

The Deserted Medieval Village of Willoughby near Norwell.

A topographic earthwork survey



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Archive Location

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1. Introduction

The deserted village of Willoughby in Nottinghamshire is situated in the Parish of Norwell, to the east of the road from Norwell to Carlton-on-Trent. The site is now marked by a number of earthworks, building platforms, holloways and a large moated site. The village was granted scheduled monument status in 1992 as monument no. M23208.

In February 2010, the site was surveyed by members of the Norwell Parish Heritage Group and other volunteers under the supervision of Nottinghamshire County Council Community Archaeologists. The survey was conducted to English Heritage level three survey specifications for earthwork survey using the techniques recommended, and the report was written to the standards and recommendations of both English Heritage (Ainsworth, et al. 2007) and the Institute for Archaeologists (IFA 1994). Archaeological survey is promoted for Community Archaeology in 2007 publication *Understanding the Archaeology of Landscapes*, and the survey was a great success as an example of public involvement in Archaeological field work.

2. Site location, geology and topography.

The deserted village of Willoughby lies in fields to the northwest of Norwell Village at OGSR 478820,363060 (see figure 1). The site is underlain by Permo-Triassic Mercia Mudstones. These are overlain in the northeast corner of the site by superficial Pleistocene Sand and Gravel deposits of the Holme Pierrepont series, and in the south and central areas by superficial clay, silt, sand and gravel Holocene alluvium deposits (see figure 2).

