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WEST DEAN VILLA, WEST TYTHERLEY, HAMPSHIRE REPORT ON GEOPHYSICAL SURVEY, JULY 2014

Neil Linford



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WEST DEAN VILLA, WEST TYTHERLEY, HAMPSHIRE

REPORT ON GEOPHYSICAL SURVEY, JULY 2014

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NGR: SU 258 271

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SUMMARY

A Ground Penetrating Radar (GPR) survey was conducted over the West Dean Roman Villa, Tytherley, Hampshire, at the request of the Inspector for Ancient Monuments, to establish the precise location and gauge the depth to the surviving remains. The survey covered an area of 1.15ha and successfully identified building remains that correspond well with plans from the C19th antiquarian excavations prompted by construction of the railway line immediately to the south of the site. In addition, the survey revealed a series of near-surface anomalies, possibly related to recent historic garden remains. It is hoped that these results will contribute to the ongoing management of the site and ensure the continued protection of the scheduled remains.

CONTRIBUTORS

The field work was conducted by Neil Linford of the English Heritage Remote Sensing Geophysics Team.

ACKNOWLEDGEMENTS

The author wishes to express his thanks to the landowners, Mr and Mrs Philip Chalkley, for allowing access to the site and providing much welcomed refreshment during the field work.

ARCHIVE LOCATION

Fort Cumberland.

DATE OF FIELDWORK AND REPORT

The fieldwork was conducted on the 22nd July 2014 and the report was completed on 14th January 2015. The cover photograph, courtesy of Mr Philip Chalkley, shows a view south over the site from Dean House.

CONTACT DETAILS

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INTRODUCTION

Roman remains at West Dean were first reported in 1741 following the recovery of a mosaic pavement and then, subsequently, through excavations during the C19th prompted by the discovery of a substantial building during the construction of the London and South Western railway line (Master 1885). The antiquarian excavations revealed the site (SU 22 NE14; AMIE 222998) of a Roman villa consisting of two buildings, an aisled one and a courtyard type; part of a third building was also uncovered, although the precise location of the remains is difficult to ascertain from the existing plans.

The aim of the current geophysical survey, prompted by a request from the English Heritage Inspector of Ancient Monuments, Ben Jarvis, was to better establish the location and likely survival of any remains to assist with the ongoing management of the site following plans to extend the planting of screening trees by the landowner. This work was undertaken as part of the National Heritage Protection Programme (NHPP) where it is categorised under Activity 8A5 Offsetting loss through knowledge dividend; Protection Result 8A5.2 Emergency investigation assistance for threatened heritage outside the planning process.

The site centred on SU 258 271 is currently divided into a series of paddocks grazed by horses. Soils of the Andover 1 association have developed over superficial deposits of clay, silt, sand and gravel Head capping Culver Chalk (Soil Survey of England and Wales 1983; Geological Survey of Great Britain (England and Wales) 2005). Weather conditions were very dry and sunny on the day of the field work.

METHOD

Ground Penetrating Radar survey

A 3d-Radar MkIV GeoScope Continuous Wave Stepped-Frequency (CWSF) radar system was used to conduct the survey collecting data with a multi-element G1922 vehicle towed, ground coupled antenna array (Linford *et al*/2010). A roving Trimble R8 Global Positioning System (GPS) receiver was mounted on the GPR antenna array to provide continuous positional control for the survey collected along the instrument swaths shown on Figure 1. Data were acquired at a 0.075m x 0.075m sample interval across a continuous wave stepped frequency range from 60MHz to 2.99GHz in 2MHz increments using a dwell time of 2ms. A single antenna element was monitored continuously to ensure data quality during acquisition together with automated processing software to produce real time amplitude time slice representations of the data as each successive instrument swath was recorded (Linford 2014).

