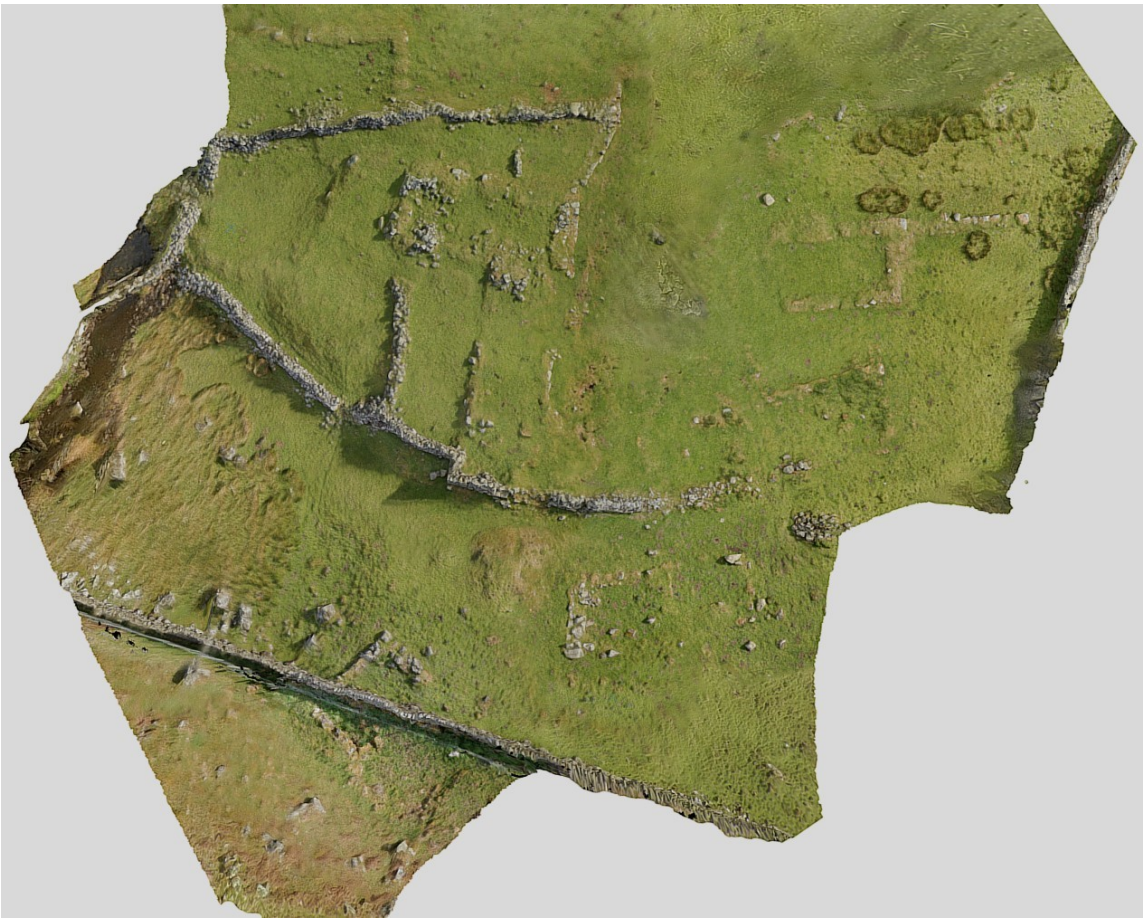
Altogether Archaeology
Digging our heritage in the North Pennines

WELL HEAD DESERTED SETTLEMENT

Holwick, Teesdale

Survey Report, 14th to 20th May 2017



ALTOGETHER ARCHAEOLOGY

Report compiled by Martin Green using survey information prepared by Stephen Eastmead, Stuart White, Pete Schofield (Oxford Archaeology North) and Martin Green. Additional information for the gazetteer by Mike and Chris Powell. Other members of Altogether Archaeology participated in preparation of the surveys and the gazetteer.

Version 2.0 (July 2017)

Site location: NY90812671

Please note: The features described in this report lie on private farm-land with no public access.

Cover image: Photogrammetry image of the core area of the Well Head settlement. Prepared by Stephen Eastmead, using Agisoft software, from multiple photographs of the site.

Contents

1 Acknowledgements 4
2 Introduction 5
3 Historical background 7
4 Handheld GPS survey 9
5 Theodolite survey with Kern tacheometer 12
6 Theodolite survey with disto for distance measurement 14
7 Photogrammetry 17
8 Lidar 21
9 Discussion 22
Survey methods 22
Interpretation of the settlement 24
Conclusion 25
10 References 26
11 Gazetteer of features 27
Key 27
F1 28
F2 29
F3 30
F4 31
F5 32
F6 33
F7 34
F8 35
F9 36
F10 37
F11 38
F12 39
F13 40
F14 40
F15 41
F16 41
F17 41
F18 41
F19 41

F20.....42
F21.....42
F22.....42
F23.....42
F24.....42
F25.....42
F26 and F28.....42
F27.....42
F28.....42
F29.....42
F30.....42
F31.....42

1 Acknowledgements

The volunteers who took part in the survey:

June Abbott, Dot Coe, Liz Cook, Stephen Eastmead, Perry Gardner, Jenny Garrod, Sue Goldsborough, Martin Green, Bill Grigg, Lesley Haley, Pete Jackson, Marilyn Kendall, Malcolm McCallum, Tony Metcalfe, Alan Newham, Rob Pearson, Chris Potts, Liz Pounds, Christine Powell, Mike Powell, Jenny Pritchard, Joan Raine, Liz Ryan, Harriet Sams, Brian Stirk, Janet Stirk, Steve Walker, Stuart White.

Permission to survey at Holwick was given by the Robinson family (Middle Farm) and the Strathmore Estate. We enjoyed the facilities of the Strathmore Arms pub, adjacent to the site. Some equipment was borrowed from the Tynedale North of the Wall Archaeology Group. Stuart White donated the tacheometer and other equipment.

Paul Frodsham gave his professional archaeological advice in a pre-survey planning visit to the site.

Pete Schofield (Oxford Archaeology North) spent a morning with us, flying the site with a drone. The drone photogrammetry images that he produced are shown in Section 7 of this report.

Photos by Liz Pounds and Tony Metcalfe:

- Plotting the theodolite and disto survey
- Flagging out a feature prior to survey
- The 2011 Holwick survey by Altogether Archaeology (AA)

2 Introduction

The Altogether Archaeology (AA) survey of the Well Head (Holwick) deserted medieval settlement (NY90812671) was carried out by volunteers from 15th to 20th May 2017. Holwick lies in upper Teesdale, on the south side of the valley above Middleton in Teesdale. Historically it was in Yorkshire, but, following the boundary re-organisation of the 1970s, is now in County Durham.

Altogether Archaeology (AA) is a community archaeology group arising out of a Heritage Lottery Find sponsored project from 2010 to 2015, managed by Paul Frodsham at the North Pennines AONB. Since 2015 the group has been an independent community organisation run by its volunteer members, though using professional advice and professional supervision for excavations. The many archaeological projects that the group has carried out since 2010 are listed on the group website, altogetherarchaeology.org, where reports can be found.

The aims of the survey were:

- to familiarise volunteers with a range of options for surveying an archaeological site
- to gain practical experience in carrying out a high-quality survey
- to assess the state of preservation of the Well Head deserted settlement and the risks to it
- to gain further insight into the form, possible date, and use of the Well Head settlement
- to explore the relationship between the settlement and other nearby settlement sites
- to fulfil the recommendations in the 2011 Holwick survey report that the Well Head settlement should be surveyed to allow comparison with the other similar settlements in Holwick (see Historical Background section below)
- to familiarise many of the members of AA with this and nearby sites
- to prepare for possible future limited excavation of the settlement by AA

The nearby Holwick Scars settlement, 200m to the south-east and on higher ground beyond the head-dyke wall, was also surveyed. The report (Eastmead 2017) of this GPS survey can be found on the Reports page of the AA website: 'Holwick Scars Scheduled Monument 1019458 - GPS Survey 17 May 2017'

The Holwick Scars site is a scheduled monument, whereas the Well Head settlement site is unlisted.

Those taking part were familiarised with a variety of different archaeological survey methods and had the opportunity to take part in surveying using several of these methods. The methods used were:

- Handheld GPS survey of the field boundaries and features (supervised by Stephen Eastmead)
- Theodolite survey using Kern tacheometer of the field boundaries and peripheral features, with partial contouring of site (supervised by Stuart White)
- Theodolite survey, using basic theodolite with a disto for distance readings, of the central area of the site (supervised by Martin Green)
- Photogrammetric models derived from multiple photographs of features taken with a pole camera (by Stephen Eastmead)
- Drone camera survey of the site, using professional-grade GPS to establish fixed co-ordinates (by Pete Schofield)
- Compilation of a gazetteer of features with photographs and descriptions (Mike and Chris Powell, and Stephen Eastmead)

Such a range of techniques would not normally be used on a single site, but the intention was not just to achieve a plan of the site, but to practice different methods, giving the chance to gain experience and to examine the site in as many ways as possible. Much of the benefit of carrying out a survey is the stimulation it gives to look carefully at, think about, and discuss the site. The survey methods agree with each other within their limits of accuracy, but highlight features of the site in complementary ways; however, there is some inevitable duplication of information.

Each of the survey methods and results are discussed in turn in this report.

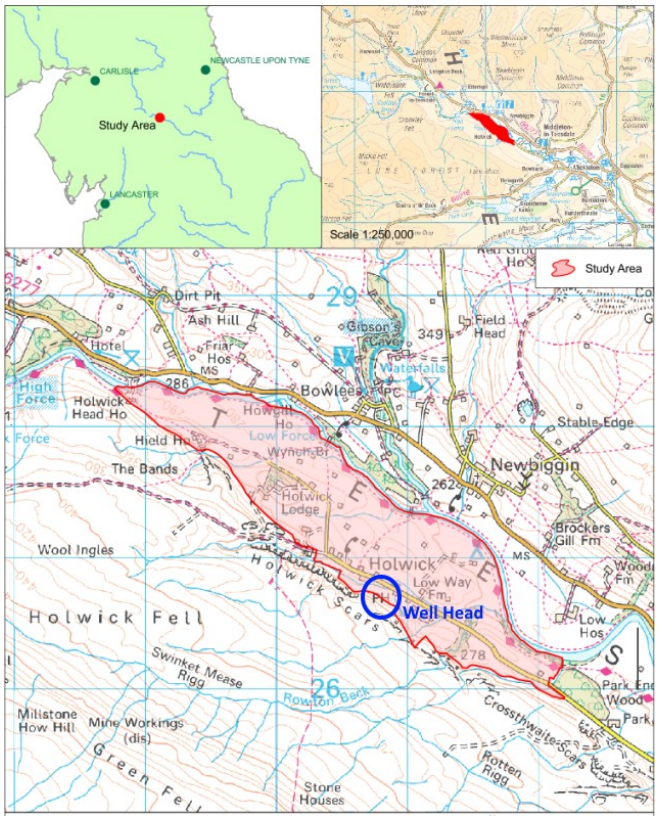


Figure 1: Location map of Well Head. The 2011 survey area is shaded in pink.
Map taken from Schofield and Quartermaine (2011): Oxford Archaeology North.
Map data © Crown copyright

3 Historical background

A 2011 AA project, managed by Oxford Archaeology North, surveyed 2.35km^2 of the valley floor at Holwick. The report (Schofield & Quartermaine 2011) is available on the reports page of the AA website. A Level 1 survey of the area was performed by volunteers to locate features. Several of the sites (including three deserted medieval-type settlements) were then surveyed in detail (Level 3), using theodolite and GPS. The report of the 2011 survey gives the archaeological and historical background to the project. Level 1 and Level 3 surveys are defined and interesting examples are given in Ainsworth (2007).