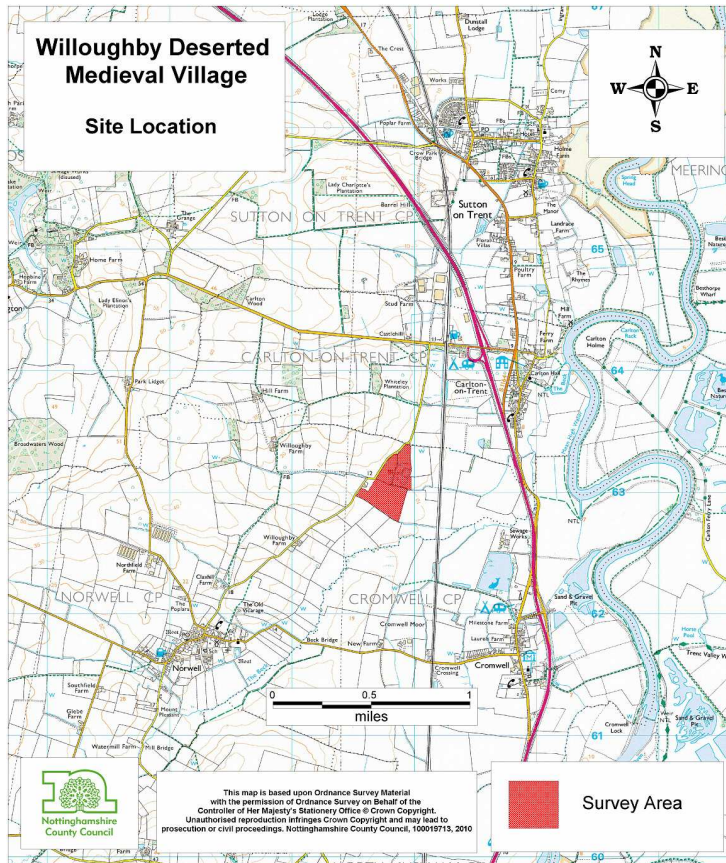


Figure 1: Survey Location on Ordnance Survey 1:25,000 Map

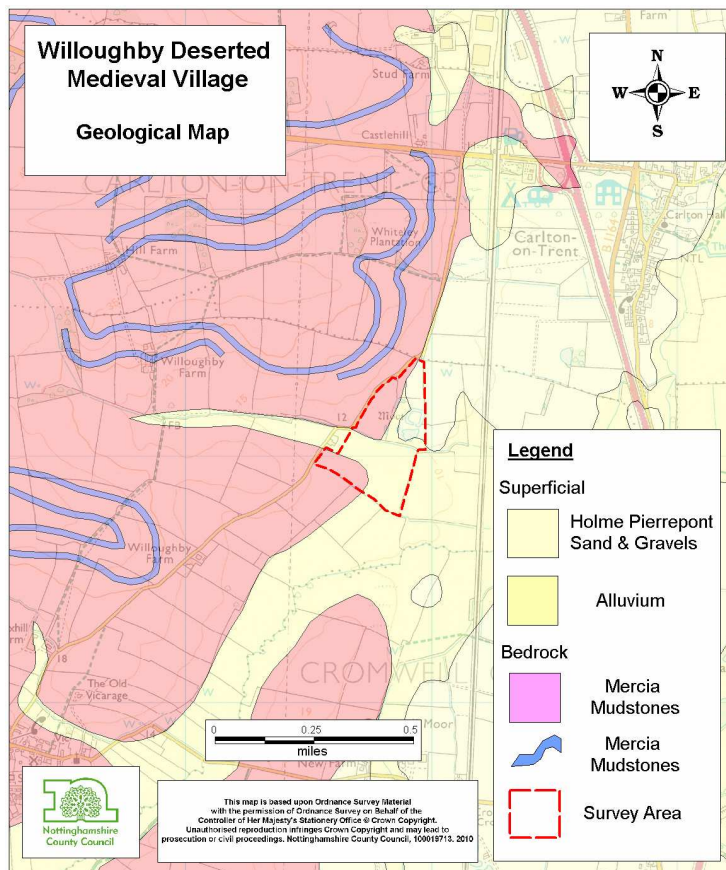


Figure 2: Geology of Willoughby

3. Historical background

The name Willoughby means settlement by the Willows, the village, situated in the Wapentake of Lyth is first mentioned in Domesday Book, as belonging to Geoffrey Alselin, and consisting of 1½ Bovates of land taxable, with land enough for 4 oxen, with half a mill and 12 acres of meadow. Prior to 1066 the village is listed as having been the property of Toki. The archbishop of York also held lands here at Domesday with 3½ bovates of land taxable, land enough for 1 plough. There is also the first mention of inhabitants of the village from the Arch Bishops entry with 4 freemen and 3 villagers who have 2 ploughs. The archbishop also owned 16 acres of meadow. It is not possible from current research to know if the settlement was nucleated at this time, or dispersed around the parish. The moated site to the east of the village was probably constructed in the early 13th century and was later home to a post-medieval manor house. This was recorded in a drawing in 1776 by Joseph Pocklington, who states that it was pulled down in 1779. John Throsby in his edition of Robert Thoroton's Nottinghamshire, dating from 1790-96 states that the village was deserted and the manor derelict by 1785 'The houses that formerly stood here are decayed and gone. The ancient manor house which was large, with an adjoining chapel, was a ruin in 1785, when the very foundations were dug up, and the materials disposed of by Mr. Bristow. In the ruined chapel was found a font decayed, and under a floor stone, the skeleton of a child'.

4. Aims and purposes of the evaluation

- To establish the overall shape and nature of the earthworks, resulting in a hachure plan of recorded features.
- The recording of X, Y and Z coordinates of points across the site, to enable creation of a Digital Elevation Model (DEM) to study the

earthwork in 3D, and to analyse its setting in the wider landscape, through 3D analysis.

- To attempt a relative dating of features as recorded in the field, and to help in interpretation of the earthworks.
- To be used to inform future site management, by measuring the condition of the earthwork, and indicating its local historical importance.
- The project was also conceived as an opportunity for public involvement in Archaeology.

5. Methodology

The survey area was divided into four sections. These are shown as fields 1-4 in the figure 3 in section 5.4. These areas were in turn subject to different survey techniques in response to the logistical nature of the site. The techniques employed and the reasons are outlined below.

5.1. Equipment

The survey was undertaken using survey grade Global Positioning System (GPS) and an Electronic Distance Measuring (EDM) Total Station. The GPS system used was a Leica GPS900 enabled to use Smartnet technology. This GPS system operates using Differential GPS (DGPS), where corrections are given to errors in the satellite location data received. Originally this method required a second GPS station onsite, located over a known point. This second station then transmitted corrections to the rover station. The rover station was operating in Real-time Kinematic mode, where corrections are received from a remote system of control stations. This Smartnet system, corrects the rover station, allowing points to be recorded 'on the fly' to sub-centimetre accuracy levels, via a mobile telephone connection. This removes the need for a second base-station receiver onsite. The GPS rover was set to

record either continuously or to take static points, depending on requirements as recommended in Ainsworth, S. & Thomason, B. 2003.

EDM Total Station combines a Theodolite to record vertical and horizontal angles, and an Electronic distance measurement device, to enable the acquisition of 3-Dimensional coordinate data. Total stations work by reflecting infra red laser against a prism. The Total Station requires two operators, one to operate the device and the other to position the prism pole in the required location for surveying. EDM total stations also provide sub-centimetre relative accuracy for recordings (<http://totalstation.org/total-station-functionality.php>). The Total Station used in this survey was a Leica TCR805.

5.2. Control of survey

‘Control is the accurate framework of carefully measured points within which the rest of the survey is fitted’ (Ainsworth, et al. 2007). Section 2.1 Control of Survey in *Metric Survey Specifications for English Heritage* (Lutton. 2003) states that metric survey ‘must provide reliable and repeatable control capable of generating the required coordinates within the tolerances stated’. The prescribed tolerance level is to a precision of $\pm 10\text{mm}$ (Lutton. 2003). This level of control was achieved by using Real-time Kinematic DGPS rovers; set to take readings within $\pm 10\text{mm}$ accuracy levels, to stake-out station points which provided inter-visibility across the site for optical survey using EDM Total Stations. Total stations were set up above these station points when required and orientated by the other survey control points to provide control between GPS and optical survey. As well as falling within the accepted tolerance levels, this technique also fulfills the requirement that the control must be repeatable. The use of Kinematic DGPS to stake-out the control points means that the survey area can be re-occupied easily in the future using technology of the same specification or higher, without the need to leave permanent markers onsite.

5.3. Topographic survey methodology

The survey was undertaken using a combination of objective and subjective survey techniques.