Post acquisition processing involved conversion of the raw data to time-domain profiles (through a time window of 0 to 50ns), adjustment of time-zero to coincide with the true ground surface, background and noise removal, and the application of a suitable gain

function to enhance late arrivals. A representative profile from the GPR survey is shown on Figure 3. To aid visualisation amplitude time slices were created from the entire data set by averaging data within successive 0.6ns (two-way travel time) windows (e.g. Linford 2004). An average sub-surface velocity of 0.07m/ns was assumed following constant velocity tests on the data, and was used as the velocity field for the time to estimated depth conversion. Each of the resulting time slices, shown as individual greyscale images in Figures 2, 4 and 5 therefore represents the variation of reflection strength through successive ~0.03m intervals from the ground surface. Further details of both the frequency and time domain algorithms developed for processing this data can be found in Sala and Linford (2010).

RESULTS

A graphical summary of the significant GPR anomalies, [gpr1-7] discussed in the following text, superimposed on the base OS map data, is provided in Figure 6.

Significant reflections are separable from background noise to approximately 25ns (1m), but beyond this the data becomes highly attenuated, possibly due to the clay head drift geology present. The near-surface data between approximately 1.8 and 10ns (0.07 to 0.41m) shows a series of diffuse, linear reflectors [gpr1] that may well be related to path or track ways, perhaps associated with equestrian activities in the paddocks or recent historic landscape design contemporary with the Dean House Rectory. However, these responses may, in part, also be related to natural gravel deposits. Whilst the orientation of the linear anomalies, [gpr1], do not appear to respect any of the known Roman buildings (cf Figure 7) the possibility of a Roman road or track way in the vicinity, connecting the site at West Dean to the East Grimstead villa and bath house 2.5km to the west (SU 22 NW9; AMIE 223061) and the aisled farmhouse excavated at East Dean 2.25km to the east (SU 22 NE17; AMIE 223009), cannot be entirely discounted. A discrete rectilinear response [gpr2] is likely to represent the location of a former water jump in the paddock.

Evidence for the Roman buildings begins from approximately 6ns (0.25m) from the surface and is well defined to at least 24ns (0.9m). The main concentration of building remains [gpr3] corresponds well with the Victorian excavation plan of the "Villa Urbana", which is now bisected by the current field boundary. Evidence for all of the structures and rooms recorded by the antiquarian investigation appear to survive as geophysical anomalies, although the definition to the east is curtailed. Some additional linear anomalies at [gpr4] and [gpr5] are suggestive of further, perhaps less substantial remains, associated with the villa complex but unrecorded by the excavation. The significance of the linear anomalies at [gpr6] and [gpr7] is more difficult to assess, although they do not suggest any immediate association with the orientation and location of the Roman settlement.

Figure 7 shows an attempt to position the Victorian excavation plan against the location of the GPR anomalies superimposed over the OS map base. This, perhaps, suggests an amendment to the approximate position of Master's plan proposed in the 1969

scheduling record, as the location of the “Villa Urbana” would appear to be further to the east placing the “Villa Rustica” in the neighbouring field (Master 1885). Unfortunately due to the presence of mature trees the survey did not extend south to cover the potential location of the buildings originally discovered in 1846 during the construction of the railway.

CONCLUSION

The GPR survey has successfully detected a series of anomalies associated with the known Roman buildings, particularly the “Villa Urbana”, recorded by antiquarian excavations at the site. These remains appear to survive well at the site although, if the fidelity of the Victorian excavation plan is to be believed, these extend beyond the currently designated area. It is hoped that the GPR survey results will contribute to the ongoing management of the site and, through the precise location of the largest known building at the site, allow for better protection of these remains.

LIST OF ENCLOSED FIGURES

- Figure 1* Location of the GPR instrument swaths superimposed over the base OS mapping data (1:1250).
- Figure 2* Location of the GPR amplitude time slice between **10.8 and 11.4ns (0.43 - 0.46m)** superimposed over the base OS mapping data. The location of representative GPR profiles shown on Figure 3 are also indicated (1:1250).
- Figure 3* Representative profile from the GPR survey shown as a greyscale image with annotation denoting significant anomalies. The location of the selected profile can be found on Figures 1 and 2.
- Figure 4* GPR amplitude time slices between 0 and 12.4ns (0.0 to 0.5m) (1:2500).
- Figure 5* GPR amplitude time slices between 12.4 and 24.8ns (0.5 to 0.98m) (1:2500).
- Figure 6* Graphical summary of significant GPR anomalies superimposed over the over the base OS mapping data (1:1250).
- Figure 7* Correlation of the significant GPR anomalies with the Victorian excavation plan (1:1250).

