Struell Wells, County Down

Geophysical investigations at the site of Struell Wells, Co. Down

SMR No.: DOW 038:002

Grid Ref: J 5117 4422

On behalf of

Northern Ireland Environment Agency (NIEA)

Sapphire Mussen

CAF GSR 24

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1.0 Summary

1.1 Site Specific Information

Site Name:	Struell Wells
Townland:	Struell
SMR No.:	DOW 038:002 (State Care)
Grid Ref.:	J 5117 4422
County:	Down
Dates of Survey:	14th-18th May
Surveyors present:	Sapphire Mussen, Stuart Alexander and Grace McAlister, Centre for Archaeological Fieldwork, Queens University Belfast.
Size of area surveyed:	Approximately 0.36 hectares
Weather conditions:	Mild with some rainfall
Geology:	Hawick group sandstone
Current land use:	In state care, public access
Survey type:	Electrical Earth Resistance

1.2 Abstract

An earth resistance survey of Struell Wells was carried out in May 2012. The main objectives were to determine the layout and extent of the subterranean culvert system which transports water to and from the wells and bath houses of the site and hopefully locate the remains of earlier church foundations. The survey area included the enclosed walled area surrounding the wells and bathhouses, a 20m wide strip of the grassed field immediately to the west of the site, the area inside the ruined church building, and the grassed area leading up to the church building. The topography of the entire site slopes gradually downwards in a general south to north direction and the grounds are well maintained throughout the year. Both high and low resistance anomalies of interest were detected during the course of the survey. Imaged clearly in the results are a series of high resistance linear anomalies, most likely representing the drainage system of the site. The remains of an older church building could not be clearly ascertained, the only possible evidence appears to be in the west field but the anomaly imaged here is more likely to be geological in nature. A number of features of interest further to this were imaged and warrant further investigation through excavation.

2.0 Cartographic evidence

The general layout of the site has not changed appreciably from 1829 onwards according to Ordnance Survey maps of the area (figure 2). On the second edition map of 1904 there appears to be a small building situated a few metres northeast of the drinking well although this may be a result of poor map quality (figure 2b). The third edition map of 1932 shows a definite line running from the eye well to the bath houses which most likely represents a connecting culvert which may have been stone capped and visible in the ground surface at the time. Similar lines are to be seen exiting the bath houses and another following the diversion of the stream (figure 2c). In the fourth edition of 1957 the line connecting the eye wall to the bath houses is truncated and instead the bath houses appear directly joined to the drinking well by a single continuous line, the eye well appears no longer linked to the bath houses (figure 2d). The culverts leaving the bath houses and the diversion of the stream appear unchanged.

The main alterations in and around the site include the addition of the modern car park, removal of several field boundaries and the gradual deterioration and removal of stone cottages and sheds. The building known as the church is shown on all maps but appears to be ruinous by 1932. It may have been in a derelict state prior to this but not depicted in such a state on earlier maps (figure 2).

The wall surrounding the wells and bath houses appears to have been rebuilt and added to over the years. Today it fully encloses the bath houses and eye well; the drinking is situated mostly on the exterior of the walled area. On the third and fourth edition Ordnance Survey maps a path can be seen running southwest to northeast leading up to the eye well. There is no clear route connecting the bath houses and wells.

A plan of maintenance and building work which was supposedly carried out on behalf of the Northern Ireland Environment Agency from 1963-1964, shows a series of glazed pipes carrying water to and from each of the wells and bath houses. One pipe can be seen exiting the drinking well and entering the eye well. Mid-way along this pipe is another joining it with the stream. A separate pipe joins the eye well to the stream and mid-way along this pipe is another which splits in two and diverts water to the bath houses. There appears to be no direct separate inlet from the stream to the bath houses. The two streams exiting the bath houses then converge and exit the site towards the south (figure 3).

3.0 The Survey Site

The site of Struell Wells is in State care and accessible to the public. It is reached by means of a road entering from the west terminating in a tarmac car park provided along the southern edge of the site. Some derelict 19th-20th century buildings lie to the east, accessed by rough roadway.

