

Geophysics Weekend

29th & 30th July 2017

Results

The geophysics weekend examined the use of three techniques, these being Resistivity, Magnetometer and Ground Penetrating Radar (GPR). The resistivity was used in two forms, firstly to survey an area and secondly to obtain a Resistivity Section.

The results are presented on the 10 sheets which follow this explanation.

Four areas were examined and these were:

1. The Upper Lawn at its North End. This was along the edge beside the remains of the original staircase (now largely robbed out) but with a much later flight of step just to the West (no hand rail, just treads).
2. The Bowling Green which is the tree lined grassed area to the West of the Rose Garden
3. The Bowling Green Extension (for want of a better name) which was the smaller tree lined grassed area adjacent to the Bowling Green and North of it.
4. King Henry's Walk. A North-South path on the East side of the site.

The three techniques, Resistivity, Magnetometer and Ground Penetrating Radar (GPR) were used on items 1 to 3, and the Resistivity Section taken on item 4.

The GPR results are three dimensional and therefore can only be presented as a two dimensional snapshot in this report. To view the GPR results in full, download and view the files below. When 'unzipped' there are three 'avi' format video files which show the GPR results as a series of horizontal slices of increasing depth.

You can download the three GPR results (together with this document) in a zip file at www.weag.org.uk/results2017/geophysicsweekend2017.zip

There now follows an interpretation of the all the results obtained.

Upper Lawn (Drawn with North to the left)

The Resistivity was performed over a 20m length. One interpretation of the result is that the light area at the bottom of the picture is the compressed soil resulting from people using the present day stairs. The light area to the left hand side in the top half could be the compressed soil/path resulting for the use of the original staircase (not shown). This possibly shows the path to turn left and not go straight on.

Another interpretation is shown in both the Magnetometer and GPR results that there is a linear feature going East-West. This is probably a retaining wall to prevent the earth of the Upper Lawn collapsing on to the Lower Lawn. On the left hand side of the feature (and possibly to the right also) there is evidence of buttress at approximately 6m intervals.

Should this need to be investigated further a small trench, strategically placed, is all that is needed.

Note: That whilst the three technologies cover virtually the same area the Resistivity is on a very slightly different alignment (see the distance of the grid from the 'back of remain of original staircase'. The Resistivity was only taken over a 20m length whereas the other two techniques were taken over 40m

Bowling Green

The Resistivity is high resistance (white) along both edges due to the trees sucking up the moisture. There is evidence of tree roots on the Green itself from the physical topology of the surface but fortunately these are not evident in the Resistivity results.

The GPR shows evidence of linear features (going North-South) but these come and go as one views the actual GPR file itself. The picture displayed (in the results presented) is only one snapshot. The Magnetometer readings display some similar linear features. The Resistivity shows a mixture of high and low resistance.

The conclusion is that there is something going on here but it requires further investigation (perhaps a targeted trench!) to find out.

Bowling Green Extension

The Magnetometer results show 20m from the base line (South end) and go over the path at the North end. Whereas both the Resistivity and GPR results show 18m from the base line and stop just before the path. This path is surfaced with 'clinker'. The Magnetometer shows some results on the path but that could be the material with which it is surfaced.

The Resistivity and Magnetometer results show something of interest in the middle of the pictures.

The GPR result is somewhat of an enigma. Examining the actual GPR file shows that the feature (shown on the snapshot) exists at the many levels (depths) but it does not exist in the Resistivity or Magnetometer results. This could be due to the depth of this feature.

It is definitely worth further investigation because it is such a strong anomaly. A Resistivity Section across the feature may well give more information and show its depth.

It appears to be about 5m in diameter. It could therefore be an ice house, another dovecot or a water cistern.

King Henry's Walk. Resistivity Section.

We are looking for evidence of a stream in a landscape. It was later filled in and the area levelled. The stream (it is thought) was the overflow from the moat (at the North end of the Lower Lawn) and crosses the present King Henry's Walk (which is to the East).

A Resistivity Section was undertaken to find evidence of the stream or otherwise.

With reference to the Resistivity chart, consider the yellow band (light brown/yellow/green) to be the original landscape (Circa 16thC). There appears to be a cut in which a stream could have run. This was later filled in and the area levelled, with soil from elsewhere (orange/red).

This is only one interpretation but it does fit with what is currently known about the site.

Conclusion

On the Upper Green we appear to have located the retaining wall.

The Bowling Green has something but is inconclusive. Further investigation is required.

The Bowling Green Extension has one target for a trench identified and also a large structure which certainly requires further investigation.

King Henry's Walk definitely does appear to have had a stream crossing it in the past.