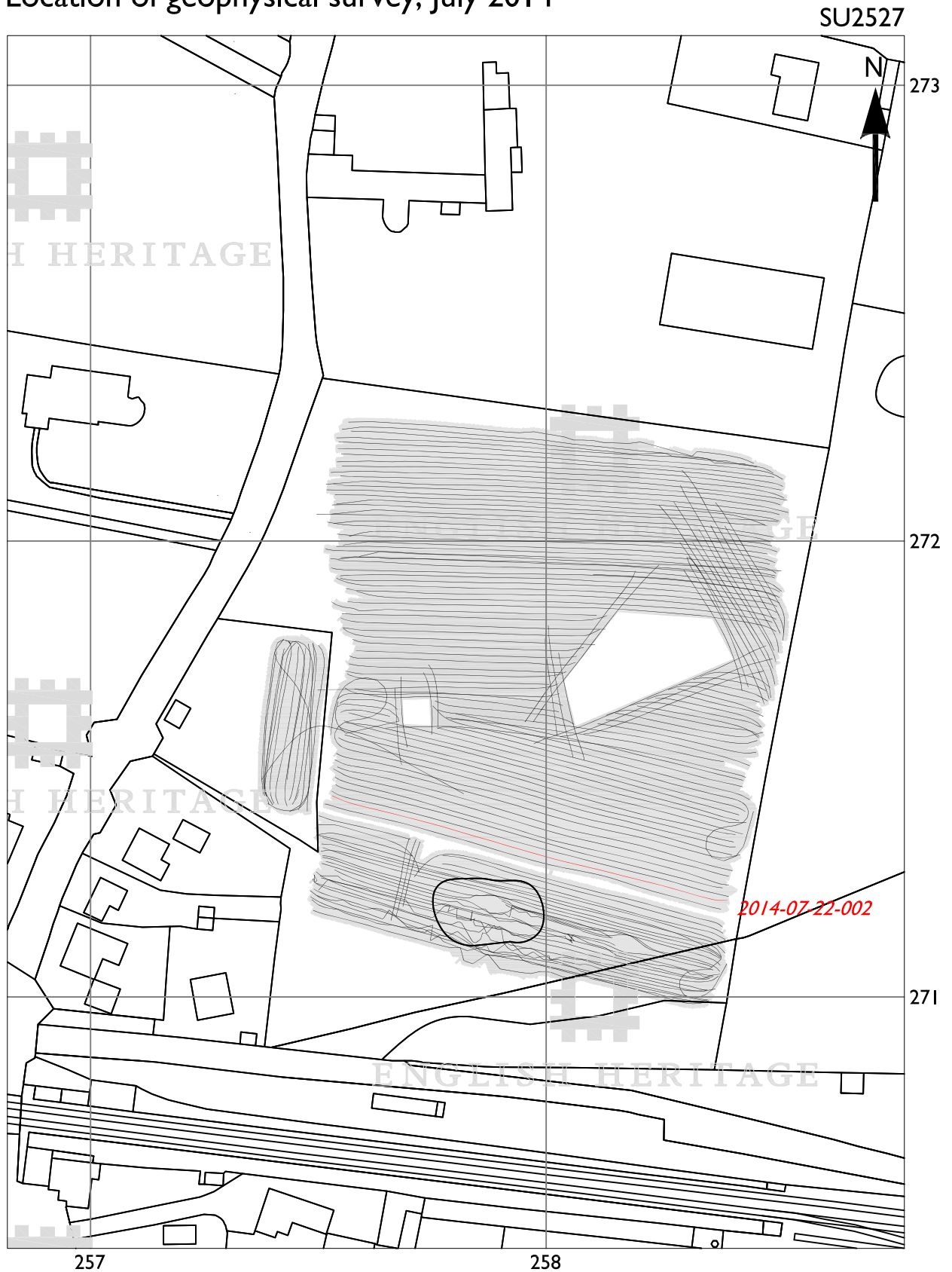
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Figure 1