The main area of the site comprises of a well maintained grassed area enclosed by a low wall approximately 1m high. Within this area the ground slopes gradually from south to north and is fairly waterlogged in places. The bathhouses and eye well are situated within this area and the main well is situated at its northernmost corner (figure 4). A few mature trees are also located within this area but proved to be of little hindrance to the survey.

A stream runs from west to east along the northern edge of the site and must at various points be diverted southwards to provide water to the two wells and two bathhouses by means of a series of subterranean culverts and drains (figure 4).

A derelict building regarded as a ruined church sits along a northeast to southwest alignment, the north-eastern gable wall is absent and it opens directly onto the stream which it probably once straddled. Entranceways are placed through the southern and eastern walls and windows in the east wall. The remains of foundations and platforms for other buildings can clearly be seen lying south of this church building. The remains of a derelict building can also be seen a short distance north of the church on the far side of the stream (figures 1 & 4).

Fields lie to the north and west of the site which are used for cultivation and grazing. To the south rises a prominent and overgrown outcrop on which is situated a cross carved stone known as ‘St Patrick’s chair’ (figure 1). A section of the western field was included in the survey and was lying fallow at the time. The topography of this field comprised of stonier ground in the south, sloping down towards much more waterlogged land alongside the stream to the north.

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4.0 Survey specific information:

4.1 Details of equipment and methodology employed;

Survey type	Electrical Earth Resistance
Instrumentation	Geoscan RM15 resistance meter and MPX15 multiplexer
Probe/sensor configuration	Parallel twin (3-probe)
Probe/sensor spacing	0.5m
Grid size	20m x 20m
Traverse interval	0.5m
Sample interval	0.5m
Traverse pattern	Zig-Zag
Spatial accuracy	Grids set out using a Leica TPS 705 series total station

4.2 The Survey

On first visit to the site it was deemed that the setting up of one survey grid would be almost impossible and of little use due to the presence of buildings, walls, pathways, trees and the unusual shape of the main enclosed area. As a result the survey site was split into four smaller gridded areas (Areas A-D) which were then surveyed separately and the results amalgamated to form an overall image of the site (figure 4).

All grids were set out with 20m intervals and covered a total area of approximately 0.36 hectares. Area A covered a strip of field to the west of the site, Area B comprised of the interior of the church building, Area C covered the area leading up to the church; between the field to the west and the walled area containing the wells. Area D encompassed the whole of the area enclosed by a low stone wall where the wells and bath houses are situated. All gridded areas were fully surveyed insofar as accessibility allowed (figure 4).

Earth resistance survey of all areas was carried out using a Geoscan RM15 meter and MPX15 multiplexer. This was carried out using a traverse interval of 0.5m and sampling interval of 0.5m. The results of the resistance survey are graphically presented in figures 5-8 and an interpretation of these results is given in table format (section 5), which should be read in conjunction with figure 8 which gives an interpretative illustration of the resistance survey data.

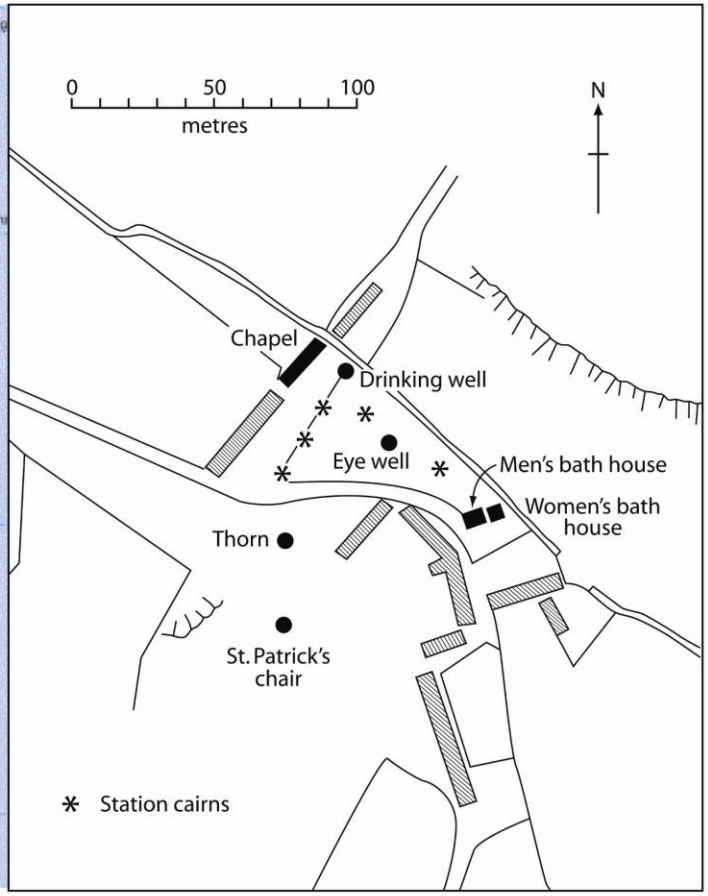
5.0 Table 1: Earth resistance survey results