5.3.1. Objective survey

The objective, systematic part of the survey was carried out using the Real-time Kinematic DGPS systems described above. 2m transects were surveyed across the site at right angles to the edges of the survey areas. Transects were controlled using tape measures and ranging-poles for guidance. Surveyors walked these transects, and recordings were automatically taken every 0.5 metres. Where tree cover prevented GPS recordings within the prescribed tolerance levels, EDM Total Stations were set up and used to take readings. This method fits in with English Heritage suggestions for interchanging between GPS and EDM survey (Ainsworth & Thomason 2003). EDM survey was employed where GPS signal was not sufficient, for general topographic readings, as part of the systematic survey process.

5.3.2. Subjective survey

Subjective survey was used as a means to record features in more detail. It relies on the expertise of the surveyor to analyse the earthworks and to record them. For this procedure, EDM Total Stations were used to record the tops and bottoms of slopes. These recordings were highlighted in the survey data using the feature code facility available in total stations. This subjective survey method was employed in order to allow a hachure plan of the site to be created as recommended by English Heritage (Bowden 2006). This was then used for interpretation.

5.4. Survey logistics

Fields 1 and 2 (see figure 3 below) were subject to both objective and subjective survey techniques using a combination of GPS and Total station. Field 3 was only surveyed using subjective survey techniques using EDM Total station due to extensive tree cover. Control points were established using the GPS system around Field 3 and a total station was used to carry the survey under the tree cover. Field 4 was not originally specified as being within the area to be surveyed, however field observations and examination of aerial photographs revealed a number of earthworks in this area, which were seen to be part of the earthwork complex. It was decided to subjectively survey these features using the GPS in the time remaining, to help include the earthworks in the interpretation of the site and to focus future work.

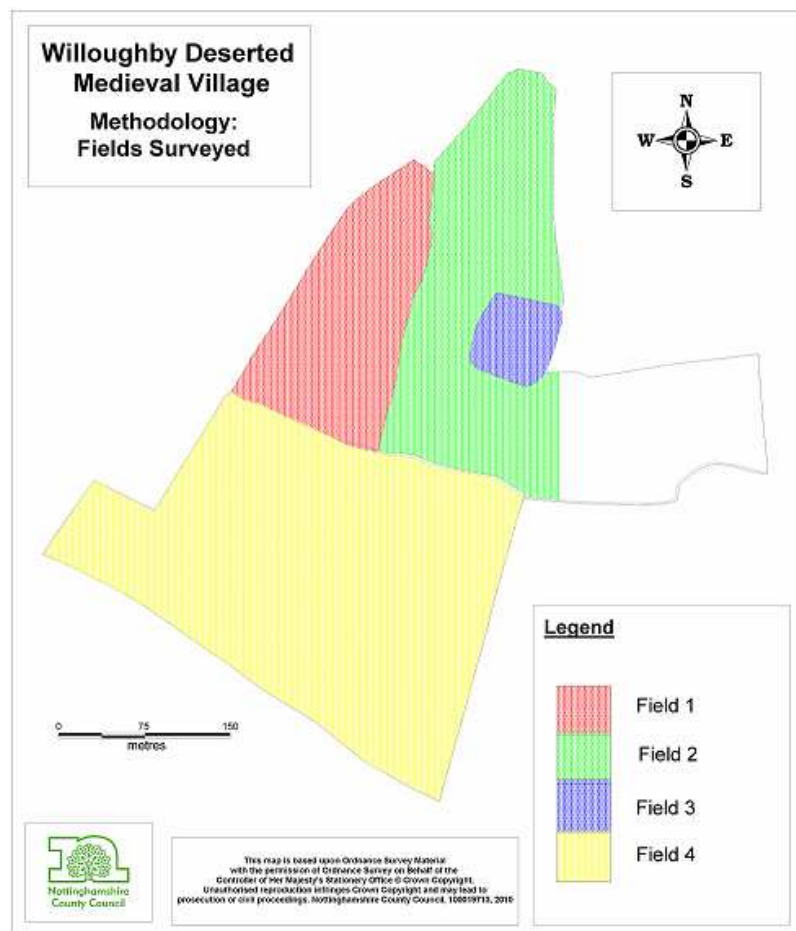


Figure 3: Survey areas

5.5. Data preparation and analysis.

All data was processed in Mapinfo Geographic Information Systems (GIS). Vertical Mapper 3.0: *Spatial Analysis and Display software*, a Mapinfo software extension was used to create a nearest neighbour interpolation model to present the site in 3D. This Digital Elevation Model (DEM) was then subject to slope surface analysis, which measures and displays relative slope severity. In order to interpret the 3-Dimensional earthworks in a 2-Dimensional map, the data has been plotted using a combination of objective contouring, and subjective hachure plans, as recommended by English Heritage. This plan produced in MapInfo and Vertical Mapper software, and was drawn to English Heritage conventions (Ainsworth et al 2007). Vertical Mapper was also used to combine survey data with Ordnance Survey digital Terrain Models to study the village in its wider landscape context.

6. Results

The site area surveyed is 600m from north to south and 300m east to west at the widest point. The topography of the area is relatively even with general dip from west to east (see figures 5 and 7).