There is a line of deserted settlements along the southern edge of the valley floor at Holwick, adjacent to the wall separating the in-bye land from the rough moorland pastures. There are also higher settlement sites (several investigated by Coggins, see 2011 report for references); dating evidence shows that these were in use at various times from the Bronze Age to the medieval period. In some eras, they may have acted as summer farms (shielings) for the valley-floor settlements. The valley floor was intensively ploughed medievally, hence evidence of prehistoric settlement there may have been lost. However, an enclosed settlement of round houses survives near the Wynch Bridge, and there is a possible Iron Age enclosure with round house near Holwick Head.

In the report of the Holwick 2011 survey, Jamie Quartermaine describes Well Head as "a deserted medieval hamlet" with the remains of at least three multi-celled longhouses, yards/enclosures, and four further agricultural buildings. There is a further part of the settlement on the other side of the stream, but in the same field; there was a cow-house here on the 1826 map. Two green lanes (peat-track and/or access to shielings) ascend up on to the rough fell pasture from the settlement.

Available maps are shown in the 2011 report, page number references are to that report:

A plan of circa 1820 (DRO D/Wat P/88, page 19, plate 6): shows a cow byre close to the road, approximately at the location of F2 in the present survey. The tumbled field walls crossing the field are shown and there is a structure close to the spring roughly corresponding to F6, F7 and F17 (the central core of the settlement).

A plan from 1800 to 1820 (D/St/P4/4/11, page 26, plate 10): in this the cow byre is absent, but a structure corresponding to F7 is present, as are some of the tumbled walls.

A plan of 1826 (page 93, figure 4): this shows the cow byre at F2, but no other buildings.

The Ordnance Survey 6-inch map of 1857 (page 95, figure 5): this shows a possible building at the location of the cow byre and the tumbled field walls, but no other buildings.

The Ordnance Survey 25-inch map of 1897 (page 97, figure 8): this shows the tumbled field walls crossing the site, but no buildings.

None of these plans show a second building north of the burn as found in the present survey (F1, F2), nor the rectangular buildings (F5, F8, F9, F10, F12, F13) around the centre of the settlement.

The 2011 report cites the one other item of documentary evidence concerning the site: that in a 1607 lease a tenant of Well Head was due to pay 7 shillings land rent.

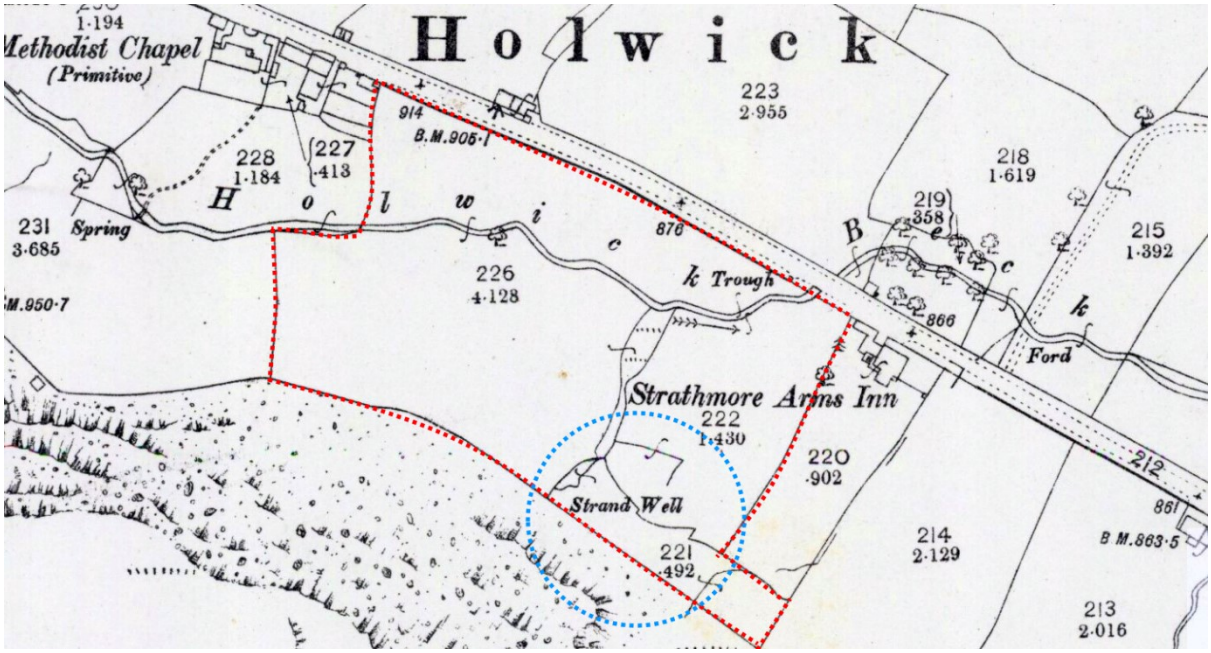


Figure 2: Ordnance Survey 25 inch map (1897)
The field surveyed by GPS and Kern theodolite is marked in red.
The core (southern) part of the settlement surveyed by theodolite with disto is marked in blue
Reproduced with the permission of the National Library of Scotland

4 Handheld GPS survey

This survey used a high-quality handheld GPS unit, the type used by walkers for navigation. These units have the advantage of being only a small fraction of the cost of professional GPS surveying GPS units, but their accuracy is far inferior (a position uncertainty of around 4 metres, compared to a fraction of a metre for professional units). However, with care and by applying special techniques the accuracy of handheld units can be improved, though still falling short of a professional unit (or of the much slower theodolite surveying). This makes it possible for useful archaeological surveys to be done using handheld GPS units, with the great advantage that they are suitable for use over large areas, are rapid in data collection, can be used in rough terrain, and don't depend on different parts of the site being visible from each other. Of course, the technique wouldn't be useful inside buildings or under dense tree cover. Care is also needed in converting between the WGS84 co-ordinate system (as used by GPS) and the OSGB36 system (as used by the Ordnance Survey); the co-ordinate transform can easily introduce errors of greater than a metre.

A description of the technique is given by Eastmead (2015). At the Well Head settlement, the technique was used to map all the features. The resulting plan is shown below, followed by larger scale plans of the northern and southern parts of the settlement.

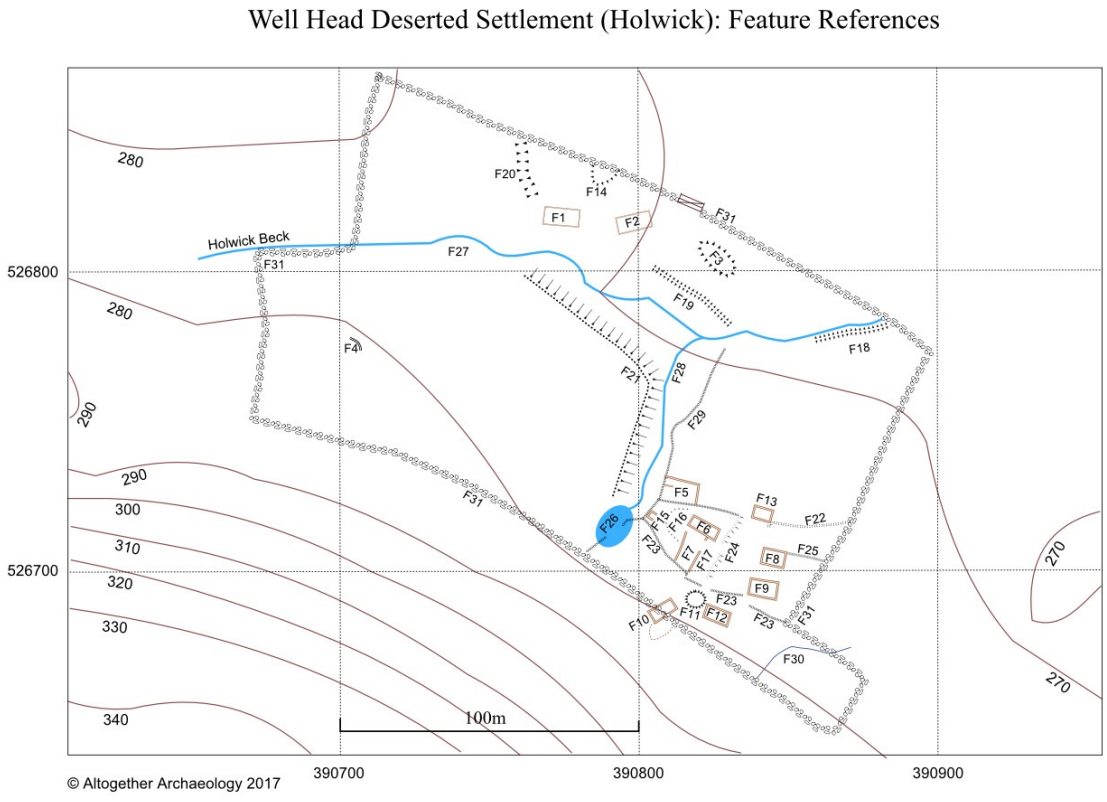
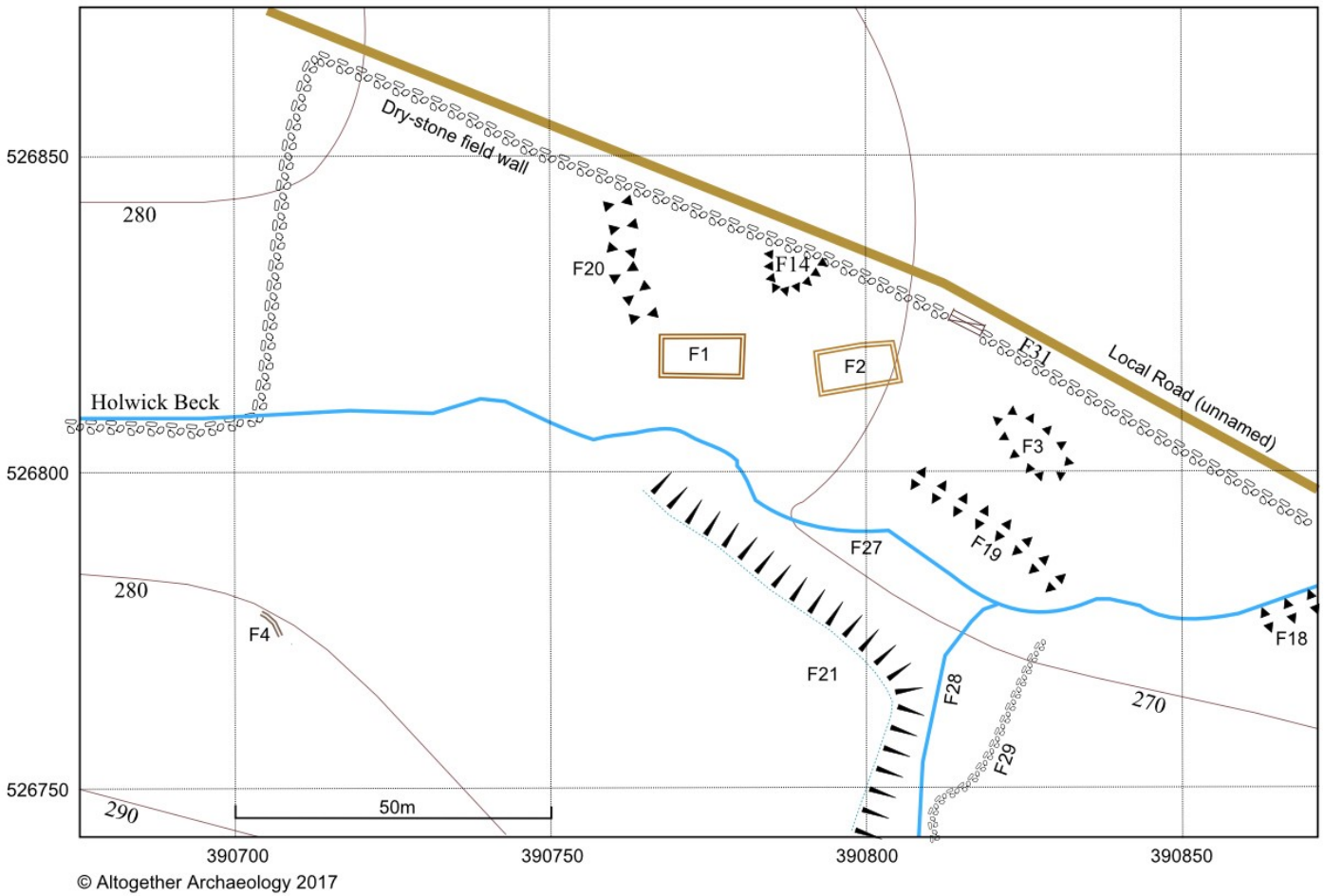


