from YCCCART and Wrington Local History Society) did sterling work: thanks to Tony Harden for liaison with the various bodies involved.

\* Ferdi, Tim, Colin, Dee, Carole, Pete, Heather, Keith, Richard: thanks, buds.

## **Introduction**

Yatton, Congresbury, Claverham and Cleve Archaeological Research Team (YCCCART) is a Community Archaeology team working across northern Somerset.

Our objective is to undertake archaeological fieldwork to enable a better understanding and management of the heritage of the area while recording and publishing the activities and locations of the research carried out.



## Site location



*Fig 1: West kiln site location*

The west kiln lies at ST 4745963131, in the extreme SW corner of Prestow Wood, off Wrington Hill, and north of Branches Cross, in the parish of Wrington in North Somerset.

## Land use and geology

Prestow Wood is largely based on the Hotwells limestone, a Carboniferous Limestone facies of the Oxwich Group, the source of the quarried stone, and that used in the kiln. This limestone is fairly pure calcium carbonate ( $\text{CaCO}_3$ ), but is also metalliferous, with iron ore bands in places: the rock itself is iron-rich, and turns dark red on heating, as can be seen in the collapsed front elevation of the kiln (May 2024), and gives rise to a bright red clay subsoil (due to the presence of  $\text{Fe}^{3+}$  ions).

The area of Prestow Wood in which the limekiln stands is in woodland, currently under active management by the Prestow Wood Conservation Group, which is opening up areas of the wood for biodiversity improvement, heritage conservation, public access and community use and education, including the installation of a permissive path across the southern end of the wood (this path contains flights of steps). The wood remains in local authority ownership. If walking in this wood, please beware of trip-and-slip issues, and please respect the wildlife of the wood.

## Historical & archaeological context

Burning of limestone or chalk to produce lime was practised from Roman times in Britain, no evidence apparently being currently known for large-scale lime burning before (although it is frequently suggested that roundhouse walls were 'painted' as weather protection, so it is natural to ask in what that 'paint' consisted). (see Fig 2)

Clamp kilns, simple piles of wood/charcoal/coal mixed with lumps of limestone were a straightforward way to produce lime, and might be expected to be the earliest form of lime burning. The method is still used today in places where more sophisticated technology is not available (e.g. by UNESCO teams in Tanzania - Amuli, J. *pers comm*).

Most Roman and medieval kilns were dug into the ground, and remains survive as pits: examples are known at Chew Valley Lake for example (Rahtz & Greenfield 1977).

Later structures were built above ground, of brick or stone: so-called flare kilns were charged, fired, and then had to be dug out before the next charge could be introduced.

Draw kilns (among which our semi-industrial kilns at Prestow Wood would be included) were stone or brick built structures with an internal combustion chamber, with the charge usually supported by a grid through which the calcined lime fell, to be removed by means of a draw hole (usually referred to in the West Country as a 'poking hole', because a 'poking iron' was used through it to loosen any blockages). The lime could then be drawn out and bagged.

Large cubic stone structures of the Prestow Wood type came into use some time early in the 19th century, mostly to address the recently inclosed uplands, where centuries of use as extensive grasslands resulted in soils that had been acidified by very slightly acid rainfall (acid rain is not solely a result of industrial outputs: natural mild acidification happens by the absorbing of atmospheric CO<sub>2</sub> to form carbonic acids) (see Fig 2). These soils need to be 'sweetened' in order for plant roots to improve their absorption of trace elements necessary for healthy growth of crop plants such as wheat or barley. This is achieved by spreading lime on ploughed fields, to replace the washed-out Ca<sup>++</sup> ions.

The remains of these kilns can be seen in many upland fields, especially on Mendip, where some areas, such as Cheddar, have almost a kiln in every field.

The kilns are usually built into hillslopes, for the obvious reason that the charge can be tipped in from above, and raked out below, descending entirely by gravity, without the flare kilns need for digging out. Draw kilns also had the welcome ability to run for continuous periods, by removing lime from the bottom the kiln, and adding more charge from the top.

The advent of industrial gas-fired kilns in the early 20th century, with easy delivery by rail and road of cheap lime, meant the abandonment of most field kilns, which have had no maintenance since (Historic England 2018; Williams 2004).

## **Lime and limeburning: how and why**

Grey Carboniferous Limestone makes good, pure lime, for which it is still in demand by the modern steel industry, where used as a flux. Limestones are composed of calcium carbonate ( $\text{CaCO}_3$ ), which on heating (in this case, with coal), breaks down into lime and carbon dioxide:



The limestone and coal are added to the kiln in layers, and as the stone lumps break down in the hopper of the kiln, the lime can be extracted from below. It takes a skilled limeburner to prevent blockages. The lime is used for three principal purposes at the date of operation of the Prestow Wood limekilns.

1. As the basis for mortar, a mixture of lime, sand and / or gravel and other neutral agents and water. The lime, when wetted, gradually begins to re-absorb  $\text{CO}_2$  from the atmosphere, and eventually hardens back into something resembling a limestone, holding the stones around it firmly together
2. For 'liming' fields, a process designed to 'sweeten' the acid Mendip soils. Thin soils like those of Mendip are acidified by rain, naturally slightly acid, due to the presence of carbonic acid ( $\text{H}_2\text{CO}_3$ ) formed by  $\text{CO}_2$  combining with atmospheric water. This dissolves out the  $\text{CaCO}_3$  they naturally contain by converting it to soluble calcium bicarbonate ( $\text{Ca}(\text{HCO}_3)_2$ ), and the quality of the soil for arable falls. Liming the soil puts this back (by converting the carbonic acid to  $\text{CaCO}_3$  again), and also allows soils to hold plant micronutrients more successfully
3. For whitewash / limewash. This simple paint, annually used to whiten houses, barns and other stone buildings, is made by dropping lumps of lime into water, converting it into calcium hydroxide: ( $\text{CaO} + \text{H}_2\text{O} = \text{Ca}(\text{OH})_2$ ). When this is painted on a wall as a white slurry, it gradually hardens by absorbing atmospheric  $\text{CO}_2$  and changing back to  $\text{CaCO}_3$ . The reaction of lime and water is profoundly exothermic (gives off a great deal of heat) and the water usually boils during the making of limewash.

The  $\text{CO}_2$  given off from limekilns normally disperses into the atmosphere, but as it cools, it becomes much denser than air, and tends to pool in any hollow, where its tasteless odourless presence can suffocate living things, and there are known instances of tramps bedding down by still-warm limekilns and being asphyxiated in the night.