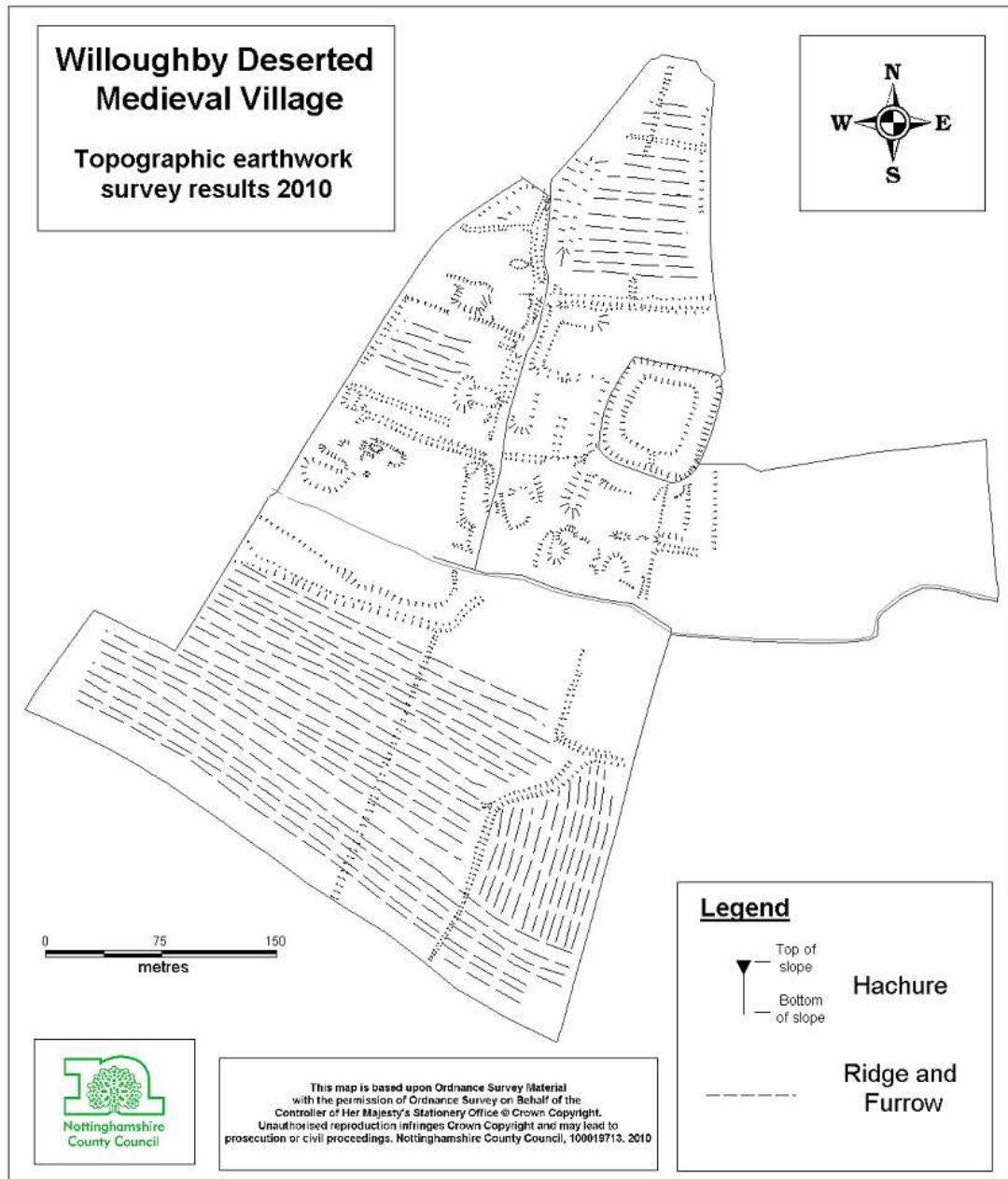


Figure 4: Willoughby deserted village survey hachure plan.

The hachure plan in figure 4 shows the features as recorded by the subjective survey. These results can be seen in the surface models in figures 5 to 7. The individual features will be discussed in the conclusions section below.

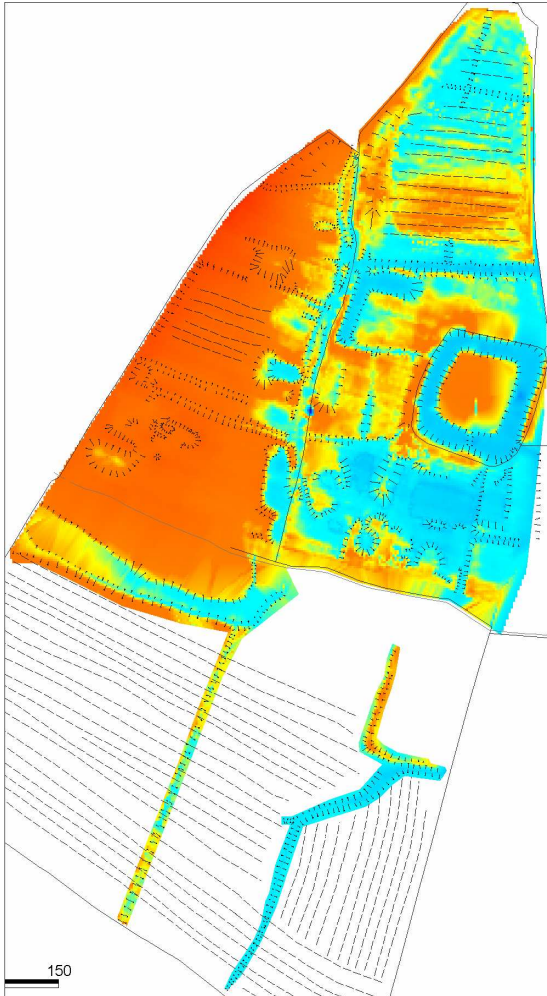


Figure 5: 3D Digital terrain model. For colour scale see figure 7 below.