Code	Description	Interpretation
r1	Sub-rectangular anomaly of mid-high level resistance with a maximum length of 30m north-south. It disappears off the edge of the survey area to the east.	The rectangular appearance of this anomaly suggests that it could represent the foundations of a structure, possibly the remains of an earlier church building at the site. However, without knowing the extent of this anomaly to the east it is not possible to say with much certainty what it may represent. It also lacks clear definition and may be imaging geological responses or the remains of an earlier field boundary. No evidence for a structure here is evidenced in the cartographic record of the site but an old field boundary can be noted crossing field in rough correspondence with the northernmost edge of this anomaly.
r2	Amorphous area of very high resistance along the eastern edge of the survey area, north of r1.	This high resistance here is likely indicative of stone or rock within the surface of the site in this area. This could potentially be from field clearance, removal of an old field boundary, demolition of nearby structures or simply a geological rock outcrop. Its position also corresponds roughly with the alignment of a boundary depicted on Ordnance Survey maps of the site.
r3	Very high resistance running along the inside of the enclosing wall of the eastern field.	As this anomaly lies with respect to the stone field boundary it is likely to be representative of stony rubble and up cast material from construction of the road and walls.
r4	Sub-rectangular area running north-northeast to south-southwest. Total length of area approximately 20m, 10 m at its maximum known width. Within this area lie a number of anomalies ranging from low to very high levels of resistance, including some high resistance linear	The area of r4 is situated directly over a raised rectangular platform of earth and stone, which is a likely cause for the mixed range of readings in this area. The linear anomalies within the area r4 may correspond to interior walls of an earlier building which once stood at the site. The northernmost edge of area r4 takes the form of a linear, short and very steep bank. The

	anomalies and very high resistance amorphous anomalies.	ground is very hard underfoot in this area and building stone can be seen in the ground surface. The eastern edge of the area r4 drops off into a steep grass covered bank, getting gradually higher towards the southern end, maintaining a level platform at the top. The foundations of a building running in line with this are preserved immediately south of this area. It is most likely that a building once stood covering the area of r4, the high and low resistance levels representing rubble and infill from demolition of the structure. Buildings are shown at this location from Ordnance Survey maps of the area from the first edition of 1829 and onwards. By 1932 it appears that the northernmost end of these buildings have been reduced to foundation level and by 1957 it appears that only foundations exist for the entire row of buildings.
r5	Area of mixed high and low level resistance within the walls of the ruined church building.	Interpretation of this area is difficult due to the close proximity of the walls of the church, the foundations of which may be having some impact on the readings in this area. The patches of high resistance may represent rubble infill from the walls of the church or the remains of an earlier church which may have stood on the site. The low resistance may indicate that the church is situated quite close to the surface of bedrock and subject to poor drainage. The close proximity of this area to the stream may also be a factor in the resultant readings.
r6	Linear anomaly of mid level, fairly homogenous resistance readings and flanked on either side by faint low resistance readings. Runs in a north-northeast to south-southwest direction towards the church building	The mid-range homogenous readings of this anomaly are typical of those associated with hard core surfacing and pathways. Its regular width and course passing between the church building and the drinking well also point to it being a possible path or hardcore route way. A path here may have