Lime is also extremely caustic, and due to the exothermic nature of its reaction with water, will burn watery parts of human bodies like eyes and mucous membranes severely. This makes it a dangerous material to use, so it is often 'cured' before spreading on fields by letting it sit around in the rain for months, converting it to the much less dangerous, but just as effective slaked lime ( $\text{Ca}(\text{OH})_2$ ).

*Fig 2: Lime and limeburning*

The historic origins of the west kiln at Prestow Wood are not clear.



The 1739 Rocque map of Wroughton shows 'Presteau' in the area today Prestow Wood:



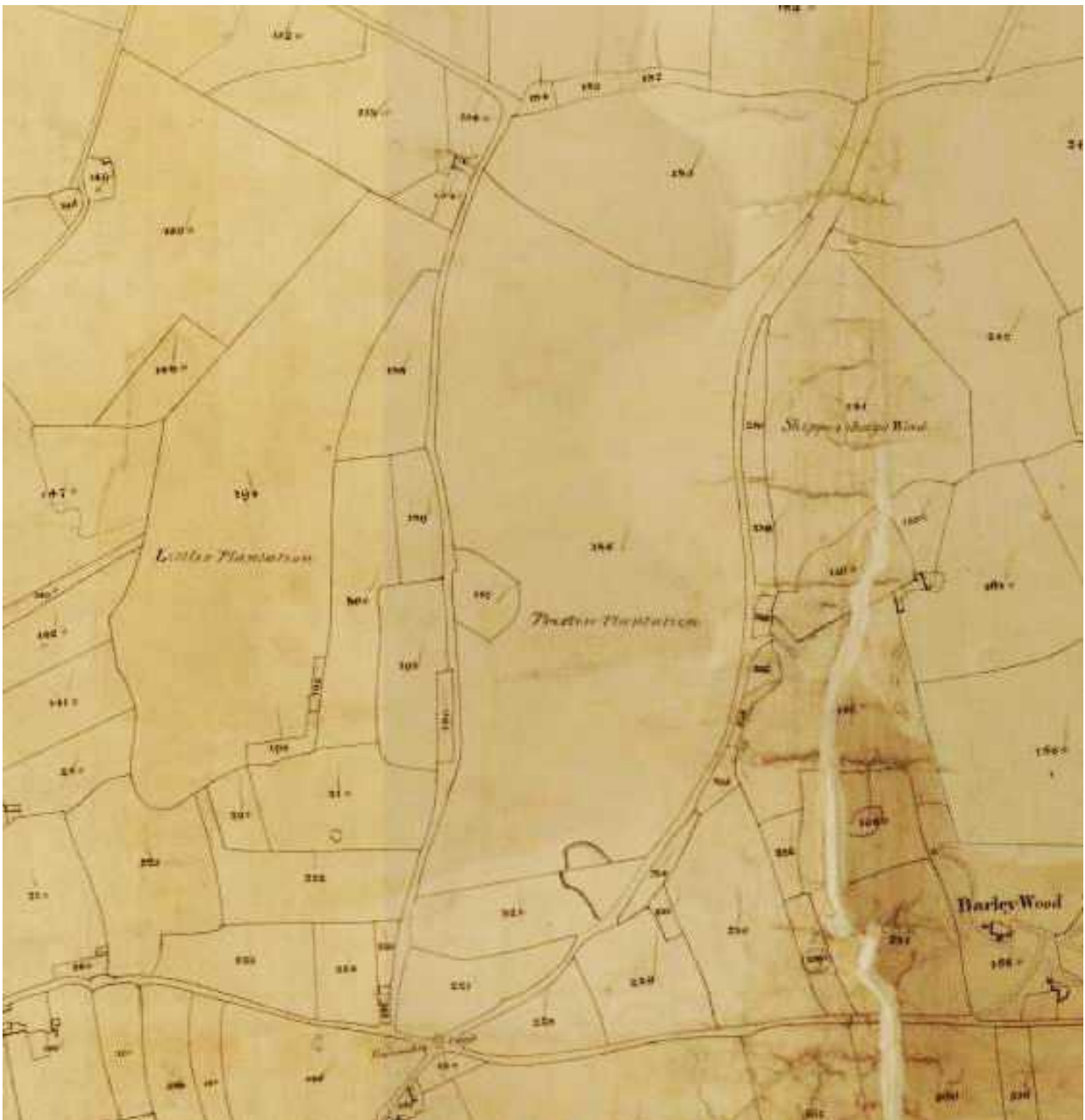
Fig 3: 'Presteau' from the 1739 Wroughton map

According to this map, the lynch of Prestow was not wooded at the time - although bear in mind the reference in 1516: Prestow 'clumps of oaks worth 40s when cut' (Neale 1968), the old woodland being on the other side of Old Hill (Lane), above Barley Farm: according to Google Earth, this area is still wooded today.

There is no trace on this map of any quarries, although very small local quarrying, for (say) walling stone would probably be on a scale that would be unrecordable here.

By the time of the Tithe Map (1839) (see Fig 4 below), the situation has changed. Prestow is labelled 'Prestow Plantation' on the map itself, in contrast with the woodland opposite, labelled as 'Shippenhayes Wood', clearly implying that the first is planted, while the second is 'natural'.

The map also shows at the bottom right (east) of Prestow, a series of hatchings clearly intended to represent a hollow, and probably the first depiction of the east side of the quarry at the southern end of the wood.



*Fig 4: Wrington Tithe map (1839) showing Prestow Wood area and initial phase of quarry*

This was a period of plantation growth: the Pigott family were similarly planting the western edge of Broadfield Down at about the same period.

By the time of the c1885 OS Epoch 1 map (Fig 5 below), the two limekilns seen to day in Prestow Wood were shown as active ('L.K.') on the map, as opposed to those already out of use ('Old Limekiln').

There were several other limekilns close to Prestow Wood recorded in 1885 (Fig 6): there may have been others not recorded by the OS, of course.