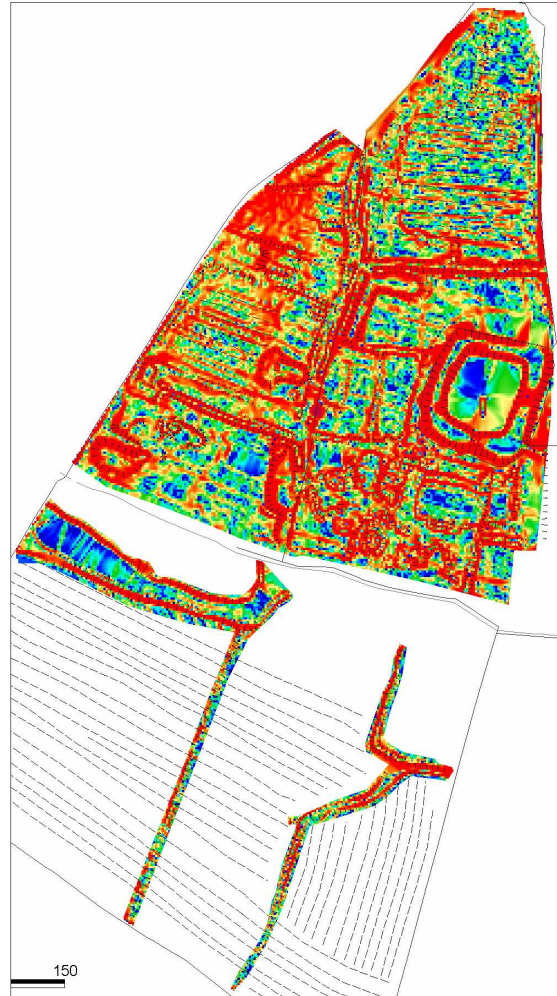


Figure 6: 3D Slope analysis model. Steepest slopes in red.

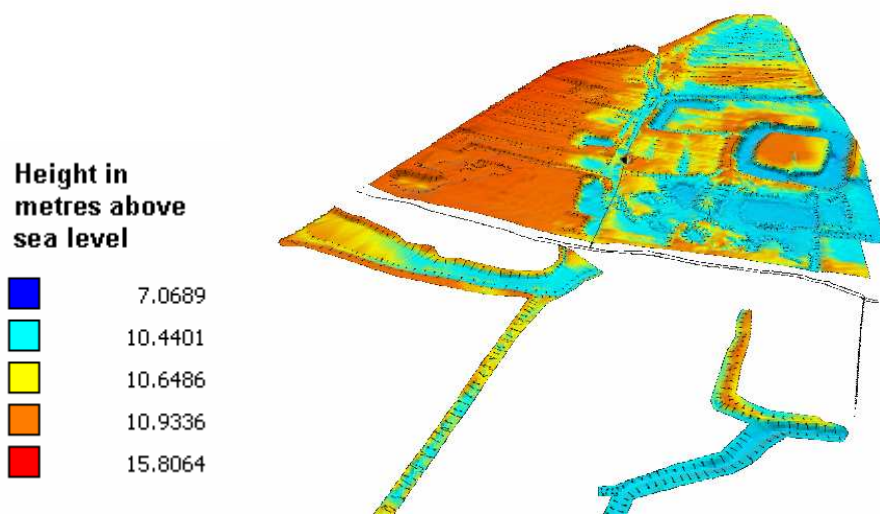


Figure 7: 3D surface model oblique view from the south

The largest earthwork on the site in terms of depth and width of earth removal is the moated site. This is shown clearly in the slope severity image above in figure 6, and below in figure 8. The moated site clearly shows a raised entrance way to the south. The overall size of the feature is 72 m north to south by 70 metres east to west. The moat ditch is in places 15 metres across and 1.7 metres or 5' 6" deep. The area enclosed within the moat is 45 metres north to south by 40 metres east to west. This is a considerable area for a manor house, and could have easily allowed for a main hall and associated outbuildings.