	and drinking well. Maximum width of approximately 4m.	been constructed at the same time as the 18th century cottages or may be much earlier in date providing access way for pilgrims to the site.
r7	Mid-high level resistance anomaly directly east of the drinking well measuring approximately 5m across.	Due to the proximity of this anomaly to the surrounding walls and stream it is difficult to say with any certainty what is being imaged. The high resistance here may be representative of rubble material from construction of associated walls and pathways. The second edition map of 1904 shows what may be a small building at this location. Literary references also allude to a rough stone altar near the drinking well and church.
r8	Sub-circular high resistance anomalies with a maximum diameter of approximately 12m.	Possible earth resistance responses to the underlying geology of the site. Another possibility is that they are imaging the remnants of stone cairns referred to in literature regarding the site.
r9	Linear high resistance anomalies running in northeast to south west and northwest to southeast directions across the site between the drinking well and the eye well. For the most part these appear to be interlinked and of the same width (less than 0.5m). They range in length from approximately 4 to 14m.	These anomalies most likely represent a subterranean drainage system across the site. Such drains may not have anything to do with the wells and have been constructed while the site was in use for agricultural purposes. Thier confinement to the area between the drinking well and the eye well may simply indicate that this is where drainage was most needed in order to redirect water from one area to another. It is also possible that such drainage exists east of the eye well but was not imaged in the survey results due to a greater overburden of earth. The ground to the east of the eye well also becomes rather waterlogged after periods of heavy rain which may indicate an absent or poorer system of drainage in this area.
r10	Linear very high resistance anomaly running northwest to southeast from the drinking well. No more than 0.5m in width and 14m in length.	This anomaly is likely imaging a stone capped and lined drain or culvert carrying water away from the drinking well and in the direction of the eye well and back to the stream. It appears to stop before it reaches either point,

		further investigation may be needed to determine its true end point. The fourth edition ordnance Survey map of 1957 shows what may be a stone capped drain leading the entire way from the drinking well to the bath houses.
r11	Linear high resistance anomaly approximately 10m maximum length, less than 0.5m in width and running roughly north-south from the stream to the eye well.	Most likely to be a subterranean culvert carrying water directly from the stream to the eye well, possibly stone lined.
r12	Series of high resistance linear anomalies no more than 0.5m in width and measuring approximately 45m overall total combined length.	These anomalies are imaging an underground culvert system carrying water to and from the two bath houses. Water enters the culvert system from the stream passes under the wall surrounding the site, then travels towards the bath houses and appears to split into two separate flows before entering the women's and the men's bath houses. Each bath house has its own exit point for water and the French drain emerging from the women's bath house appears to turn off to the right to converge with that coming from the men's before passing out under the south-eastern wall of the site.
r13	High resistance anomaly no more than 0.5m in width and approximately 10m in total length. Curving from the north-eastern wall of the site to the south-western wall.	This high resistance anomaly is most likely imaging a stone lined and capped drain running diverting the stream from the northern edge of the site past the bath houses and beyond the south-eastern wall of the site. A line corresponding to this anomaly is clearly imaged on cartographic representations of the site from 1932-1957 (figure 2).
r14	Low resistance anomaly running in a northeast to southwest direction along the north-western wall of the men's bath house measuring approximately 1.5m in width.	This anomaly may be representing a ditch dug during pipe maintenance work carried out in 1963-4 in order to divert water back to the stream whilst work was being carried out (figure 3).



Centre for Archaeological Fieldwork

CLIENT: NIEA Northern Ireland Environment Agency www.ni-environment.gov.uk

DETAILS:

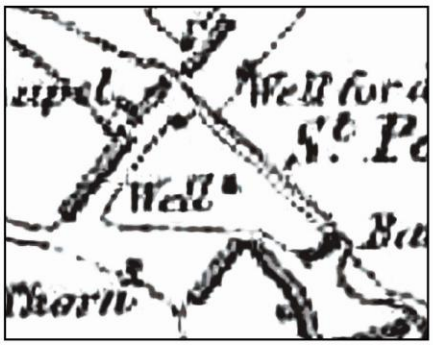
Maps showing the location and layout of Struell Wells

PROJECT:

Struell Wells 2012

FIGURE:

1



(a) 1st edition Ordnance Survey
1829-1835

(b) 2nd edition Ordnance Survey
1831-1904

(c) 3rd edition Ordnance Survey
1857-1932

(d) 4th edition Ordnance Survey
1901-1957

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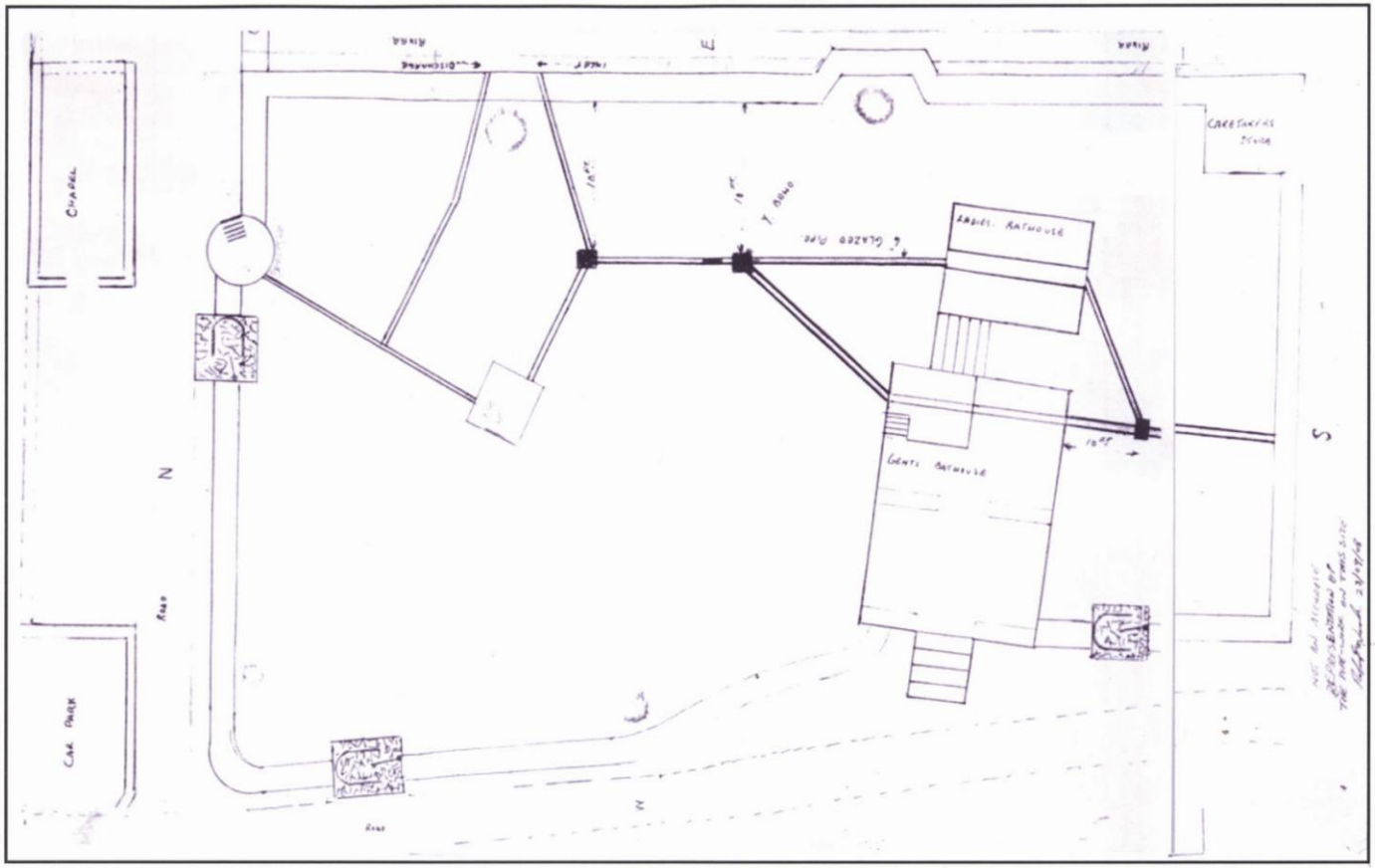
CLIENT: Northern Ireland Environment Agency

DETAILS:
Extracts from 6-inch Ordnance Survey maps of Struell Wells

PROJECT:
Struell Wells 2012

FIGURE:
2



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CLIENT: NIEA Northern Ireland Environment Agency www.ni-environment.gov.uk