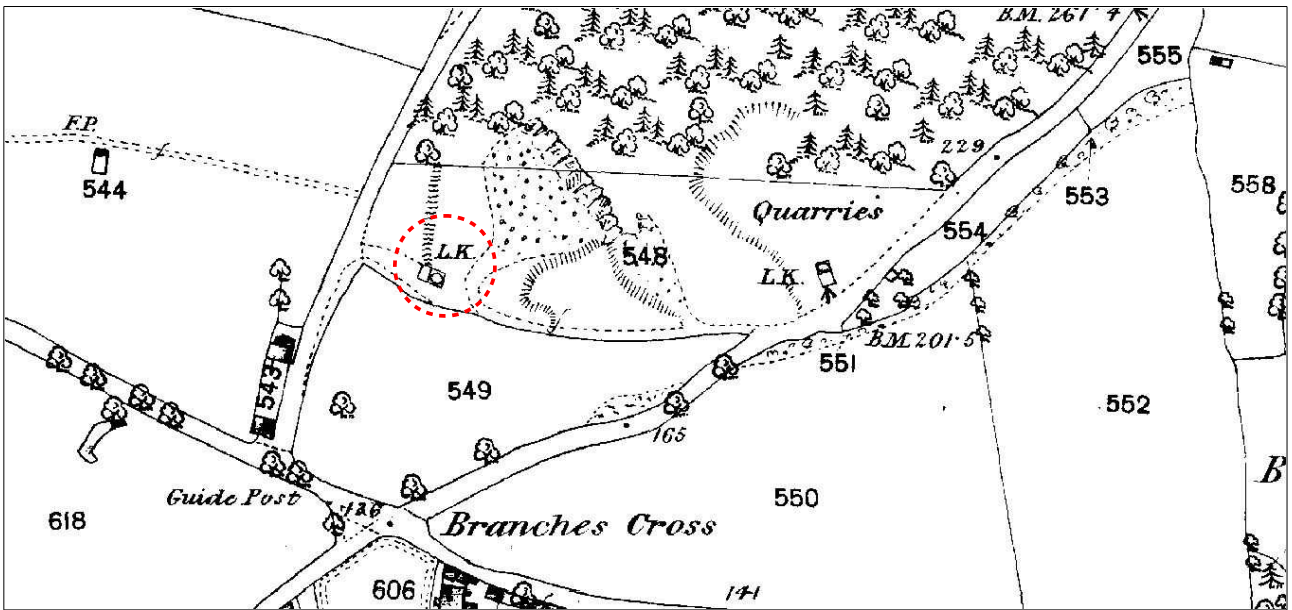


Fig 5: Vicinity of Branches Cross, OS Epoch 1 (c1885) (subject limekiln circled)

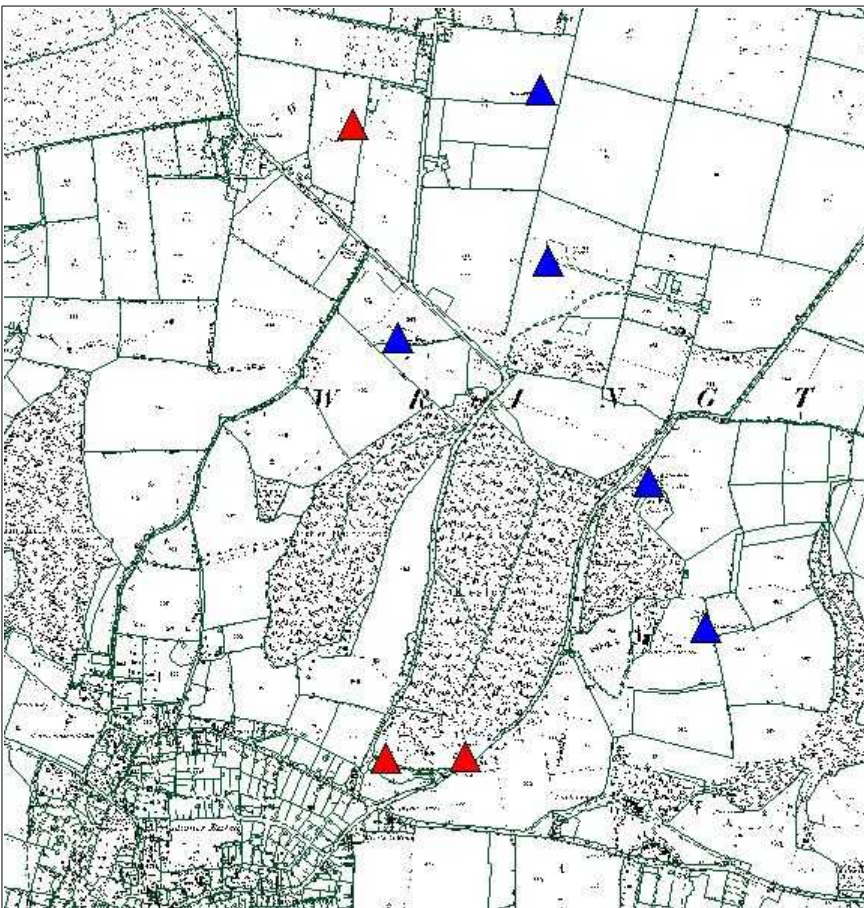


Fig 6: Limekilns in the vicinity of Prestow Wood, 1885  
(red triangles = 'LK')  
(blue triangles = 'Old limekiln')

Note the limekiln the subject of this report is the western of the two red triangles at the bottom of Prestow Wood.

The 1885 map shows our limekiln with its accompanying quarry: although the quarry depiction with the east limekiln does not look much changed from the Tithe Map representation in Fig 4, that limekiln is shown as active, so work was probably still proceeding there.

In c1900 (Epoch 2; Fig 7), the two kilns were shown with a roofed element (the hatched section): at least in our kiln, the roof is shown on the lower, west side of the kiln: presumably the cheek walls in front of the kiln formed a roofed addition to it: such would provide dry temporary storage for bagged lime. The roofed section of the second kiln is shown on the upper level, something which needs further consideration.

