

Report on the Excavation of a Corn Drying Kiln at Kilnsey Green, Kilnsey, North Yorkshire



2009

An Upper Wharfedale Heritage Group Publication

**Report on the Excavation of a Corn Drying
Kiln on Kilnsey Green, Kilnsey,
North Yorkshire**

2008

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AN UPPER WHARFEDALE HERITAGE GROUP PUBLICATION

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Thanks are due to Sonia and Tim Wilkinson of Kilnsey Old Hall for allowing their home and garage to be used as a logistics and catering base during the surveying and excavation phases.

SUMMARY

Excavation of a seventeenth-century lime kiln on Kilnsey Green (Town's Piece) in 2007 by the IAG, supported by the UWHG, pointed up the surviving nature of Kilnsey Green's proto-industrial past: a vague earthwork proved to be a perfectly preserved clamp, or sow, kiln (Johnson 2008). Evidence from the Kilnsey tithe apportionment map, of 1845, showed a rectangular building as a 'drying kiln' but earthwork evidence for this was scant (Borthwick TA 491L). A nearby set of earthworks corresponded to the tithe map's depiction of an 'old corn mill'.

The entire field known as Kilnsey Green was topographically surveyed by members of the UWHG, under the direction of Dr Roger Martlew, in spring 2008, as a precursor to excavating the supposed site of the drying kiln. Excavation took place, in conjunction with the Ingleborough Archaeology Group, over ten days in September 2008 and it revealed a two-phase corn drying kiln: an earlier phase 'keyhole'-type kiln with an external stone-lined flue and rounded interior; and the squared fire pit of a later phase kiln, aligned in the same way as the kiln shown on the tithe map. Archaeomagnetic dating of the flue entry was unsuccessful.

A large assemblage of artefacts was recovered from within the primary fill of the bowls, consisting mainly of pottery with a limited number of metal objects.

1. SITE LOCATION

The field was named 'Town's Piece or Green' on the 1845 tithe apportionment, though the name was later changed to Kilnsey Green. It is owned by the Parish Meeting and lies between the fish ponds of Kilnsey Park, to the south, and the modern line of Mastiles Lane, to the north. The excavation site lies at the north-western corner of the field, at grid reference SD97264 67736, at an altitude of 195m OD. The site lies between two access tracks running east-west across the northern section of Kilnsey Green.

2. AIMS AND OBJECTIVES

Though the site was shown on the tithe map and listed in the apportionment as a structure still in use – unlike the adjacent and presumably disused 'old corn mill' – mills and their associated drying kilns could have medieval origins. Historical sources mention water-powered mills at Kilnsey in 1496 and a corn mill and fulling mill were noted from the early sixteenth century (Walbran 1863, 376). The location of these mills is unknown but was suggested on a sketch plan (Mason and Pacey 2000) reproduced as Fig. 1.

There is no evidence of when the corn drying kiln was first constructed or of what form the earliest structure took.

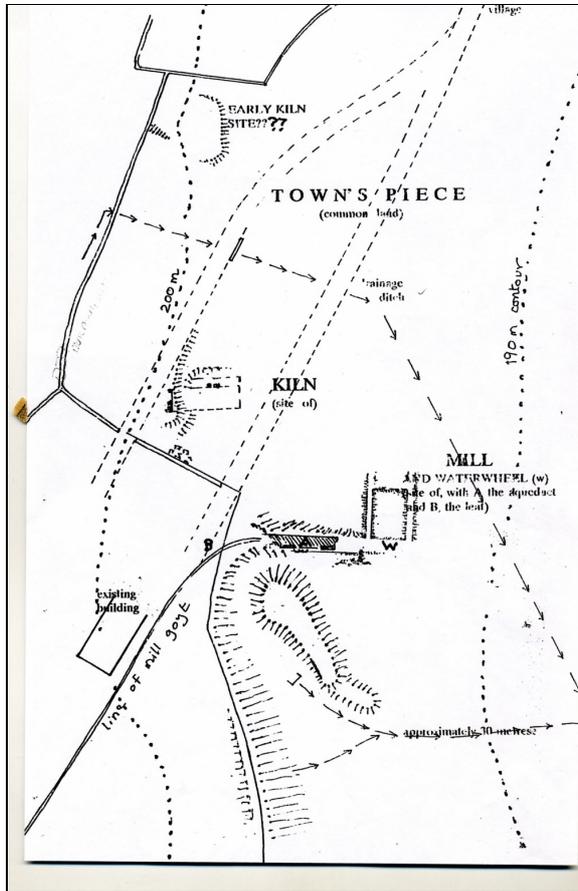


Fig. 1 Sketch plan of sites on Kilnsey Green
Source: Mason and Pacey (2000)

The specific aims of the excavation were to:

1. locate any surviving remains of the corn drying kiln shown on the tithe apportionment map,
2. determine its morphology and detailed plan form.
3. obtain dating evidence for the kiln's use and abandonment post-1845.

3. Topographical and geophysical survey

Roger Martlew, Yorkshire Dales Landscape Research Trust

Summary

Topographical and geophysical surveys were carried out in advance of the excavation of a corn drying kiln, funded by an 'Awards for All' Heritage Lottery grant. Background interference affected part of the area investigated by geophysics, but the surveys successfully recorded a multi-period range of features which are of regional and potentially national significance.

3.1. Introduction

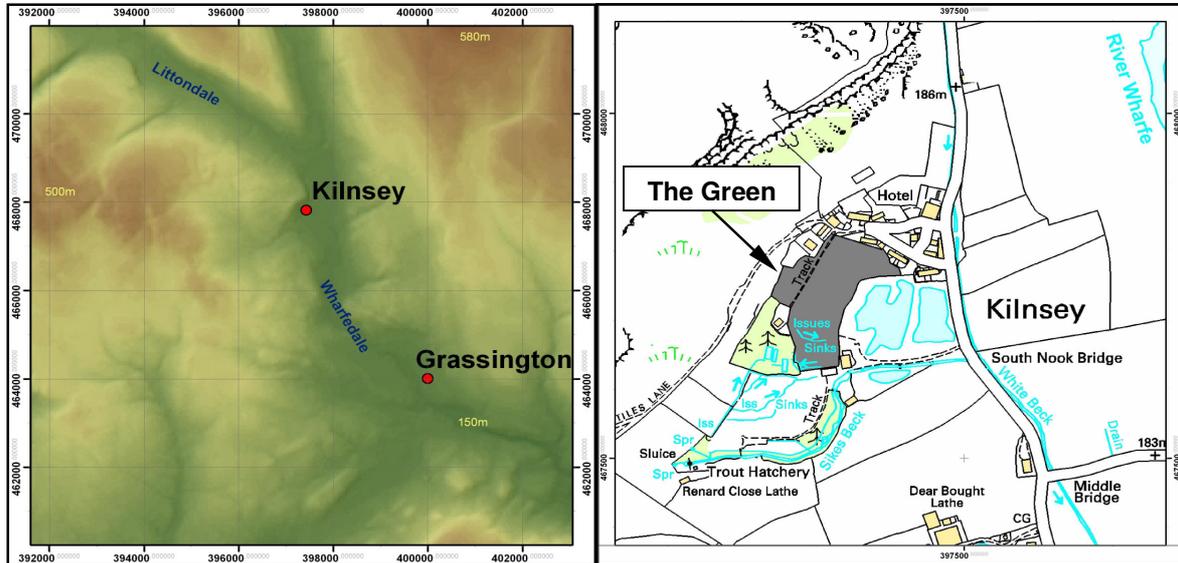


Fig. 2 Location and extent of the survey area.

The surveys were carried out as part of a project funded by an 'Awards for All' Heritage Lottery grant. The project aimed to investigate a possible corn drying kiln, in a field known locally as The Green and referred to in the 1845 tithe award as Kilnsey Town's Piece (NGR SD 397467). The field is owned by Conistone with Kilnsey Parish Meeting, and an important element of the project was the involvement of the local community. Members of the Upper Wharfedale Heritage Group took part in the surveys, which were carried out over five days in April and May 2008. Supervision, training and the collation and processing of results were carried out by Roger Martlew of the Yorkshire Dales Landscape Research Trust.

A detailed study of the earthworks in the field was required to set the kiln excavation in context, and this was undertaken before the vegetation began to obscure the complex features. The field is bordered on the west by the access road to Kilnsey Quarry and Mastiles Lane, on the north by the village of Kilnsey, and on the east and south by Kilnsey Park Trout Farm (Fig. 2). It is on limestone bedrock, steeply sloping on the west but relatively level across most of the north-eastern side. Several modern ditches and culverts channel water from the spring line along the western slope.

Details of the significance of the site and relevant historical sources are given in later sections (see pp. 17-21). The corn drying kiln was identified in the Tithe Award of 1845, but may have medieval origins: water-powered mills at Kilnsey were mentioned as early as 1496 and a corn-mill and a fulling mill were mentioned in the early 16th century (Walbran 1863, 376). The location of these mills has been suggested on a sketch plan of the field (Mason and Pacey 2000), but no detailed work had been carried out. Excavation of another potential kiln site in the field in 2007 identified a lime kiln which had last been fired between AD 1620 and 1670 (Johnson 2008).

3.2. Methods

Five fixed reference points were located by differential GPS (two Thales ProMark 3 receivers) to OS National Grid references within 0.1m, and base-lines for the survey were constructed from these by tape and line-of-sight. The earthworks in the field were surveyed at a scale of 1:500 by a combination of tape offset and triangulation, and by self-reducing alidade. A detailed survey of the excavation site was produced at a scale of 1:100. GPS was also used to collect data for a digital terrain model of the field, and to locate the present wall and wire-fence boundaries.