DETAILS:

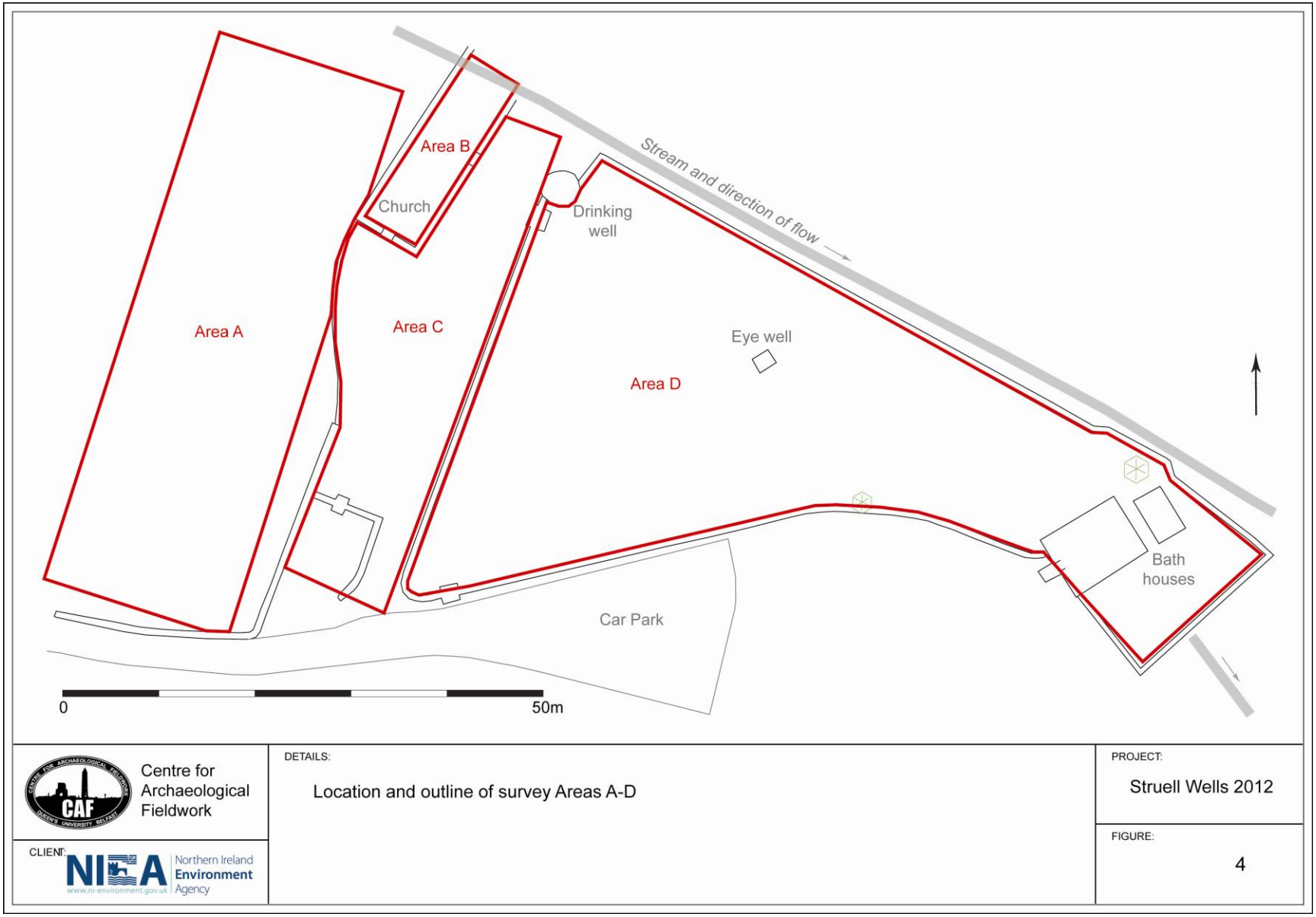
Plan of proposed maintenance and building work, 1963-1964 (NIEA)