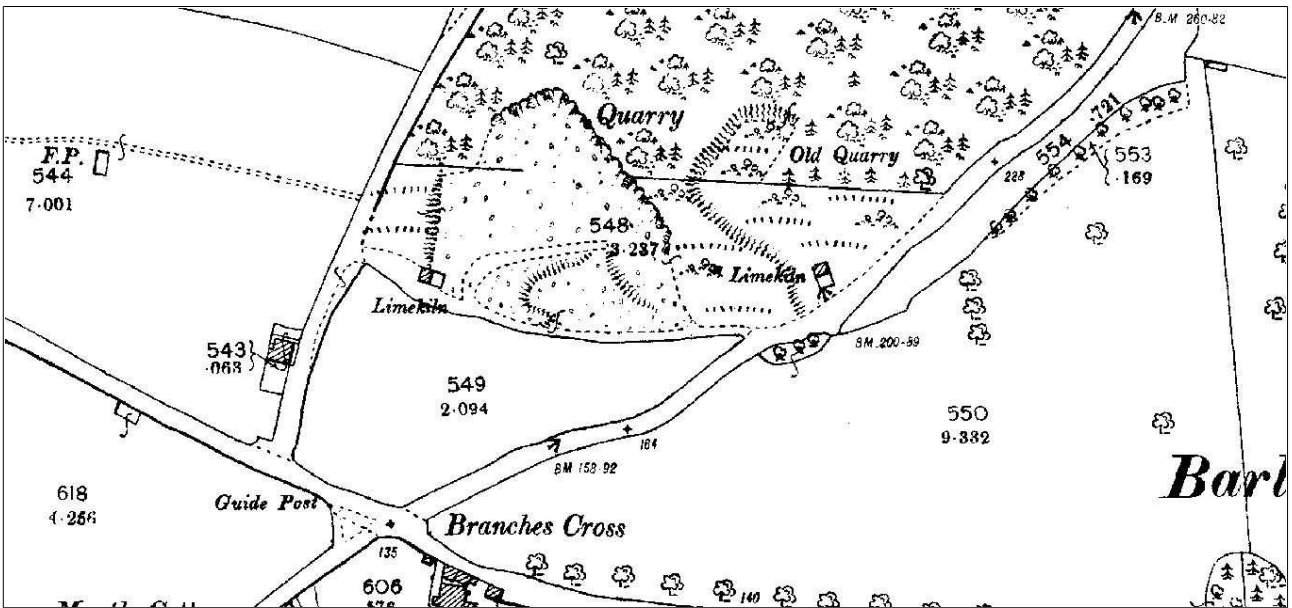


Fig 7: Prestow Wood from the Epoch 2 OS plan (c.1900)

By the time of the 1946 air photographs of the area (Fig 8), the kilns and quarry had gone out of use, and were beginning to become overgrown.



Fig 8: Prestow Wood quarries area, 1946 RAF air photographs

The subsequent removal of rabbit grazing through myxomatosis allowed faster colonisation of the site by tree growth, as on most higher ground in northern Somerset.

By 2023, the conservation work by the Prestow Wood Conservation Group was starting to be visible on air photographs (Fig 9 below): the work (of which this study forms part) continues.





*Fig 9: Google Earth image of 2023 shows the cleared glade at the west side of the wood*



## **Survey objectives**

These are detailed in the Written Scheme of Investigation (Appendix 1 below)

## **Methodology**

Excavation was entirely by hand, recorded in the field by digital photography (see Appendix 1).

As can be seen from Appendix 1, the two small trenches were located in order to

1. Understand whether the linear earthwork running away from the top of the limekiln was a ramp of the kind seen on Mendip. An area to examine was chosen since it lay in the permissive path, thus not disturbing other areas where the ramp might be better preserved.

- 2 Understand whether the projecting (?key) stones from the side of the front elevation of the kiln were evidence for the existence of cheek walls projecting from the front of the kiln.

Recording of the upstanding features of the kiln was by digital photography, with images adjusted to planar 50mm lens equivalent in Photoshop, then converted to Figures in Libre Office Draw 5.

The report was written in Libre Office 5 Writer.

Photographs were taken by members of YCCART, and remain the copyright of YCCART.

## The evaluation trenches

### The upper trench (TR 1)



*Fig 10: Site chosen for trench 1: where path crosses linear earthwork at rear of kiln*

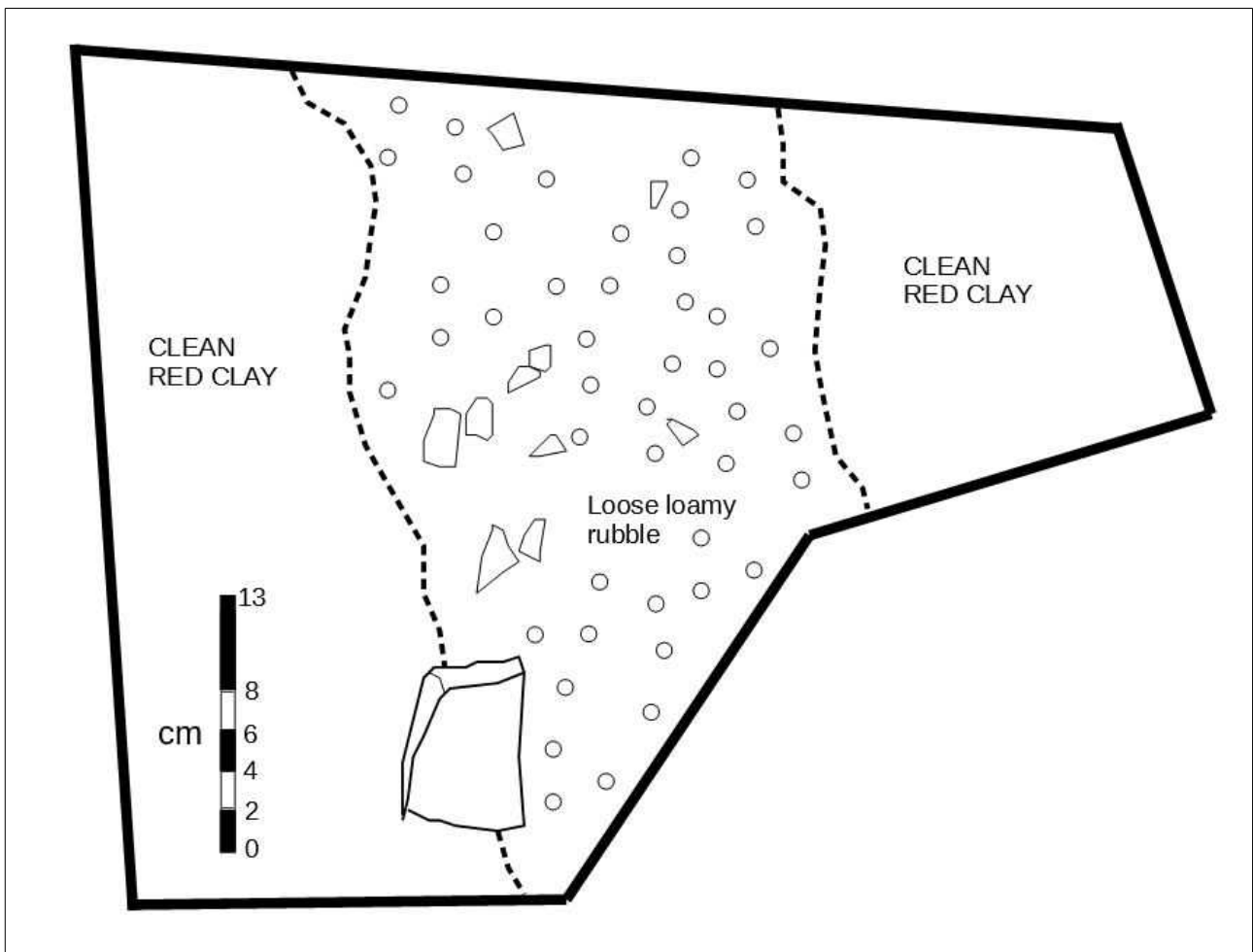


*Fig 11: Cleared section across ramp earthwork at rear of kiln*

The chosen area of trench had been worn by foot traffic, but a central gravelly section (much bioturbated by adjacent tree roots) showed in the centre.