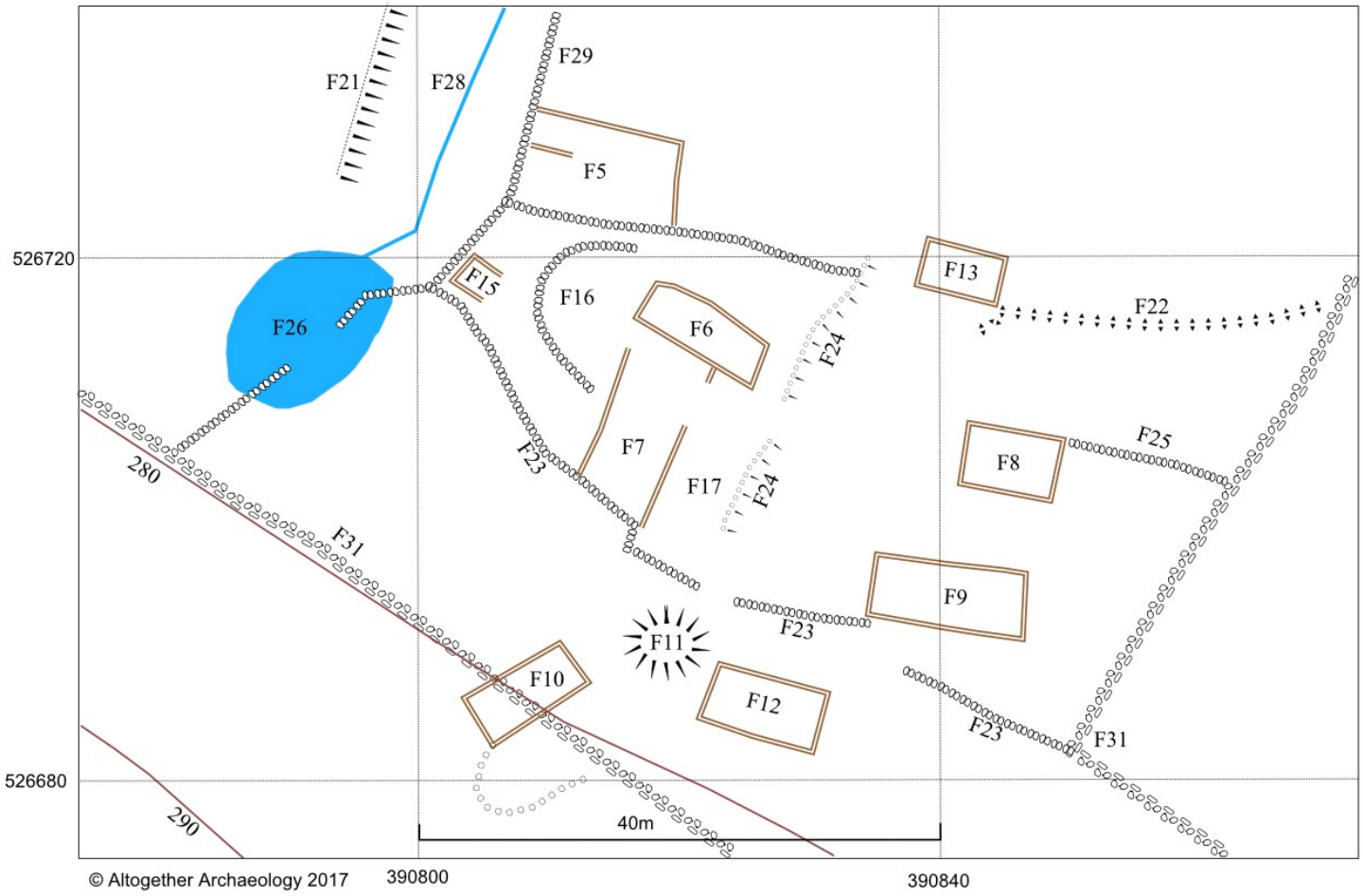
Figure 3: GPS handheld survey of whole site. Contours from Ordnance Survey data. See the gazetteer for a description of the numbered features.

Figures 4 and 5 (next two pages): Enlarged parts of this plot, showing the northern and southern parts of the site

Well Head Deserted Settlement (Holwick): Northern Section



Well Head Deserted Settlement (Holwick): Southern Section



5 Theodolite survey with Kern tacheometer

A theodolite measures the horizontal and vertical angles between the point of interest and a fixed reference point. To work out the location of the point of interest fully, its distance from the theodolite must also to be measured. Traditionally this was measurement was by a chain (later a tape-measure) stretched out between theodolite and object. However, this is slow and cumbersome, particularly where the ground is broken or covered in high vegetation, or the object is far from the theodolite. To speed the process, the Kern tacheometer is a theodolite that uses an optical method to measure the distance.

At the object of interest, one member of the surveying team holds a levelling staff graduated in centimetres; this is similar to staffs used when measuring heights with a dumpy level. The telescope of the tacheometer has two cross-hairs, set vertically one above the other. The operator reads the separation (in centimetres), as seen on the levelling staff, of the two cross-hairs. The angle between the cross-hairs is read off the instrument. Using these pieces of information, the distance to the staff can be calculated: for a given angle between the cross hairs, the separation on the levelling staff will increase as the distance increases between tacheometer and staff.

In practice, the readings are entered into a spread-sheet for each point of interest and the calculations are performed automatically to give points which can be plotted on to a plan later. Since the vertical angle is measured, this method can be used to calculate heights as well as locations: hence it can be used to generate contours of ground surface as well as plans of features.

Its accuracy, around 0.5m (depending to some extent on distance), is better than handheld GPS. However, the tacheometer is slower than GPS in taking readings and is less easy to use in wet conditions. If all parts of the site are not visible from one station, the instruments has to be moved between stations, with the parts of the survey linked together by surveying the positions of the stations from each other. In practice on the Well Head site, 4 stations were used (marked A, B, C and D on the plan) although most of the readings could be taken from a single station. The instrument is capable of accurate readings over more than 100m so wide separation of the stations is not a problem.

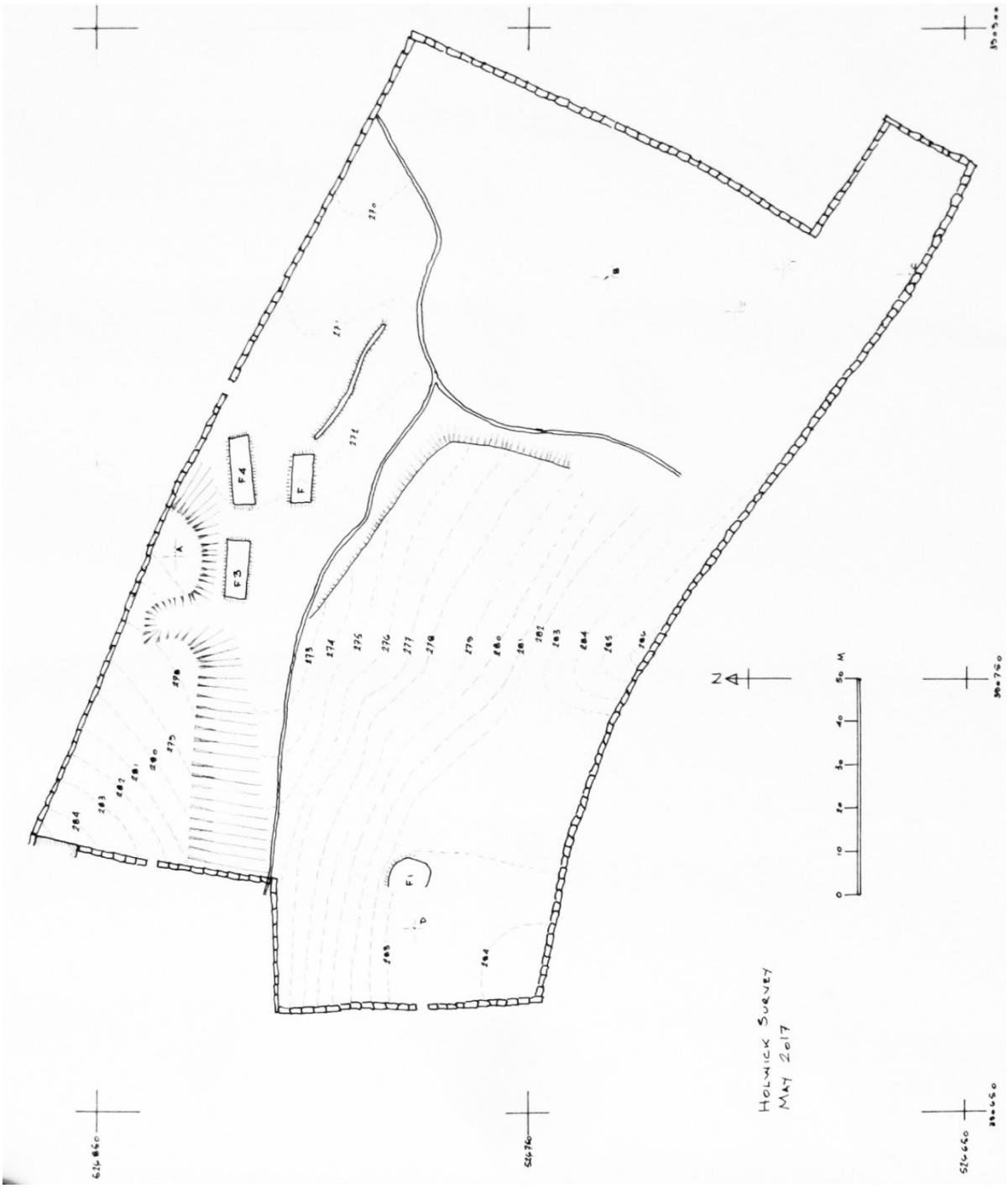


Figure 6: The theodolite with Kern tacheometer survey plan (omitting the core area).
Plan drawn by Stuart White

6 Theodolite survey with disto for distance measurement

As described in the previous section, traditional surveying with a theodolite necessitates the cumbersome measurement of distance by a chain or tape measure. Substituting a disto for a tape streamlines this process. The disto is a laser distance-measuring unit, as used by estate agents when measuring rooms in houses. It is mounted on top of the theodolite and gives a reading of the distance between theodolite and object of interest. At the object, a member of the surveying team holds a flat white target with a central cross. The theodolite operator aligns the theodolite on the cross, reads the horizontal angle then reads the distance of the target with the disto. The horizontal angle is read from the main scale to the nearest half degree, not using the fine scale to keep the process simple and quick.

An advanced type of disto is used which automatically corrects for the vertical angle, so that the reading it shows is the horizontal distance between theodolite and object of interest. No vertical angle needs to be read off the theodolite.