WEST DEAN VILLA, WEST TYTHERLEY, HAMPSHIRE

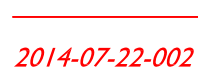
Location of geophysical survey, July 2014



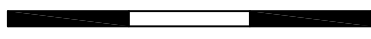
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Ground Penetrating Radar survey swaths



Location of selected GPR profile shown on Figure 3
2014-07-22-002

0  60m

1:1250

Figure 2

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GPR amplitude time slice between 10.8 and 11.4 ns (0.43 and 0.46 m)

SU2527



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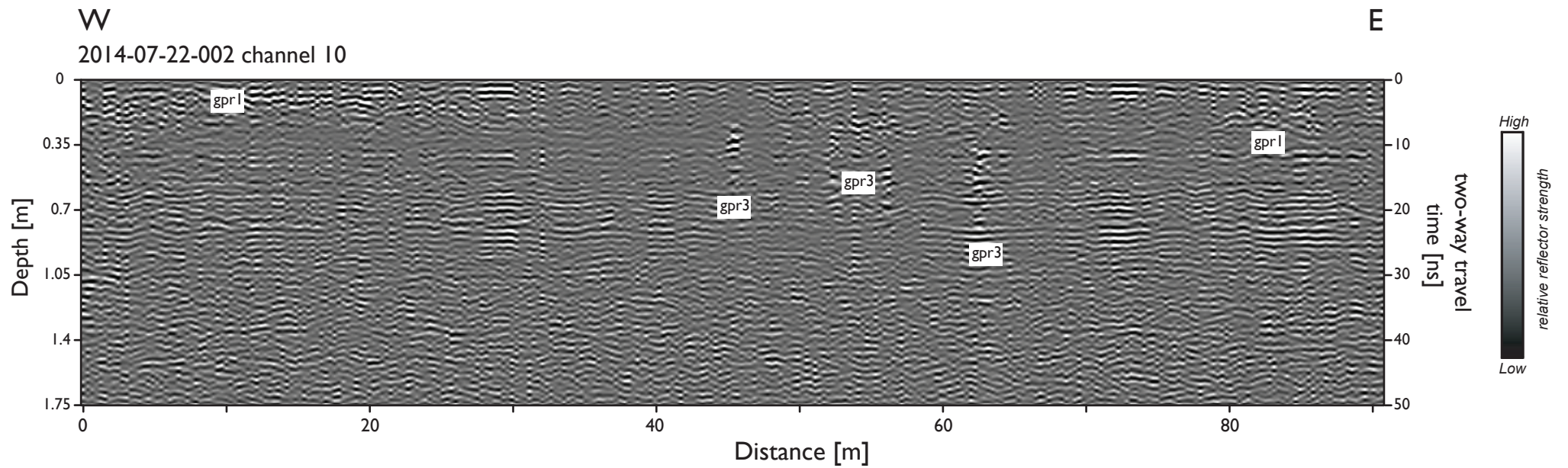
Low High
relative reflector strength