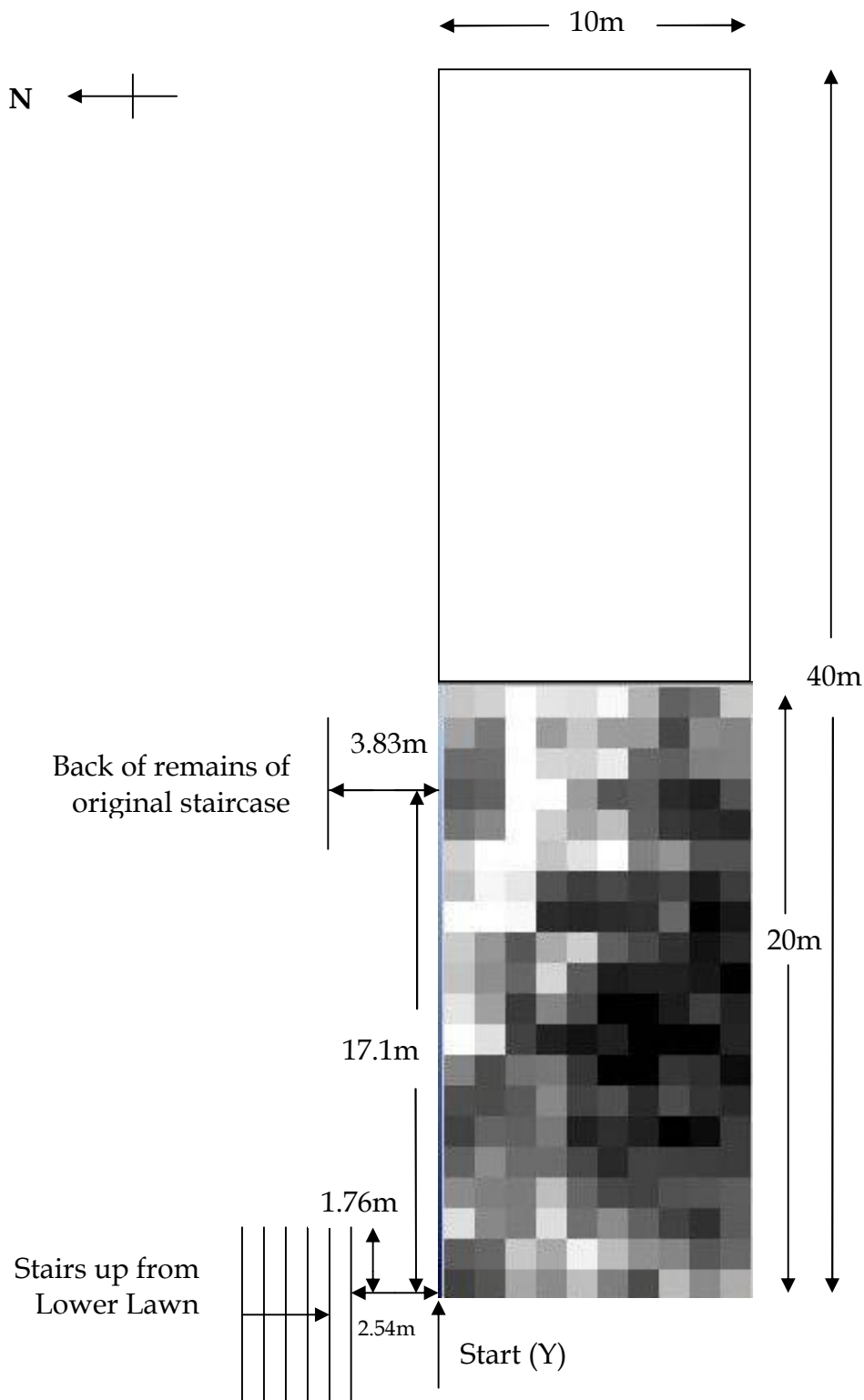
These results proved very enlightening.

This event was run by the West Essex Archaeology Group (WEAG) as part of the Copped Hall Trust Archaeology Project's (CHTAP) 'Taster Weekends'

My thanks to the students who attended the weekend and to the members of WEAG who arranged it. The results are great. I hope that all enjoyed the weekend.

Site Copped Hall, Essex	Site Code UPCH17	RESISTIVITY	Context/Reference	Sheet 1/1
Location Upper Lawn	Grid 3	File Name Prefix Res- CHUpperLawn2017Grid3	Date 29/7/2017	

This was taken on the Upper Lawn at the North edge adjacent to the staircase.