This feature (about 5cm thick in the centre: see Fig 12) is recognisable as the fill of a feature running directly across the path, along the earthwork.

The fill was of stoney loam and would have formed the fill of the ramp: by comparison with better preserved examples from Mendip (see Appendix 1), it is clear there would have been low walls on either side, which have been completely removed (apart from the one stone at lower left).



*Fig 12: Features in trench 1*

It was just about possible to recognise the imprint of the stones removed on the left side of the rubble, but these imprints were extremely shallow.

Next to the trench on Fig 11 may be seen the one group of finds made in the trench - a group of 41 old 7V carbon-zinc batteries, whose origin is obscure!

This is definitely enough, with the surviving linear earthwork and analogies with kilns on Mendip, to say there was indeed a ramp above the kiln, used to wheelbarrow coal and limestone to the top of the kiln.



## Trench 2 and the kiln 'cheek walls'

Trench 2 was 2m x c1.15m, and sited parallel to, and at 2.15m from, the front of the kiln. A more promising target area closer to the kiln was avoided due to Health and Safety considerations. It would be useful to check this once the kiln has been conserved.

The trench (2) held no distinguishing features, other than the 80cm length to the south end holding more concentrated mortar deposits than the rest of the trench (2.5YR 4/3 as opposed to the 2.5YR 3/2 of the dump material in the rest of the trench). This mortar presumably derived from the former wall, but the dump completely covered the approximate line of the south cheek wall. No trace of the south cheek wall was found.

However, the north cheek wall, of which little had been thought to remain, was found on clearing ivy to survive for 3.2m, which appeared to be the end of the wall (Fig 13; Fig 14).



*Fig 13: North cheek wall of kiln cleared of ivy*

This not a typical cheek wall, since it also seems to function as a retaining wall to the slope north of the kiln, as can be seen in Fig 13 above.

Little now survives: at its eastern end it is built up against the structure of the front elevation of the kiln.

The evidence for both walls having once existed is clear on the front elevation of the kiln (see Figs 14 and 20 below), as spreads of mortar smeared on the faces of the stonework, above that resulting from building the kiln itself.