The two readings (horizontal angle and horizontal distance) are noted for each point and can be plotted later to create the plan. In practice, since no calculations are needed, the readings can be plotted by a member of the team as they are taken, producing a plan as the survey proceeds. Plotting is done using a protractor pinned to a sheet of drawing film on a drawing board, with a ruler attached to the protractor to measure the distance.

Prior to measuring the points, the feature being surveyed is “flagged out”: small flags are put in at each point where a reading will be taken This process is partly to speed the surveying, so all members of the team know what lines are to be surveyed. It also forces the whole team to think about the nature of the feature and which elements of it require recording to produce a meaningful plan.

The plan produced in this way is checked against the features on the ground to correct any uncertainties and add hachures and other annotations. This can be done immediately without having to revisit the site (an advantage over surveying methods in which the plan is drawn off-site at a later time). The plan is later scanned or photographed and the image imported into a computer vector drawing programme (DrawPlus) so that it can be traced and a clean digital version produced.

This method is comparatively simple and so can be used by volunteers with no surveying experience. Its accuracy is good enough (about 0.2m) to plot the sides of walls and banks separately to show their thickness. It is fast enough for several archaeological features to be planned in a work session (about 100 points an hour to survey and draw), although not as fast as GPS surveying. A team of about four people is needed if the plan is drawn as the points are taken; therefore it needs a larger team than other methods.

A major limitation is that it can only be used within a 25m radius of the theodolite. This is because the disto is unable to work reliably beyond that distance (especially in sunny conditions) and also because the angular uncertainty of a quarter of a degree (introduced by only reading angles to the nearest half degree) increases, as a distance on the ground, in proportion to distance. At 25m distance, a quarter of a degree represents 0.11m, hence at greater distances this error would become unacceptable. The error in the disto reading is much smaller, and less than the error due to deviations from vertical of the target.

The limitation to a 25m surveying radius means that the theodolite must be moved between several stations to cover even a moderate area. Each move to a new station requires time to set up the

instrument again, makes it necessary to take back readings to a previous station, and increases the errors in the plot. For the Well Head survey, this method was used to produce a detailed survey of the core area of the settlement; six stations were needed to survey the 80m x 80m area.

Hence the theodolite plus disto method is a straightforward way to produce accurate plans of small areas, but not suitable on sites larger than the Well Head core area (80m x 80m) due to the need for many changes of station. It could not be used, for instance, to survey the whole of the Well Head site, as done by the GPS and the Kern tacheometer surveys. It is also limited by being unusable in wet conditions and by the lack of height measurement, so contouring is not possible. A dumpy level has to be used separately to measure the elevation of features (as was done for the Well Head core area).

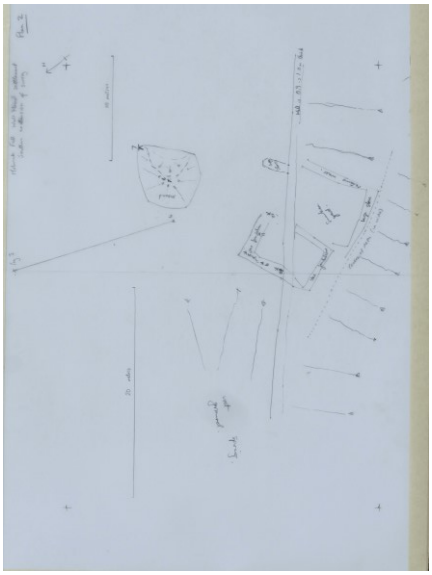


Figure 7: Theodolite and disto survey of core area of Well Head settlement: raw plans. These are the two overlapping plans produced on site. They were checked on site for accuracy and to have hachures and other annotations added. A cleaned-up version is shown in the next figure. Height measurements, measured by a dumpy level, are included on these plans.

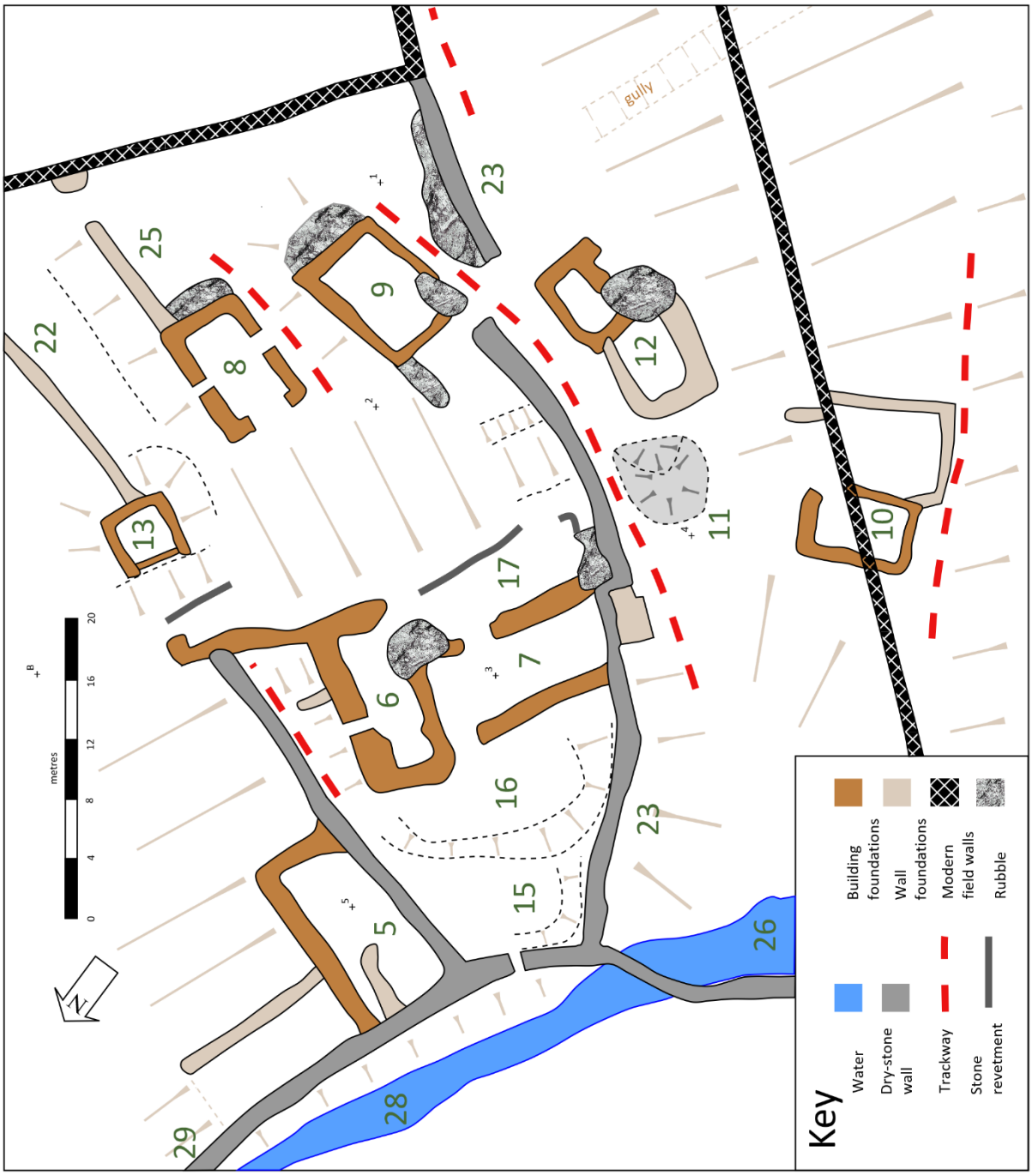


Figure 8: Theodolite and disto survey plan of core area of Well Head deserted settlement. This plan is of the same part of the site as shown in Figure 5, the plan of the southern section of the GPS survey.

7 Photogrammetry

Photogrammetry is a technique which is increasingly replacing traditional site surveys, and can also be used to record archaeological excavations. Examples of its use can be found on the AA website and on eastmead.com. It has the advantage of producing rapid, high accuracy surveys.

Multiple overlapping photographs are taken of the site using a normal digital camera, a specialist camera is not required. These are then combined in the computer to produce a 3-dimensional model of the site. The program works out where points on the photographs are in 3D-space, joins them together to form a 3D-surface representing the site, and then uses the colour information from the photographs to "clothe" the 3D image in the correct colours.

For publication and to produce scale-correct plans, the 3D models can be reduced to 2D views of the site; thus a view vertically downwards gives the equivalent of a plan. If required this can then be traced to produce a traditional drawn plan with interpretation.

To locate the plan in the OS co-ordinate system and to establish the correct scale, there must be identifiable fixed points in the image whose location/separation are already known.

Considerable computing power is needed; the average laptop takes several hours to process 40 photographs into a photogrammetry model (this is roughly the number of photographs needed to record an archaeological trench). For large sites, it may be necessary to split it into sections which are processed separately and then the models later combined. The software normally used, Agisoft, requires purchase of a licence.

Photogrammetry of features on the Well Head site was performed by Stephen Eastmead with a camera fixed on a pole to take the necessary overhead images. The vertical photogrammetry images produced are shown in the gazetteer and (for the core area of the settlement) on the cover of this report. It is important to realise that although these images appear to be single photographs taken from above, they are actually computer produced "isometric" images that don't have the perspective and lens distortions that a normal photograph taken from a single point would have.

Photographs were also taken of the site by Pete Schofield (Oxford Archaeology North), using a helicopter drone. Before the flight, marker pegs on the ground were measured using professional-grade GPS to fix the position of the images. He processed the resulting photographs to give a photogrammetric model of the site. Three views of this model are shown below: a vertical isometric view of the whole site, a hill-shaded vertical view of the whole site and a micro-contoured plan of the core area of the Well Head settlement. North is to the left in these images.

Figure 9: Drone photogrammetry: vertical isometric view of site.
By Pete Schofield (Oxford Archaeology North).