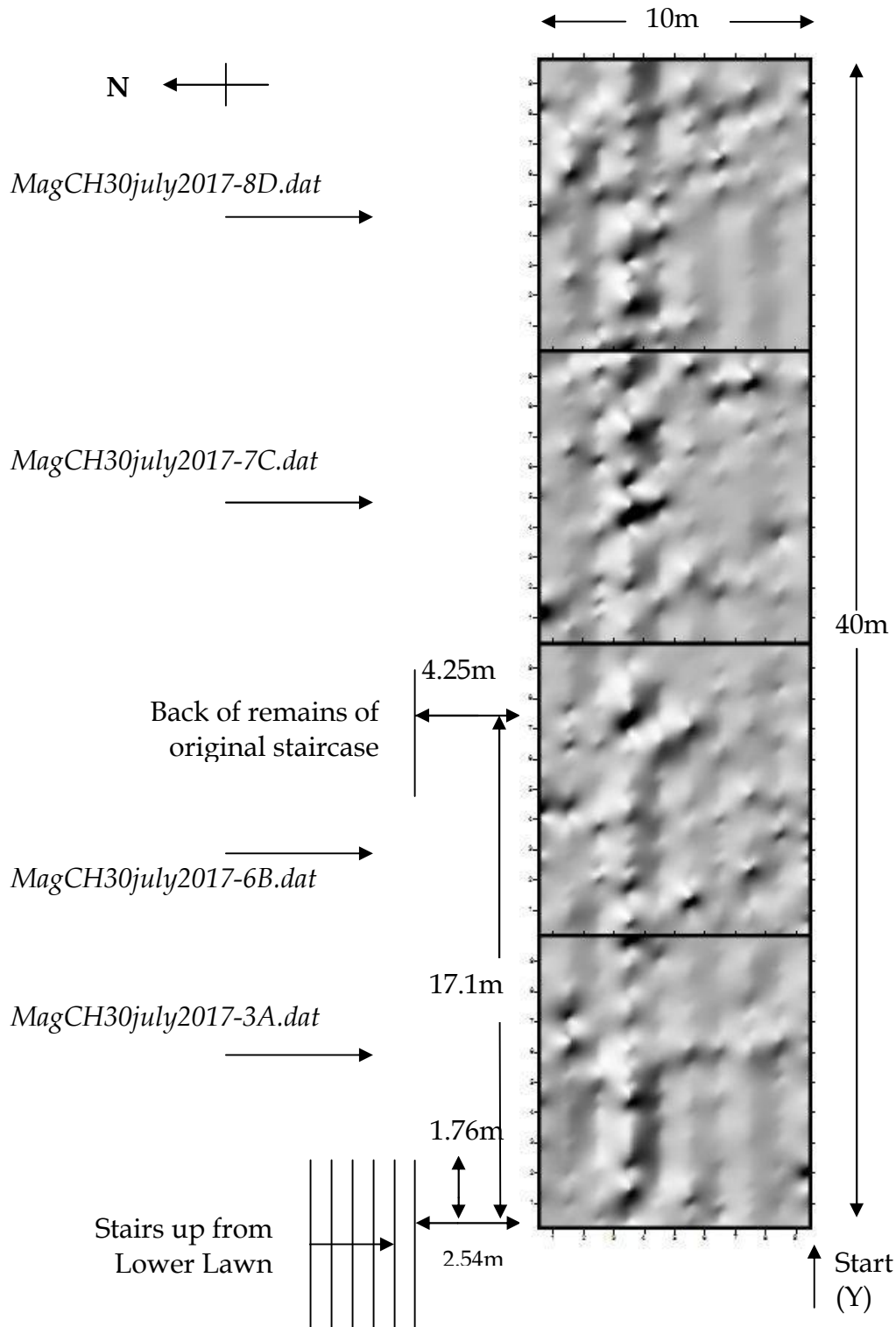
Data File:
ResCH29July2017Grid3.dat

Not to scale

West Essex Archaeology Group	Equipment and resolution: TR/CIA 1m x 1m	Drawn by and date: J Avis 4/8/2017
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Site Copped Hall, Essex	Site Code UPCH17	MAGNETOMETER	Context/Reference	Sheet 1/1
Location Upper Lawn	Grid A,B,C and D	File Name Prefix CHUpperLawn2017GridsAtoD	Mag-	Date 30/07/2017

This was taken on the Upper Lawn at the North edge adjacent to the staircase.
 The filenames of the four 10mx10m grids
 which make up the 10mx40m grid
 are given in italics below.

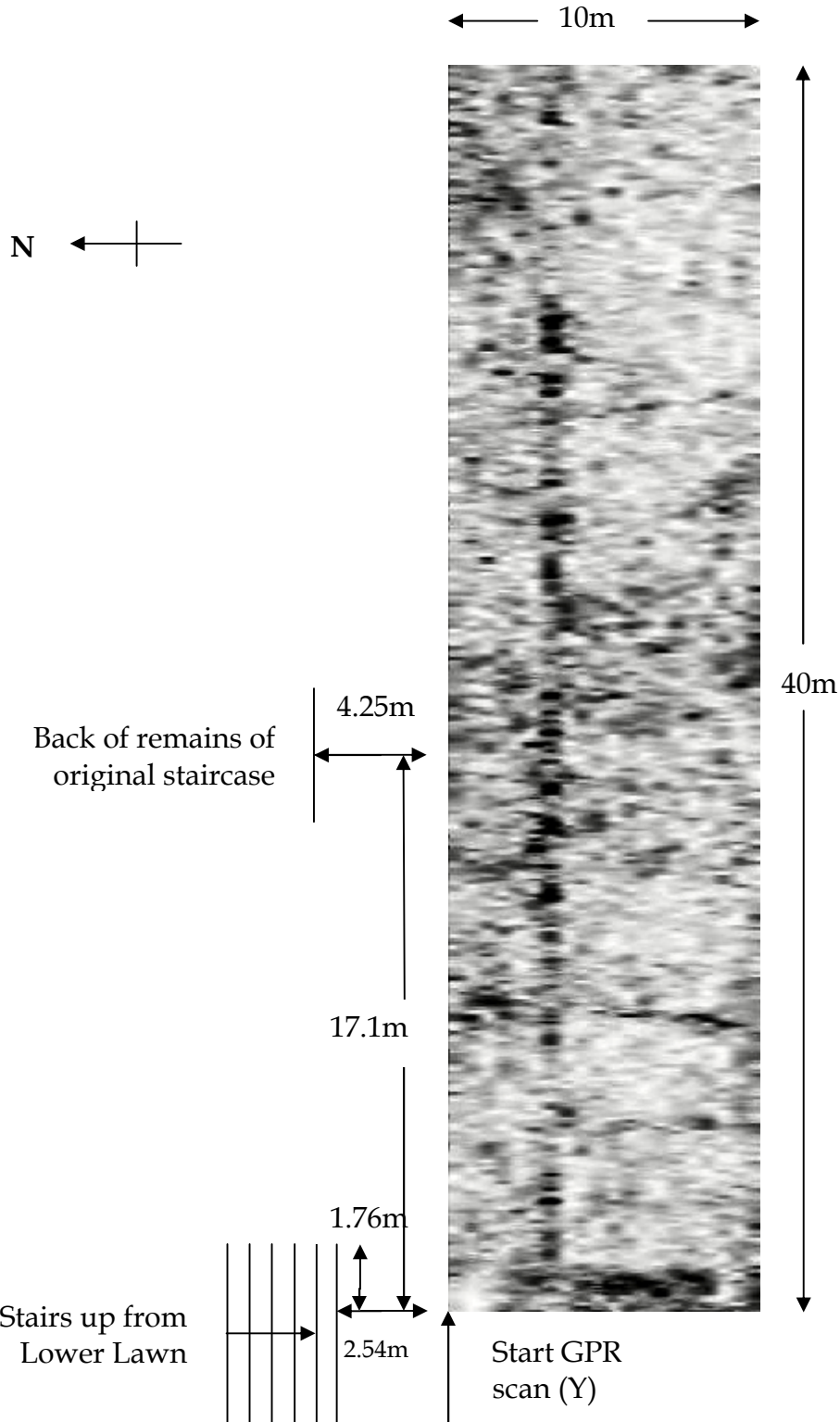


Not to scale

West Essex Archaeology Group	Equipment and resolution: Bartington X=1m & Y=0.25m	Drawn by and date: J Avis 4/8/2017
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Site Copped Hall, Essex	Site Code UPCH17	GROUND PENETRATING RADAR	Context/Reference	Sheet 1/1
Location Upper Lawn	Grid 3		File Name Prefix GPR- CHUpperLawnGrid3	Date 30/07/2017