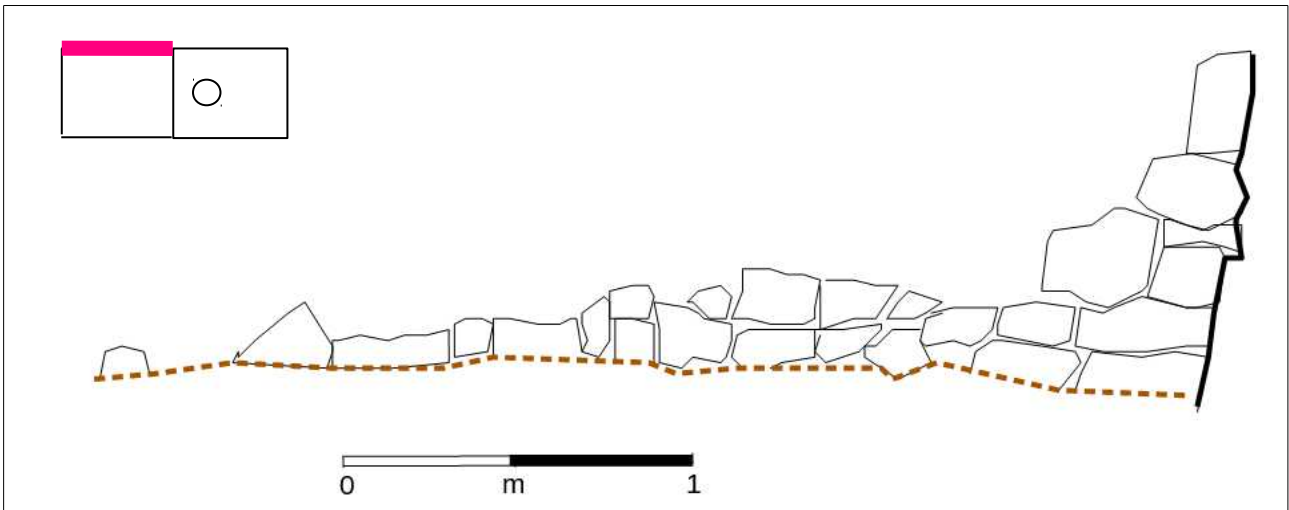


Fig 14: Elevation of north cheek wall of kiln

### The body of the kiln

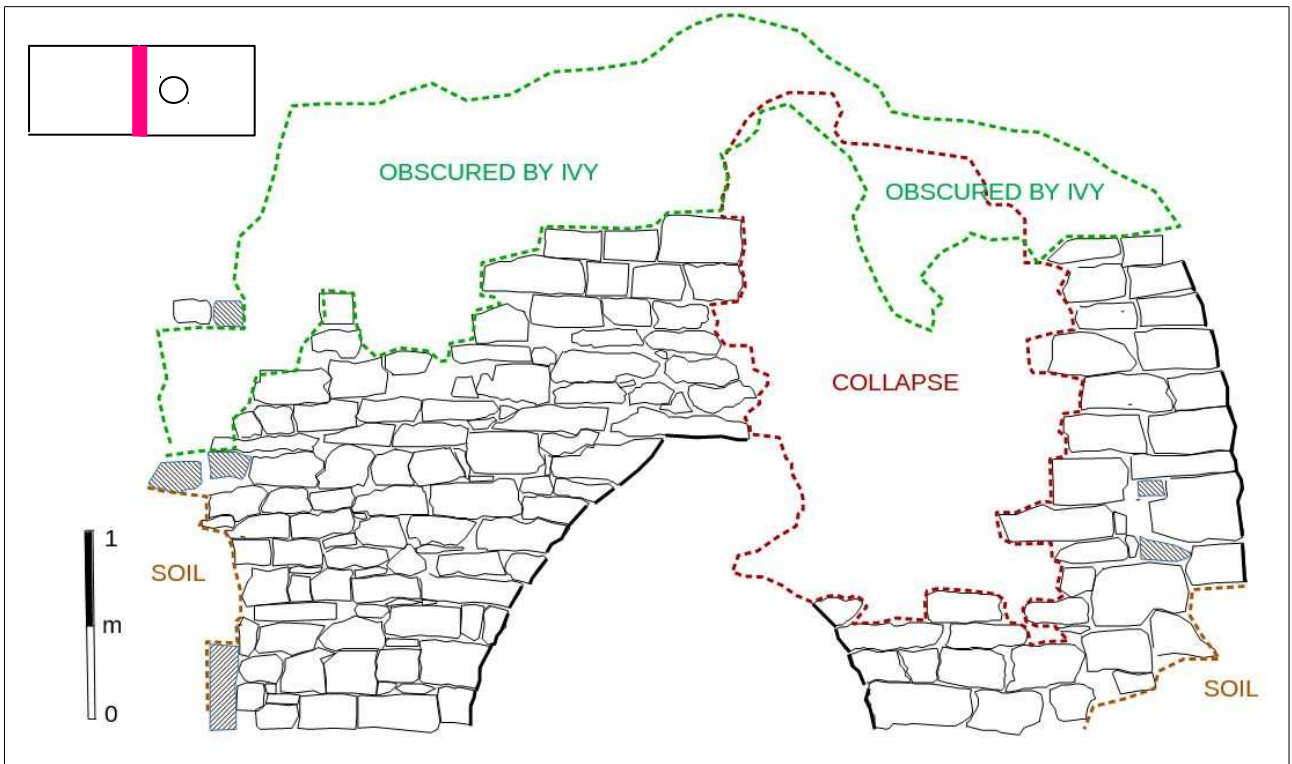


Fig 15: Front elevation of kiln (4.70m wide)

The central hearth / vestibule (both names are in common use) was a recess in the front elevation of the kiln, where the poking hole was sited, so lime was removed from the kiln through this area.

Fig 16 shows this area at the west limekiln in Prestow Wood. The wooden stick is part of the 'safety' repairs to the kiln before evaluations began.



