



RADAR SURVEY OF CAR PARKS AT BISHOPS ROAD, PETERBOROUGH

Radar Survey of car parks

for ECUS Ltd

March 2011

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Parish: St Mary, Peterborough

Council: Peterborough City Council

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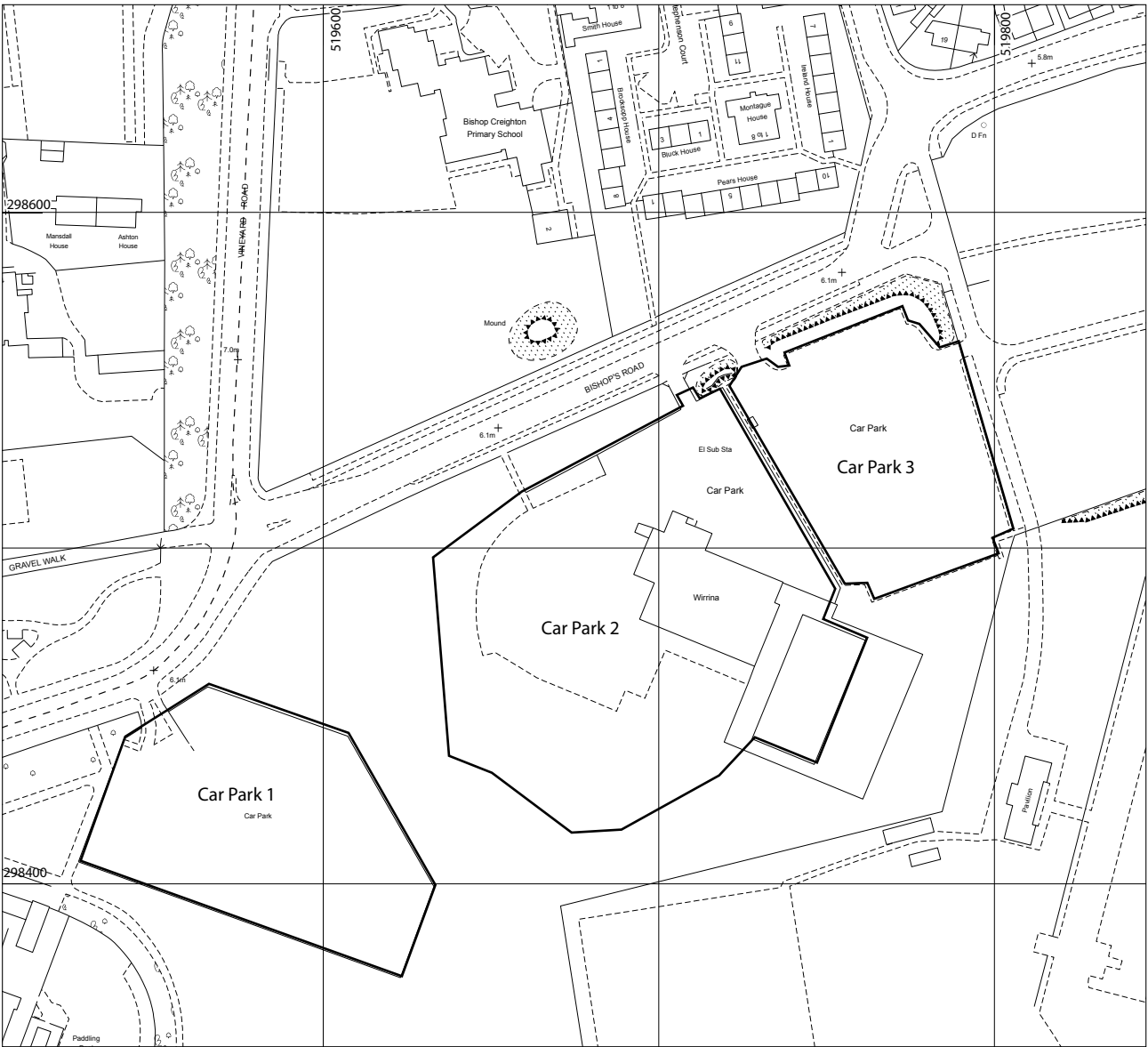
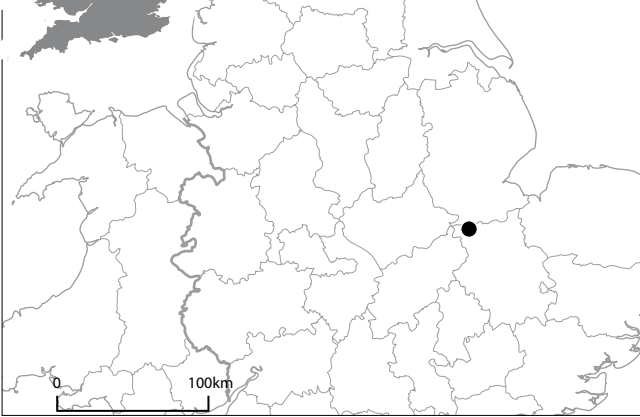
ACKNOWLEDGEMENTS

The work was funded by Peterborough City Council (PCC) and was monitored by Rebecca Casa-Hatton (Archaeological Officer - AO) PCC.

The fieldwork and reporting was carried out by Simon Mayes (Project Officer) and the overall project was managed for Headland Archaeology by Joe Abrams (Project Manager). The contract was awarded and managed for PCC by Simon McCudden, ECUS Ltdd



Bishops Road
Peterborough
Cambridgeshire



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Scale 1:2,000 @ A4



0 100m



Illus 1
Site location

RADAR SURVEY OF CAR PARKS AT BISHOPS ROAD, PETERBOROUGH

Radar Survey of car parks

This report details the results of a Radar Survey conducted in March 2011, by Simon Mayes of Headland Archaeology, of car parks at Bishops Road, Peterborough (NGR TL 19681 98477). The aims of this survey were to:

- *identify any geophysical anomalies of possible archaeological origin within the specified survey areas*
- *accurately locate these anomalies and present the findings in map form*
- *describe the anomalies and discuss their likely provenance in a written report*
- *recommend any further work (including other forms of geophysical survey if appropriate) likely to contribute to the mitigation of the impacts of the development on these features*

Generally it is not possible to attribute a date to features identified in radar surveys. However, it is clear from this survey that in Car Park 2 the floors of what are probably two quite modern buildings were detected, alongside disturbance associated with their demolition. This car park is considered to have a relatively low potential to contain significant archaeological remains. Other cut features and structures in car parks 1 and 3 may be of more historic interest. Perhaps the most significant features are the large structure and possible hollow identified in Car Park 3. It should be noted that these features are substantial and the modern disturbance evident across the areas may have masked more ephemeral features. These car parks are considered to have a relatively high potential to contain significant archaeological remains. Specifically, the most interesting feature is the possible rectangular structure/cut feature in Block 5 (A1.19). This may be a moated feature, or it may be a structure with relatively thick walls, and appears to be pre-modern at this stage.

Statement of Indemnity

Radar Surveys rely on observations about the physical properties of the archaeological remains they attempt to locate. Through experience it becomes possible for geophysicists to identify features with reasonable accuracy by the physical trace these features leave. It must be noted however, that the hypotheses offered should not be treated as the unequivocal truth until tested and proved by further intrusive investigation where warranted.



1. INTRODUCTION

As part of the overall transport strategy from Peterborough City Council (PCC) designed to encourage car users to use Park and Ride services within the City Centre and the need to identify suitable sites (currently utilised as car parks which are owned by PCC) for future development; it was necessary to carry out evaluative works. A Ground Penetrating Radar (GPR) survey was commissioned through ECUS Ltd on behalf of PCC as part of the assessment of below ground archaeology.

The GPR survey on the three car parks (The Regional Pool/The Wirrina/Bishops Road), forms part of an overall Heritage Assessment Report on nine car park sites situated within the city centre. The Heritage Assessment Report forms part of a wider Environmental Assessment Report.

The Environmental Assessment Report also covers Ecology and Contaminated Land.

The primary aim of the overall Environmental Assessment Report is to identify the overall environmental baseline of each site together with any constraints. Any environmental constraints identified will need to be taken fully into consideration in order to assist PCC in deciding their future strategy on which car park sites to prioritise in taking forward (or not) for any development opportunities.

2

The three particular car park sites selected to undertake the GPR survey on were chosen due to the ease of access, the potential for gaining positive results and fundamentally because of the archaeological potential of the three sites being in close proximity to Peterborough Cathedral and precincts.

Headland Archaeology Ltd was commissioned by PCC through ECUS Ltd *the client* to undertake a ground penetrating radar survey of three car parks in central Peterborough.

The aims of the proposed archaeological geophysical survey were to:

- identify any geophysical anomalies of possible archaeological origin within the specified survey areas
- accurately locate these anomalies and present the findings in map form
- describe the anomalies and discuss their likely provenance in a written report
- recommend any further work (including other forms of geophysical survey if appropriate) likely to contribute to the mitigation of the impacts of the development on these features

1.1 Location

The car park is located at NGR TL 19681 98477 bounded by Bishops Road to the north, the grade II listed Peterborough Lido to the west, a football pitch to the south and athletics ground to west. Peterborough Cathedral lies approximately 200m north to northwest of the car park on the other side of Bishops Road. The car park is surrounded by trees to the south and west and car park 1 is separated from car park 2 and 3 by a 50m wide woodland area. The site is relatively flat at 5.8m OD and lies approximately 300m north of the river Nene.