This was taken on the Upper Lawn at the North edge adjacent to the staircase.
Snapshot from Data File: GPR-CHUpperLawnGrid3.avi

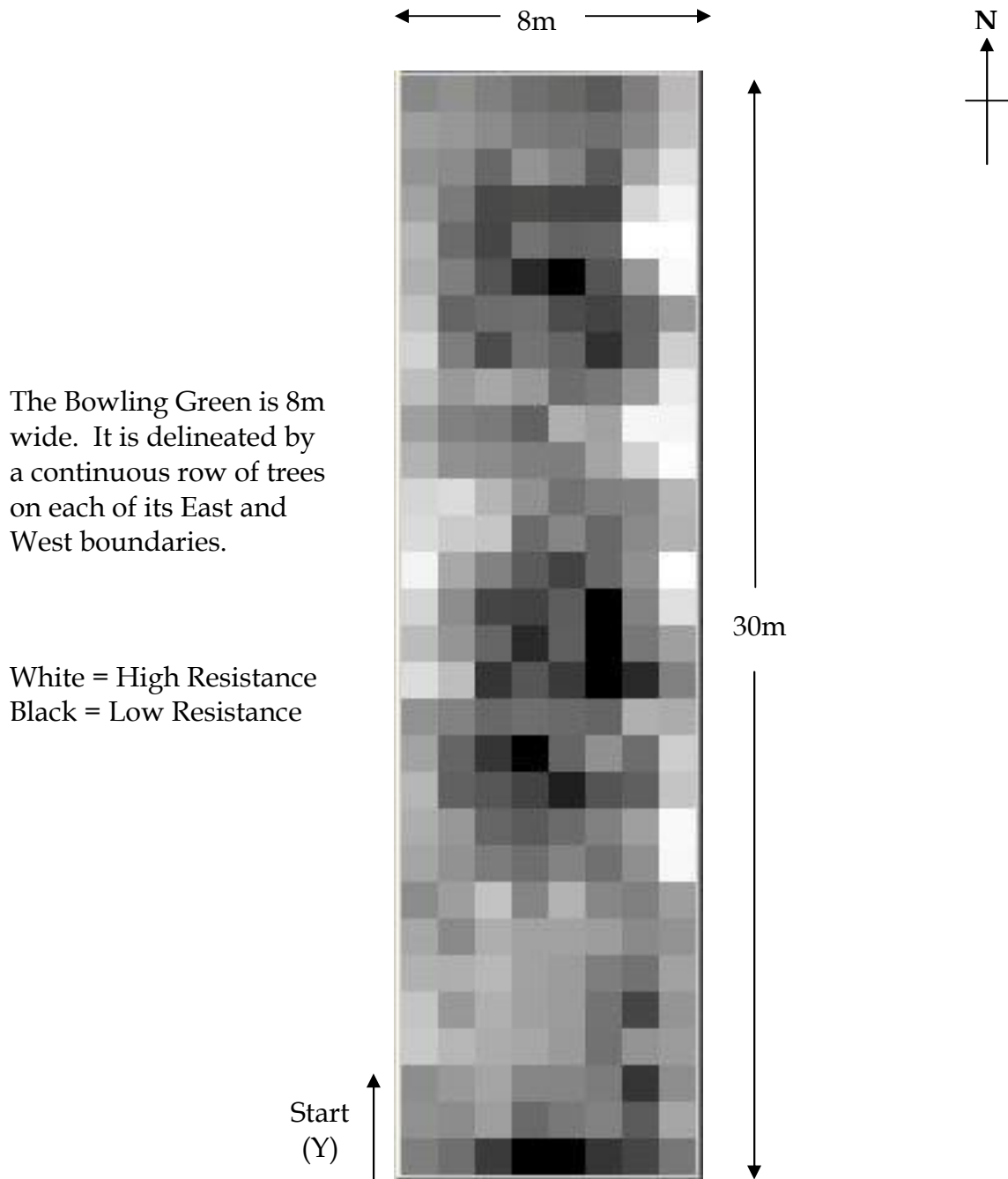


Not to scale

West Essex Archaeology Group	Equipment and resolution: Operated by R Potter Mala X=0.5m Y=0.05m. Display X=Y=0.05m	Drawn by and date: J Avis 4/08/2017
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Site Copped Hall, Essex	Site Code UPCH17	RESISTIVITY	Context/Reference	Sheet 1/1
Location Bowling Green	Grid 1	File Name Prefix CHBowlingGrn2017Grid1	Res- Date	29th July 2017

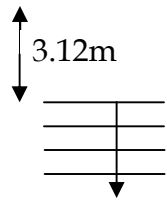
The Bowling Green is to the West of the Rose Garden.



The Bowling Green is 8m wide. It is delineated by a continuous row of trees on each of its East and West boundaries.