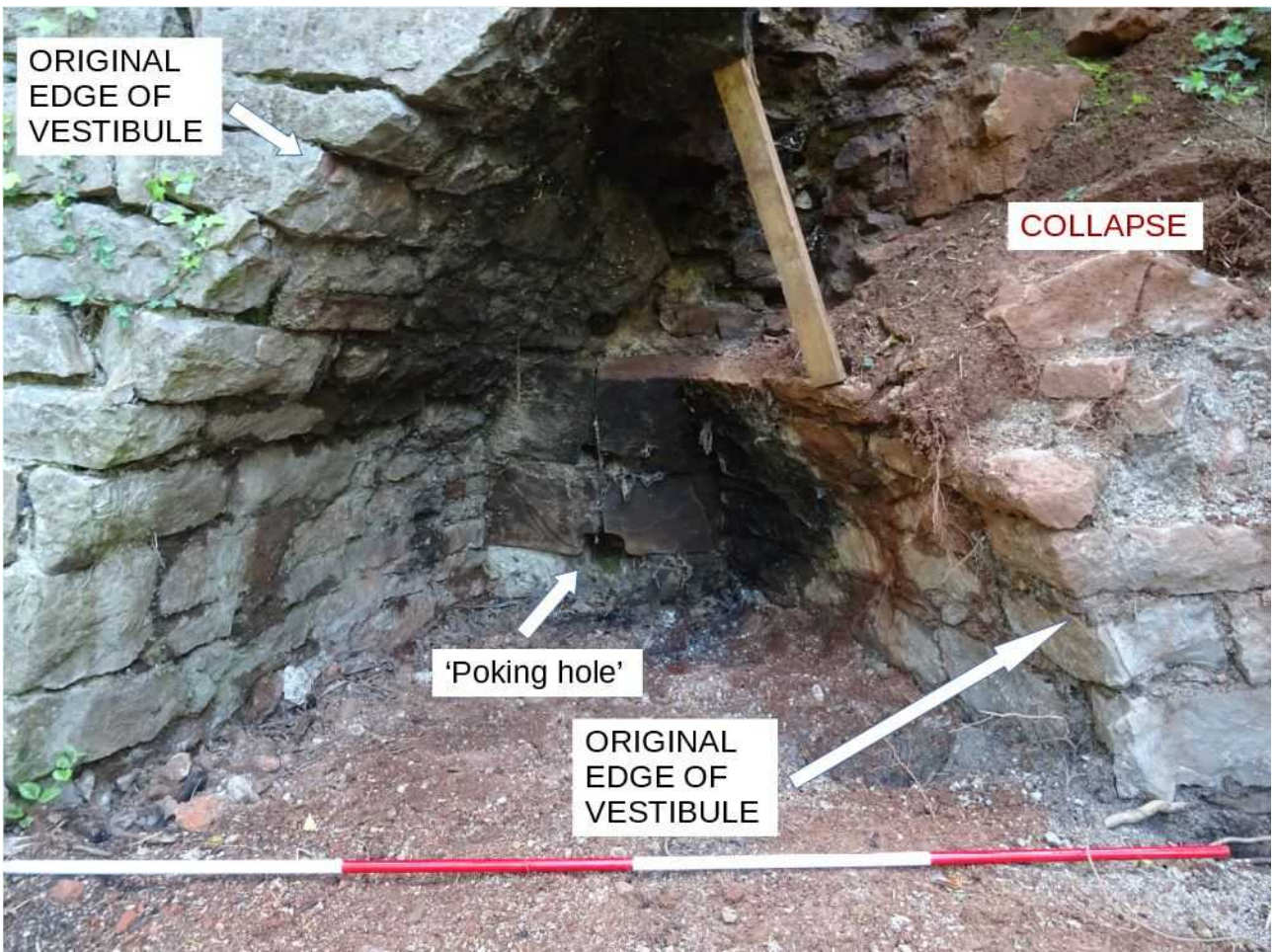


Fig 16: Collapsed hearth of the kiln

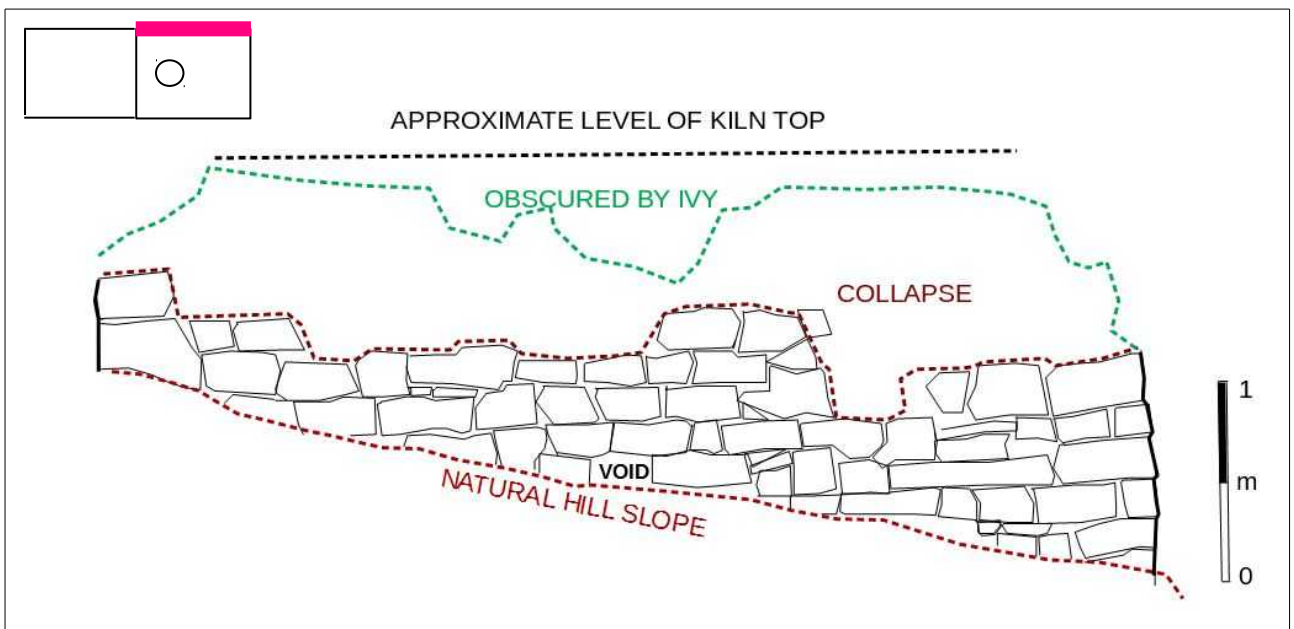


Fig 17: North elevation of kiln (front to right)

The side elevations of the kiln show how deeply it is buried in the hillslope.



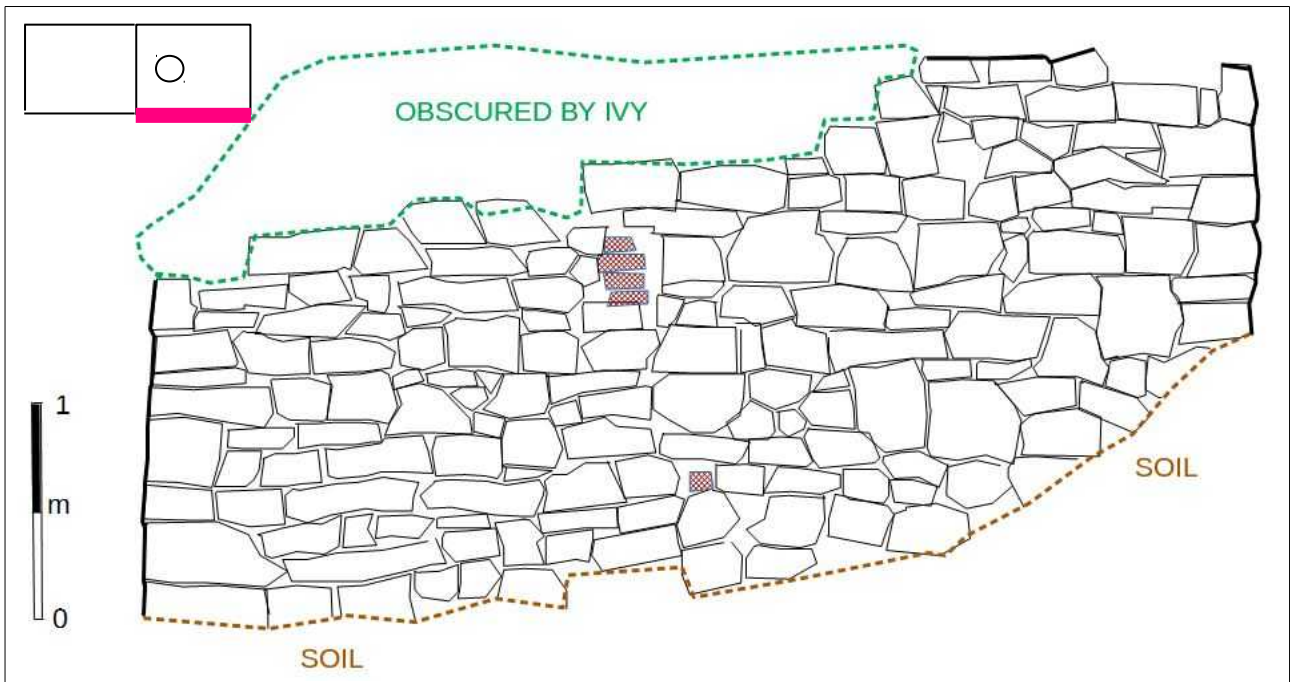


Fig 18: South elevation (front elevation to left)

In the centre top of the south elevation of the kiln is a rectangular opening, blocked with bricks and surrounded by smears of modern concrete.

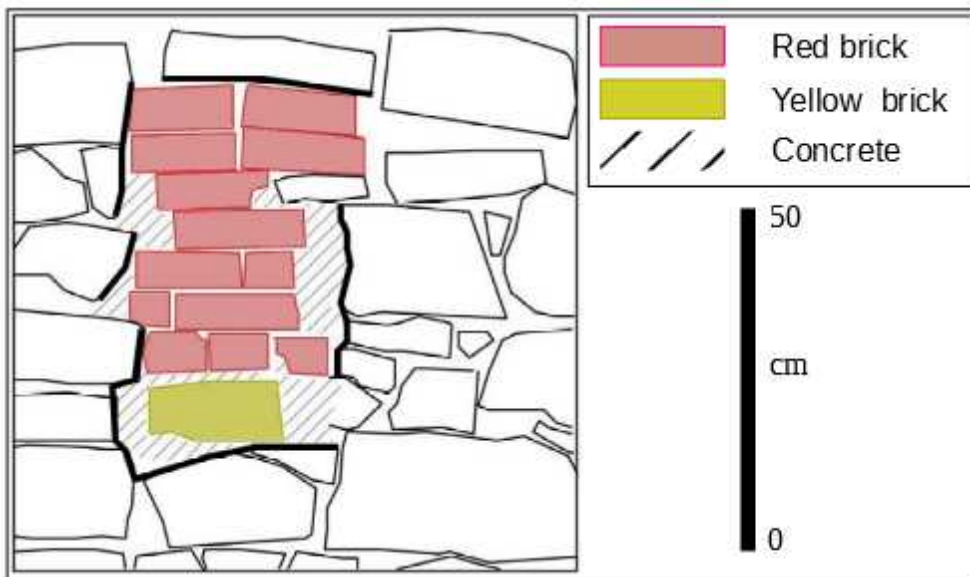


Fig 19: Filled-in feature in south elevation of kiln

These features, while rare, are not unknown: there is a good example in a kiln at the top of Batcombe Hollow, in Cheddar.