The resistivity survey was carried out using a Geoscan RM15 twin-probe array with 0.5m spacing; data were collected on 1m sample and traverse intervals. A gradiometer survey was carried out using a Geoscan FM256 instrument, also on 1m sample and traverse intervals. Post-processing was undertaken with Geoplot v. 3.0. The separate topographical surveys were inked up and scanned to produce an overall plan of the field. All the resulting plots were combined using ArcGIS 9.2, which was also used to produce the elevation model from the GPS data.

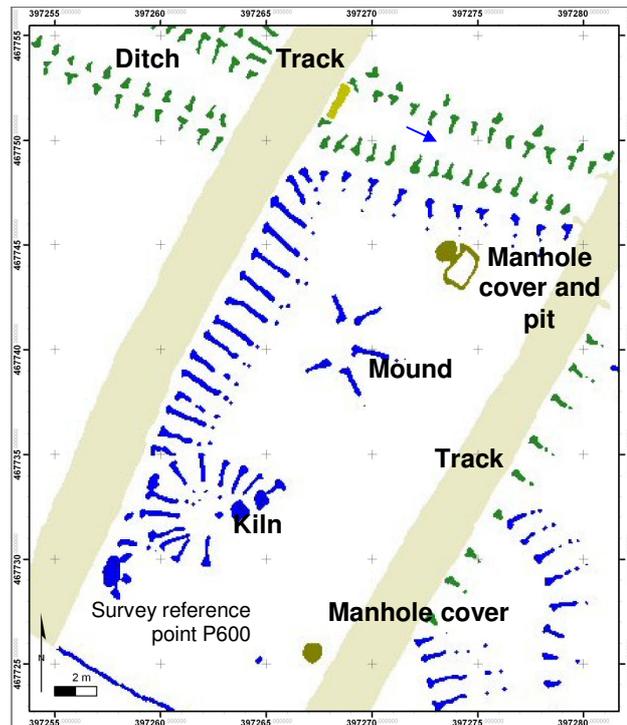


Fig. 3 Detailed plan of the kiln area showing features discussed in the text

3.3. Results

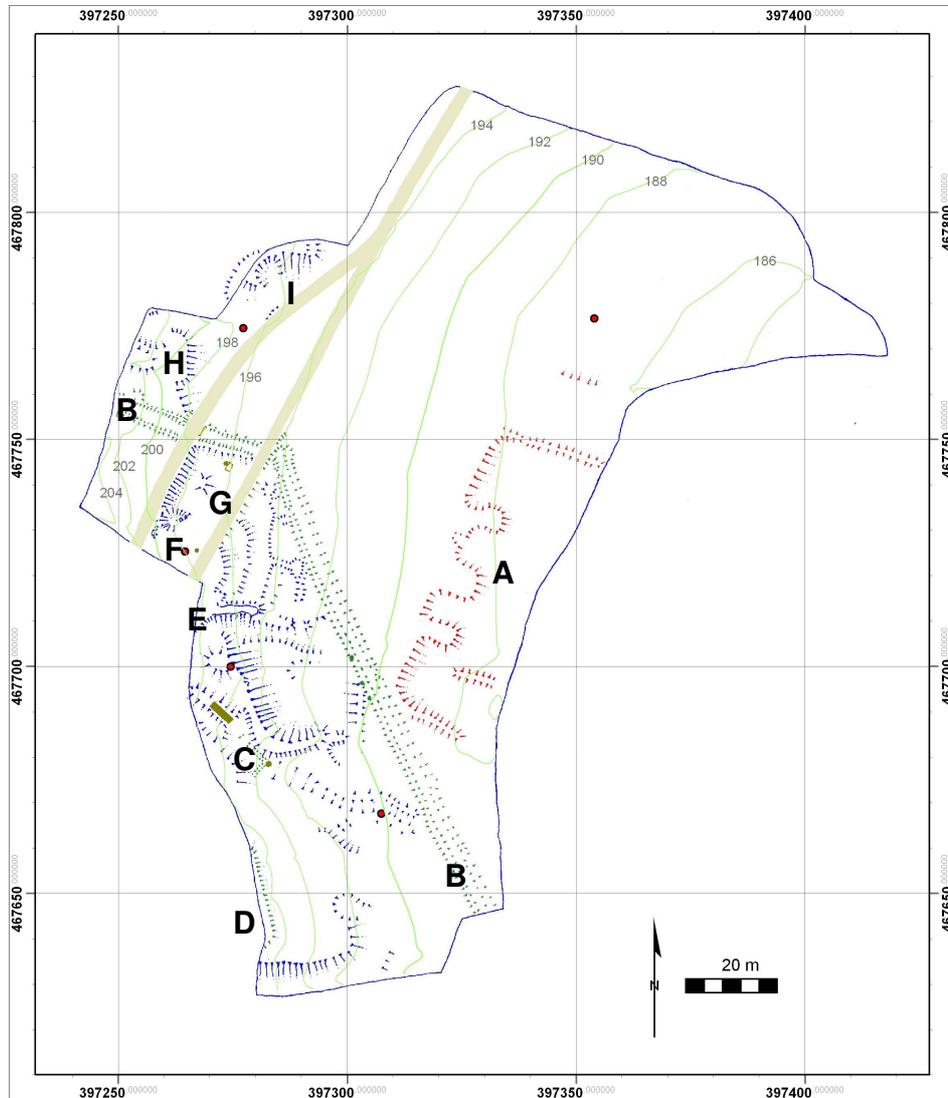


Fig. 4 Topographical survey with features discussed in the text
Red dots indicate the survey reference points. Contours at 2m intervals above OD.

3.3.1 Topographical survey

The topographical survey (Figs. 3 and 4) recorded a complex set of earthworks set into the steep natural slope on the western part of the field. Slight earthworks were visible on the almost level eastern side of the field (shown in red and labelled **A** on Fig. 4), truncated by the boundary wall and ponds beyond. The northern part of the field contains the natural break of slope along the line of the track, but little can be seen that represents clear evidence of human activity. Recent activity (shown in green on Fig. 4) is represented by the drainage ditch (**B**) that crosses the field, and by spring-heads and inspection covers reinforced with brick and concrete (**C** and Fig. 3). In the south-west corner of the field the wire fence follows the top of the retaining bank of a pond or reservoir (**D**) lying outside the area of the present survey, and draining into the gully along the southern boundary of the field.

A series of building platforms was recorded between the prominent stone buttress (E) and the track; the buttress has been suggested as support for an aqueduct to take water to an overshoot wheel providing power for one of the mills (Mason and Pacey 2000, Fig. 2). Wall footings survive as earthworks in parts, and have clearly been truncated by ditch B. The site of the corn drying kiln (F) is indicated by a shallow scoop into the steep slope below the track (Fig. 3). A low bank along the edge of the track appears to continue down the side of ditch B, and may represent an original enclosure that has been respected by the more recent features. A low mound (G) can be seen within this area, and may be associated with activity at the kiln. On the western side of the field the survey recorded a building platform and slight lynchet (H), and the site of the kiln that was excavated in 2007 (I).

3.3.2 Geophysical surveys

The areas covered by the geophysical surveys are shown in Fig. 5. The southern and eastern parts received significant electrical interference possibly from a high-voltage supply to Kilnsey Quarry, although this has allegedly been disconnected as the quarry is no longer operational. Although the equipment filters this to some extent, the effects can be seen in the raw data plots of the resistivity data in Appendix 1(b). An overhead power line created interference in the south-west corner of the mill area survey (Fig. 7). All the areas depicted in Fig. 5 were covered by both resistivity and gradiometer surveys, with differing success: the most informative plots are presented and discussed below.