White = High Resistance
Black = Low Resistance

Start (Y) ↑



Steps leading up
Steps leading up
to Lower Lawn

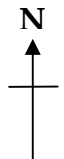
Data file:
ResCH29July2017Grid1.dat

Not to scale

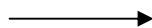
West Essex Archaeology Group	Equipment and resolution: TR/CIA 1m x 1m	Drawn by and date: J Avis 4/8/2017
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Site Copped Hall, Essex	Site Code UPCH17	MAGNETOMETER	Context/Reference	Sheet 1/1
Location Bowling Green	Grid E,F & G	File Name Prefix CHBowlingGrn2017GridsEtoG	Mag-	Date 30/07/2017

The Bowling Green is to the West of the Rose Garden.
 The three files which make up the one 8mx30m are given in italics below

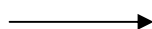


MagCH30july2017-11G.dat

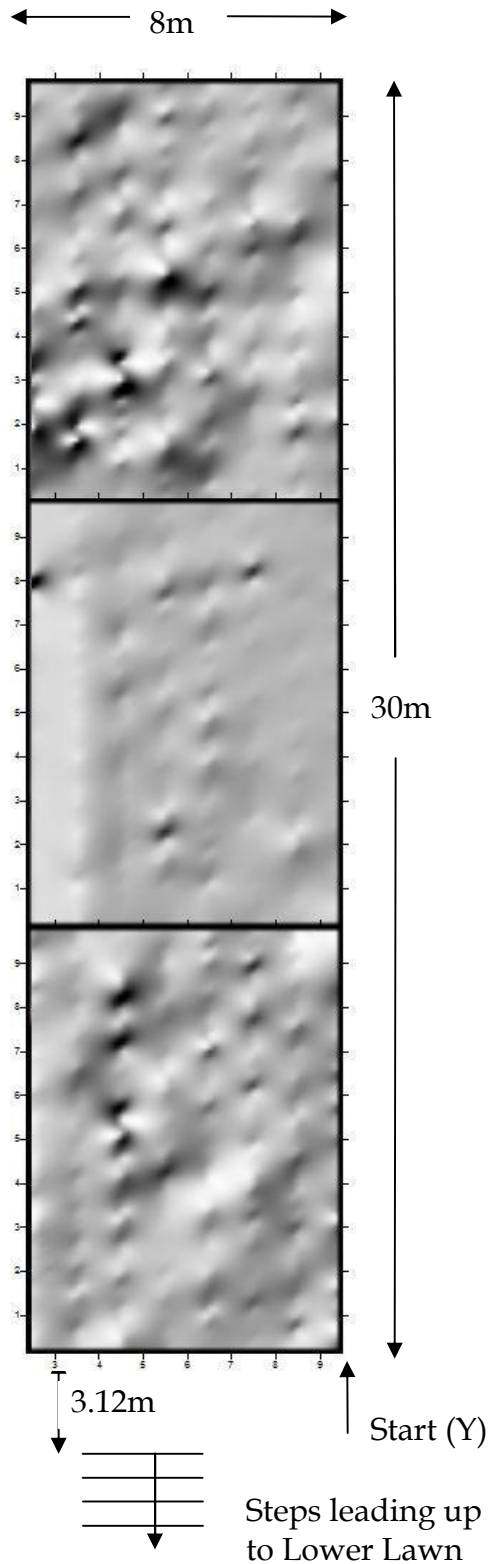
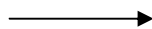


The Bowling Green is 8m wide. It is delineated by a continuous row of trees on each of its East and West boundaries.