1.2 Site topography and geology

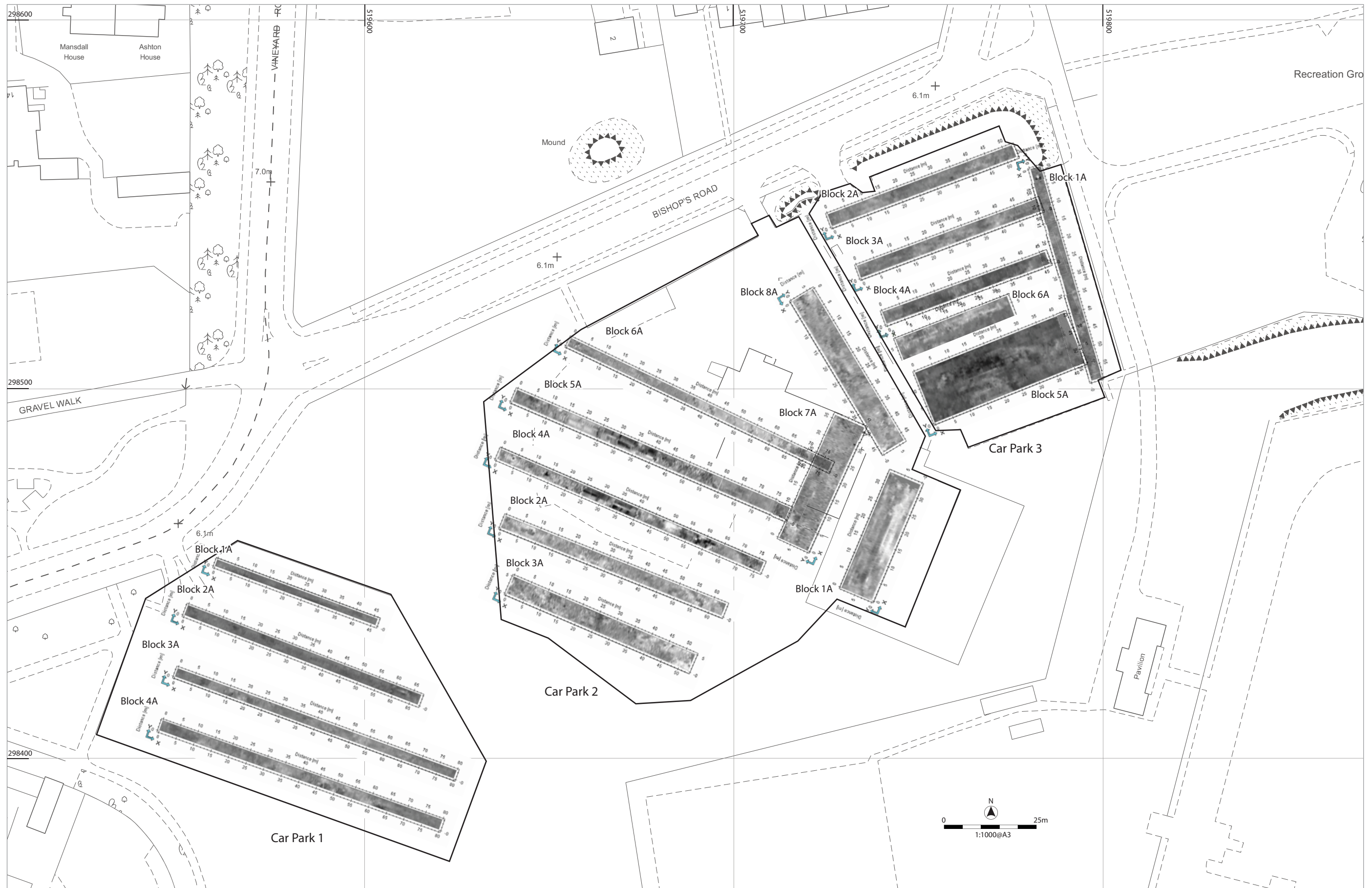
The geology of the site consists of *alluvium* overlaying a Blisworth Limestone formation (http://maps.bgs.ac.uk/geologyviewer_google/googleviewer.html). The geology did not affect the results of the GPR survey.

The site is currently in use as a car park. Car park 1 was covered with mixed period tarmacs, car park 2 consisted of a gravel surface with patches of tarmac and car park 3 was tarmac. The result of the survey was not affected by the tarmac or gravel surfaces.

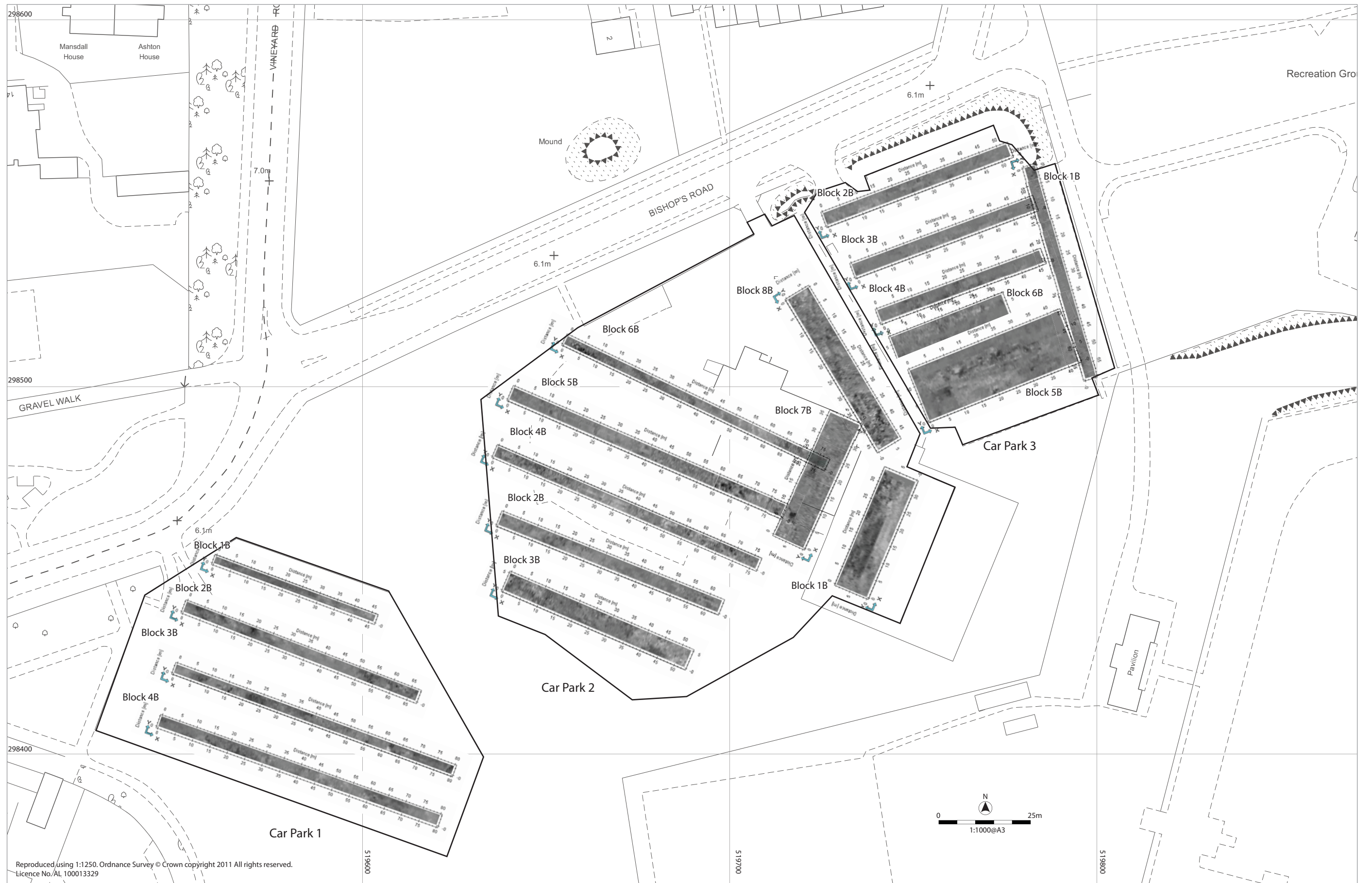
1.3 Background and history

Peterborough city centre's prehistoric and Roman history is relatively unknown although residual evidence from excavations within Peterborough indicates that this lack of evidence is due to later urban developments rather than a lack of use of the area. A monastery was established at 'Medeshamstede' on the site of the present cathedral church of St Peter in the Middle Saxon period. The monastery was probably located close to a Mercian royal centre and continued as a successful house into the Late Saxon period when the early church and some of its associated buildings were enclosed by a set of defences originally erected by Aethelwold and later refortified in stone by Cenulf. A stone wall foundation cutting into an earlier bank may have been associated with these enclosures (Mackreth 1994). Following a fire in 1116, a new monastic church and precincts were built. Following Henry VIII's dissolution of the Monasteries in 1541 the church was selected as the cathedral of the new Diocese of Peterborough.