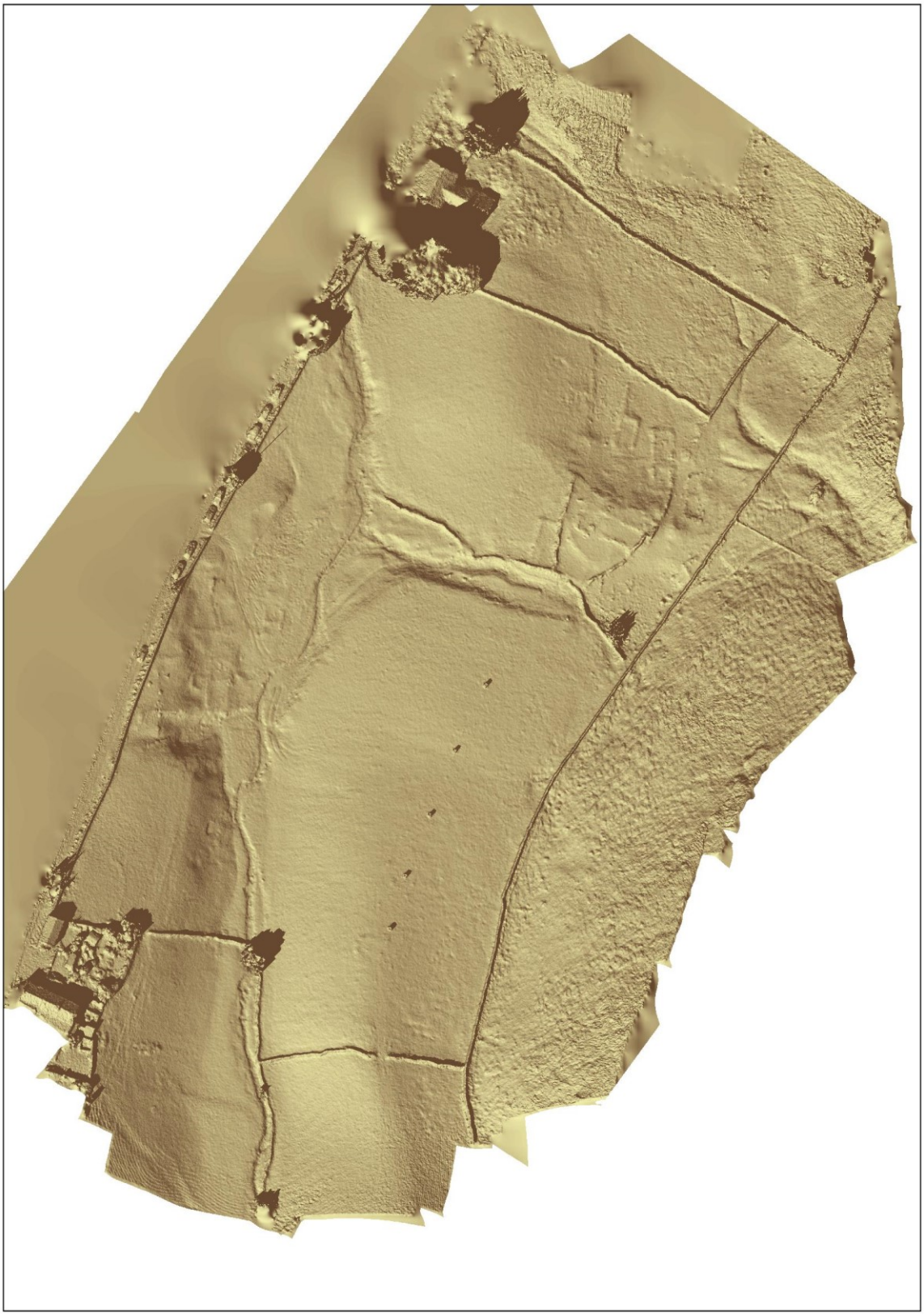


Figure 10: Drone photogrammetry: hill-shaded isometric view of site.
By Pete Schofield (Oxford Archaeology North).

Figure 11: Drone photogrammetry: core area of site, contoured at 20mm intervals
By Pete Schofield (Oxford Archaeology North).

8 Lidar

Lidar data for the area is available free of charge from the Environment Agency website. This has a resolution of one metre, so is not capable of showing detail of any of the features, and hence is not a replacement for other survey methods. However, it is does have sufficient resolution to show trackways and cultivation ridging well, and provides a good impression of the general topography of the area. See the AA website (Lidar page) for information about the processing and use of lidar images; lidar images for all of the North Pennines and surrounding area can be downloaded from the website. A lidar image for the site is shown below; a rotatable 3D lidar image of the site can be seen on the AA website (3D page).

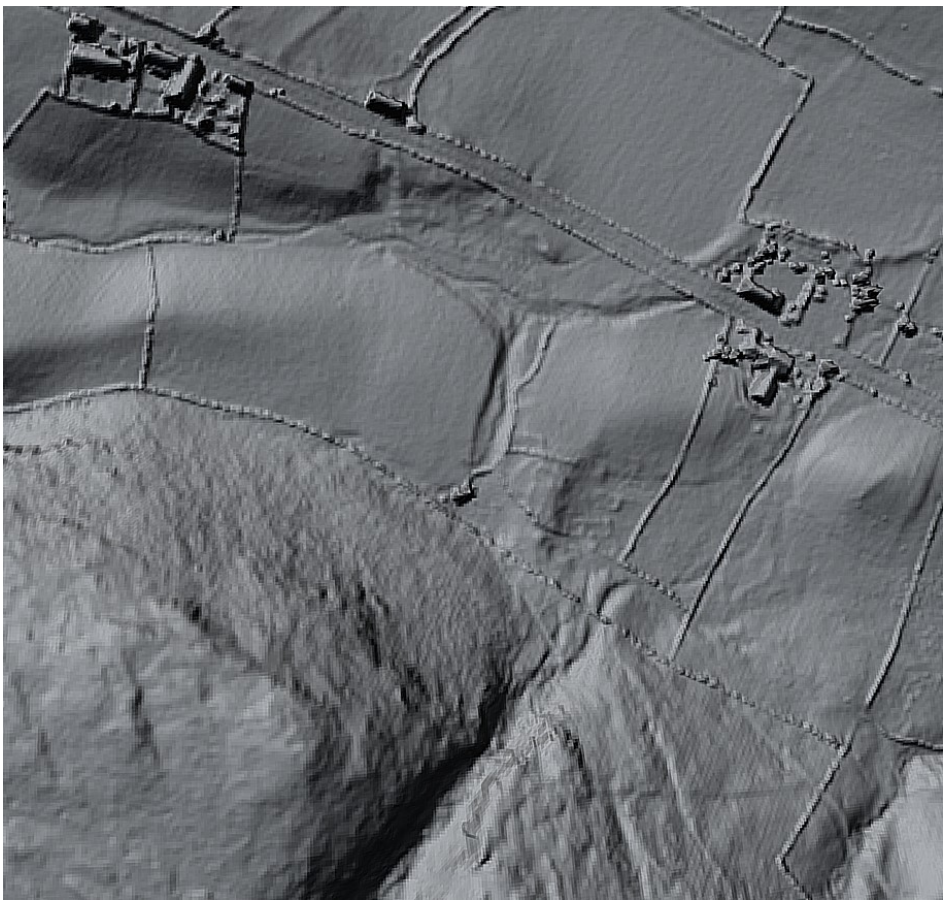


Figure 12*:* Lidar image of the Well Head settlement. Note the tracks leading up from the settlement on to the higher land. *Image processed by Stephen Eastmead.*
Lidar information © Environment Agency copyright and/or database right 2017.

9 Discussion

Survey methods

The multiple survey methods used have resulted in multiple plans of the same site, derived and drawn in different ways. To show that they are all useful representations of the site, they can be overlaid on the aerial view of the site shown in Google Earth.

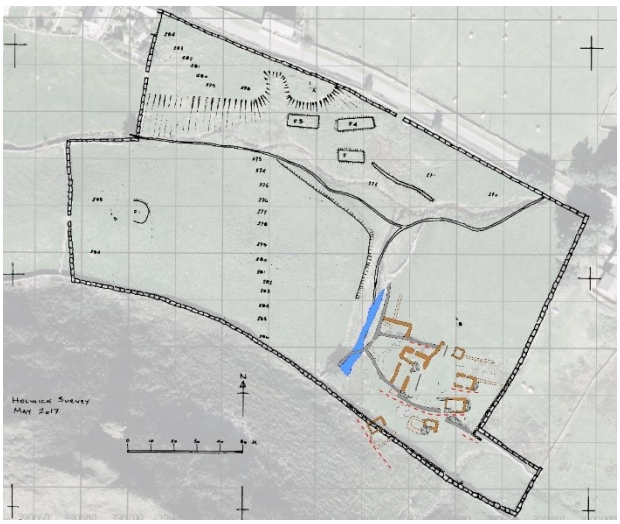


Figure 13: The two theodolite surveys (with Kern stadiometer and disto) superimposed on Google Earth images and OS gridlines (these are uncorrected for co-ordinate transformation errors).

Figure 14: The theodolite with disto survey of the core area superimposed on Google Earth image.

The advantages/disadvantages of the various surveying method in summary are:

Method	Advantages	Disadvantages
Handheld GPS	Provides a plan in OS co-ordinates. Rapid. Needs only one or two people. Accuracy (1m) good enough for showing shape of features. Suitable for any area size, even if rough or vegetated Equipment light to carry to remote or rough areas.	Plan production needs careful post-survey computer work. Height information inaccurate so not suitable for contouring. Cannot be used under tree cover or in buildings.
Theodolite/stadeometer	Only needs two or three people. Suitable for moderately large areas (100m+) even if rough or vegetated. Accuracy (0.5m) good enough for showing shape of features. Able to produce height/contouring information.	Plan needs known fixed points to relate to OS grid Equipment hard to carry over rough ground. Requires some operator skill.
Theodolite/disto	Simple and intuitive, needing no knowledge of maths or computing. Equipment cheap. The plan can be drawn during the surveying. High accuracy (0.2m) so finer details of features (e.g. wall width) can be plotted.	Plan needs known fixed points to relate to OS grid Needs about four people Not usable in wet weather. Can only survey only in a 25m radius of theodolite, so suitable only for sites well below 100m. Does not give height information.
Photogrammetry	Only needs one person. Only short time on site needed to gather photographs. Produces a 3D model which aids appreciation of the topography of site. The accuracy is very high, better than other survey methods, and it gives the most realistic representation of the site.	Needs known fixed points to relate to OS grid and establish scale. Needs a lot of computing time on a powerful computing system, even for relatively small areas; large areas (100m+) are likely to be too much for amateurs' computers. To produce an interpreted plan, the photogrammetry image must be traced. Needs dry weather and is sensitive to light conditions.

It should be noted that a professional system allows much greater accuracy than handheld GPS and is far faster to use than the older theodolite technology.

In the future, amateur archaeologists will probably change to using cheap second-hand professional equipment as it increasingly comes on to the market. However, there may still be a role for handheld GPS in rough and/or remote areas where its lightness and small size will give it the advantage.

Whatever the method of surveying, it remains important to think about what is being surveyed: what aspects of it need recording and what are just "noise" and not significant.

Interpretation of the settlement

Discussion of the features of the deserted settlements along the side of the valley floor, including Well Head, can be found in the report of the 2011 survey (Schofield and Quartermaine 2011).

Well Head is sited in a classic settlement site on raised ground beside a spring and watering place. On one side of it is the good in-bye land of pastures, hay meadows and arable fields. On the other side are the steep slopes and crags leading up to moorland and high, rough pasture. This would have provided summer grazing for livestock, hunting areas, and peat for burning.

Linking the settlement to the higher ground are tracks running diagonally up-slope south-eastwards. One of these tracks leaves the settlement beside F10, a building in the south of the settlement. Another track, the one leading past the Holwick Scar settlement, runs parallel to this track, but a little to the east (see lidar image). The lower end of this track, where it enters the settlement, is obscured by debris from a natural chute in the crag. Inside the settlement there are trackways, seen as hollow ways, running between the buildings (see theodolite with disto survey plan of the core area on which tracks are marked in red).

In the centre of the settlement, at the summit of a hillock, are two single-celled rectangular structures at right angles to each other (F6, F7). Unfortunately, tumbled field walls and debris obscure part of these foundations. F6 is a rectangular building, probably a long house. F7 is also rectangular, and may be a building or enclosure. Its NW wall is slightly curved and its SW end is obscured by the overlying tumbled later field wall, in addition it has a different orientation to the other rectangular structures. Hence F7 is not typical of the long-houses in the settlement. To the NW of F7 are two platforms lower on the slope (F15, F16). These may have been yards or formed the base of less permanent structures. F17, to the SE of F7, is rectangular platform, similar in size to F7; its eastern side is a wall revetting the slope, not a wall foundation.

Around this central core are the foundations of six rectangular buildings (F5, F8, F9, F10, F12, F13), all (except F10) roughly sharing the orientation of F6. Some are single-celled. However, F9 and F12 may be two-celled and F12 has a western section in a scoop and an eastern section with the alignment slightly different (although debris obscures part of the structure). The western end of F13 has been lost in debris from a steep earth slope. If its extent to the west was as far as the remains of an abutting wall, then it was roughly the same size as the other rectangular structures. Only F6, F7, and F8 have clear entrances: these are in their long sides. However, care need to be taken in identifying entrances as ongoing movement of cattle across the site may have created gaps in the ruined walls. F10 has an attached yard, revetted by stone walls, to its east. F5 has a flat platform attached to its north side which may also have been a yard.

The building F10 lies underneath the current wall at the edge of the in-bye land, so the location of this "head-dyke" is not the original one. It does show that the settlement was at least partly out of use

when the post-medieval system of dry-stone walls was built. Map evidence (see Section 3) also shows that by 1800 the settlement was largely deserted with stone field walls built across it (now mostly tumbled) and only two remaining buildings; a cow byre north of the burn (at F2) and rectangular structures in the core of the settlement (F6 and F7), although it is not clear if these were ruined or still in use. By the middle of the 19th century there were no structures apart from field walls.