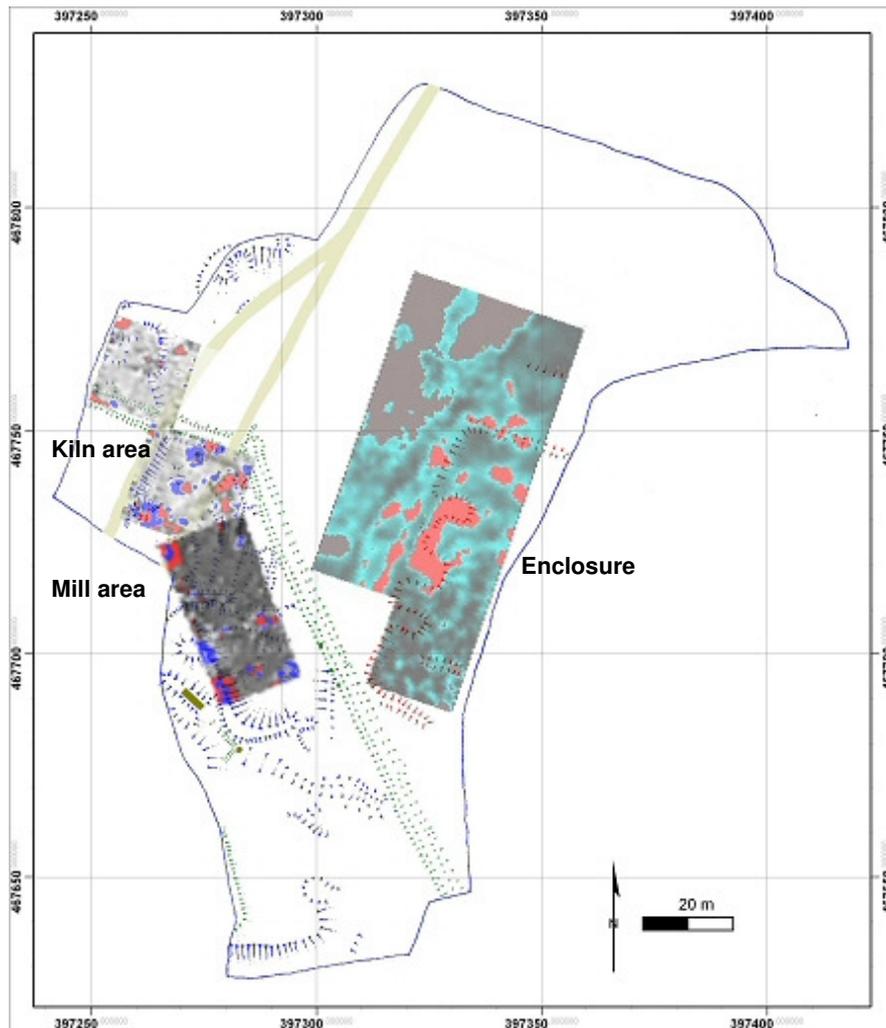


Fig. 5 The geophysical survey areas in relation to topographical feature

a. The kiln area

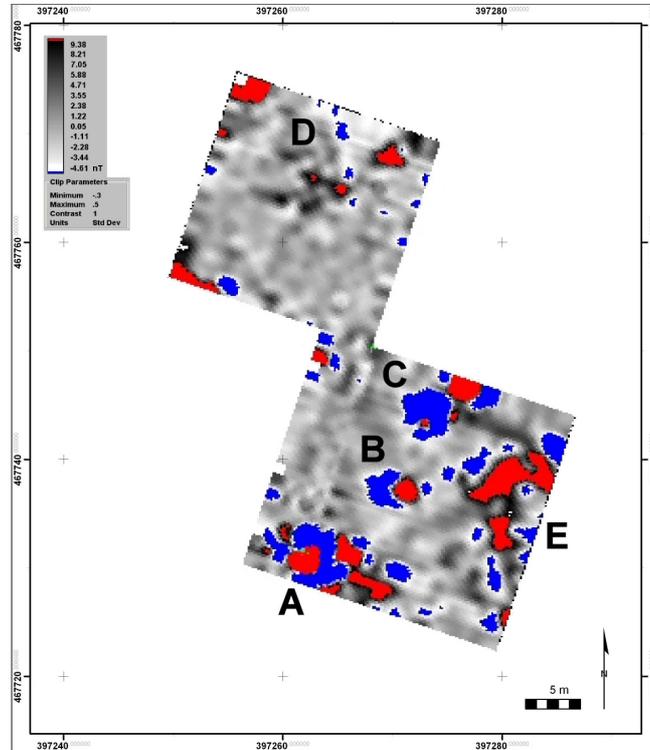


Fig. 6 Processed gradiometer data of the kiln area: despiked, traverses (E-W) set to zero mean and data points interpolated (SinX/X)

The most informative results in this area came from the gradiometer survey, with the exception of the modern water pipeline that runs along the western side of the western trackway which was picked up more clearly by the resistivity survey (see Appendix 1(b)). A very large bipolar response was detected in the area of the kiln (A on Fig. 6), with a second response in the area of the low mound recorded by the topographical survey (B). The anomalies at C represent a manhole cover and adjacent recent pit (see also Fig. 3).

The building platform D is indicated by generally higher readings, with low readings representing an accumulation of soil at the foot of the slope in front of the platform. The absence of any significant anomalies here indicates that this is not an early kiln site as suggested by Mason and Pacey (2000). The high reading in the north-west corner, against the stone wall, is likely to be a modern iron spike or an accumulation of stone at the base of the wall.

The most interesting result from the gradiometer survey is the truncated rectangular anomaly at E, which may represent the gable end of a building on one of the platforms identified by the topographical survey. The modern tracks appear to have little influence on the gradiometer readings, and the gable wall lies partly beneath the track;

the drainage ditch is very close, and upcast from cleaning out the ditch may overlie the north-east corner of the building.

b. The mill area

The gradiometer plot of the area to the south of the kiln is not very informative (Fig. 7). Very large anomalies are caused by modern features at **A** (manhole cover) and **G** (power line), and the anomalies at **D** and **H** may possibly be due to iron objects. The high readings at **F** represent stone (probably bedrock) very close to the surface at the top of the mound shown on the topographical survey, and there is a possibility that similar high readings at **I** may represent buried masonry. The anomalies at **C**, **D** and **E**

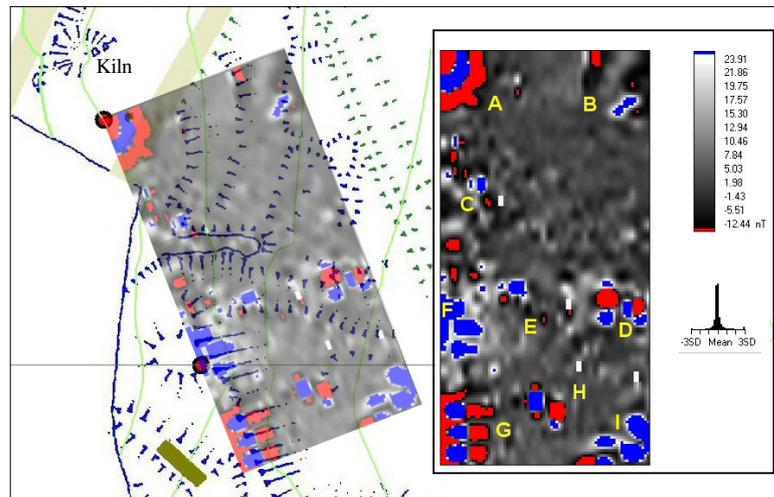


Fig. 7 Processed gradiometer plot of the mill area (despiked and interpolated (SinX/X)) also shown in conjunction with the topographical survey

can all be related to features visible on the surface, but the magnetic responses reveal little additional information that might convincingly be interpreted as structures. The exceptions to this are the parallel linear anomalies at B. These may represent a further structure similar to the one identified at E in Fig. 5, with the possibility of a slight change of alignment following the contour around the steep slope.

c. The enclosure

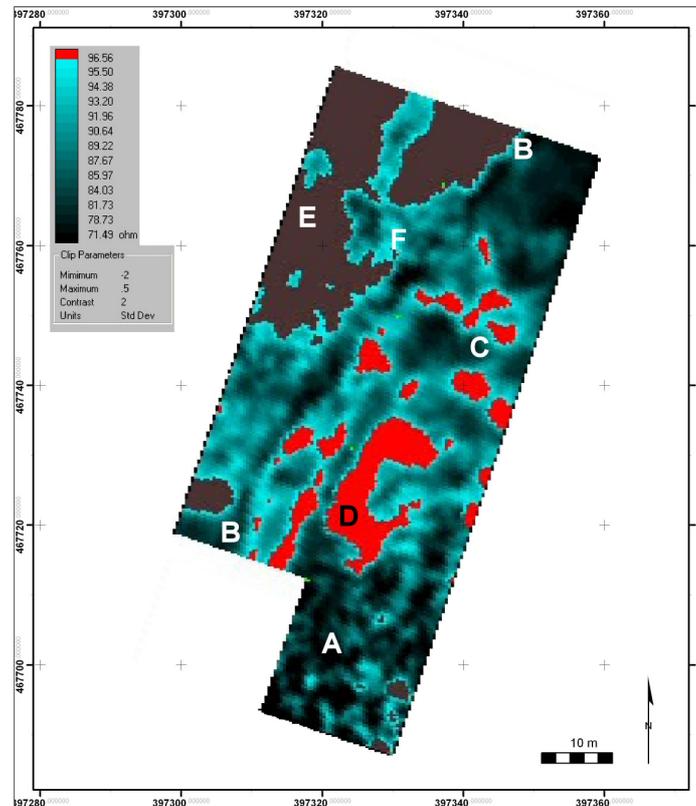


Fig. 8 Processed resistivity data:
edge matched, despiked, low pass filter (2m radius, Gaussian) and interpolated (SinX/X)

The raw data plot in Appendix 1(b) shows the effect of interference on the surveys in this area, and this is still visible at A in Fig. 8 after processing. The most informative results came from the resistivity survey, which clearly shows a linear low resistivity anomaly (B – B) that was also the strongest feature recorded by the gradiometer. This may be a cable or pipeline; a second but fainter anomaly runs towards this at F from the north-west, and this may be identified as a 32 mm pipeline to supply water into the field (information from Sonia Wilkinson). The other large scale features on the resistivity plot, such as the area around E, represent underlying geology.

The earthworks of a truncated rectangular enclosure, clipped by anomaly B on the north-west corner, show up clearly as a band of low resistivity between two narrow strips of higher readings (C). The large open-sided rectangle at D produced the highest readings of the survey and appears to be integral to the inner face of this enclosure. It will be seen from the coincidence with the topographical survey (Fig. 5) that a third projection visible as an earthwork does not give a similarly clear response, but this and the southern side of the enclosure become increasingly compromised by the background noise in this area. A possible rectangular enclosure lies north-west – south-east beneath the more obvious features around F, but this may arise from patterning in the background interference. It is more apparent on the raw data plot before processing to remove the noise.