A resistivity survey was carried out over the south lawn of the Bishop's Garden in the grounds of Peterborough Cathedral in 1996 in an attempt to resolve the course of the western boundary of the Anglo-Saxon burgh. Even over the small 60x20m area investigated, there was considerable variation in the measured resistance and a number of anomalies possibly indicative of artificial structures were located. Of these a distinct high resistance linear anomaly is in a position and orientation coinciding

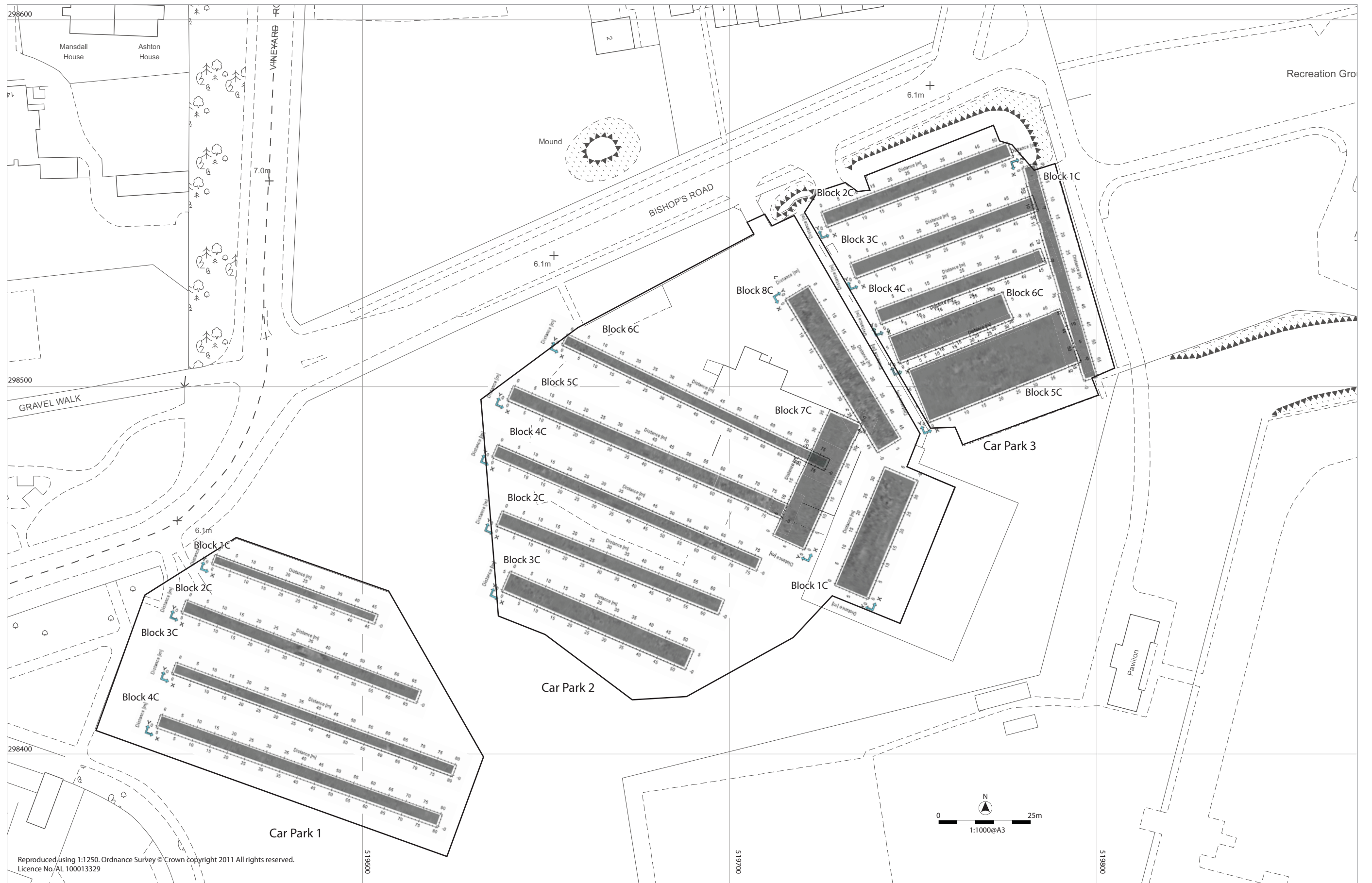


Illus 2
Plan with survey results, Level A



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Illus 3
Plan with survey results, Level B



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Illus 4
 Plan with survey results, Level C



with the expected course of the western section of the burghal defences (Payne 1996).

The Western Range at Peterborough Cathedral was excavated in 1998 to test the theory that elements of the monastic and later drain system ran through the area. The excavations (*HER 51279*) revealed a culvert of mortared bricks which was internally 0.7m high and 0.9m wide. An earlier culvert survived as a mortared limestone wall inserted into an earlier open ditch. An assemblage of Late Saxon, medieval and post-medieval pottery was retrieved. Remains of a partly open and partly stone-built and roofed culvert were previously found at TL 193 988 (*HER 00908*) (Meadows 1998, Hatton *et al.* 2006).

It was anticipated that the GPR survey could pick up features related to the settlement surrounding the monastic site and its defences or to the later precincts. This information would be used to target the need for any further archaeological work more effectively.

2. METHOD

The survey was conducted to the highest professional standards as detailed in *Geophysical Survey in Archaeological Field Evaluation*, English Heritage Research and Professional Services Guideline No. 1, 2nd ed. (English Heritage 2008) and *The Use of Geophysical Techniques in Archaeological Evaluations*, Institute of Field Archaeologists Paper, No. 6 (IfA 2002) and the *DRAFT Standards and Guidance for Geophysical Survey*, IfA Technical Paper (IfA, Pending Ratification). All data provided by Headland Archaeology (UK) Ltd., has been treated in accordance with the guidelines laid out in *Geophysical Data in Archaeology: A Guide to Good Practice* (AHDS Guides to Good Practice; Schmidt 2001).

Metal objects were detected during the survey and are likely to be modern services, but as the aim of the survey was not to identify the location of modern services, these are not included in the subsequent analysis. All the interpretations set out below are provisional and cannot be viewed as reliable until tested by intrusive investigation.

2.1 The survey

The survey was undertaken using a Maya Ramac, cart-mounted 250 MHz antennae ground penetrating radar system. Ground penetrating radar was chosen due to the need to use a method capable of propagating a signal through tarmac and receiving a signal capable of interpretation

Ramac antennae are shielded and therefore any residual signals from parked vehicles are only likely to become an issue in the last traverse immediately adjacent to them. As the time domain of any interference from these will differ from ground signals, due to the air gap between

the receiver and the vehicle, then they should be easily distinguishable in the data set where they occur.

Based on a cursory review of available information (modern air photos) the site would appear to lie within, but near the edge of, the alluvial plain, and from the apparent shape of this edge there is potential for palaeo-channels to exist in its vicinity. Therefore the soil types that may be expected are a mixture of bedded sands, silts, clays and gravels. The moisture content of these will influence the effectiveness of the survey technique. Due to this it was decided the 250mHz antennae be used. This sacrifices a degree of resolution for an increase in depth of detection. In urban settings even such a deep seeking antennae might not penetrate greater than a meter beneath the surface.

Due to the presence of rows of parked cars only the 'aisles' between these were available for survey. The survey blocks were located using a Trimble R6RTK GPS and were all rectangular in shape. A total of 18 blocks were surveyed covering an area of 7533m² that can be divided into Car Park 1, Car Park 2, Car Park 3 (Illus 1).