To the north of the burn are the foundations of two buildings. F1 is a two-celled long-house, which is longer than those in the core settlement. The other building (F2) is probably also larger than the core settlement buildings, but interpretation is difficult as one side has been obliterated by farm vehicles and lies in wet ground near the burn. A platform, F14, lies at the top of the slope to the north of these two buildings and there is an old track, F20, to their west which leads down to the watering place on the burn and provides access to these buildings. (the modern road to the north of them is only two hundred years old).

The only feature to the west of the main settlement is F4. The nature of this is unclear as there are only fragmentary remains. It may have been a structure, or just the product of field clearance. The lack of features in this area is probably due to the ridge between the burn and the crag having been ploughed, as evidenced by the "clean" appearance on lidar images.

The date of the tumbled field walls running across the settlement is unclear. They were clearly built after the settlement had gone out of use, but appear to be older than the current field walls surrounding the field in which the settlement lies. The layout of the walls suggests that they were stock enclosures and intended to control access to water sources. The "stepped" gap in the tumbled wall beside F9 may have been to control stock descending from the moors. One of the walls, F22, is only seen as foundations and may be older: it appears to be the boundary between the settlement and agricultural land to the north. There is no clear straight route through the settlement for stock movement between in-bye land, byres in the settlement and the moorland. This may be because of the steepness of the slopes necessitating zig-zag tracks, and the location of the core of the settlement on a hillock discouraging through traffic.

Some of the eastern side of the settlement may have been obscured by debris and water coming down the chute through the crags, and by the ploughing of the field behind the Strathmore Arms. This field, immediately to the east of the field in which the settlement lies, has a ploughed appearance and any tracks through it or building foundations will have been lost. The field is interesting in that it does not stretch as far as the head-dyke, suggesting that it is a later enclosure, carved out of the settlement field.

A small mound, F11, is located in the southern part of the settlement. There is a scoop quarried in to one face. It is unclear if this is a natural feature, or is a constructed cairn.

Conclusion

In summary, the survey identified the foundations of ten rectangular structures, mostly aligned roughly east-west. The core of the settlement is centred on a natural hillock, with a circle of buildings around it and two further buildings to the north of the burn. Only a few of them have identifiable entrances, where these do occur they are in side walls. Most of the buildings are simple single-celled structures. Associated with them are at least six platforms which probably functioned as yards or held less permanent structures. Associated with the settlement are tracks passing through the head-dyke, running diagonally up on to the high land. There is a nearby watering place for livestock.

The site is complex enough for there to be undoubtedly several phases of construction. The central hillock with F6 and F7 on top may have been the original nucleus of the settlement, with other buildings constructed around it later. It would have been a good site to establish a farmstead with views of the surrounding fields, a nearby spring, enough flat ground for a house or two to be built, and would have been drier than the lower land around. As the settlement grew, the hillock would have been extended by construction of platforms to increase the usable flat land on it (F15, F16, F17). When the need arose for further buildings, these were built in a haphazard way (apart from sharing a common alignment) on the lower slopes of the hillock in a circle around the original nucleus.

The buildings are typical of the medieval period, suggesting that the settlement was in use in use about 750 years ago. It seems likely that it was in use for several centuries as it is a complex site, clearly more than just a single farmstead. Only excavation can give a better idea of when the settlement was established, how it developed, and when it was abandoned.

10 References

Ainsworth, S. 2007 *Understanding the Archaeology of Landscape*, English Heritage, available at https://historicengland.org.uk.

Eastmead, S. 2015 *Landscape Surveying using Handheld GPS Receivers*, ISBN 978-1-4710-6296-4, Swaledale and Arkengarthdale Archaeology Group, available from lulu.com.

Eastmead, S. 2017 *Holwick Scars Scheduled Monument 1019458 - GPS Survey 17 May 2017*, Altogether Archaeology, available at https://altogetherarchaeology.org.

Schofield, P. and Quartermaine, J. 2011 *Holwick, Upper Teesdale, County Durham: Community Archaeology Survey,* Report 2010-11/1195, Oxford Archaeology North, available at https://altogetherarchaeology.org.

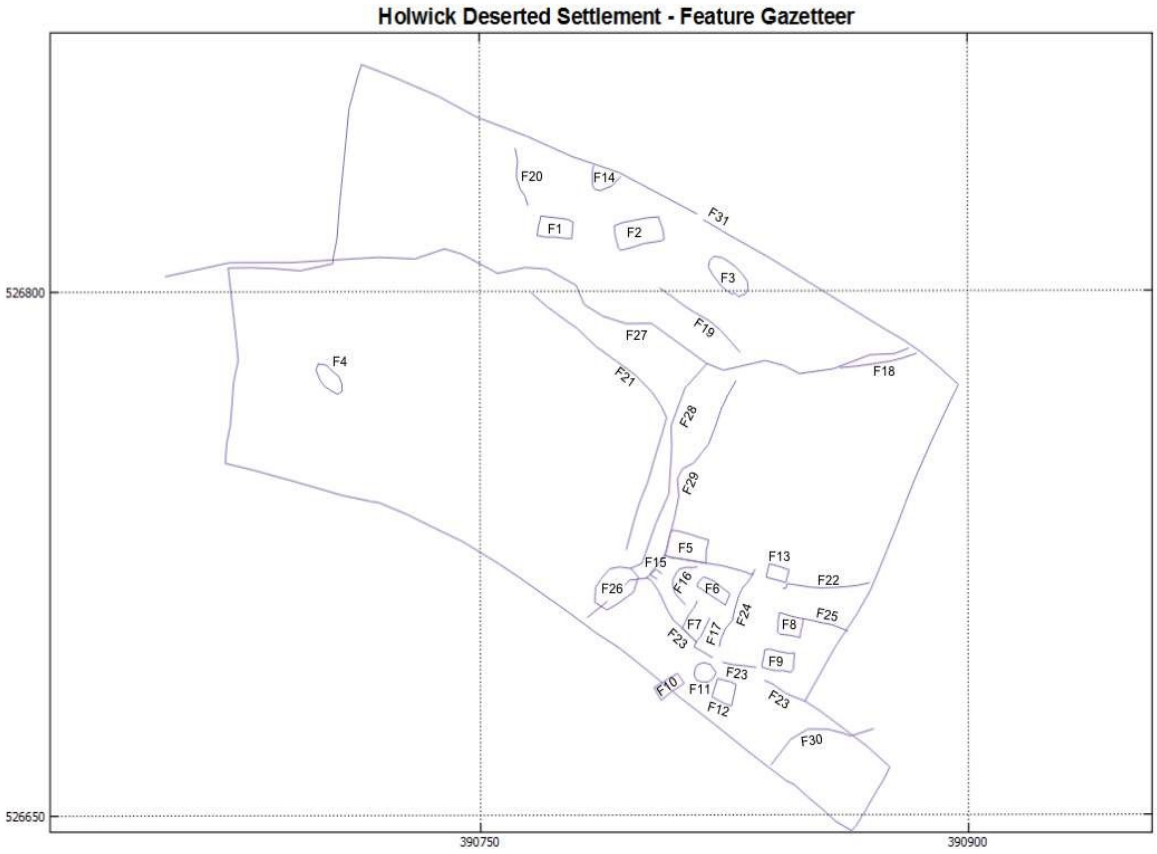
11 Gazetteer of features

Key

A key to the location of the features is given below. Information given for each feature is of one or more types:

- Description by Mike and Chris Powell (in normal text)
- Description by Stephen Eastmead (*in italic text)*
- Photograph and sketch-plan by Mike and Chris Powell
- Photogrammetry (vertical view) by Stephen Eastmead

Inevitably there is some duplication of information, but giving the full information from all five sources does give a fuller view of the nature of the features.



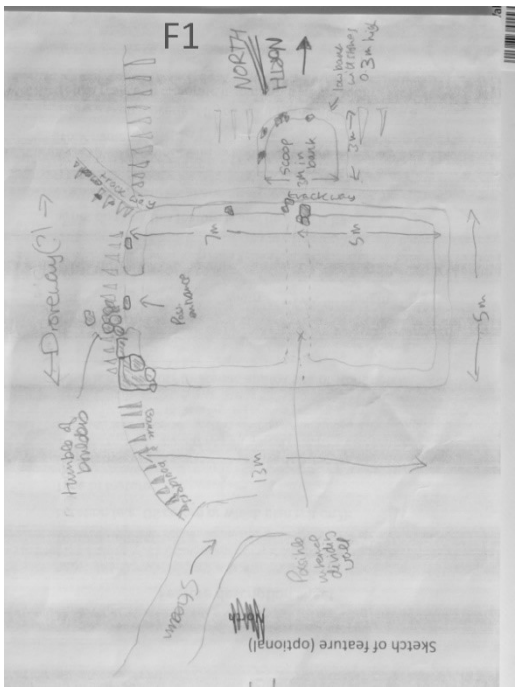
Stephen Eastmead notes that in many of the house platforms, some of the corners of the foundations and sections of the walls are not always identifiable with certainty. So, the measured lengths in the descriptions below should be treated as approximate. His measured lengths are for the most part maximum external lengths. Future targeted excavations ought to firm some of this data up. On inspection, it was not possible to identify if any of the houses had a gable end entrance.

Measurements given by Mike and Chris Powell are internal dimensions and therefore in general smaller than those of Stephen Eastmead. Their sketch plans are shown in the original form, not cleaned up for publication, and should not be taken as scale-accurate.

F1

Rectangular building possibly two-cell. Possible entrance in west end. Stone wall bases about 0.1m high, mostly earth-covered. Clear wall corner at SW. 5m x 15m.

House platform foundation remains, either double celled or an ancillary building at the eastern end. Approximate sizes: Total length: 16.5m. Main cell 10.5m long, ancillary cell 5m long. Width of both in the order of 5.3 to 5.6m. General orientation E-W.

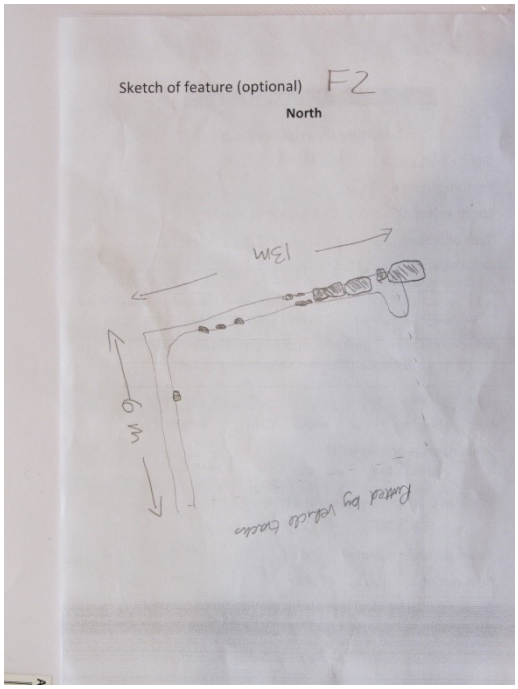


Photogrammetry: F1

F2

Rectangular building platform. Clearly defined at N and W ends. Some of other walls may have been destroyed as rutted track runs along S side. Stone wall bases about 0.1m high, largely earth-covered. 6m x 13m. **Risks: Damage to south side by farm track.**

House platform foundation remains, either double celled or an ancillary building at the western end. Sited close to F1. The corners at the eastern end are very vague. Approximate sizes: Total length: 14.5m. Main cell 9.5m long, ancillary cell 5m long. Width of both in the order of 5.8 to 6.3m. General orientation E-W.