The large rectangular enclosure, clipped by the modern trench and the drainage ditch and truncated by the ponds of Kilnsey Park, can be identified as the 'Ingleton' type enclosure recorded from historic aerial photographs by the Yorkshire Dales Mapping Project (Horne and MacLeod 1995, 95, NY.1116.14.1). The type site, on morphological grounds, is the Broadwood Enclosure at Thornton in Lonsdale which was investigated by the Ingleborough Archaeology Group; a single radiocarbon date from the base of the bank surrounding this site suggests construction in the Late Pre-Roman Iron Age (Johnson 2004, 60).

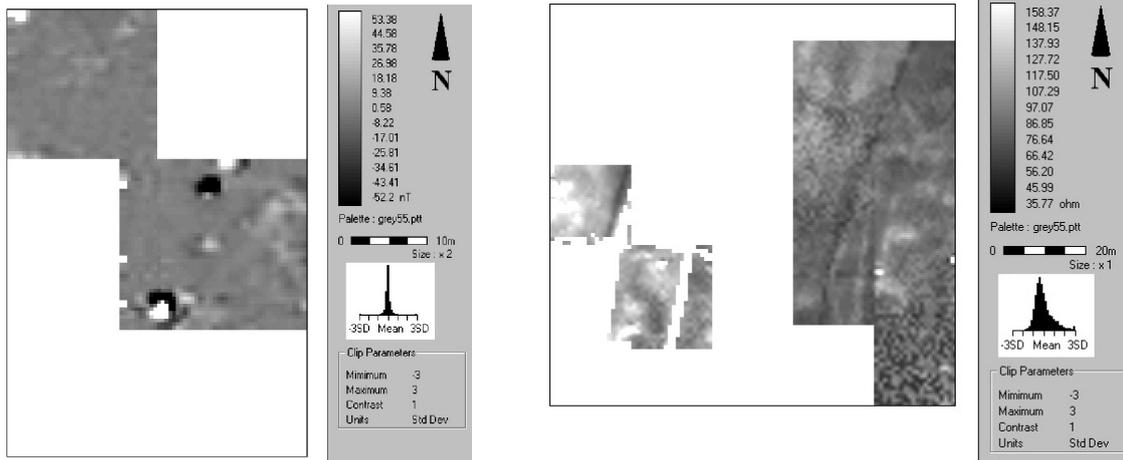
3.4. Conclusions

The surveys of Kilnsey Green have recorded in detail for the first time the true complexity of this historic landscape in this relatively small area. Interpretation at this stage is premature, and it is more appropriate to suggest questions and hypotheses that can be tested by future investigation:

- what structural remains of the corn drying kiln survive, how did it operate and can it be dated?
- what is the significance of the magnetic anomaly associated with the low mound to the north-east of the kiln?
- the gradiometer surveys suggest that structural remains may survive to the south of the kiln, but further investigation would be needed to clarify the nature and date of the earthworks in this area.
- can any further definition be given to the interpretation of the stone buttress (E in Fig. 4 and C in Fig. 7) as part of a mill's water supply system?
- in what is clearly a multi-period landscape, does the large enclosure on the east of the field represent late Iron Age settlement at Kilnsey, or is it part of the medieval monastic grange complex?
- what is the significance of the high response anomaly within this enclosure, and does the site overlie an earlier smaller enclosure?

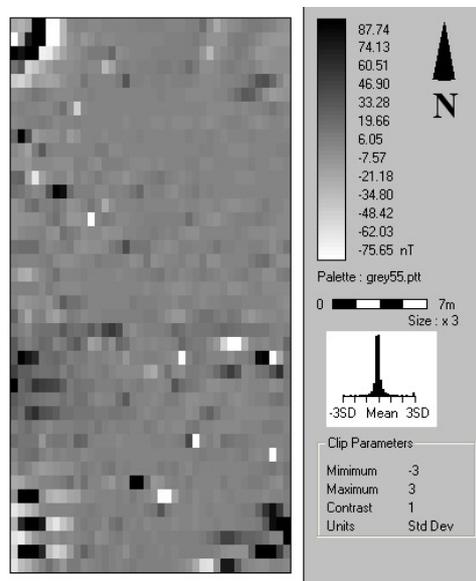
The first of these was tackled by the excavation, and no doubt further questions will arise as each of these questions is investigated. Given the association of this area with one of Fountains Abbey's most important granges in the Dales, it is clear that the evidence that survives in Kilnsey Green is of major importance in the wider context of Cistercian and later activity in the region; it is also potentially significant in extending the history of settlement in Kilnsey back to at least the late Iron Age.

Appendix 1 Raw geophysical survey plots



(a) Raw gradiometer plot, kiln area

(b) Raw resistivity plot, kiln area and enclosure.



(c) raw gradiometer plot, mill area

4. ARCHAEOLOGICAL CONTEXT

Pat and Phil Carroll

The hamlet of Kilnsey is situated in the upper reaches of the River Wharfe some 18 km due north of Skipton in North Yorkshire. Located on the western side of the valley, the cluster of stone buildings shelters beneath the imposing 50m high Kilnsey Crag with its dramatic 12m overhang. Here, Kilnsey Old Hall dates from 1648 when it was built for Christopher Wade, whilst the remains of an adjacent gatehouse, possibly fourteenth century, are a standing reminder of the role that Kilnsey played as one of the more important granges for Fountains Abbey.

The valley of the River Wharfe is one of a number of major waterways draining the dales and is situated within the Yorkshire Dales National Park, an area of outstanding natural beauty. The current settlement pattern of villages and hamlets along the valleys, with isolated interspersed farmsteads, has evolved over many centuries. However, less noticeable yet far more extensive than these present day structures, are the many subtle archaeological features that punctuate the landscape, not only linked to the present day patterns of land partition and use but with the vast majority dating from much earlier periods.

In the mid 1990s the Royal Commission on the Historical Monuments of England (RCHME), as part of the National Mapping Programme undertook a closer look at the local landscape in 1998 with the Yorkshire Dales Mapping Project (YDMP). The Wharfe valley was an integral part of this project which in total studied an area of some 3000km² and recorded over 18,000 potential archaeological sites, of which some 65 per cent had not been previously recorded (Horne and MacLeod 2004, 21).

These records, with the existing previous and subsequent research, form part of the national database and, to give an indication of the archaeological 'intensity' within these files there are 750 individual records relating to a small section of the valley - 4km wide and 7km long between Threshfield to the south and the confluence of the Skirfare and Wharfe rivers, north of Kilnsey.

A cursory look at these entries shows that though the majority are loosely identified as prehistoric, one has to accept that ground-based supportive research and identification lags far behind the paperwork and much study is required to support the dating claims.

However, from sporadic finds in the area, early human influences can be traced – the discovery of a Mesolithic mace head near Grassington, a microlith from the same period found at the confluence of the Skirfare and the Wharfe and, in 1930, on a nearby shingle bank, a Neolithic polished green stone axe indicates, if not occupancy, at least early human use of the area.

Evidence from occupation in the Bronze Age is slightly more substantial with a scatter of round cairns; however those excavated lack modern dating methods as they were dug in the nineteenth and early twentieth centuries. The only firmly dated site from the period, North Flats is a small enclosure that contained two inhumations and animal remains (Martlew 2006, HER MYD 37676). Other possible enclosures and the probability that the higher ground may have been under cultivation during this period have been proposed.

However, the bulk of the earlier archaeological records within the Historic Environment Record (HER) are identified as 'prehistoric' and these exist, in the majority, as low earthen banks containing stone or in places turf, or as the remains of stone-built enclosures.

One significant and striking local archaeological feature is the 'co-axial field system' thought to be later prehistoric in date – these are identified by their long parallel

boundary banks some 30m to 50m apart. The more obvious surviving examples are to be found on the west-facing upper slopes north of Grassington and above Conistone. Survey work by the RCHME Wharfedale Training Project examined some of these field system boundaries and their relationship to surrounding features (Horne and MacLeod 2001, 73). The co-axial blocks may have extended further towards the valley floor but could have been terminated by later medieval ploughing.

However, more confident interpretation for occupation of the local area during the Iron Age and Romano-British period within the dale was forthcoming from the RCHME. Both sides of the valley appear to support a line of Iron Age/Romano-British farmsteads, now seen as low earthworks with their associated field systems on the 'shoulders' of the hillside. Where more recent research on existing finds has been undertaken, *ie* with the material from the Lea Green site above Grassington (Curwen 1928, HER MYD 4028), the identification of Roman pottery amongst their finds would support a Roman phase for this complex multi-period site. Current excavation projects, such as the ongoing Chapel House Wood research have securely dated finds from the Late Iron Age and throughout the period of Roman occupation. (Martlew – personal communication)

Despite the few isolated examples of accurately dated early material, the majority of archaeological features in this area remain undated or have been given probable dates from their form and relationship to other features, but no work has tested the accuracy of these assumptions. Consequently, many of the enclosures, field systems, settlements, clearance cairns and trackways that carpet the local area come under the loose categories of 'undated, prehistoric or medieval'.

The most obvious features of the man-made landscape are the blocks of lynchets which are thought to date mainly from the medieval period. However, a network of trackways, buildings, field systems and enclosures of varying dimensions is considered to be of similar date.

The details contained within the Historic Environment Record for our small study area include over eighty 'farming'-related remains for this period, including sheephouses, ridge and furrow ploughing, farmsteads, settlements and boundary banks.