Car Park 1

Block 1	44m x 5m
Block 2	65m x 5m
Block 3	91m x 5m
Block 4	92m x 5m

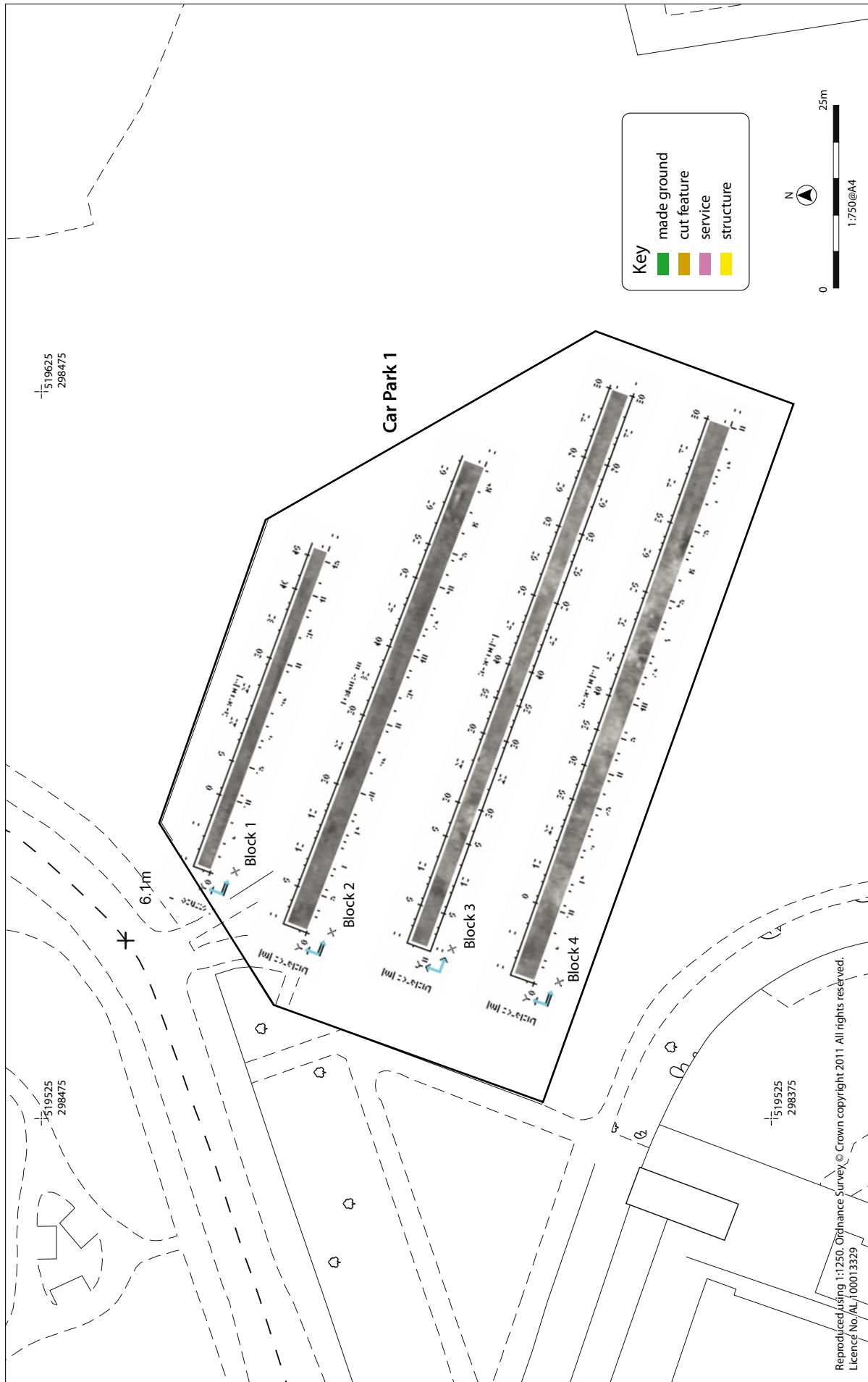
Car Park 2

Block 1	31m x 16m
Block 2	62m x 5.5m
Block 3	51m x 9m
Block 4	75m x 5.5m
Block 5	77m x 5.5m
Block 6	76m x 6m
Block 7	33m x 18m
Block 8	46m x 7m

Car Park 3

Block 1	57m x 3.5m
Block 2	51.5 x 6m
Block 3	49m x 5.5m
Block 4	45.5m x 6m
Block 5	40m x 21m
Block 6	31m x 9.5m

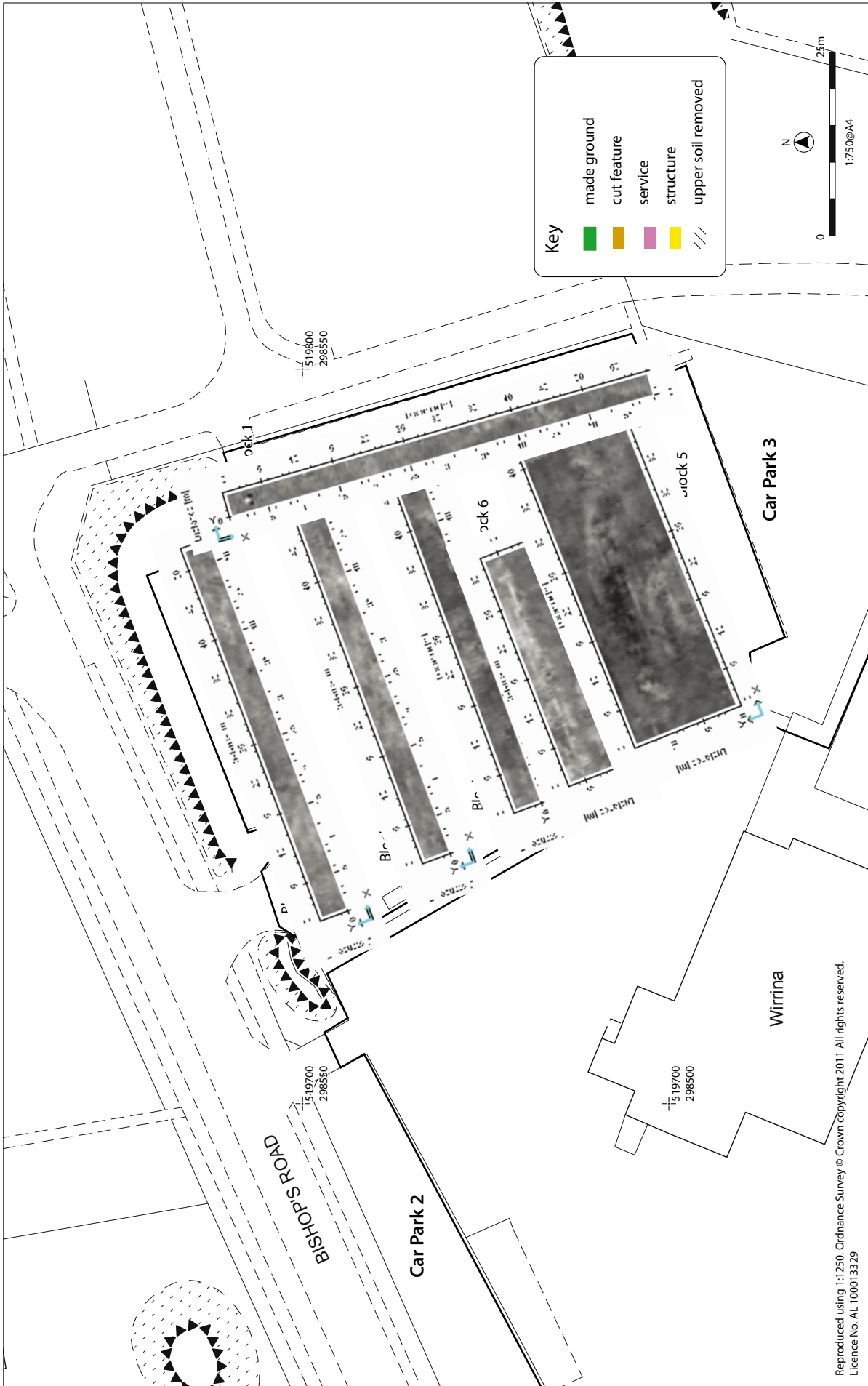
Table 1
Size of surveyed blocks



Illus 5
Car park 1, with interpretive shading



Illus 6
Car park 2, with interpretive shading



Illus 7
Car park 3, with interpretive shading



2.2 Data Processing

The data was processed using EASY 3D software. Three slices at estimated depths of 0.55m, 1m and 1.20m below ground level were produced and in situ grayscale data plots were produced for each slice (Illus 2, 3 and 4). All profiles through the blocks were manually inspected for features and the main anomalies noted are annotated on illus 5, 6 and 7. The data was processed using an AGC filter with scale of 5000 and 21 reading window. Sample sections have been produced in support of the various interpretations shown on illus 5, 6 and 7 and are presented in Appendix 1.

Copies of the report and the data archive created during the course of the survey will be made available to the curator, English Heritage and OASIS.

3. RESULTS

3.1 Car Park 1 (Illus 5)

10 The area was surveyed in four blocks. A key attribute of the data within this area is that there appears to be an earlier ground surface sealed beneath the modern-day car park surface. This is most probably the 20th-century ground level prior to the construction of the car park. At both its southern and northern extremities the ground appears to have been made up. This is most evident in Illus A1.2 and A1.6 where at the right hand end of both these sections a divergence in the first and second horizontal bands is clearly evident.

The most interesting feature visible within the data lies within Block 2. This data appears to contain a relatively large and deep hollow (Illus A1.4) adjacent to what may be a small structural feature (Illus A1.3) visible in plan from 30–45m along this block (Illus 5). The cut feature appears at face value to be relatively deep – although it is not clear whether the equipment is seeing the base of the feature or simply its fills. The structural feature stands out in contrast to this, where the bands of responses curve upwards. It is quite broad in form and possibly relates to masonry or concrete. The juxtaposition of the two features is interesting and could result from a tip of rubble in one quarter of a large pit or a large concrete base cast in a bigger feature. Given how high up the profile the feature appears it is likely to be relatively recent in date.