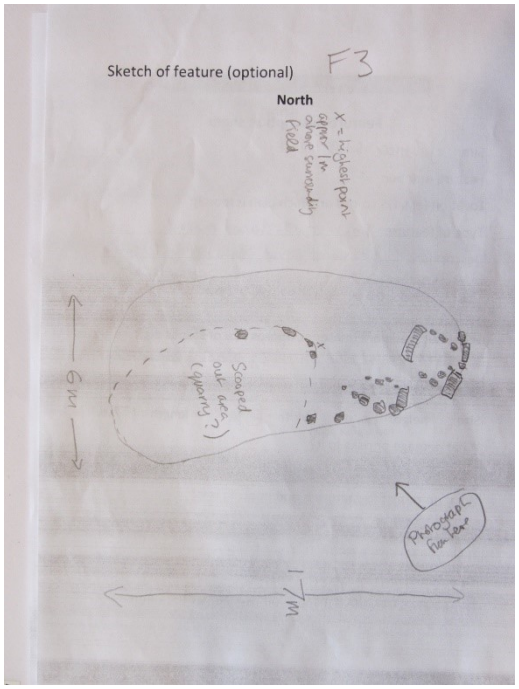


Photogrammetry: F2

F3

Low oval-shaped mound with long axis aligned E-W. Maybe natural. Earthen with protruding stones. W end has been scooped out, probably quarried. 17m x 6m. At highest point is 1m high. **Some evidence of rabbit damage.**

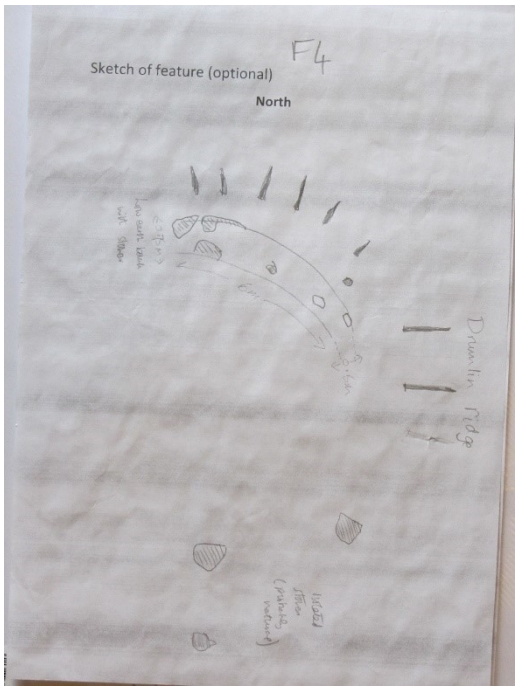
Initially this looks like a partially quarried cairn, but on closer inspection it appears to be a small natural outcrop that has grassed over except for a small section at the western end. Approximately 6m x 3m.



F4

Low curving earthen bank with stones, becoming indistinct at E end. To the S are a group of 3 isolated earth-fast stones which may be related to the bank or may be natural. 6m long, 0.7m wide (E end) and 0.5m wide (W end). Height up to 0.5m (near E end).

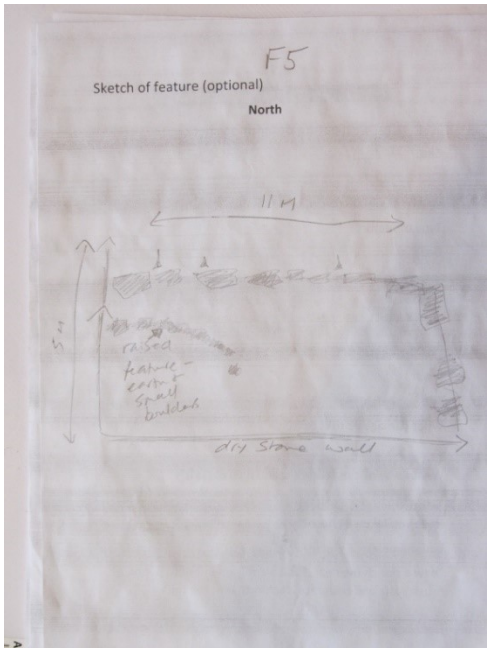
F4 is a 5m length by 1m wide section of curving wall foundation, that looks as though it once could have been a base of a small roundhouse. This section would have been a small section at the northern side. To the south are a group of 3 natural stones that may have been incorporated into a structure, or perhaps more likely a foundation wall would have butted against them. Only excavation would clarify if this is archaeological, and if so, its extent.

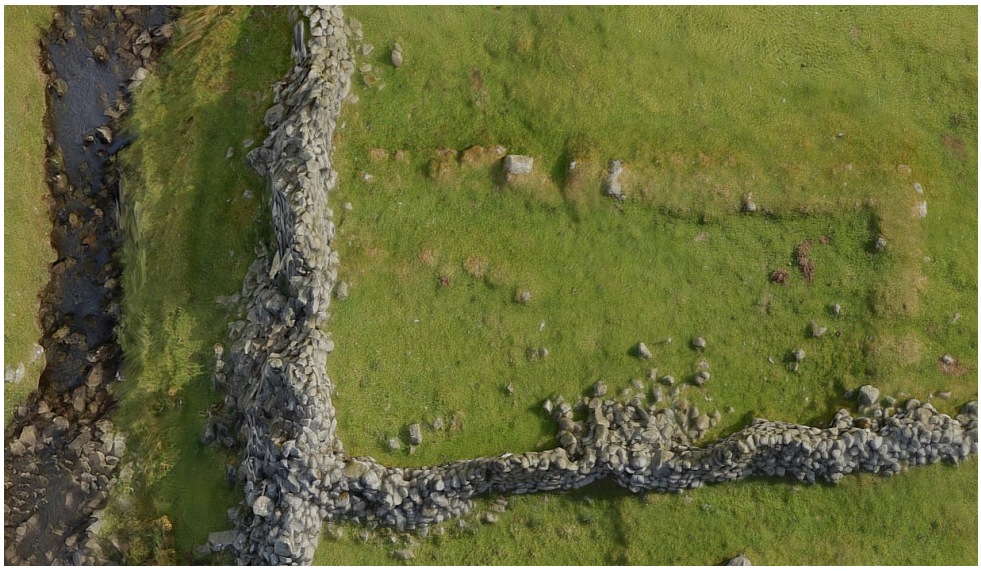


F5

Rectangular building foundation, bounded on S and W edges by dry-stone wall. N and E sides are earthen banks and large boulders. May be building or enclosure. 11m x 5m. Up to 0.4m high. Has internal curved bank, extending approximately 3m into interior from W edge. **Risks: Erosion of banks, collapse of dry-stone wall.**

House platform foundation remains, with a possible partitioned section at the eastern end. Approximate sizes: Total length: 13.2m. The partition at the west end, if present, appears to be in the order of 4m x 2m. Width of both in the order of 6.2m in the east to 7.9m in the west. General orientation E-W. The southern wall of this house platform appears to have been reused at a later period as a base for a field enclosure dry-stone wall, which subsequently has partially tumbled. In consequence, it is not possible to measure the platform width with any certainty. This enclosure wall extends eastwards beyond the house platform and probably once connected with wall F22.



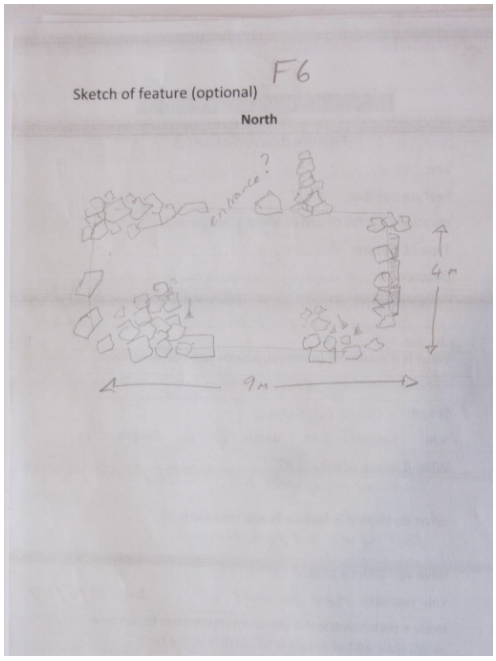


Photogrammetry: F5

F6

Roughly rectangular building foundations, possible house. On platform, foundations are irregularly shaped boulders/stones, although some at base of E edge appear to have been worked. 8m x 4m. Foundation height 0.2m. **Risks: Some collapse of stone-work.**

F6 lies a few metres to the south east of F5. It is located on a slightly higher plateau than F5. Approximate sizes: Total length: 10.8m to 11.0m. Width in the order of 6.0m. General orientation NW-SE. A revetted bank F24 is located close to the eastern end of the platform, and a small semi-circular enclosure F16, lies to the west.

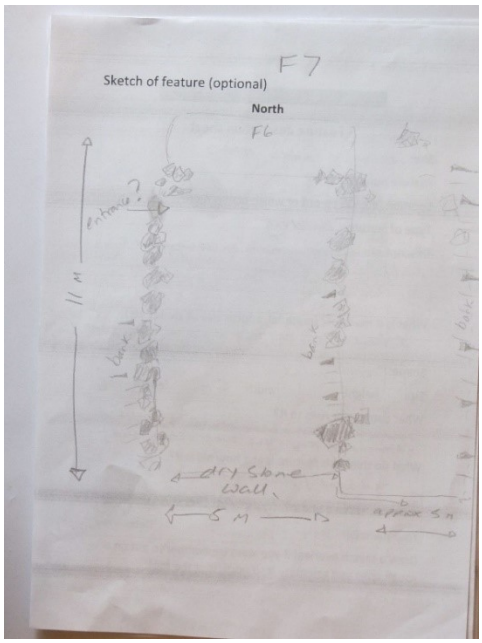


Photogrammetry: F6

F7

Foundations of building, with associated platform (F17) lying to the E of it. Low foundations consisting of stones/boulders from 0.2m to 0.5m diameter. 11m x 5m. **Some smaller stones have been removed to form dry-stone wall overlying S end; this wall is collapsing**.

F7 and F17 are two adjacent platforms. However, there is only a single foundation wall between them. F7 looks more like the house platform and F17 an enclosure associated with it. The eastern side of F17 is the partially robbed out revetment wall. It is not possible to identify where the north wall of F7 is located. Looking between F6 and F7, it gives the impression that a narrow footpath passed between them. F7 western wall that is still visible is 9.3m long and the visible section of the eastern wall 7.6m Width 6.5m. General orientation NE-SW.

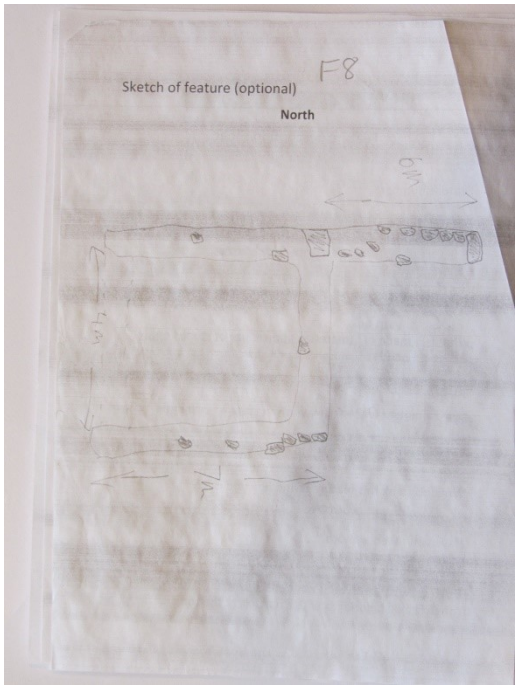


Photogrammetry: F7 and F17

F8

Foundations of rectangular building on platform with an external wall (F25) attached to NE corner and orientated E-W. Foundations are of stones, partly earth-covered. 7m x 4m. Height 0.2m to 0.3m.