0 60m

1:1250

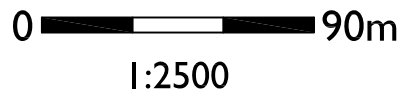
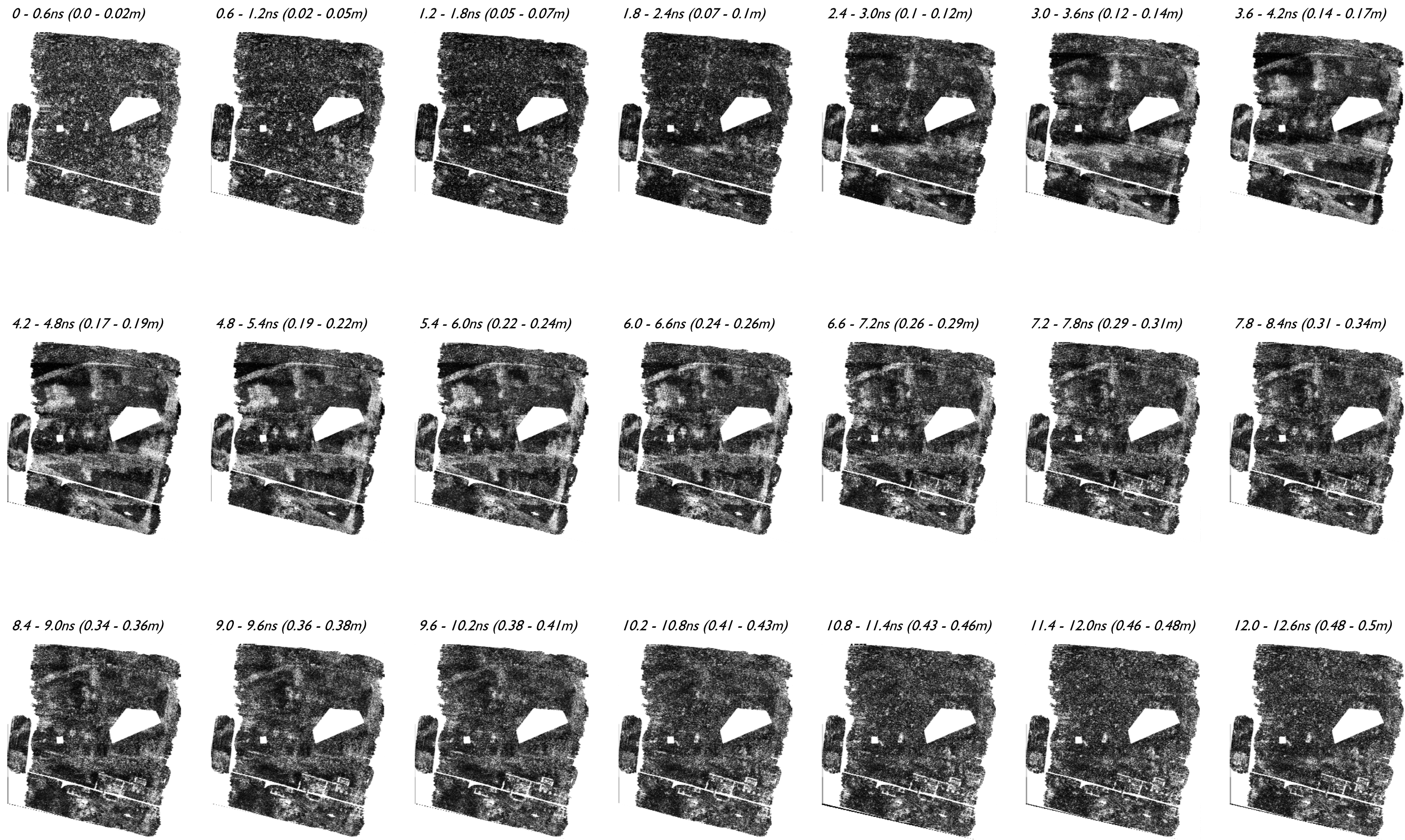
WEST DEAN VILLA, WEST TYTHERLEY, HAMPSHIRE
Selected GPR profile, July 2014

Figure 3



WEST DEAN VILLA, WEST TYTHERLEY, HAMPSHIRE
 GPR amplitude time slices from between 0.0 and 12.6ns (0 - 0.5m), July 2014

Figure 4



WEST DEAN VILLA, WEST TYTHERLEY, HAMPSHIRE
GPR amplitude time slices from between 12.6 and 24.4ns (0.5 - 0.98m), July 2014