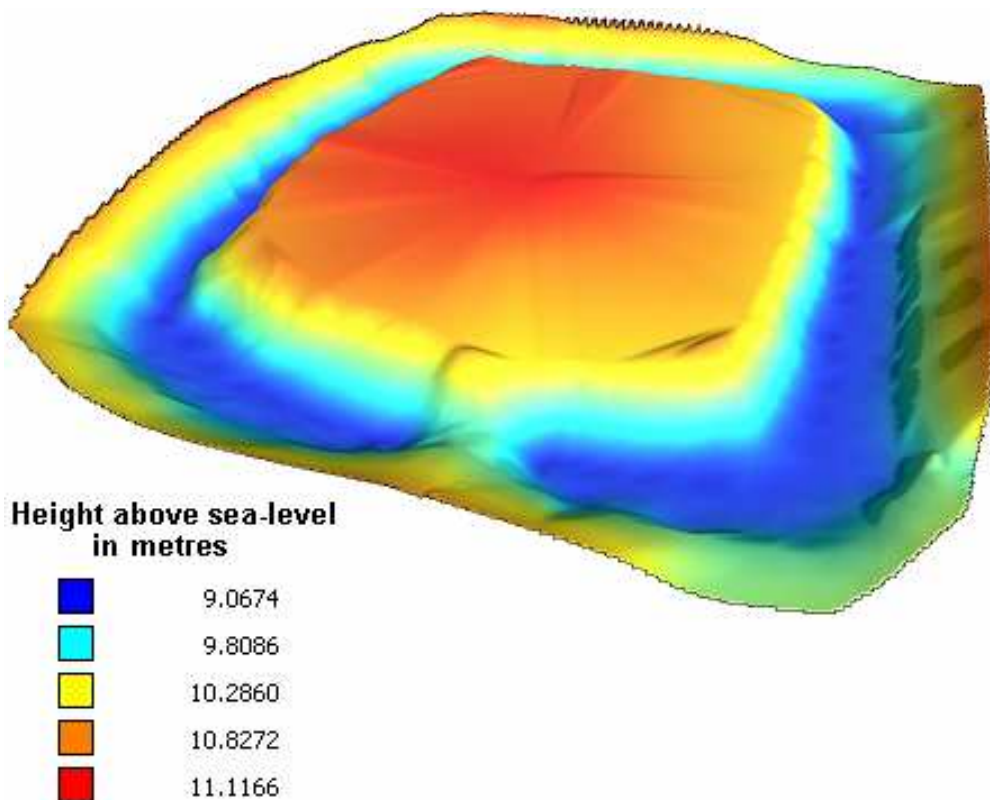


Figure 8: Moated site

The moat was mapped using an EDM Total Station. As well as mapping the tops and bottoms of slope as part of a subjective survey, a number of cross – sections through the water filled bottoms of the moat allowed for a reasonable reconstruction of the site, and the digital removal of standing water. The results are shown in figure 8 above.