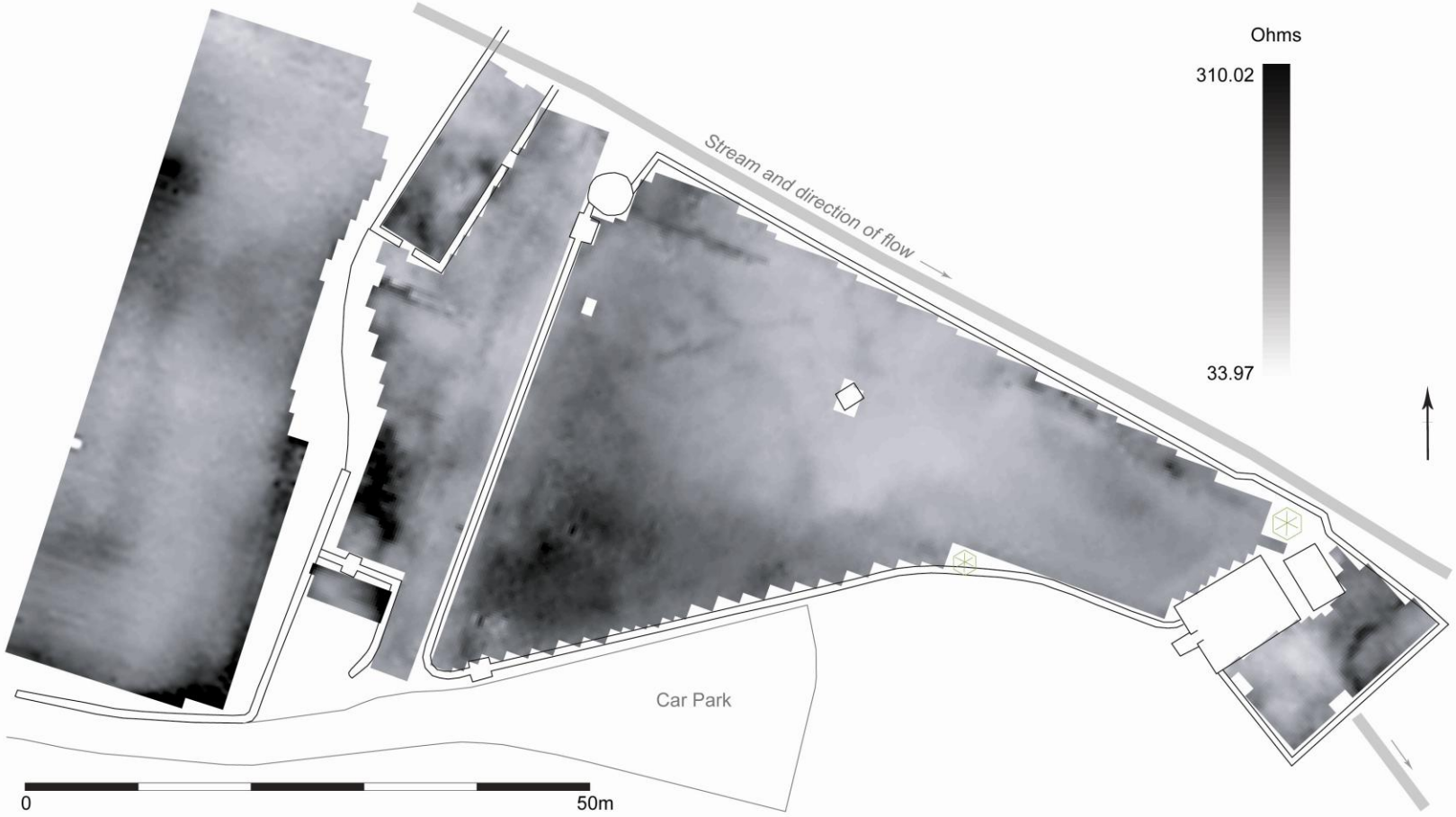
PROJECT:

Struell Wells 2012

FIGURE:

3


Area A
Area B
Area C
Area D
Church
Drinking well
Stream and direction of flow
Eye well
Bath houses
Car Park
0
50m
Centre for Archaeological Fieldwork
CLIENT:
Northern Ireland Environment Agency
DETAILS:
Location and outline of survey Areas A-D
PROJECT:
Struell Wells 2012
FIGURE:
4