As mentioned above, Kilnsey was an important grange for Fountains Abbey between the mid 1140s and 1540 and it operated through a number of outlying lodges. Fountains Abbey papers record that sheep farming dominated the site and the many complex earthworks remaining on Outgang Hill possibly reflect this huge enterprise. However, this medieval monastic landscape had been superimposed upon an earlier pattern of land usage and the full implications have yet to be understood. Scarthcote, just north of Kilnsey, was excavated and revealed a sixteenth century farmstead on the site of a fifteenth century farm (Raistrick 1965, HER MYD 4054) which would have dated from the later years of a reduced monastic influence in the area when tenant farmers, rather than the earlier lay brothers, managed the holdings.

Evidence of water management is also apparent – as dams, leats and the re-channelling of streams – in the field opposite Kilnsey Old Hall where the grass-covered remains of a water mill, dating from at least 1572, are to be found (Mason & Pacey 2000, 82). Along this apparent water course can be seen the leat, the position of the fall-trough and a possible overgrown and mainly filled in wheel pit. Early records show that in 1599 and at least until 1684 this was in use as a corn mill (YAS. MD335/6/43/5-11), though whether the earlier drying kiln dates to this period is not yet known.

Further recent research has centred on industrial remains such as the many kilns that are to be found: kilns that may have dried grain, processed lime, produced potash or, as a chop wood kiln, dried wood for smelting purposes. Several smelt mills were built in the valley – plus smaller, simpler sites – as at Kettlewell and Grassington as well as Kilnsey. The smelt mill here was in operation from at least 1729 but appears to have

stopped production in 1827 (Gill 1993, HER MYD 43112). The Kilnsey smelter would have been predominately associated with the processing of lead from the local mines (including Malham) but at some of the sites small quantities of silver may also have been produced as a by-product of the lead industry.

Though lead ore from outside the district was smelted locally, the majority of the raw material must have come from the local lead veins, mainly on the eastern side of the Wharfe, centred on the huge complex workings at Yarnbury and on Grassington Moor and from above Conistone. On the western side of the Dale mining on a much reduced scale was carried out but the veins were less plentiful and the yield much lower. The remains of deep mine shafts, lines of shallow shafts following the veins, dressing floors, waste heaps, dams and diverted water channels and the maze of trackways, show the size and intensity of the industry which faded in the latter half of the nineteenth century.

5. HISTORICAL CONTEXT: KILNSEY GREEN

This section acknowledges the input of Sonia Wilkinson.

Land at Kilnsey was granted to the Cistercian monks of Fountains Abbey in 1150 and 1156 by William de Forz, son of Duncan and nephew of the King of Scotland, and his wife Alice de Romille. Other lesser landowners also granted lands to the abbey in the locality. Owing to its location on a major north-south highway, Kilnsey was developed as the main grange and administrative centre for Fountains' vast estates in the Yorkshire Dales which stretched right across Malham Moor beyond Malham Tarn, across Fountains Fell into Littondale, and to the east of the Wharfe valley. The monastic complex here is said to have consisted of a hall, chapel, domestic quarters for the lay brothers, bakehouse and other logistical buildings as well as a complex of farm buildings and stores, industrial mills and workshops, and fish ponds. There are documentary records proving that lime was being burned at Kilnsey during the mid-fifteenth century (BL. MS Add.40011A).

For almost 200 years Fountains' lands in the Dales were held as demesne, worked by and for the abbey by lay brothers, farm labourers and servants, but the series of disasters that occurred through the first half of the fourteenth century led to a change of strategy. Scots raids, probably brought about by severe climatic deterioration, affected much of the Dales, and these two series of events in turn led to harvest failures and consequent famines and epidemics of human and animal diseases. During 1349-50 the monks and lay brothers were severely affected by plague.

A serious shortage of labour ensued as the number of lay brothers and labourers had fallen below a sustainable level. The decision had been taken, and permission secured from Bernard of Clairvaux in 1336, to demise their lands for not more than five years, but permanent change to Kilnsey's status came in 1363 when the abbey was granted licence to transform Kilnsey into a *vill*. The former farm labourers now became monastic tenants, working the land and tending their own flocks, paying annual rent to the abbey while also being paid to tend stock belonging to the abbey. Eight tenements were thus created in and around Kilnsey.

Following the Act of dissolution of monastic foundations in 1536, all Fountains' properties, including Kilnsey, were sold to Sir Richard Gresham, a rich London merchant, who probably saw his purchase as a lucrative but temporary investment opportunity and much of value was quickly sold off. In 1547 the property here was sold on to the Yorke family. By the middle of the following century, however, Christopher Wade was in possession of Kilnsey and it was he who rebuilt the monastic hall in 1648. Three generations of Wades occupied the hall until 1693 but after that it was let out until

1745 when the last of the male line, Cuthbert III, died without issue in 1745. The hall then fell into disuse as a residence and was consigned to use as a slowly decaying agricultural building until being rescued in 1999 and returned to its former residential status following the lines of the original layout of the 1648 rebuilding.

Kilnsey's industrial functions continued into early modern times. A lead smelt mill was in operation by at least 1729 within Town's Piece, to work ores mined to the north-west of the village and in Littondale. It closed down around 1827 (Gill 1993, 132-51). The most recent – and most intrusive – element of the village's industrial past is Cool Scar Quarry which produced crushed limestone from sometime in the nineteenth century (the first definite date is 1880) until closure in 1998. The tarred road past Kilnsey Old Hall was created as the quarry access road.

6. HISTORICAL CONTEXT: CORN DRYING KILNS

Corn drying kilns were one of the most common features of the rural built environment as the effects of a generally damp climate necessitated artificial drying of grain, especially of oats. If the grain had not been dried it tended to clog up the grooves on the grinding surface of millstones, especially as oats is a fatty grain, and it was also necessary to dry oats thoroughly to facilitate removal of the hard husk when the grain was passed through 'shilling' stones, hence the former use of that word to refer to oats with the husk removed. Drying it out prior to milling apparently added a particular flavour to the oats. In addition, seed for the following year's planting had to be dried prior to storage to avoid fungal infection.

Oats (and barley) cakes were a major element in the subsistence diet until the 1770s across the country and beyond that date in Westmorland, north Lancashire, Craven and the Yorkshire Dales, where they were still significant into the nineteenth century (Prince 1986, 106-07). Methods of drying grain must have existed for as long as it has been grown, *ie* from prehistoric times, especially when climatic conditions made it impossible to air dry the grain. Even when quernstones were the norm, it would have been virtually impossible to grind the grain if it were damp as it would have so easily been reduced to a mush. Specially constructed corn driers are known from the Roman period and surveys have located large numbers across the arable areas of the Midlands, East Anglia and the south-east (Taylor 2007, 115-16). A scattering of Roman-period driers has been recorded in the Welsh Marches but very few in the north of England – one each in Cumbria and Northumberland and eighteen in Yorkshire north of the Humber make up the known total.

It has been suggested that 'almost every farm' in Scotland had its own drier up to the eighteenth century at least, though archaeological excavations have given medieval provenance to a number of kilns, and one was revealed within a known Viking structure (Gibson 1989, 219-20). An example excavated on St Kilda, tentatively dated to the early nineteenth century, points up the long history of corn drying kilns (Emery 1990). The dearth of excavated examples with firm dating evidence, however, has so far precluded the formulation of any convincing typology for corn drying kilns. As occupation extended upwards in highland Scotland through the eighteenth century, to establish new shielings, oats were the dominant crop owing to cool and wet climatic conditions. Farmsteads either utilised their own driers (if the farm was large enough to warrant its own) or made use of larger kilns designed for communal use (Whyte and Whyte 1991, 19, 44-45; Whyte 1995, 137).

Archaeological investigations in Wales have also described proven medieval corn drying kilns where oats seemed to be the dominant cereal being processed (Britnell 1984); while work in Ireland has found similar evidence and similar changes in

kiln technology and design that became apparent from the eighteenth century (Rynne 2006, 198-99), which will be discussed in Section 10 of this report.

Rather nearer to home, work on the Otterburn Training Area in Northumberland identified nearly thirty corn drying kilns of varying date with close parallels to the kiln on Kilnsey Green (see Section 10) (Charlton and Day 1982). A similar parallel has been described for a restored kiln at Hartsop in the Lake District which is thought to have been for communal use (Denyer 1991, 121-22).

In a pioneering work on industrial archaeology Arthur Raistrick described the close relationship between corn mills and drying kilns especially in 'stone areas of the north' (Raistrick 1972, 90). By this he presumably meant upland areas, like the Dales, where workable sandstone was more or less at hand for construction purposes.

More recently, discussion of drying kilns in Wharfedale and Airedale has focussed on known kilns at Addingham, Bolton Abbey, Hartlington and Barden (Mason and Pacey 2000). These writers referred to the Kilnsey corn mill and its associated drying kiln but they incorrectly located it elsewhere within Kilnsey Green (2000, 83). Documentary sources confirm the presence of a drying kiln at Parceval Hall, Appletreewick (Walsingham, survey). An inventory was drawn up when that estate changed hands in 1735 and it included the item 'One Kiln for Drying Corn on 8 yards long 4 wide and well slatted and timber'd; but of no great Use'. All these kilns have elements in common with the excavated site at Kilnsey, as will be seen in Section 10.

7. METHODOLOGY

Recording

Trench recording was carried out using IAG's recording system which, in turn, is based on that used by English Heritage's Centre for Archaeology, using context record, photographic record, and object proforma sheets. A comprehensive photographic record of digital images was compiled (Appendix 1). The feature was planned on completion of the excavation phase and a section drawn of the north face of the trench. All finds were logged, bagged and processed by members of the UWHG and IAG, with joining sherds being reassembled.