Another possible hollow or channel edge is visible in Illus A1.6 at the east end of block 4 and a possible structural feature is visible between 30–35m along this block. A cut feature lying between 45–50m appears to have been cut from the modern car park surface and may be related to services in the area. Block 3 (Illus A1.5) contained an area of disturbed ground that could be associated with the

deep hollow within Block 2 and occurs to quite a depth beneath the ground surface – the nature of the ground appears rubble-rich at this location, or may contain quantities of metal rubbish.

3.2 Car Park 2 (Illus 6)

The data from the eight blocks surveyed in this area contrasts with that from Car Park 1 in that it appears to contain areas of disturbance and also areas where the upper soil surface may have been stripped off (perhaps in an attempt to level the site). In Block 6 there appears to be the remains of a floor (perhaps concrete) of a building that once stood on that part of the site (Illus A1.12 and A1.13). To the east of this an area of disturbance probably relates to the demolition and grubbing up of remains of this building. In the adjacent Block 1 (Illus A1.7) the distinction between what may be a concrete floor of another building (not shown on maps or air photos) is clearly visible and shown on Illus 6 between 40–62 m along the block.

In a similar fashion to Car Park 1 there are indications of cut features in this part of the site too, such as Block 2 (Illus A1.8), Block 4 (Illus A1.10) and Block 7 (Illus A1.14). In Block 3 most of the earlier ground surface appears to have been stripped (Illus A1.9 – the arrow shows the buried ground surface and where it stops).

At the north side of this car park, in Block 8, there is an indication that the ground surface has been made up, perhaps within a hollow in this part of the site (Illus A1.15).

3.3 Car Park 3 (Illus 7)

Of the three areas investigated this part of the site contains the most coherent features as well as showing signs of having been the most truncated by car park construction. Of the six areas investigated Blocks 1–4 show no indication of a late historic ground surface beneath the car park make up. The ground appears to have been built up, or reworked, at the north end of Block 1 and along the entire length of Block 2.

Within the centre of the car park there appears to be a large hollow which potentially runs through blocks 3, 4 and 6 (Illus A1.18, A1.20 and A1.21). To the south of these, in Block 5, is what appears to be part of a rectangular structure 20m in length and of unknown width. Assuming the responses associated with this structure relate to walls or footings then the width of these would be about 2m (Illus A1.19). Alternatively the responses may arise from a buried cut feature. In this case the features appear to lie beneath an earlier soil horizon in places and therefore could have some antiquity. It is not common for features to appear so visibly in the time slice data with very little

editing, and this is usually a result of the layers above being very parallel to the ground surface.

4. CONCLUSION

The natural geology is evident in all the sections produced in Appendix 1 where the blue data suddenly gives way to yellow. It is at this point that alluvial deposits may occur and the moister, clayey nature of these deposits tends to absorb almost all reflections of the radar signal so that all that is left are echoes of features or deposits at a higher level in the profile. It is clear that features have on occasion been cut through this horizon, the most noticeable being visible in Illus A1.3.

In terms of the modern topography of the three car parks the data suggests that the southwestern most car park (1) originally had lower lying ground that had to be made up to the current level when it was constructed. Conversely in Car Park 3 at the northeast end of the three, it would appear that the ground had to be reduced when it was leveled, removing the earlier ground surface and possibly any shallow archaeological features in this area.

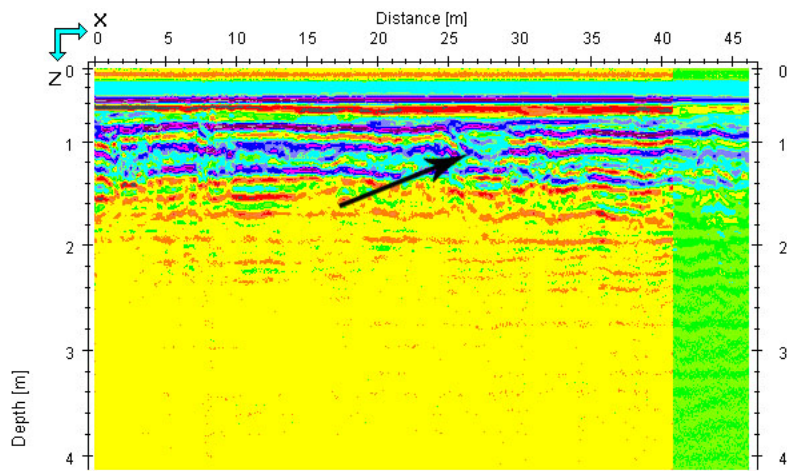
Generally it is not possible to attribute a date to features identified in radar surveys. However, it is clear that in Car Park 2 the floors of what are probably two quite modern buildings were detected, alongside disturbance associated with their demolition. This car park is considered to have a relatively low potential to contain significant archaeological remains. Other cut features and structures in car parks 1 and 3 may be of more historic interest. Perhaps the most significant features are the large structure and possible hollow identified in Car Park 3. It should be noted that these features are substantial and the modern disturbance evident across the areas may have masked more ephemeral features. These car parks are considered to have a relatively high potential to contain significant archaeological remains. Specifically, the most interesting feature is the possible rectangular structure/cut feature in Block 5 (Illus A1.19). This may be a moated feature, or it may be a structure with relatively thick walls, and appears to be pre-modern at this stage.

5. BIBLIOGRAPHY

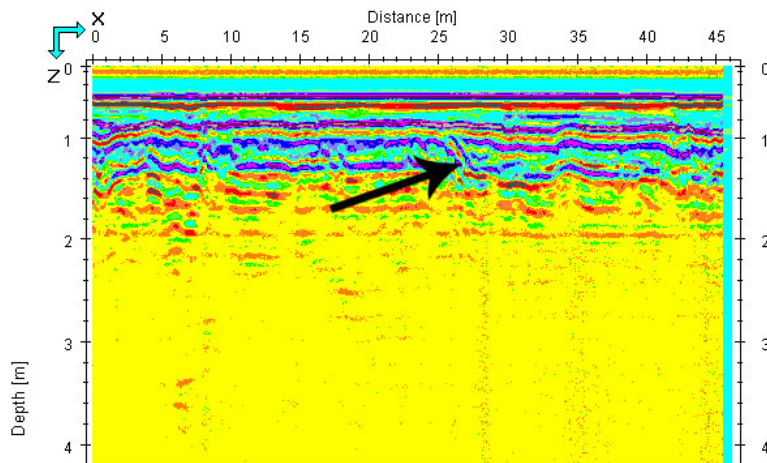
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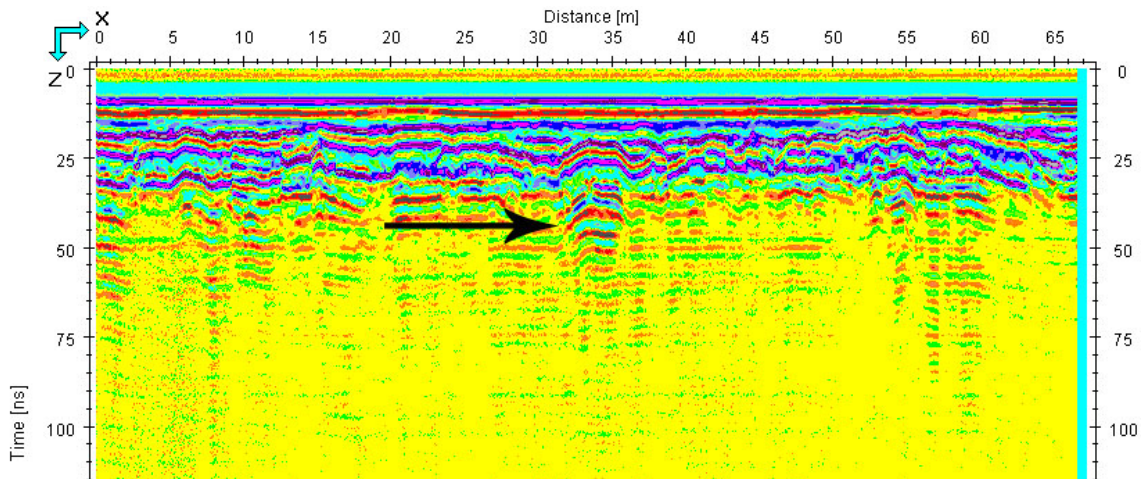
6. APPENDIX 1 – SECTIONS