The inside of the feature becomes hot during firing.

These features are probably used for the drying of material for lighting the kiln (although local folklore at Cheddar says that it was used to cook the limeburner's dinner, which could also be true!)

The front elevation also gives further information regarding the cheek walls of the kiln, and their original height against the kiln (Fig 20 below). Unfortunately, the part of the kiln that could have mortises for rafters roofing the space between the cheek walls is either missing or thickly overgrown.

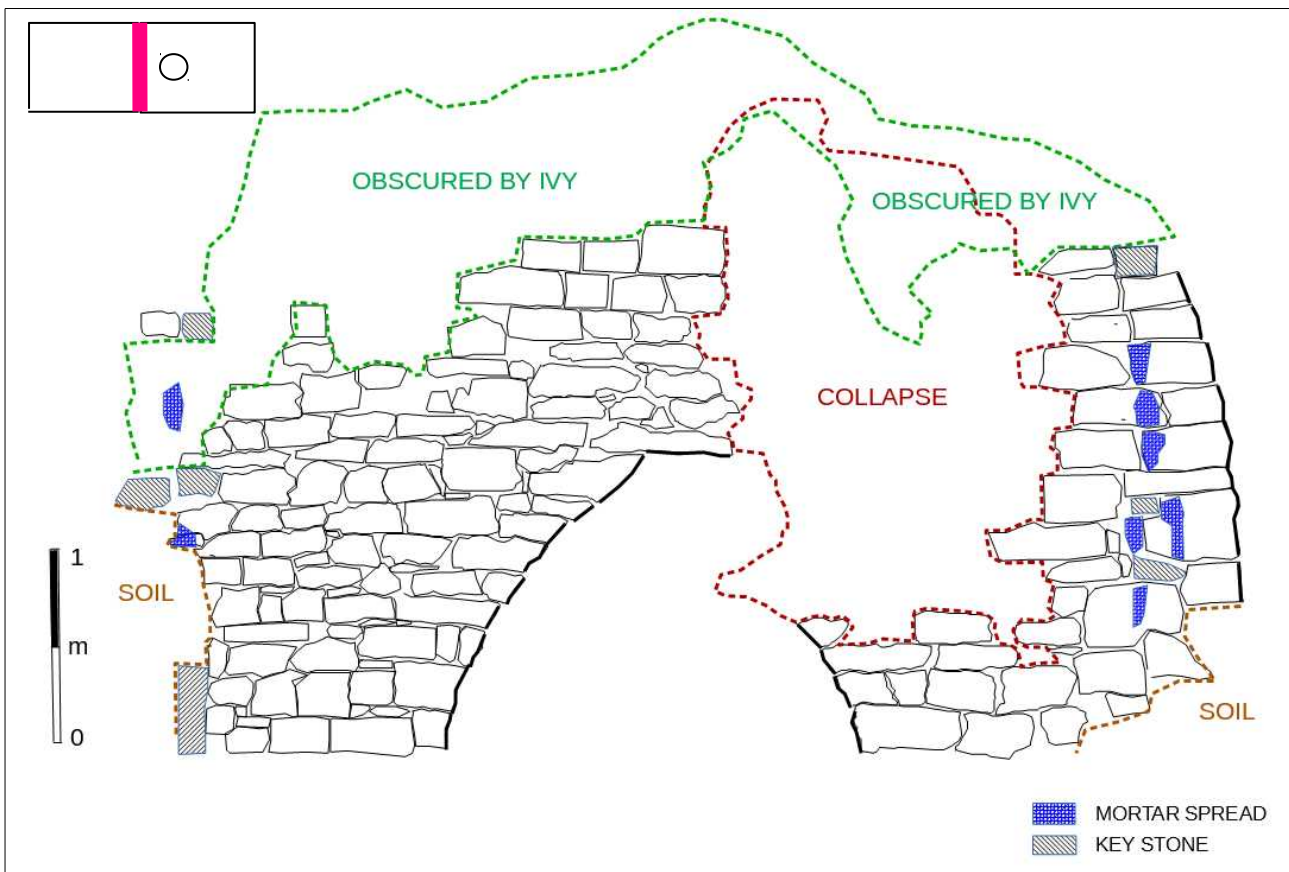


Fig 20: Front elevation of kiln showing key stones and mortar spreads, indicating original height of cheek walls

There is a slight clue to the possible roofing of this area: Fig 7 above (the Epoch 2 OS plan) shows the left hand end of the kiln complex hatched, indicating a roofed structure. Fig 5 (Epoch 1 OS plan, c1885) also indicates a closed structure, possibly with a gated or doored entrance (see Uphill kiln in Appendices). There does not appear to be any trace of this structure on the ground today.

The rest of the kiln is still very overgrown, especially the upper surface.

The top of the combustion chamber (Fig 21) is clearly visible after partial clearance of the kiln top surface.

The opening at the highest surviving course is approximately 1.5m wide, circular, and built with refractory yellow brick, being far more resistant to high temperatures than Carboniferous Limestone (which itself calcines) or red brick (which often melts at the temperatures involved). The usual lining in agricultural field kilns is simple limestone, but this kiln being semi-industrial in nature, and which therefore would see much heavier use, explains the use of the refractory brick. Limestone combustion chambers frequently require rebuilding, usually every several years (YCCART 2019).

Even the Carboniferous Limestone will melt given high enough temperatures, as can be seen by the limekiln in Cheston Combe, Backwell.





*Fig 21: Combustion chamber, top surface of kiln*

The top of the chamber would have been flush with the upper kiln surface, which gives an indication of how much of the kiln has been robbed.

The top of the kiln would also have been levelled, to facilitate the movement to and from the combustion chamber with barrow loads of charge.



## Recommendations for further work

The deep dump of material in front of the kiln is problematic. Once the kiln is properly stabilised, then it is recommended that the dumped material be cleaned out by machine to a level or working surface contemporary with the kiln, under archaeological supervision.

## References

Historic England 2018	<i>Pre-industrial Lime Kilns: Introductions to Heritage Assets</i> . Historic England. Swindon
Rahtz, P. A. and Greenfield, E. 1977	<i>Excavations at Chew Valley Lake, Somerset</i> HMSO, London
Williams, R. 2004	<i>Lime Kilns and Lime Burning</i>
YCCART 2019	An 18th century limekiln at Saunders Down, Priddy: Structure and accounts <i>Available at <a href="http://ycccart.co.uk">ycccart.co.uk</a></i>

## Authors

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## Date

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