Excavation

The excavation and planning phases took place over ten days from 15th to 25th September, with one day off in between. All work was carried out manually, including deturfing and backfilling, to avoid damaging the site. Excavation used 100mm pointing hand trowels, hand shovels and buckets, with occasional use of a mattock on strongly consolidated backfill within the structure. The site was left open, at the request of the local community, so backfilling was delayed until 10th October.

Weather conditions were fine for most of the time, unusually for 2008, with only very occasional light rain.

Archive

A site archive and a day book were maintained and these have been added to the main project archive lodged with the UWHG, senior partner in the project, from which it can be accessed by arrangement with the Secretary. Artefacts are to be deposited

8. EXCAVATION RESULTS

See Appendix 2 for Context descriptions.

Narrative

Plan reference no. 1500 (Fig. 9 on page)

Section reference no. 1501 (Fig. 10 on page)

The site is centred on SD97264 67736, and it showed on the ground prior to excavation as the vaguest of depressions (Fig. 11) nestling beneath a bank in the north-west corner of Kilnsey Green. Three semi-dressed sandstone blocks, slightly proud of the turf layer, were the only possibly structural signs of surviving masonry.



Fig. 11 Excavation trench showing a shallow depression

The sole evidence for a drying kiln being sited here was depiction of a drying kiln on the tithe apportionment map of 1845. The decision where to site the excavation trench was made solely on the basis of the three masonry blocks and a high magnetic anomaly on the geophysics (see Fig. 5). A trench was laid out centred on the magnetic anomaly, aligned north-west to south-east, 6.50m by 6m in extent, with the intention being to open up the entire area thus defined. This decision was justified as the excavation process proceeded because the trench had (fortuitously) been dropped onto the entire surviving kiln structure.

Topsoil (context 100) was removed from the entire trench, varying in thickness from 80mm to 300mm, with the smallest depth recorded in the south-eastern sector. Small quantities of coal, coal shale and lime mortar were recovered from within the topsoil, interpreted as post-demolition infill, and various artefacts were also logged: 21 pottery sherds, 4 fragments of clap pipe stem, 3 fragments of glass and 4 metal pieces. Again, all were logged as post-demolition deposits.

Removal of 100 revealed a lens (101) of loose but compacted material, limestone chippings in fact, with a thickness of 25mm and extending 3.60m by 2.50m, located in the north-east corner of the trench. This was interpreted as material laid down in (unknown) recent times during repair of the access track running alongside that side of

the trench. It had no contemporary relationship with the kiln. This context was not excavated further.

Once 100 and 101 had been cleaned off, work concentrated on the south-west quadrant of the trench to expose more fully the three masonry blocks. As excavation proceeded it became clear that these blocks were set within the foundation layers of a wall (110) 2.30m long and 750mm in average width, aligned more or less west-east. It was formed of well-lime-mortared, semi-dressed sandstone blocks of variable size. On the north edge of the wall base was a small area of mortared stone lying at an odd angle which proved to be tumble (104) from higher levels of 110.

At the same time, a team worked on the north-west quadrant to expose a cobbled surface (103) that extended 4.20m in length and in width from 1.24m at the north-west end to 1.50m centrally and 700mm at the north-east end. This was composed of angular limestone cobbles, with an average long axis of 150mm-200mm, dipping eastwards at an angle of 15 degrees from the horizontal. Two pot sherds were logged from 103. The southern edge of the cobbled surface formed an absolutely straight line, coincidentally parallel to the north edge of the trench. It appeared as though the surface had once butted against a now-robbed out wall line.

It very quickly became apparent that the area between 110 and 103 had been infilled with rubble (105) as the material consisted of a then unknown volume of limestone cobbles, laid at all angles, and clearly just thrown or tipped in. Soil from 100 had also worked its way down among the stones. As this was cleared out, some semi-dressed stone was also recovered, probably from layers of the demolished wall 110, and large quantities of modern rubbish, such as bed springs (which had given the high magnetic reading on the geophysical survey), ceramic tiles, aggregate, and over 80 pottery sherds. 105 extended across the entire trench other than on 103, 110 and outside 110. It was also clear that this backfill extended beyond the trench towards the access track on its eastern side. 105 was interpreted as material dumped into the demolished kiln hole to level it off, but at an indeterminate date.

As 105 was removed from the inner edge of 110 a further structure began to appear (102). This was mainly formed of well-lime-mortared sandstone, some semi-dressed, laid in regular courses. The lime mortar had been used to partially render the stonework in addition to tying the stonework together. This proved to be a curving wall, laid with a batter of 60 degrees from the horizontal, that had been the bowl wall for the drying kiln. It extended beyond the western edge of the trench under the banking that supported the upper access track, so it could not be investigated further for fear of undermining the track. The wall was excavated downwards to try and find a floor to the bowl. This had clearly been removed after the kiln's abandonment. Excavation downwards stopped within a depositional gravel layer (109) through which groundwater was seeping. Part of this gravel layer had been heavily coated with a lime mortar 'floor'. 102 extended 3.20m in length, as excavated, and was between 1.10m and 1.80m in height.

The bowl wall 102 had been built against a cut (106) into the natural pre-existing banking.

As excavation of 102 proceeded, a further aspect of the kiln's constructional detail emerged. At the eastern end of the excavated wall there was a flue opening (107), 280mm high and 640mm wide, set at the base of the wall. It was capped with a large sandstone lintel 420mm long by 200mm thick and 660mm wide. The flue passage (111) extended for 650mm from the bowl at an angle of 170 degrees from the north but it was blocked with rubble infill. Its sides up to that blockage were lined with coursed sandstone blocks of variable size and shape. A keyhole excavation was cut down into 111 beyond the blockage to try and identify if it extended further out from the kiln. Unfortunately, a

collapsed capstone (500mm by 460mm) and extensive rubble fill prevented further exploratory work. Whenever the area outside the trench had been levelled off, the flue passage (and external fire pit) had been given the same treatment.

When 105 was removed in its entirety a further wall was revealed (108). This was exposed to form three sides of a square:

- on the south side it was a free-standing wall 1.76m long and 300mm wide with two to three surviving courses built vertically with no batter. It was built of mainly sandstone, semi-dressed blocks;

- on the west side it was 1.68m long and built as a revetment wall, backed with rubble infill (112) between this wall and the curving bowl wall 102. 108 along this length was slightly battered outwards (at 50 degrees) and consisted of a mixture of sandstone and tufa blocks, again semi-dressed;

- on the north side it ran for 1.68m and was also revetted in a similar way to the west line. It was also battered outwards, at 50 degrees. A very short section of part of the curving wall 102 appeared at the eastern end of this wall.

The three wall lines together made up the sides of what had once been a square fire pit; the east wall had been robbed out during demolition of the kiln. The west and north walls survive several courses high. All three were well mortared with lime.

Excavation failed to find an *in situ* floor, except for one very small fragment in the south-east corner. It had clearly been stripped out at demolition and the current base consisted of loose gravelly material. The surviving fragment enabled the hypothesis to be put forward that the floor (113) had consisted of flagstone slabs. Internally the floor area measured 1.70m by 1.70m.

Figure 12 shows the kiln at the end of the excavation phase.



Fig. 12 The two-phase kiln at the end of the excavation

9. FINDS REPORT

In all, 521 artefacts were logged from the excavation site of which 89 per cent (464) were pottery sherds. Other artefacts consisted of:

glass fragments	- 21
ceramic tile	- 17
clay pipe fragments	- 5
metal pieces	- 5
plaster	- 1

rubber bung - 1
brick - 7

A database of all finds is provided in Appendix 3. Virtually all artefacts were recovered from the post-demolition backfill (105).

Miscellaneous finds

All of the glass fragments were modern and mainly consisted of pieces of bottles, of various colours. All were contained in the upper part of backfill (105) and had no coeval relationship with the functioning kiln.

The tiles were also modern, probably from an electrical conduit system discarded in the kiln hollow. They, too, had no significance to the kiln.

Four of the clay pipe fragments were pieces of stem: all were narrow-bore indicating late – ie nineteenth century – date. They may have been contemporary with later usage of the kiln. The remaining fragment was part of a pipe bowl but it was too small to be indicative of its original size and shape, and therefore of no value for dating.

All of the metal pieces were modern and represent discarded material. One piece was identified as a saw blade.

The brick fragments all showed clear signs of having been affected by high temperatures, and two pieces had linear grooves on one face. It is thought they may have formed part of a conduit system for channelling hot air but it cannot be determined whether the conduit was part of the later kiln or material discarded at a later date.

Pottery

The assemblage represents the common, vernacular domestic ware that one would expect to find in a nineteenth- (or early twentieth-) century rural community. None of it can be considered to be of high status. No complete vessels were recovered, and most sherds were fragmentary, though it was possible to partially reconstruct several vessels from joining sherds (see below). The dominant pottery forms were blue and white earthenwares, mostly transfer-printed and underglazed, with the willow pattern or rural scenes typical of these wares. Trade from China in this pottery form developed after about 1750 and quickly led to its industrial-scale production and to the almost ubiquitous presence of such patterned ware (Howard-Davis 2001, 218). The assemblage from the drying kiln is thought to date from the 1880s or 1890s (pers. comm. Chris Howard-Davis).

The green and white variant was also found within the backfill. Several joining sherds related directly to a local (unidentified) family: they were from a blue and white christening bowl or plate and bore the inscriptions “lb 13oz”, “9th”, “May”, “19” and “Bill”. These give part of the baby’s weight, indicate that the christening occurred on the 9th May in 19.. (probably the 1930s) and that someone called Bill was involved – was he the baby or the father?