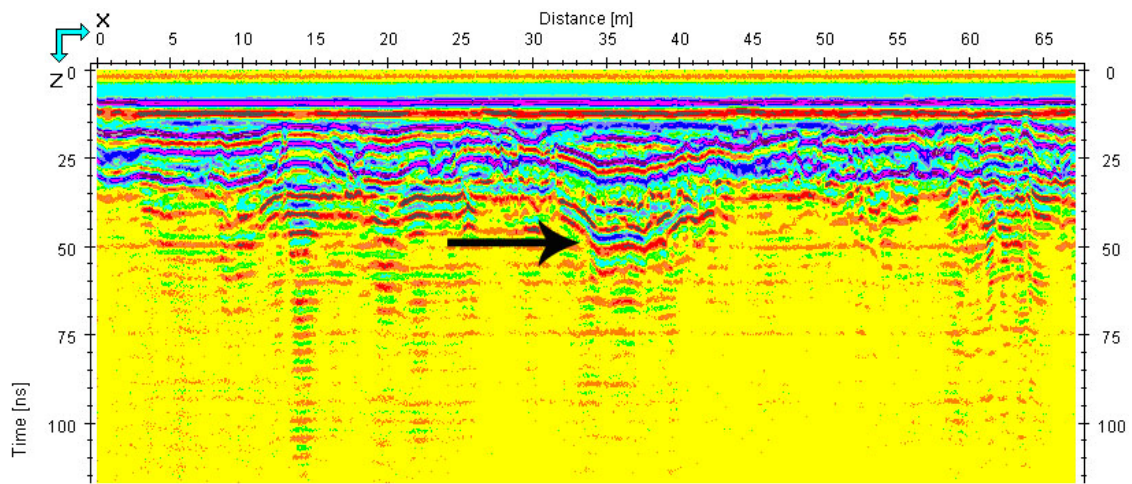
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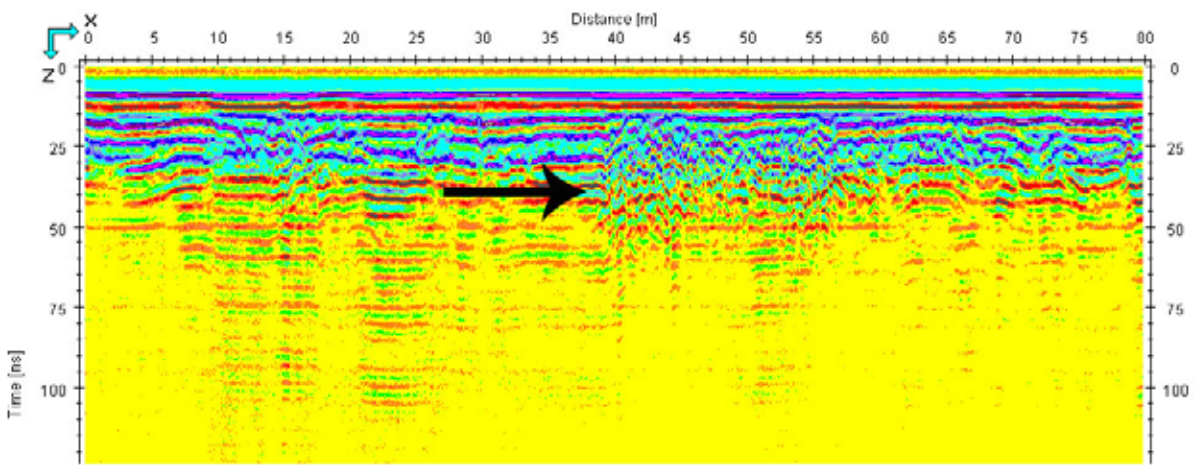
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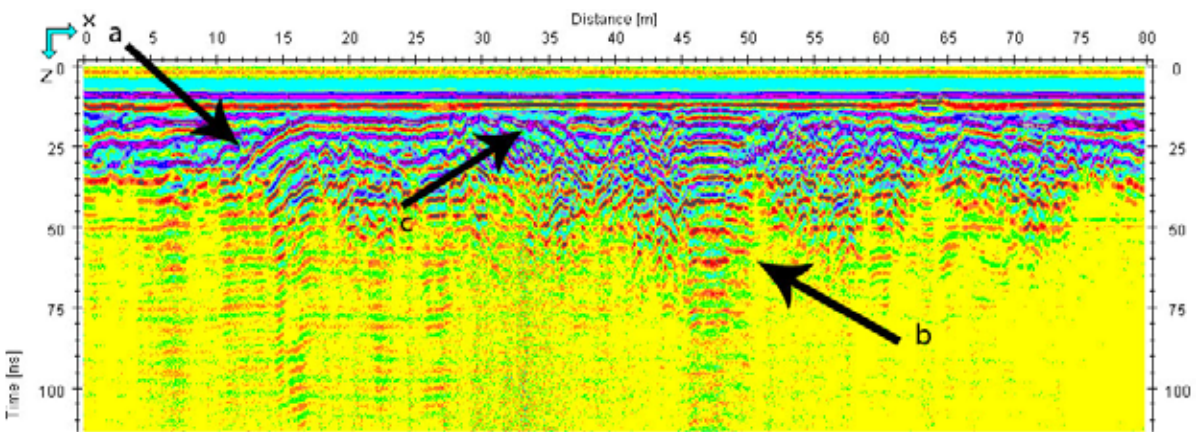
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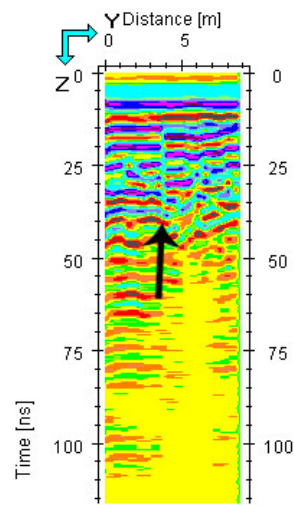
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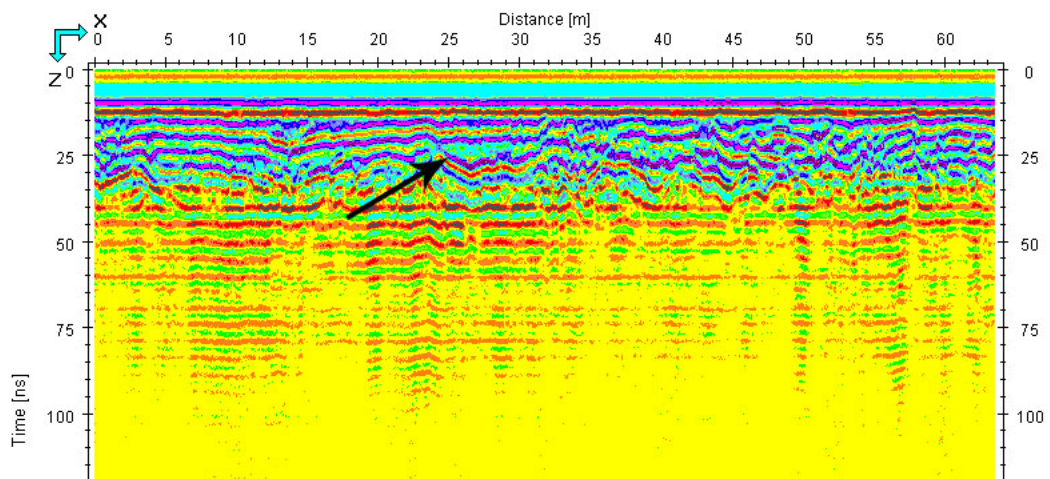
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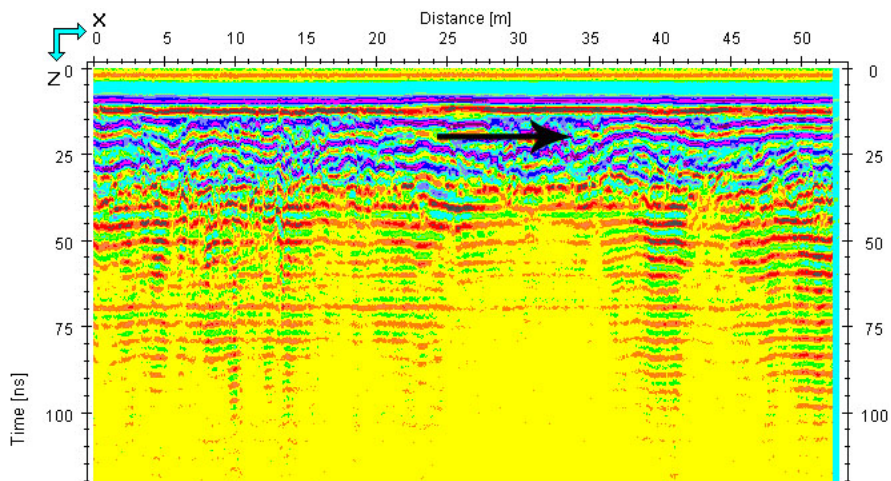
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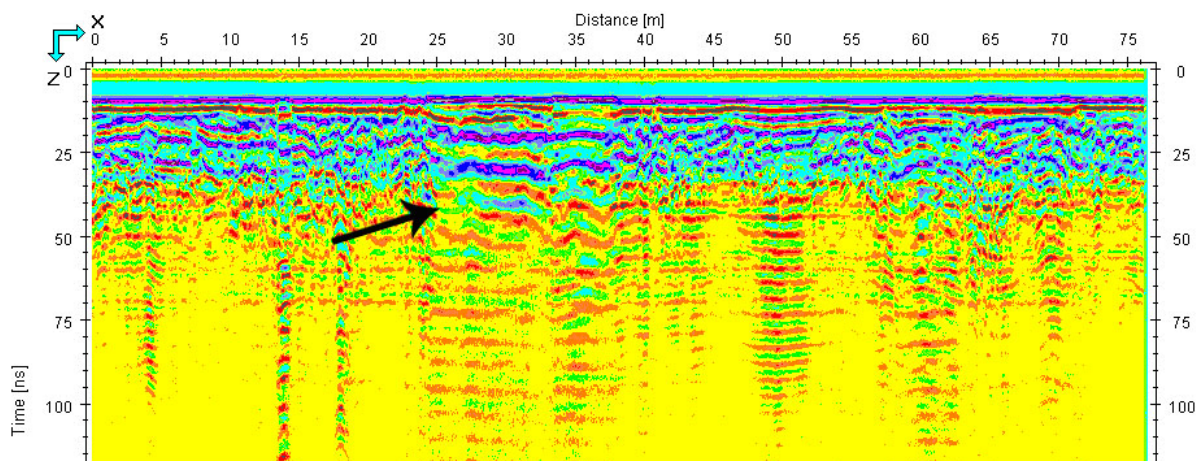
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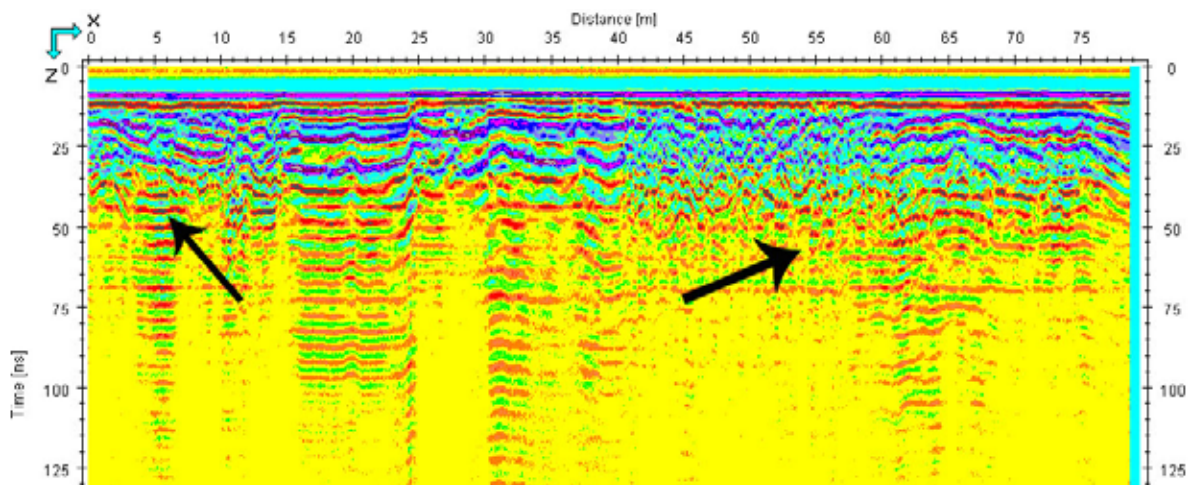
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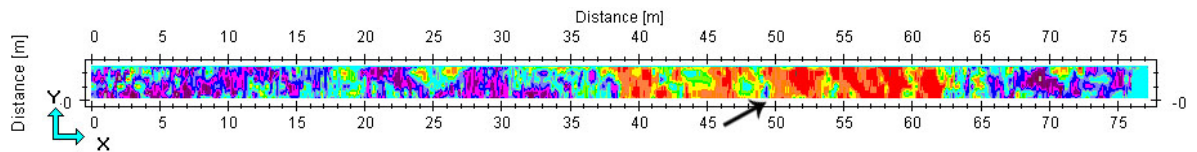
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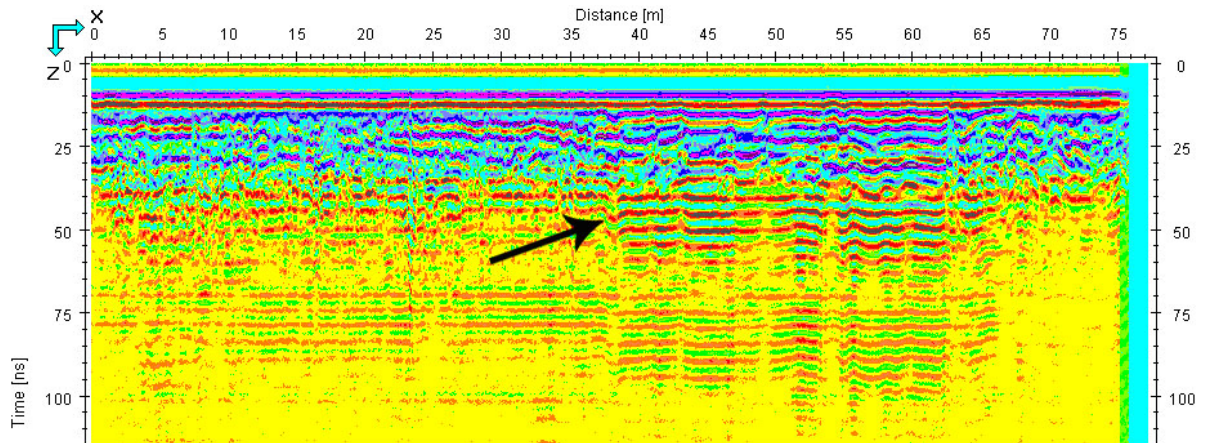
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Section 11