Figure 5

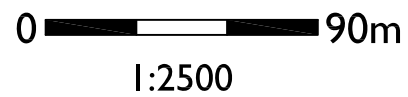
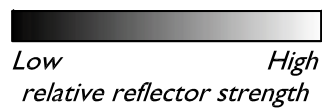
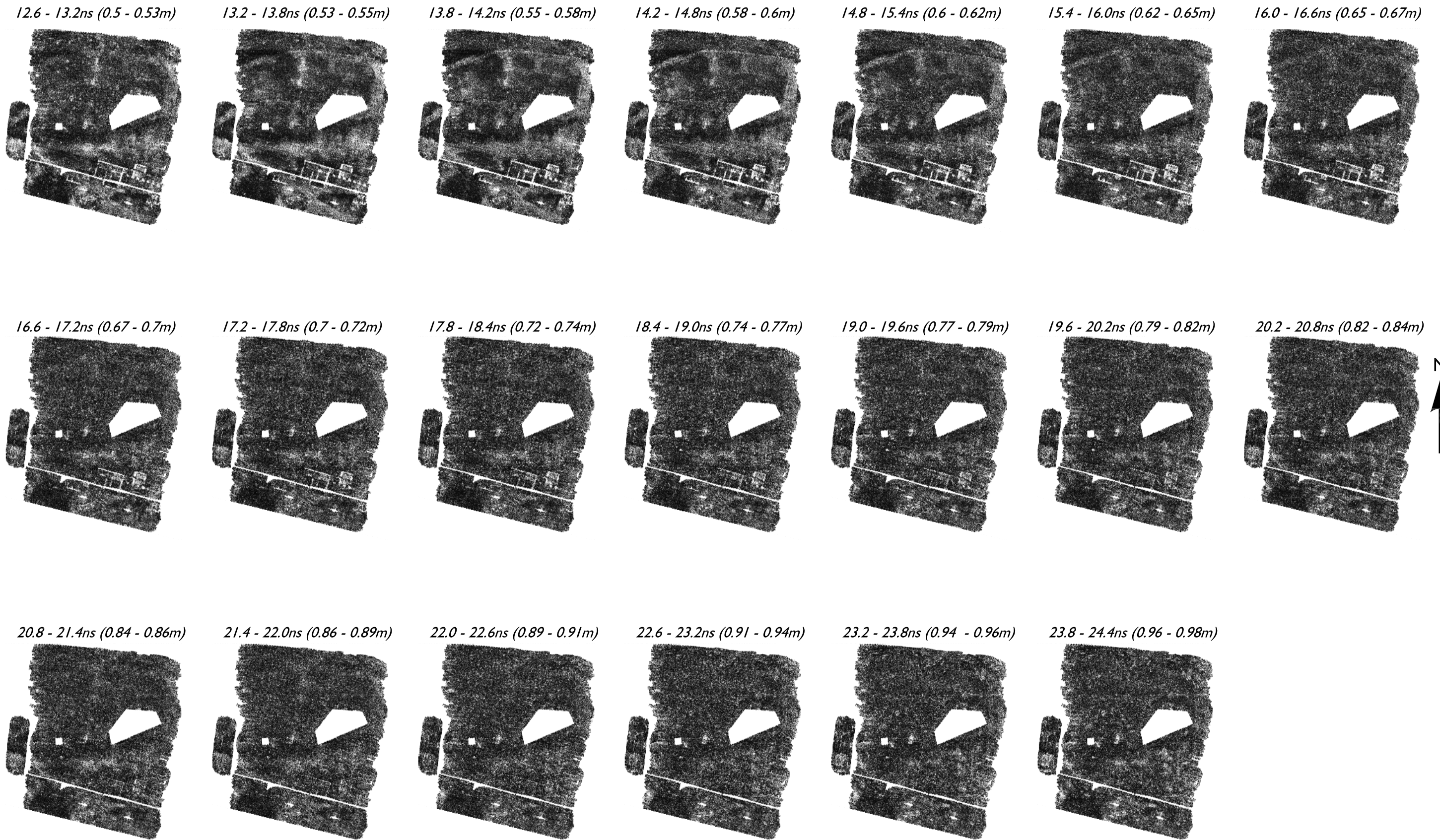
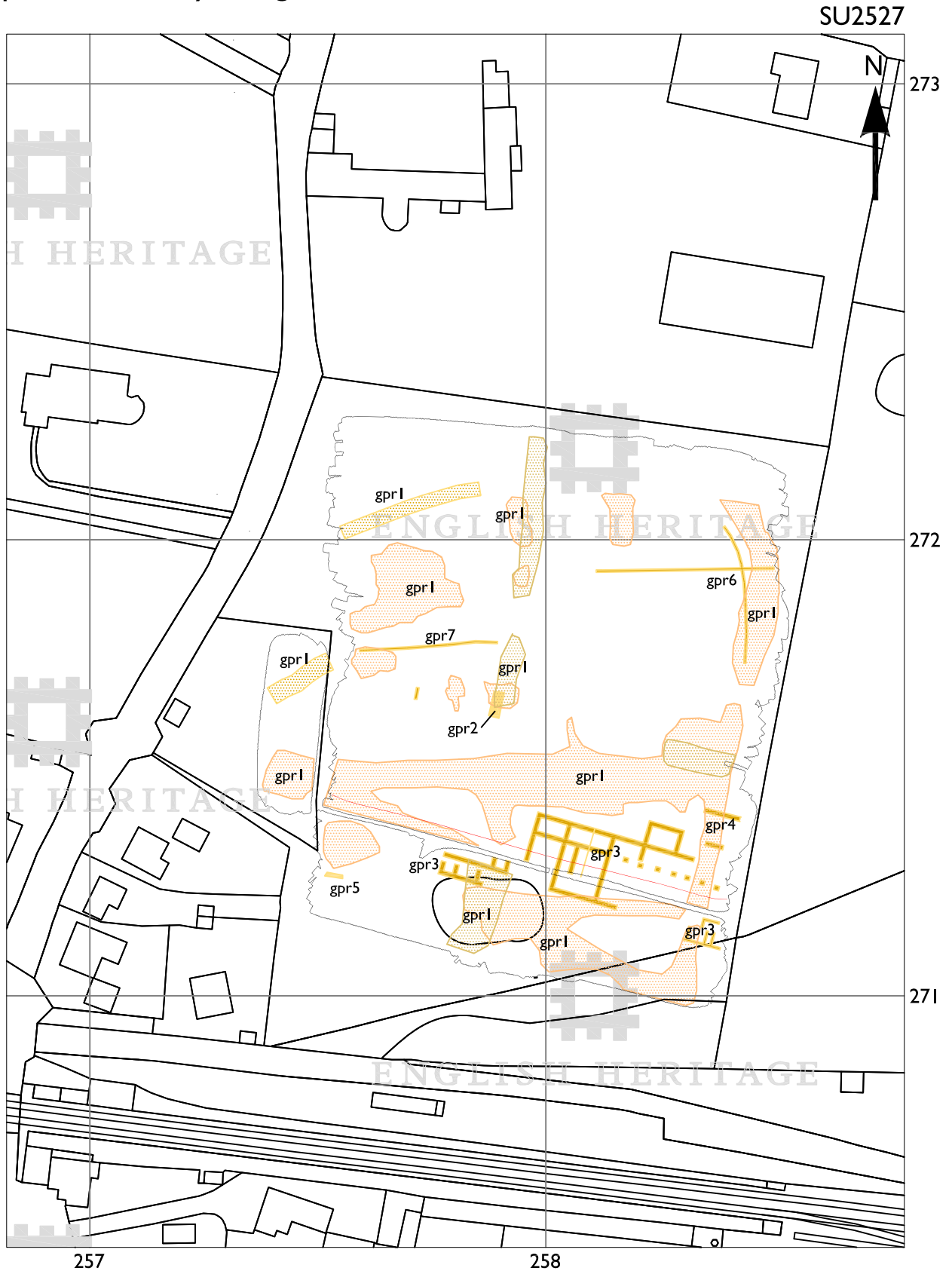


Figure 6

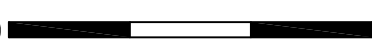
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Graphical summary of significant GPR anomalies



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-  low amplitude reflectors
-  high amplitude reflectors

0  60m

1:1250

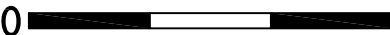
Figure 7

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GPR anomalies superimposed over Victorian excavation plan



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0  60m

1:1250



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- * Remote Sensing (including Mapping, Photogrammetry and Geophysics)

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