A large quantity of stoneware jars was recovered, representing several discrete vessels, and a number were marked on the base with the manufacturer’s name and location, namely Hartley’s of Liverpool and London. All the vessels were storage jars, mainly used for jam. They were a very common feature and date anytime from the 1880s onwards.

Several vessels made of salt-glazed stoneware were logged, all having been from sanitary ware in use in the late nineteenth and early twentieth centuries; and there were also examples of creamware sanitary ware that was very popular in the late eighteenth and early nineteenth centuries.

Another type of pottery well represented in the assemblage was dark brown earthenware, mostly well-fired, used for cooking and food storage. These cannot be tied

down more closely than to between the 1870s and 1940s. In addition, there were sherds from undateable china tableware, early to mid nineteenth century pearlware tableware, and items of a 'folksy' nature which may have been from a jug or tankard.

Post-excavation processing of the pottery assemblage identified the following as worthy of partial reconstruction:

	<u>Small finds number</u>	<u>No. of sherds</u>
	138	3
	149	2
	158	6
	162 + 170	4
	179	2
and	179	2
and	179	2
	149 + 172 + 232	4
	187	5
	208 + 215	4
	216	2
	217	2
	218 + 219	3
and	218 + 219	6
	226	2
	229	2

10. DISCUSSION AND INTERPRETATION

Though the site seemed unpromising prior to excavation, given the vagueness of the earthwork and the distorting effect of the dumped metal bedstead springs on the geophysical signal, it did prove to be a site capable of meaningful interpretation. However, a number of questions remain unanswered as the nature of surviving remains does not permit a full reconstruction of the kiln's original form.

Phasing

This corn drying kiln had undergone at least two chronological phases, according to the evidence from excavation. Neither could be given start or end dates. The first phase was a 'keyhole' type of drying kiln well known from the documentary record. These consisted of a rounded bowl, stone-lined, within which some form of racking was installed to support the grain being dried. The fire was maintained in an external firepit some metres from the bowl, and the two were connected with a linear stone-capped flue. The purpose of a drying kiln was to slowly dry out the grain using hot air, so the fire could not have been contained within the kiln. Hot air was drawn from the firepit through the flue and into the bowl. The curving and battered nature of the bowl wall encouraged the hot air to rise upwards to the drying racks.

Within this kiln the curving wall (102) was the surviving section of the first phase bowl. It has not been possible to determine its internal diameter as the northern section had either been demolished or was hidden behind 108, and the western section extended beneath the banking and could not be accessed. Neither was it possible to determine the length of the flue nor to locate the firepit as both had been backfilled and destroyed at an unknown point in time.

The nature of the floor of the phase 1 bowl is also indeterminate: this had been taken out when the kiln was modified. It is thought likely that the surviving section of bowl wall represents the full height of the bowl as built.

It is not possible to determine when the phase 1 kiln was modified, but the archaeological evidence is clear that the kiln was completely rebuilt. However, it is possible to postulate why modification was undertaken. Through the early modern period the area under the plough slowly decreased as more land was converted to permanent pasture. If less grain was being locally grown, as improved transport links and deteriorating local weather conditions made importation more attractive, a large kiln would not have made economic sense. Whatever the size of the first bowl, it can only be described as large given the excavation evidence, with an upper diameter probably in excess of 4 metres. The amount of fuel required to maintain the necessary heat was substantial and if smaller amounts of grain needed to be dried, the cost would have been unnecessarily high. Downsizing the kiln would have addressed this problem.

A contrary argument, though, would question why the kiln was rebuilt at all if the amount being produced was decreasing. Could it be that it was rebuilt for an altogether different reason? This issue will be returned to later, in the Conclusion. A further hypothesis suggests that the original kiln, with its external fire pit and long flue, was inefficient in terms of fuel and temperature and was deemed to be outdated: the decision was made to replace it with a more modern and efficient kiln with the drying floor set directly above a smaller fire pit.

The second phase kiln was still standing, and probably still in use, when the tithe apportionment survey took place in 1844 (Borthwick Institute, TA 491L). It was depicted on the accompanying map as a rectangular building occupied by John Inman and assessed at 6d. At this time, out of the total area of the township of 3233 acres, only 5 were under the plough. The total harvest recorded in the award was 116 bushels of oats, 81 of barley and 45 of wheat. One bushel equates to 36 litres so the total amount of oats and barley was the equivalent of 7092 litres dry weight. This small quantity could hardly have kept the kiln going for long.

The dates when the kiln was finally abandoned and eventually demolished are also unknown. No evidence has been located in the documentary record.

Dating

The project commissioned archaeomagnetic dating of the first phase kiln taking samples from the lintel and surrounding blocks at the flue entry into the bowl. Unfortunately the exercise was unsuccessful: to achieve results a temperature in excess of 500°C was required and this is unlikely to have been the case in a corn drying kiln.

All that can be said concerning dating is that the earlier phase kiln was of the 'keyhole' type known from many upland areas in Britain to date from the medieval period. No conclusion, though, can be drawn about the Kilnsey kiln in this respect. Rectangular two-storey drying kilns are of post-medieval date. The building seen by this writer in the Lake District is thought by a local historian there to date in its present form from the seventeenth century. The only corresponding evidence from Kilnsey is the rectangular form shown on the tithe apportionment map. If they were similar, the later phase Kilnsey kiln also may date from that era. Again, though, it is stressed that this is purely conjectural.

The nature of the overall pottery assemblage in part helps inform the period when the kiln was finally demolished. Most of the artefacts date from the late nineteenth or early twentieth century and all were clearly discarded on the site at some point after demolition. It is most unlikely that the building was still extant beyond the early years of

the twentieth. It was still standing in 1845, whether or not it was still functioning as a drying kiln. Thus the inference can be drawn that the building met its end at some point between 1845 and the early twentieth century. It cannot be narrowed down more tightly than that.

Structure and Form

The phase 1 bowl was a circular structure, at least 4m in rim diameter, narrowing at the base, of the type of drying kiln known as 'keyhole' kilns from their surface plan of circular bowl, linear flue and circular external firepit (Fig. 9). It was entirely built of coursed stone, held together with lime mortar. The flue was substantially constructed, as far as surviving evidence informs.

The later phase bowl was squared and constructed of large semi-dressed blocks, including some of tufa which is a building material known elsewhere in Kilnsey. This bowl was the actual firepit and the drying floor would have been set on the upper storey. Current topography suggests that the ground at that time would have been basically the same with a distinct drop from the upper access track to the lower. The firepit would therefore have had access from the lower level at the south gable end while the drying floor would have had access from the upper at the west gable end, as seen in several surviving drying kilns in Scotland and Cumbria (see Denyer 1991, 121-23).

When the kiln was rebuilt in its later form the original bowl was ripped out on the northern and eastern quadrants but not on the south and probably not on the now-hidden west side. The former would have been redundant but the latter were left to act as revetments against the steep natural banking. It was probably at this stage that the original wall was heavily mortared, to give it extra strength, and the floor void in between the first and second phase walls also partly infilled with lime mortar for the same reason.

Given the plan form shown on the tithe apportionment map, this firepit was set within a rectangular building, certainly stone-built (Fig. 9). If the depiction is accurate, the building was 6.7m long by 2.5m wide, though this seems too small for the surviving internal imprint on the ground. To support the drying floor, there had to be a system of beams and joists above the firepit. For a kiln these must have been of stone rather than wood. There are several examples within Wharfedale of such joists having been recycled for use as wallheads (Fig. 13) or as decorative features in later buildings (Fig. 14). They tend to be varied in dimension: those shown in Fig. range from 420mm to 780mm in length, from 230mm to 330mm in width and from 140mm to 200mm in depth. All are of sandstone and have the same pattern of carving, with small notches cut into two opposing faces. The notches would have faced upwards when in situ designed to take thin slats – probably of stone – laid vertically, supported by the notches in the parallel joists. Some form of matting, possibly of horse hair, would have been laid across these slats with the grain being spread thinly on it. The hot air seeped between the slats and through the matting to dry the grain. Vents in the roof ridge would have allowed hot air and any smoke to dissipate.



Fig. 13 Wallhead reusing corn drying joists



Fig. 14 corn drying joists

Fuel

No evidence was found within the later phase structure of fuel used.

Drying material

As the bowl floor had been taken out after abandonment no evidence remained of what type of grain had been dried in the later phase bowl. It has to be assumed it was oats for most of the kiln's life, with barley as a further possibility.

11. CONCLUSION

The initial objectives of the excavation were to locate the drying kiln on the ground, to identify its plan form and structural detail, and to obtain dating evidence. The first aim was achieved almost immediately as the parameters of the trench encompassed the kiln in its surviving entirety.

The second aim was achieved to a certain extent. Much of the bowl of the early phase kiln was revealed by excavation, and the line of the remaining sections could be postulated; the presence of an external flue to this bowl was located; and the plan of the second phase kiln was also determined on the ground. On the other hand, the firepit for the early kiln was not found, owing to post-demolition backfill of rubble, and the north wall of the later kiln building could only be hypothesised from the straight edge of the cobbled surface (103) which may have represented the cut for the outer edge of the wall. The wall footings (110), on the south side of the kiln, may have been coeval with either phase of the kiln: it was not on the same alignment as that shown on the tithe map, so it could have been the external wall of the early bowl. As so little is known of these rounded forms, above ground level, no conclusion can be drawn here.