MagCH30july2017-10F.dat



MagCH30july2017-9E.dat

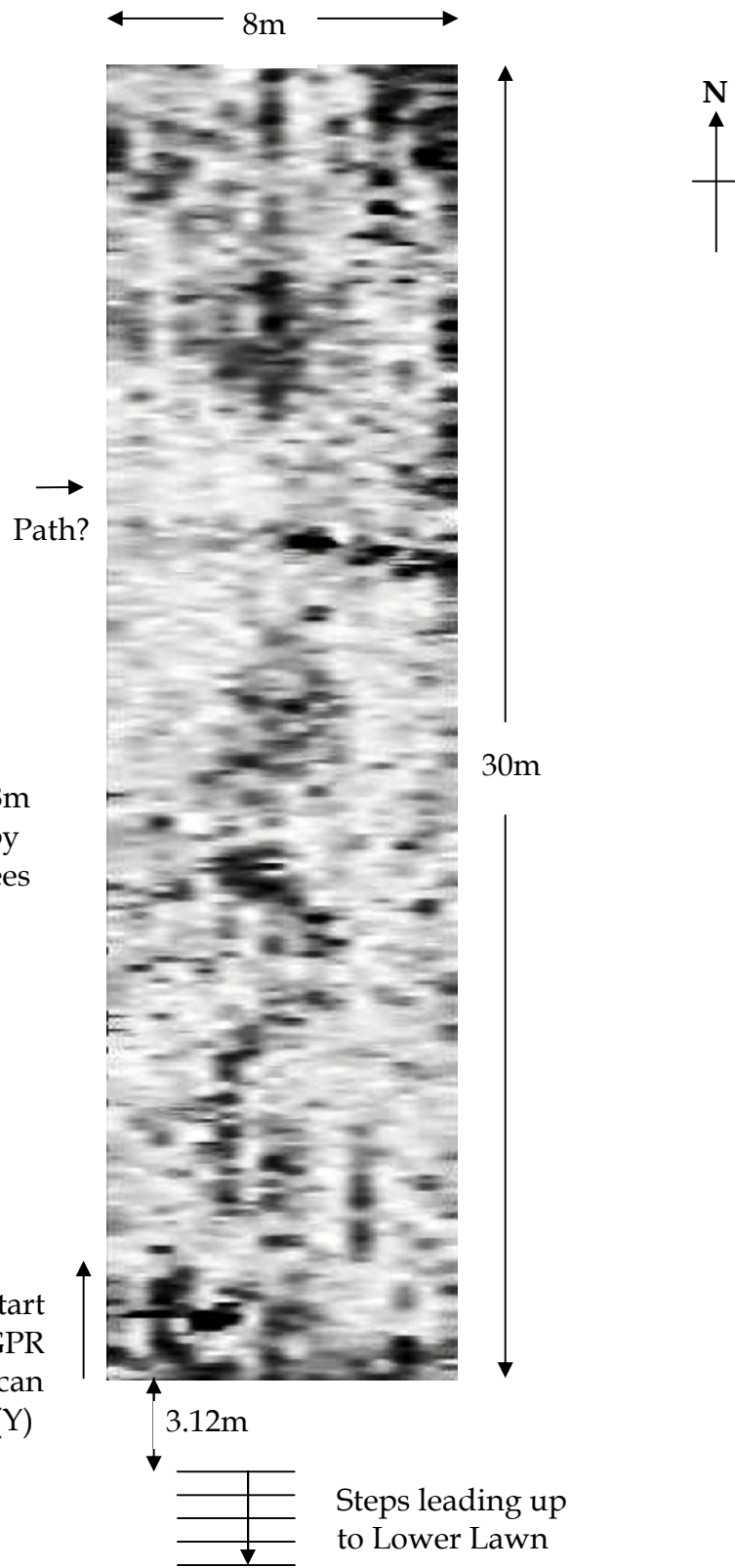


Not to scale

West Essex Archaeology Group	Equipment and resolution: Bartington X=1m & Y=0.25m	Drawn by and date: J Avis 4/8/2017
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Site Copped Hall, Essex	Site Code UPCH17	GROUND PENETRATING RADAR	Context/Reference	Sheet 1/1
Location Bowling Green	Grid 1		File Name Prefix GPR- CHBowlingGrn2017Grid1	Date 29/07/2017

The Bowling Green is to the West of the Rose Garden.
Snapshot from File: GPR-CHBowlingGrn2017Grid1.avi



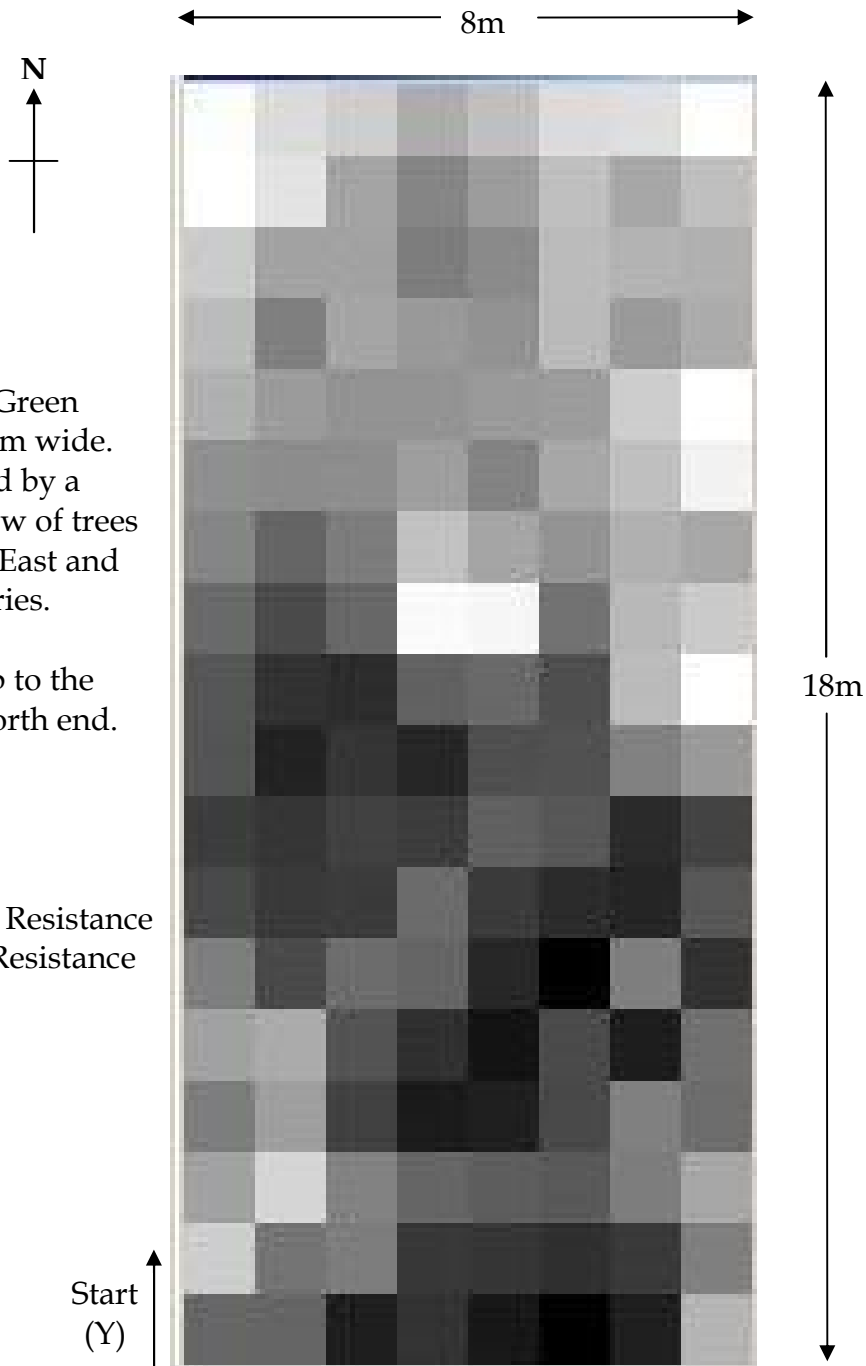
The Bowling Green is 8m wide. It is delineated by a continuous row of trees on each of its East and West boundaries.