7. Conclusions and interpretations.

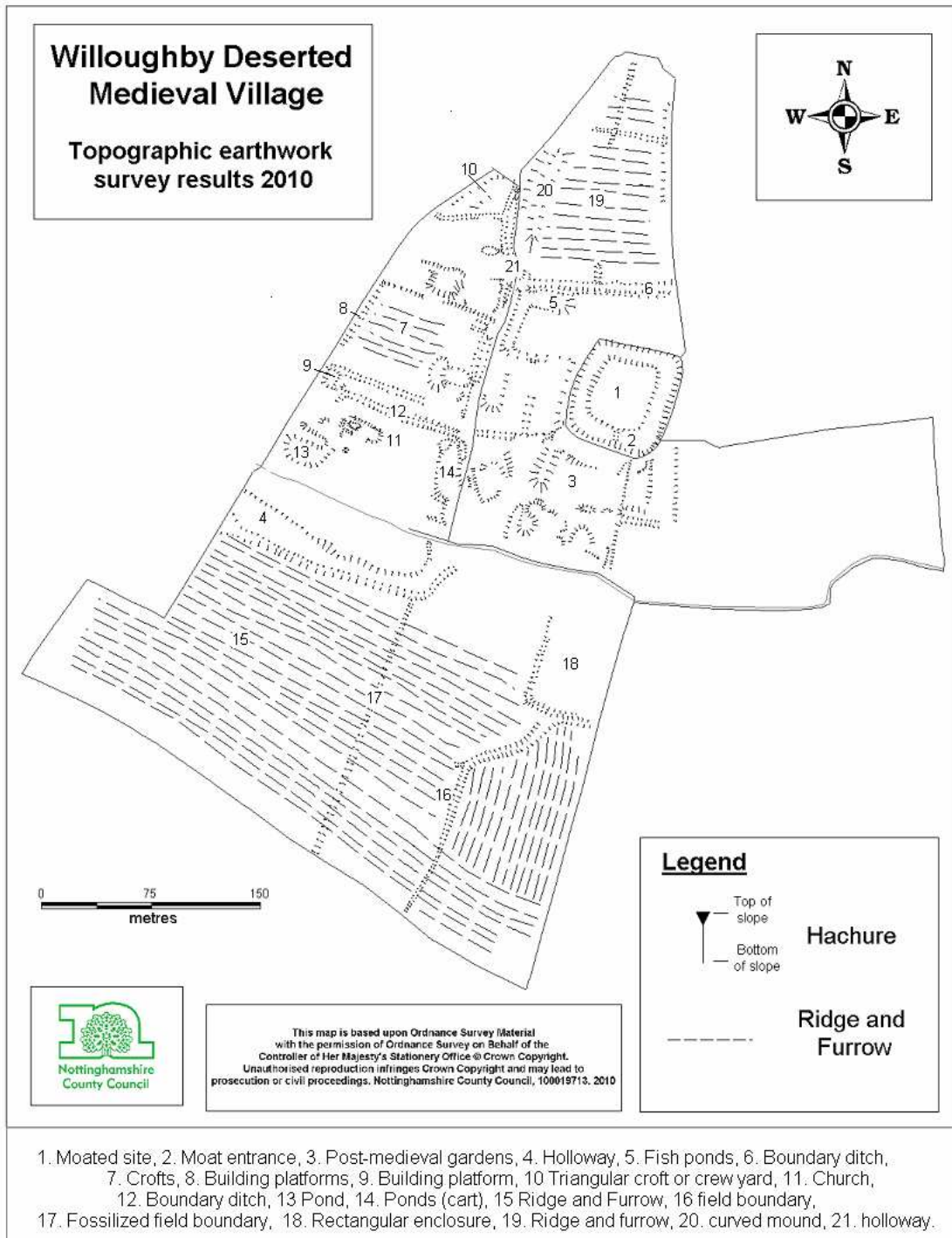


Figure 9: Interpretation plot

Interpretation of the site is based on field observations and the results in the previous section. The maps in figures 9 and 10 provide the basis for discussion of these findings. The individual earthworks are interpreted in relation to the numbering system in figure 9. Figure 10 has been created to

display potential zones of land use within the site based on the relative positioning of these earthworks.

The village appears to be structured into discreet areas of land use; the manorial complex, domestic area, ecclesiastical, and agricultural land. For the purpose of the discussion each area will be looked at in turn.

The manorial complex is grouped around a moated site of early 13th century construction. The area is shown in red in the map in figure 10 below. The area around the moated site is in the east section of the site and is demarked by a hedge line to the south, a boundary ditch to the north and to the west by the north-south running holloway in the centre of the site. This holloway is now the hedge line dividing the east and west fields. This area is believed here to represent the manorial zone of the village. Within this area is the moated site itself (1) (see figure 9) with its entrance to the south side (2). This is approached via an area that is interpreted as post-medieval gardens (3). The holloway (4) in the north part of the southern field provides access to this manorial zone from the south and west. To the north east of the moat is an L-shaped fish pond (5) adjacent to the boundary ditch (6).

The field to the west of the manorial zone contains a number of interesting earthworks. This area can be divided into two with the northern part containing a number of possible tofts and crofts (7 and 8) running perpendicular to the road from Norwell to Carlton-on-Trent. There is also a possible building platform (9) and a crew yard (10). The road provides the boundary of the site on the western edge. This part of the site is interpreted as the domestic zone of occupation and is marked in yellow on the map in figure 10. The southern edge of this domestic zone is marked by a ditch running east to west (12). To the south of this ditch are a number of earthworks believed here to represent the location of the chapel (11) mentioned by Throsby. The boundary ditch mentioned previously may have existed to separate this ecclesiastical land from the rest of the site. This ecclesiastical area is marked in blue in figure 10. The southern field and the northernmost part of the survey area contain excellent examples of ridge and furrow (marked 15 and 19 respectively). In the southern field a number of former field boundaries survive as ditches (16 and 17). In the northeast corner of the southern field is an unusual large relatively flat area which is enclosed by a substantial earth bank on its south

and western edges (18). The purposes and use of this earthwork are as of yet unexplained and further investigation will be required.

It is hoped that the interpretations above can form a starting point for discussion and potential future investigations. Much research has already been done into the written accounts for the site by Professor Michael Jones, and it would be of great interest to consider the earthworks in relation to this historical documentation. Especially in relation to the zones of land use suggested here.