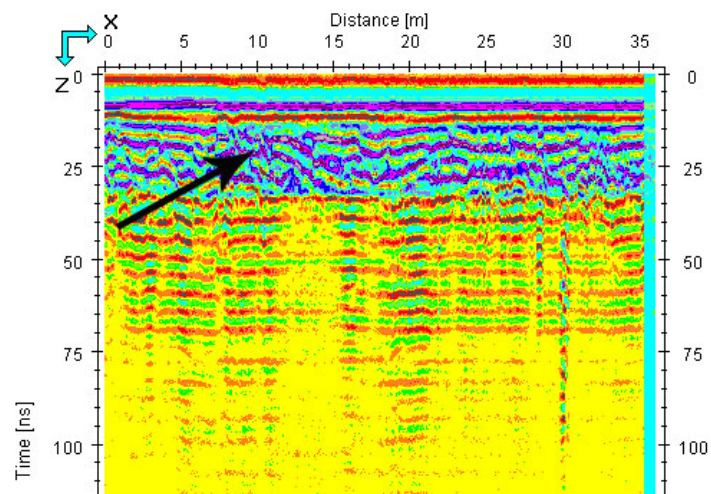


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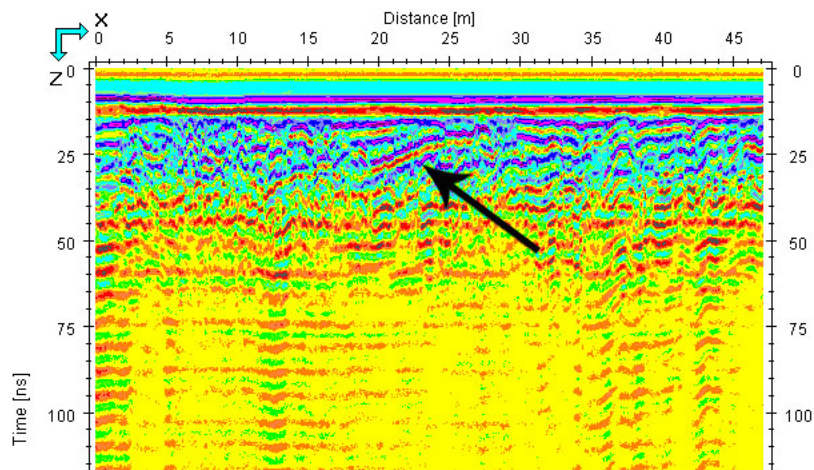


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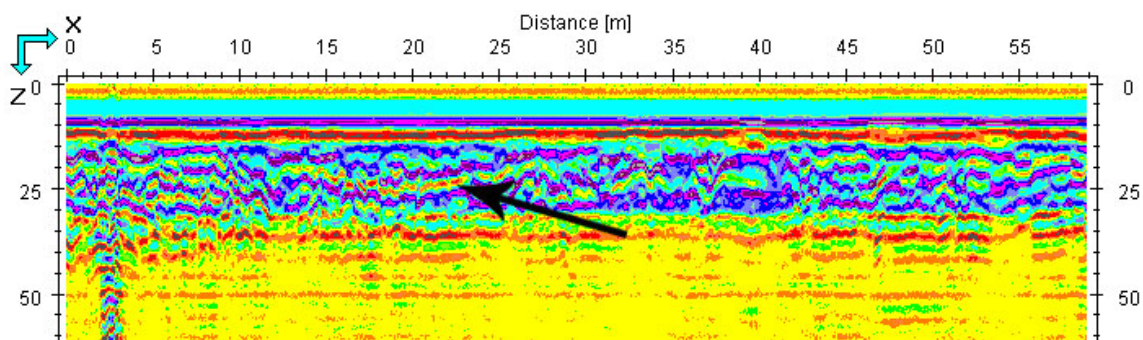
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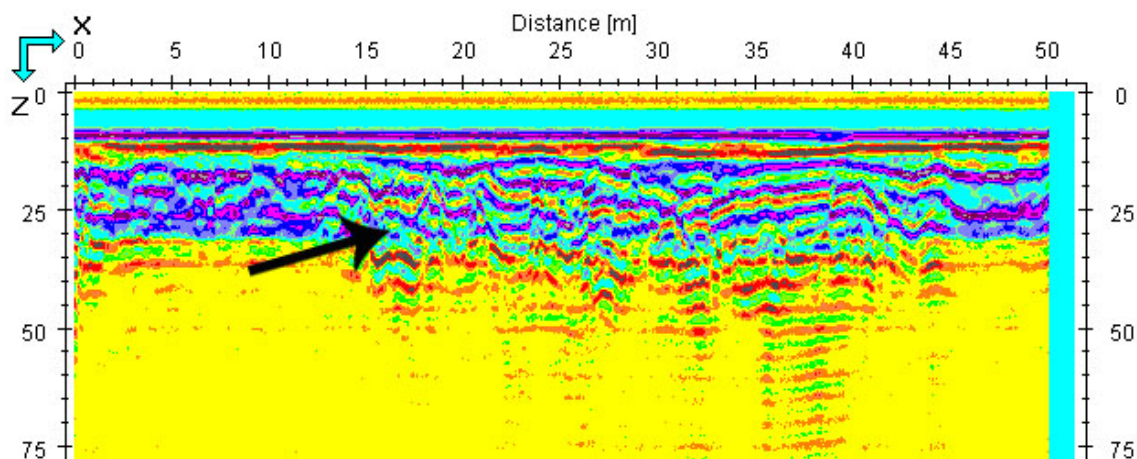
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Section 15