House platform foundation remains. The corners are easy to see. Approximate sizes: Total length: 8.5m. Width 5.9m. General orientation E-W. The northern wall appears to also form part of an enclosure boundary that extends 13.2m further eastwards as feature F25.

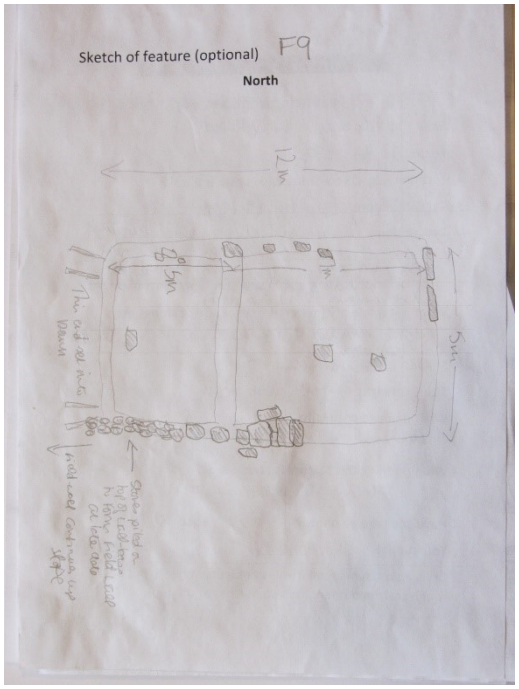


Photogrammetry: F8 (upper rectangular feature) and F9 (lower rectangular feature)

F9

Foundations of rectangular double-celled building on platform. The eastern cell is the larger. Orientated E-W. Foundations formed of stones (up to 0.3m diameter) partly earth-covered. A ruined dry-stone field wall overlies the SW corner (part of F23). 12m x 5m, height up to 0.25m. **Some evidence of stone disturbance**.

House platform foundation remains. The corners are not all easy to see. It could be doubled celled extending further westwards. Approximate sizes: Total length:14.5m. Width 6.2m. The partition wall centred approximately 9.5m from the western end. General orientation E-W.

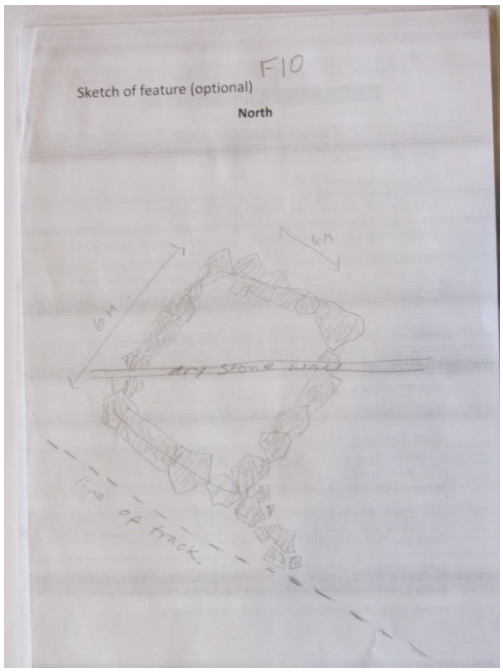


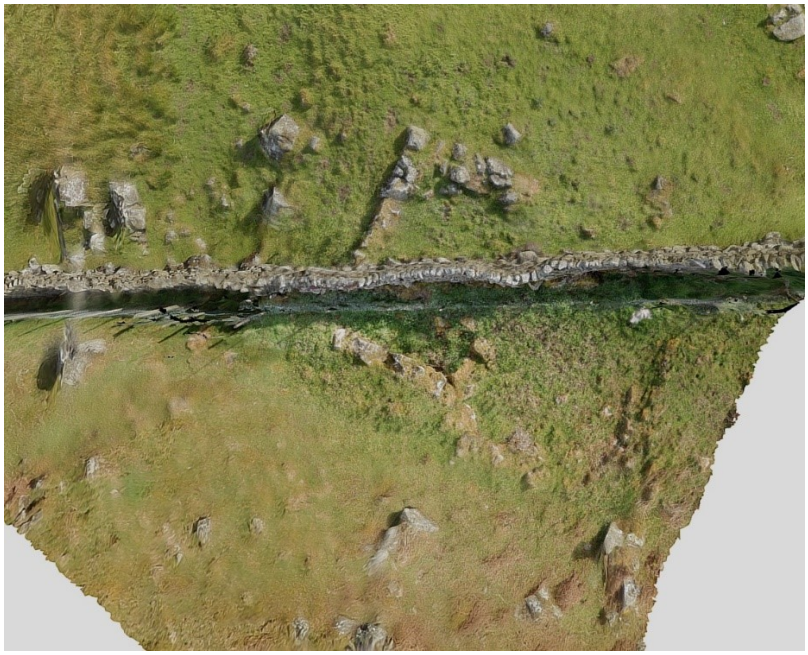
Photogrammetry: see F8

F10

Rectangular building foundations, overlain by the dry-stone wall enclosing the field. 6m x 4m, foundations 0.5m high. Formed of large stones/boulders up to 0.5m x 1m. From southern corner a wall extends SE then NE defining a small enclosure. A pathway running diagonally up the slope towards moorland lies along the SW side of F10. **Risk of collapse of dry-stone wall on to feature.**

House platform foundation remains. Compared with the other house foundations the stones used are significantly bigger. Very approximate sizes: Total length: 7.5m. Width 5m. General orientation NE-SW. The house platform is bisected by the dry-stone wall that separates the unenclosed moorland from the improved pasture. It is general appearance is of a much cruder structure. On the moorland side of the boundary wall there is evidence of a small enclosure on its eastern side.



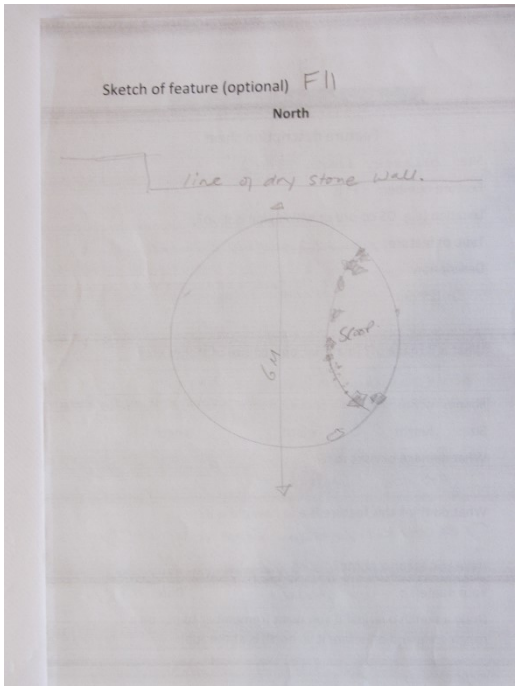


Photogrammetry: F10

F11

Mound formed of earth and stones. Semi-circular scoop into E side. Mound diameter 6m, height 0.8m. **Some erosion, risk of livestock damage**.

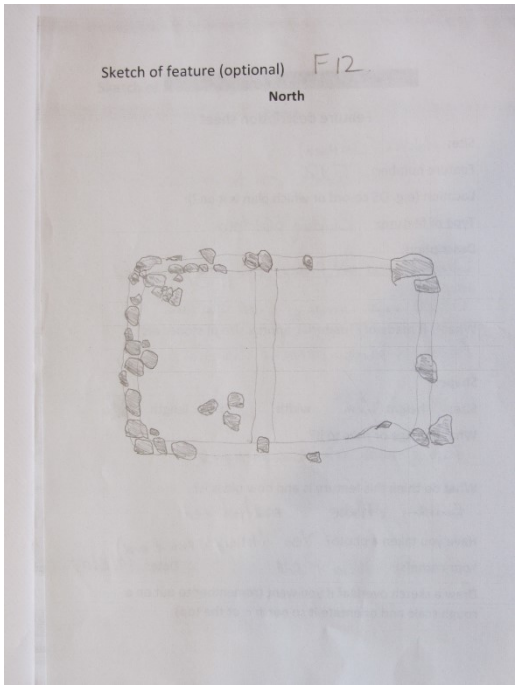
A slightly ovoid cairn 5.3m N-S and 5.5m E-W. Could be a burial cairn.



F12

Double-celled rectangular structure orientated between SE-NW and E-W. Foundations of boulders and stones. 12m x 4m, foundation height 0.2m. Western cell approximately 4m internally, eastern 6m. **Risk of stone disturbance/falling.**

House platform foundation remains just to the east of F11. Corners not well defined. Length between 6.7m and 7.5m and width between 5.7m and 6.5m. General orientation NW-SE

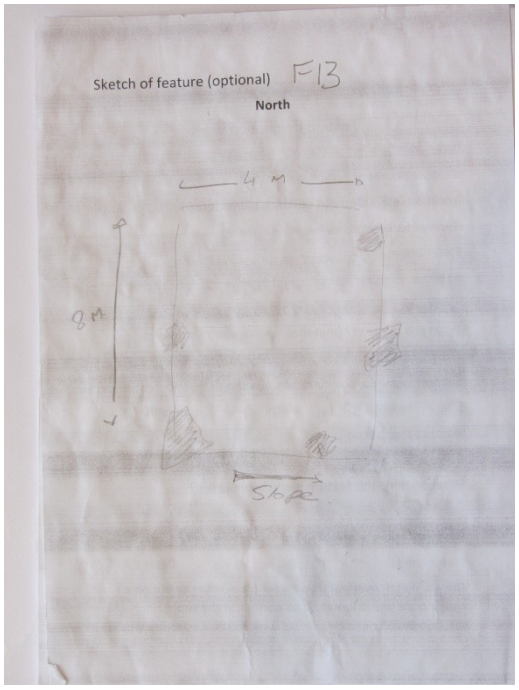


Photogrammetry: F12

F13

Roughly rectangular platform, possibly for building, some stones on raised edge, scooped into slope running downhill eastwards from F6 and F7. 8m x 4m, height 0.1m. A boundary, F22, a probable field wall foundation, is attached to the centre of the E side and runs eastward from the feature. **At risk from livestock and erosion as on steep slope.**

F22 appears to be the remains of field wall foundation that may have also been the part of the house platform foundation of F13. The western end is very indistinct. Not measured but looks slightly smaller than F8.



F14

A raised platform that appears to extend under the dry-stone field boundary wall and possibly the road through Holwick. The edge of the platform within the field is well delineated. There is no evidence of any structure on the platform.

Photogrammetry: F14

F15

A small building platform butting onto dry-stone wall F28 just to the west of F6 and F16.

F16

A curving enclosure foundation to the west of F6.

Photogrammetry: F15 (platform on left) and F16 (platform on right)

F17

See F7

F18

Small bank beside the Holwick Beck near to the bridge beside the Strathmore Arms.

F19

A bank. May be part of system to impound water in burn if necessary.

A length of bank within the field between the Holwick Beck and F3.

F20

Hollow way from the field boundary wall beside the road through Holwick, south towards the Holwick Beck.

F21

Sharp edge to the upper plateau as it descends steeply towards the Holwick Beck.

F22

See F13 and F22

F23

F23 appears to be an old field or enclosure boundary that cuts across the main settlement site, and has subsequently been reused and modified at different periods. House platform F7 may be using it as its southern wall.

F24

A fragmentary wavy alignment of stonework that appears to have been a revetment to the bank along which it parallels.

F25

See F8

F26 and F28

A spring fill pond (F26) that flows northwards as a beck (F28) to meet the Holwick Beck

F27

Holwick Beck

F28

See F26 and F28

F29

An old dry-stone wall field boundary, that probably existed as some form of enclosure when the settlement was built.

F30

Small watercourse that appears to be dry for most of the time. Probably only carries water in exceptionally wet periods.

F31

Current dry-stone wall field boundary, probably erected when land was enclosed in the 19C.