Not to scale

West Essex Archaeology Group	Equipment and resolution: Operated by R Potter Mala X=0.5m Y=0.05m. Display X=Y=0.05m	Drawn by and date: J Avis 4/08/2017
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Site Copped Hall, Essex	Site Code UPCH17	RESISTIVITY	Context/Reference	Sheet
Location Bowling Green Extension	Grid 2	File Name Prefix CHBowlingGrnExtn2017Grid2	Res- Date 29/7/2017	

The Bowling Green Extension is to the North of the Bowling Green.



The Bowling Green Extension is 8m wide. It is delineated by a continuous row of trees on each of its East and West boundaries.

The scan is up to the Path at the North end.

White = High Resistance
Black = Low Resistance



Slope leading up to the Bowling Green

Data file:
ResCH29July2017Grid2.dat

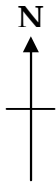
Not to scale

West Essex Archaeology Group	Equipment and resolution: TR/CIA 1m x 1m	Drawn by and date: J Avis 4/8/2017
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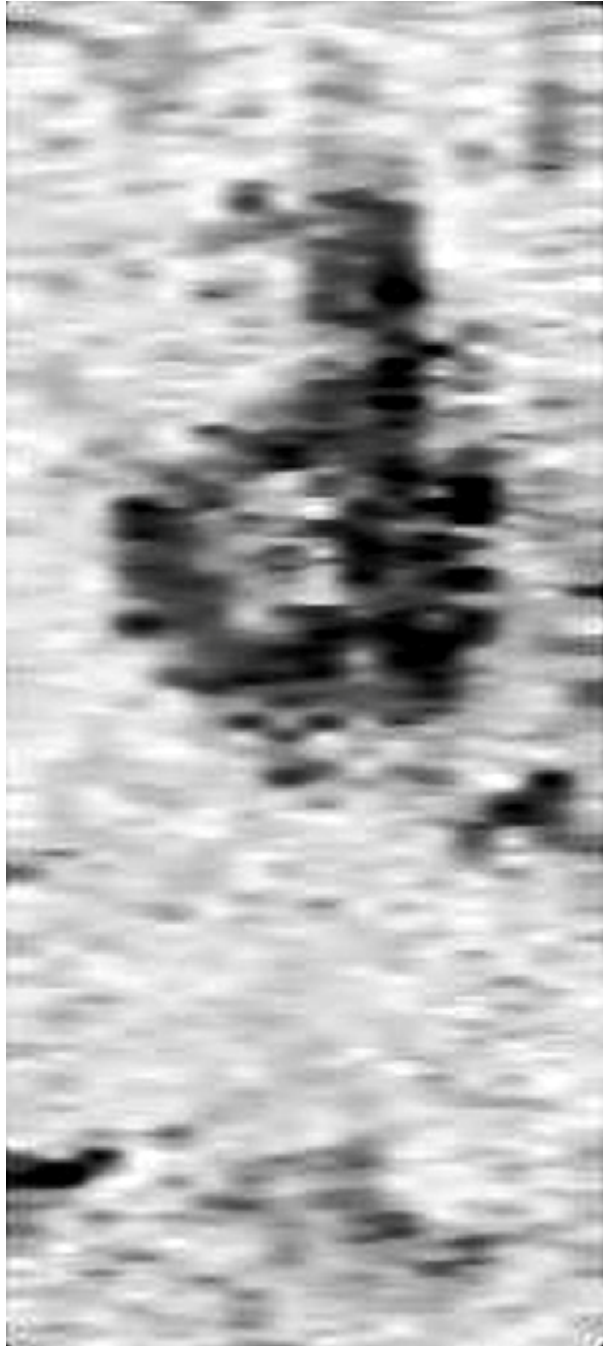
Site Copped Hall, Essex	Site Code UPCH17	MAGNETOMETER	Context/Reference	Sheet 1/1
Location Bowling Green Extension	Grid H & I	File Name Prefix CHBowlingGrnExtn2017GridsHtoI	Mag- Date 30/07/2017	
<p>The Bowling Green Extension is to the North of the Bowling Green. The filename of the two grids In given in <i>italic</i> below.</p> <p>This mag scan is across the path at its North end, to accommodate the two 10m grids.</p> <p><i>MagCH30july2017-12H.dat</i> →</p> <p>The Bowling Green Extension is 8m wide. It is delineated by a continuous row of trees on each of its East and West boundaries.</p> <p><i>MagCH30july2017-13I.dat</i> →</p> <p>8m</p> <p>N</p> <p>20m</p> <p>Start (Y)</p> <p>Slope leading up to the Bowling Green</p>				
Not to scale				
West Essex Archaeology Group	Equipment and resolution: Bartington X=1m & Y=0.25m		Drawn by and date: J Avis 4/8/2017	

Site Copped Hall, Essex	Site Code UPCH17	GROUND PENETRATING RADAR	Context/Reference	Sheet 1/1
Location Bowling Green Extension	Grid 2		File Name Prefix GPR- CHBowlingGrnExtnGrid2	Date 30/07/2017

The bowling Green Extension is to the North of the Bowling Green.
Snapshot from File: GPR-CHBowlingGrnExtnGrid2.avi



← 8m →



18m

The Bowling Green Extension is 8m wide. It is delineated by a continuous row of trees on each of its East and West boundaries.