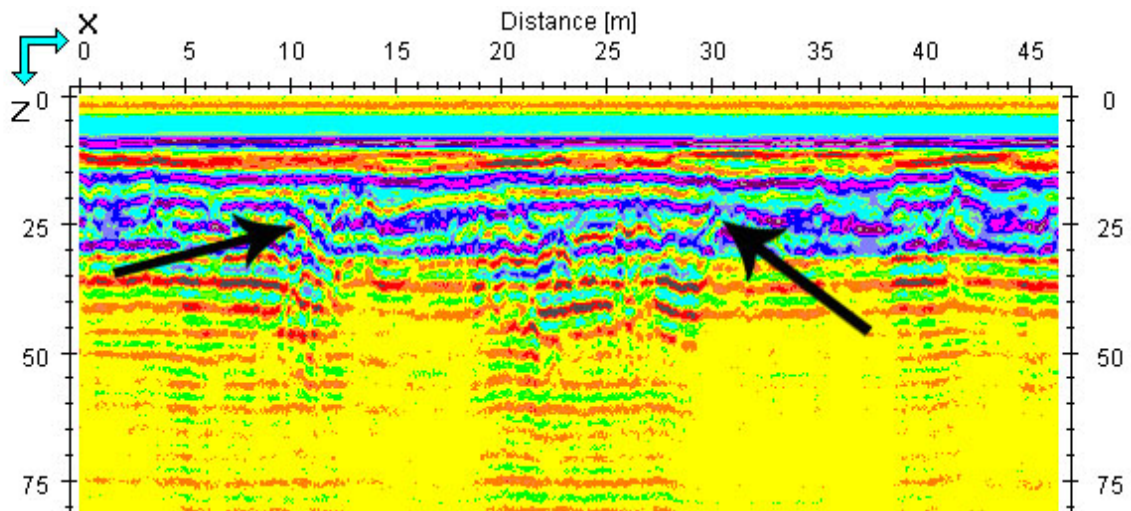


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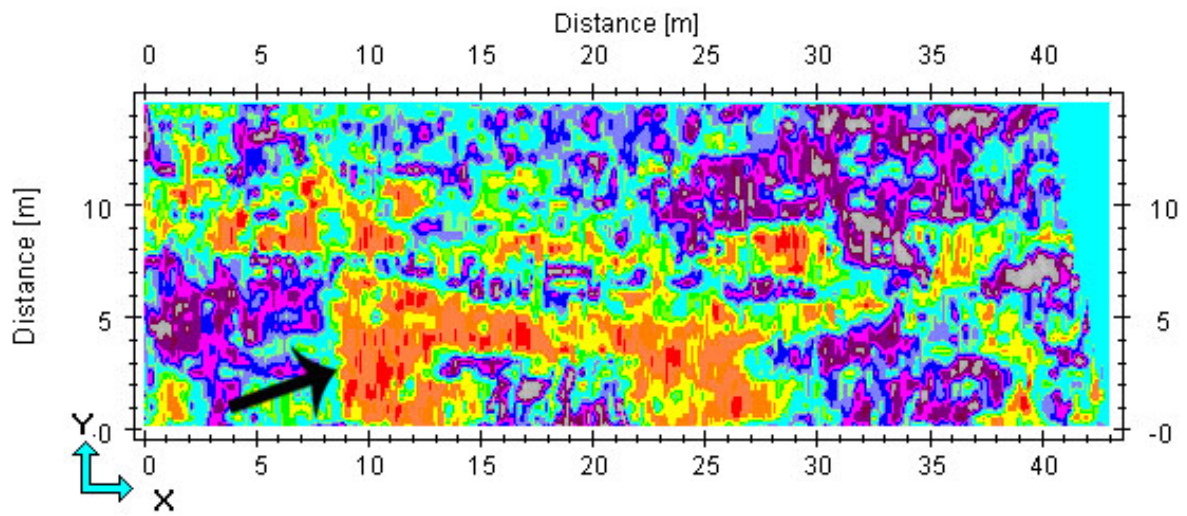


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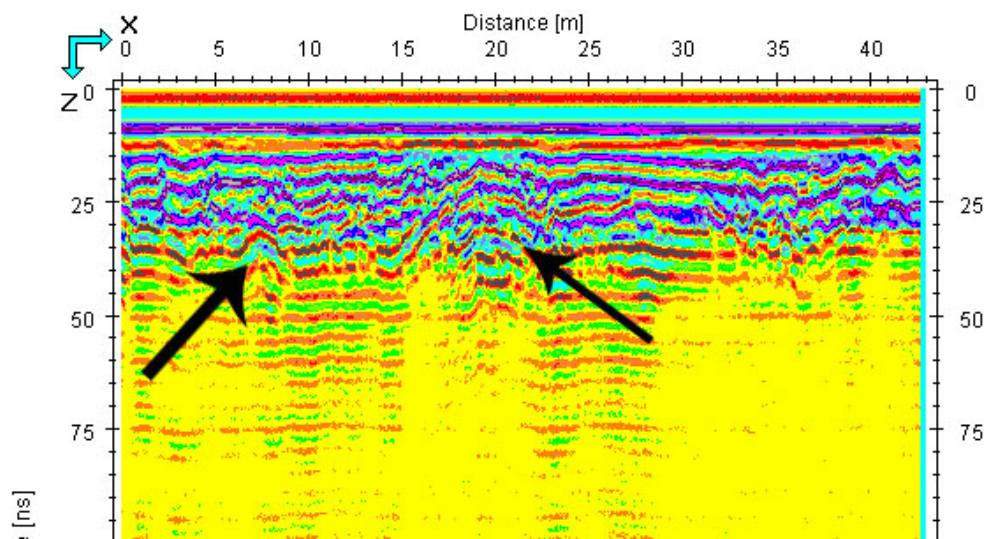
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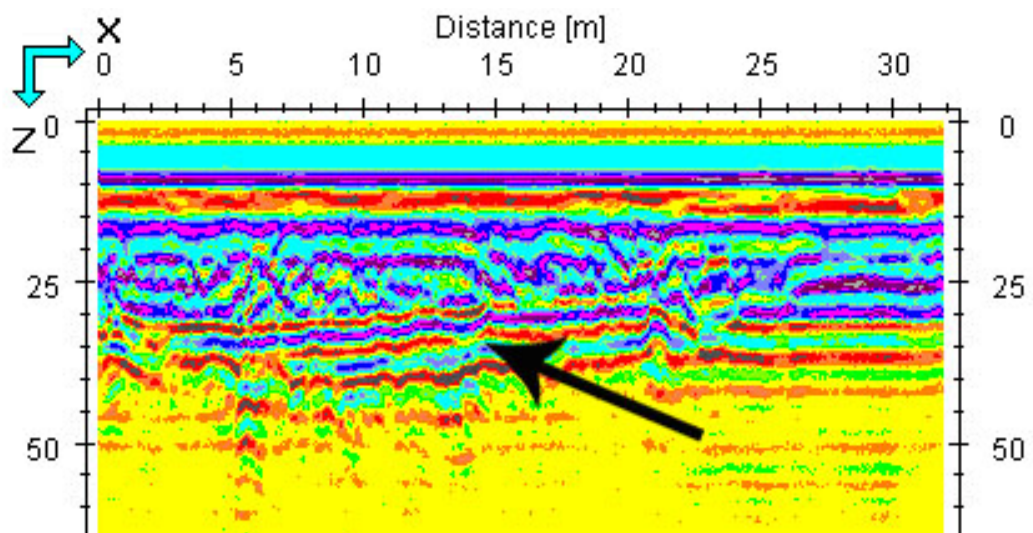
Section 18



Section 19



Section 20



Section 21



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