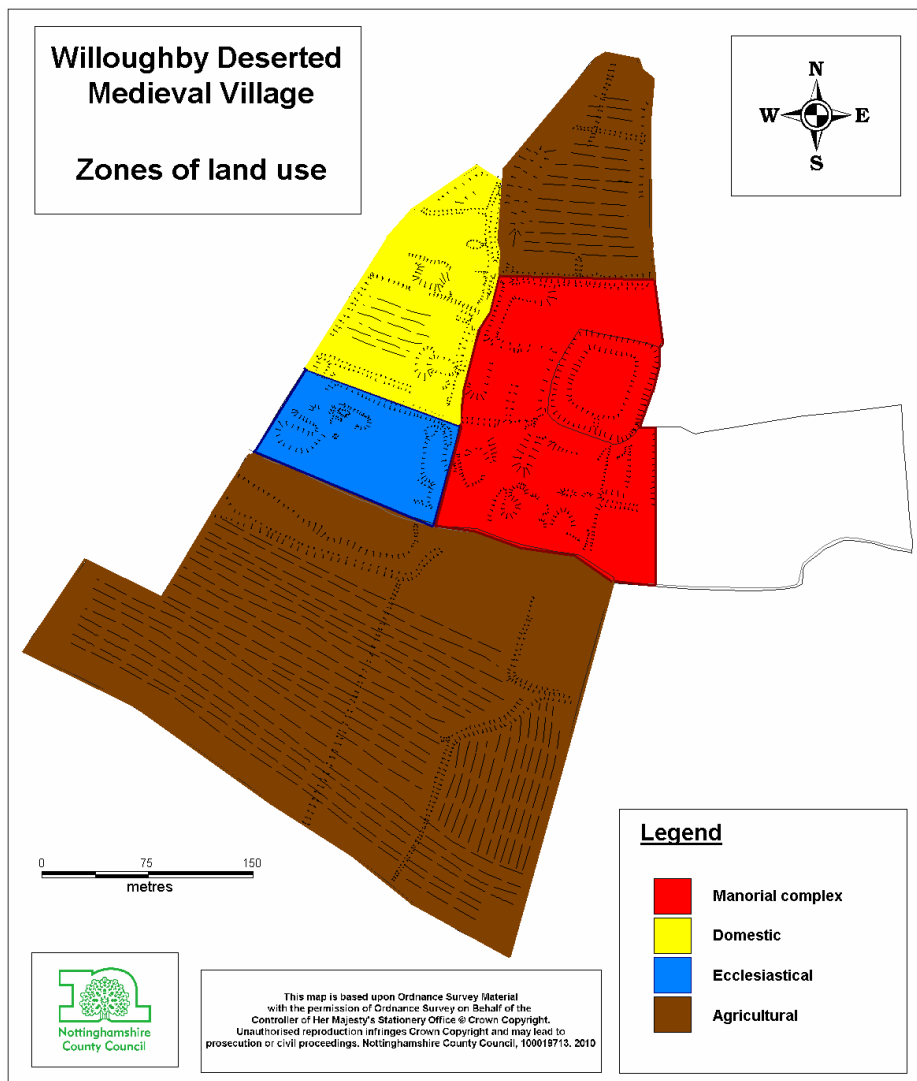


Figure 10: Zones of occupation

8. Future work

In order to understand further the relationships between these earthworks, their definite function and to allow accurate dating and phasing, further work would be needed. Targeted geophysical survey on the enclosure, moated site and other features might reveal subsurface anomalies that could help in further understanding of the site. It is hoped that a resistance survey and magnetometer survey can be carried out by Nottinghamshire County Council Community Archaeology and the Norwell Parish Heritage Group in the coming year.

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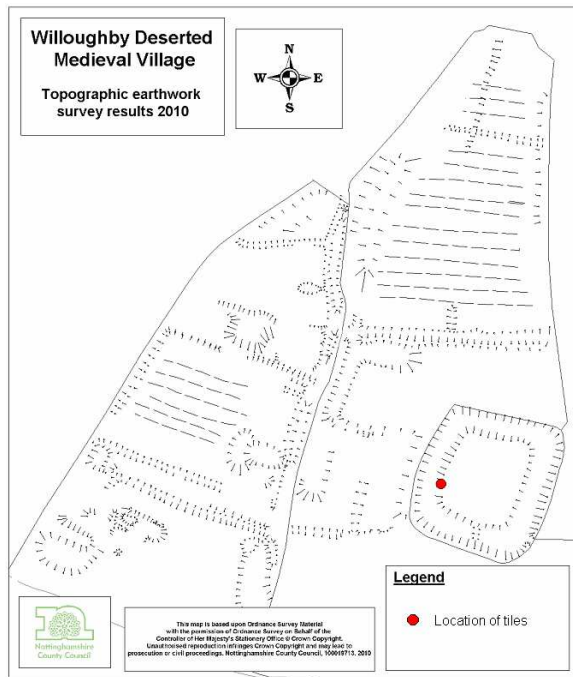
<http://www.leica-geosystems.com>

<http://smartnet.leica-geosystems.co.uk>

<http://totalstation.org/total-stations-functionality.php>

Appendix I

Finds



Map showing the location of tiles

During the survey a number of roof tiles were found in the upturned root system of a fallen willow tree on the internal western bank of the moated site as shown in the adjacent map at OSGR 478915.76,363167.75

These tiles were removed for recording and conservation after consultation with English heritage.

The tiles were photographed and included here to allow the information to be included on the Historic Environment Record for Nottinghamshire. The tiles are believed to be made from local Skerry stone which is abundant in the Trent Valley. Consultation with Jason Mordan Senior Conservation Officer at Nottinghamshire County Council suggests that these could be the only examples of Skerry Stone being used for roof tiles in Nottinghamshire.

This would make the find of great significance to the understanding of the heritage of the built environment of the county.

An illustration of the hall drawn in 1776 by Joseph Pocklington may show the tiles in situ.



Photograph 1: Skerry roof tiles discovered on Willoughby moated site



Photograph 2: Tile 1.



Photograph 3: Tile 2.



Photograph 4: Tile 3.

Appendix II
Photographic record



Photograph 1: feature 4 holloway looking east



Photograph 2: feature 4 showing sides of holloway looking east



Photograph 3: feature 9 looking west



Photograph 4: feature 10 looking north



Photograph 5: feature 11 looking east



Photograph 6: feature 12 ditch looking east



Photograph 7: feature 15 ridge and furrow facing southeast



Photograph 8: feature 17 looking south



Photograph 9: feature 18 rectangular enclosure with bank, looking northeast



Photograph 10: feature 18 rectangular enclosure with bank, looking southeast