The scan, at the North end, is up to the path.

↑
Start
GPR
scan
(Y)



Slope leading up to the Bowling Green

Not to scale

West Essex Archaeology Group	Equipment and resolution: Operated by R Potter Mala X=0.5m Y=0.05m. Display X=Y=0.05m	Drawn by and date: J Avis 4/08/2017
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Site Copped Hall, Essex	Site Code UPCH17	RESISTIVITY SECTION	Context/Reference	Sheet 1/2
Location King Henry's Walk	File Name Prefix ResSec- CHKingHWalk2017Grid4		Date 30 July 2017	
<p>Readings taken on 40 pins placed along the centre line of King Henry's Walk.</p> <p>That is 40 pins (0 to 39) over a length of 39metres.</p> <p>Pin 16 was opposite the entrance to My Lady's Walk</p>				
<p>Results are shown on the next sheet.</p> <p>Data files: ResSecCH30July2017Grid4AResInv.dat inverted from ResSecCH30July2017Grid4A.dat</p> <p>Not to scale</p>				
West Essex Archaeology Group	Equipment and resolution: TR/CIA 40pins 1m spacing	Drawn by and date: J Avis 4/08/2017		

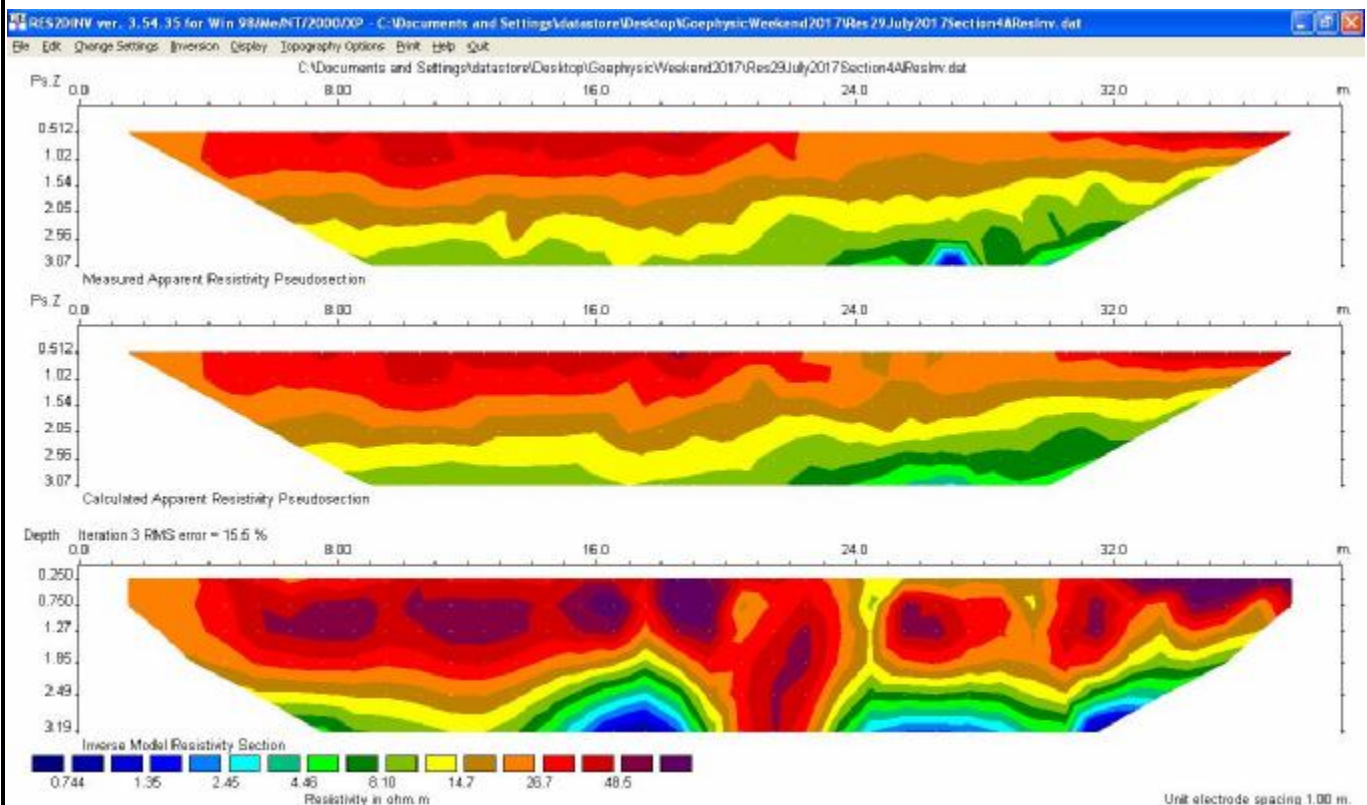
Site Copped Hall, Essex	Site Code UPCH17	RESISTIVITY SECTION	Context/Reference	Sheet 2/2
Location King Henry's Walk	File Name Prefix CHKingHWalkGrid4-30072017		Date 30 July 2017	

The top picture are the results as recorded.

The middle picture is an interim calculation and can be ignored

The bottom picture is the Resistivity Section.

Note the depth is given on the left hand side. The top line (of each picture) is the pin number and also the distance in metres.



Interpretation:

We are looking for a evidence of a stream in the landscape, which was later filled in and the area levelled. The stream (it is thought) was the overflow from the moat (at the North end of the Lower Lawn) and crosses the present King Henry's Walk.

Consider the yellow band (light brown/yellow/green) to be the original landscape (Circa 16thC). There appears to be a cut in which a stream could have run. This was later filled in and the area levelled, with soil from elsewhere (orange/red).

This is only one interpretation but it does fit with what is currently known about the site.