The third aim was not achieved, though it was not expected that the trench would reveal a two-phase structure. The dating procedure failed to provide a date for the last firing of the first phase kiln, so there is no means of determining when the kiln was redesigned and rebuilt. The tithe award confirms that the building was still in use for one purpose or another in 1845, at which time it was occupied by John Inman. He was landlord of the now defunct *Anglers Inn*, and was registered to pay tithes on other properties in Kilnsey, including the brewhouse and the 'old corn mill'. It is therefore possible that he was using the drying kiln not for oats but to dry barley prior to malting.

There is no record of when he gave up the kiln and the dates of its abandonment and demolition cannot be determined.

The excavation, though, has added to the existing (scant) corpus of knowledge of corn drying kilns in the Yorkshire Dales.

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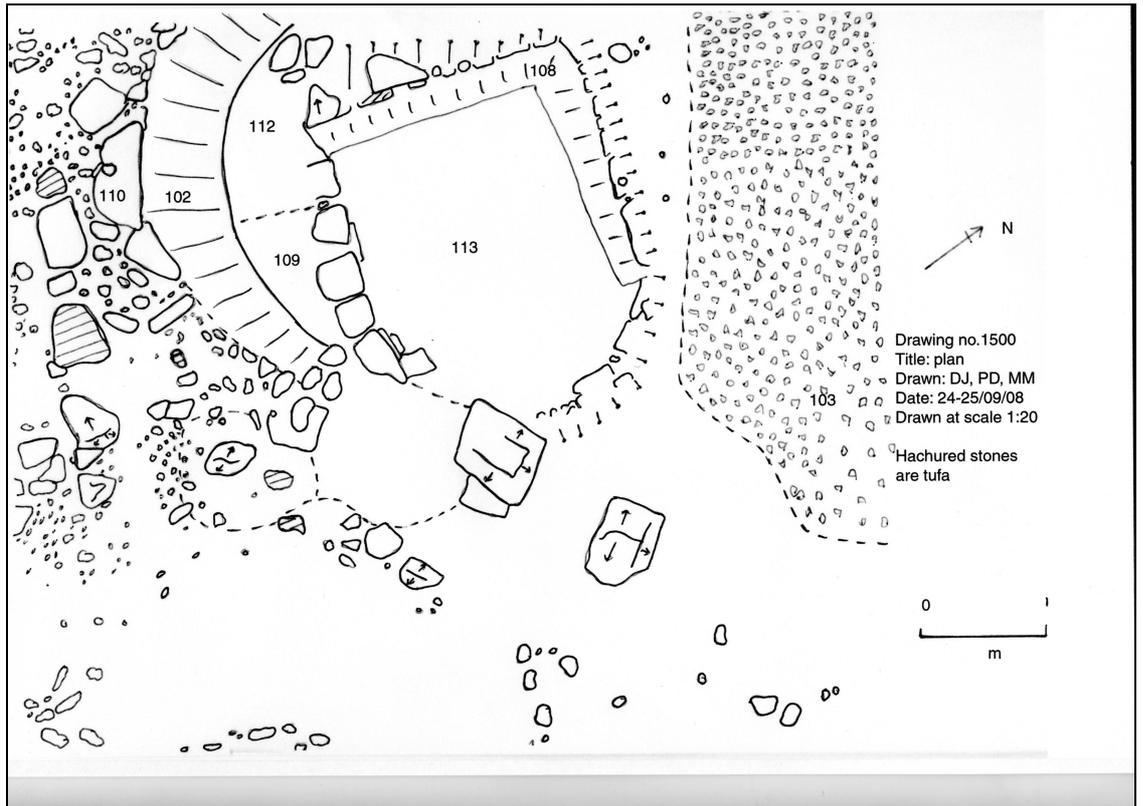


Fig. 9 Excavation plan, reference no. 1500

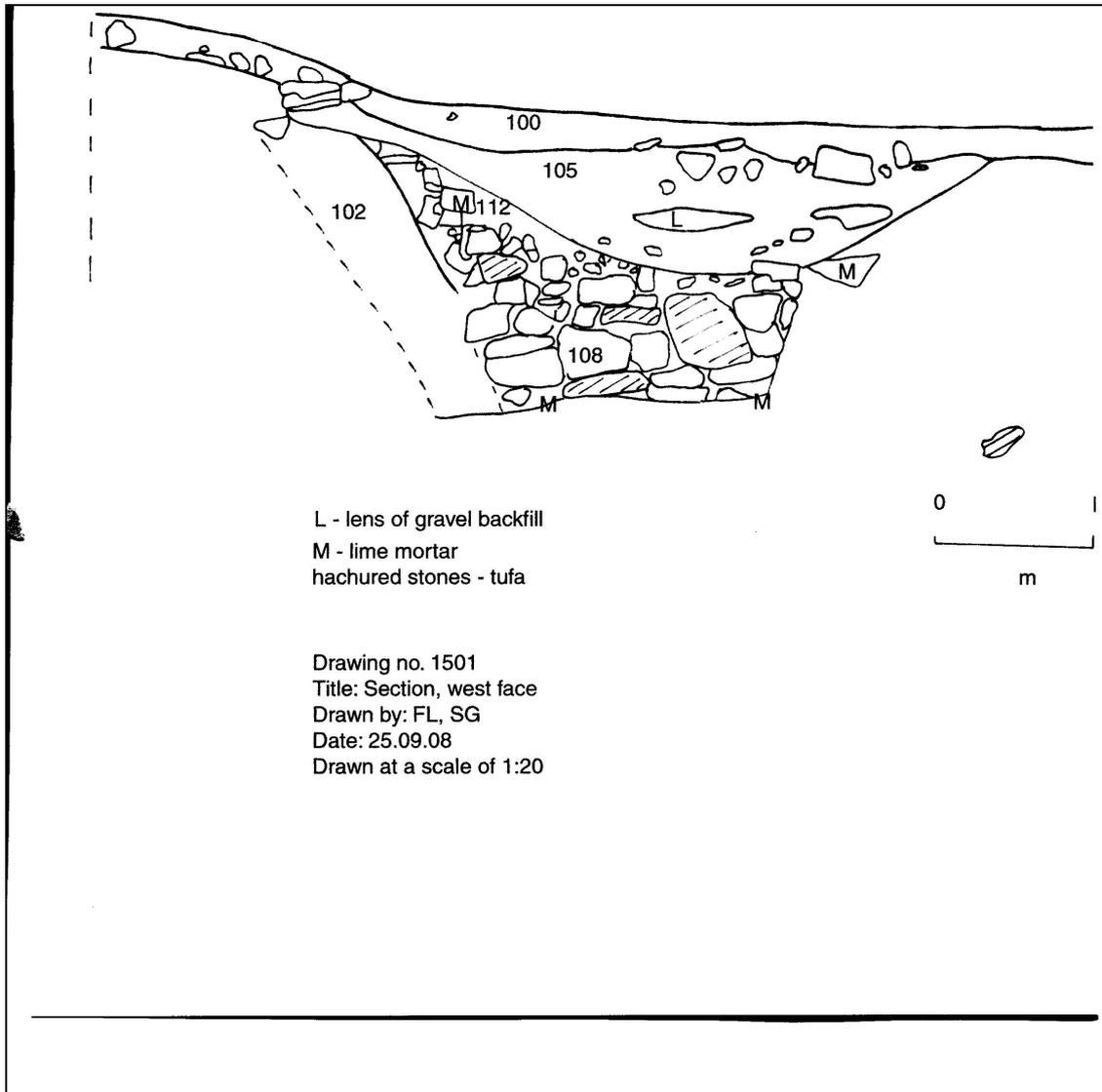


Fig. 10 Section 1501, showing west face of trench

14. APPENDICES

- 14.1. Photographic database (see Excel file)
- 14.2. Context descriptions
- 14.3. Finds database (see Excel file)

14.2. Context descriptions

Key

- | | |
|---|-------------------------|
| 1 | description of material |
| 2 | approximate thickness |
| 3 | above Context |
| 4 | below Context |
| 5 | finds |

Context 100

1. topsoil
2. 80mm – 300mm
3. 102, 103, 104, 105, 110
4. turf layer
5. 100-29, 132-33, 135-37, 139-40, lime mortar, coal, coal shale

Context 101

1. lens
2. 25mm
3. 105
4. 100
5. nil

Context 102

1. south wall of the bowl of the first phase kiln
2. 1.10m – 1.80m
3. n/a
4. 101
5. 130, 134

Context 103

1. cobbled surface
2. n/a
3. natural?
4. 101
5. 131, 138

Context 104

1. stone tumble
2. max 180mm
3. 105
4. 101
5. nil

Context 105

1. post-abandonment backfill
2. max 1.70m
3. 108, 109, natural
4. 101, 104
5. 141-232

Context 106

1. cut
2. n/a
3. natural
4. 102, 110
5. n/a

Context 107

1. flue for the first phase kiln
2. 280mm
3. natural?
4. 105
5. nil

Context 108

1. wall foundations of second phase kiln bowl
2. exposed to a depth of 550mm
3. natural?
4. 105
5. nil

Context 109

1. possible floor level between walls of phase 1 and phase 2 kiln bowls
2. n/a
3. natural?
4. 105
5. nil

Context 110

1. wall footings possibly of the second phase kiln building
2. n/a
3. natural
4. 101
5. nil

Context 111

1. flue passage
2. 650mm as seen during excavation
3. natural?
4. 105
5. nil

Context 112

1. revetment to west wall of phase 2 kiln bowl, between phase 1 and 2 walls
2. 580mm
3. not seen
4. 105, 108
5. nil

Context 113

1. layer within phase 2 bowl
2. not tested
3. natural?
4. 105
5. nil