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DETAILS:

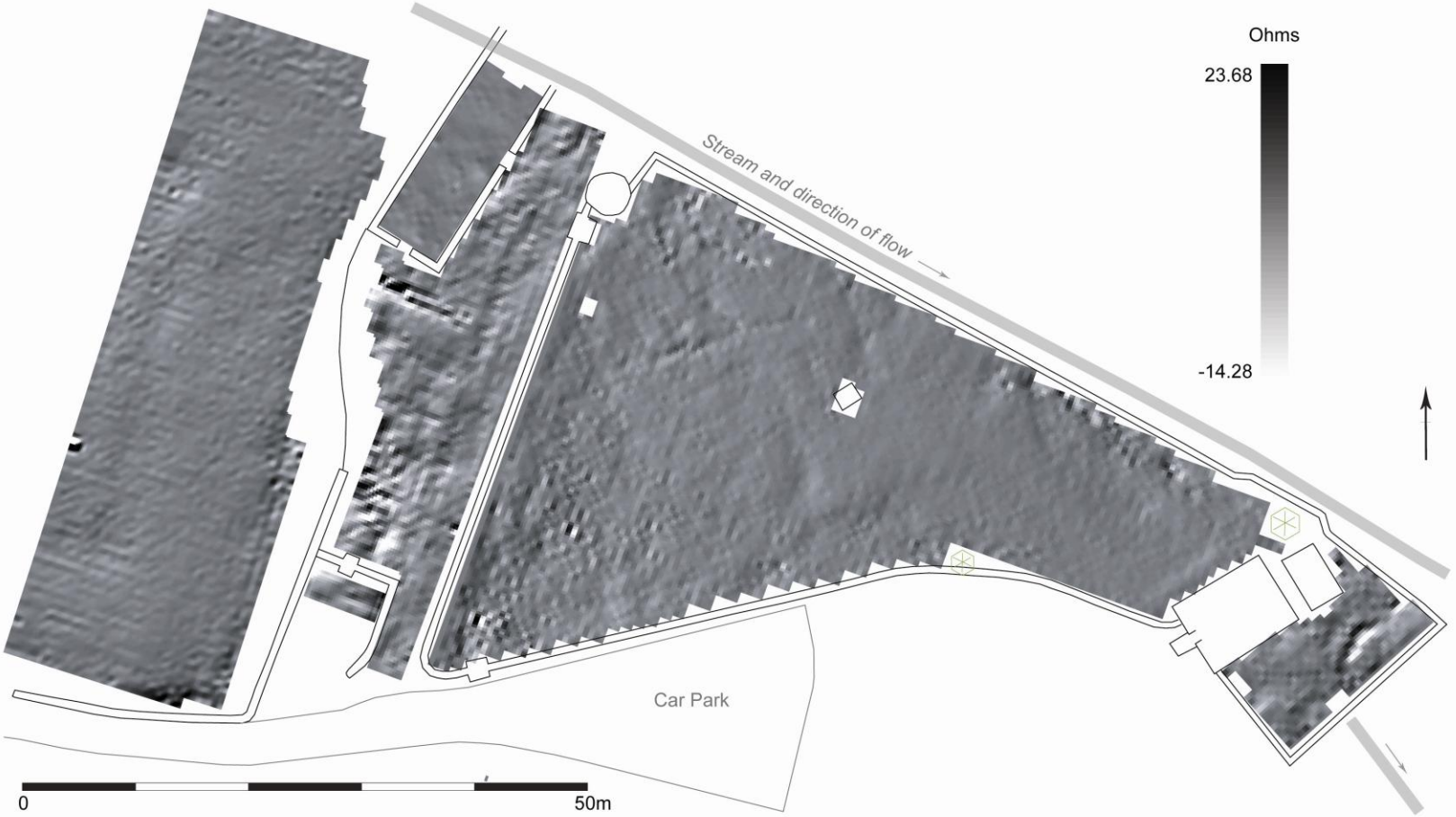
Shade plot of raw resistance data, despiked and interpolated

PROJECT:

Struell Wells 2012

FIGURE:

5



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DETAILS:

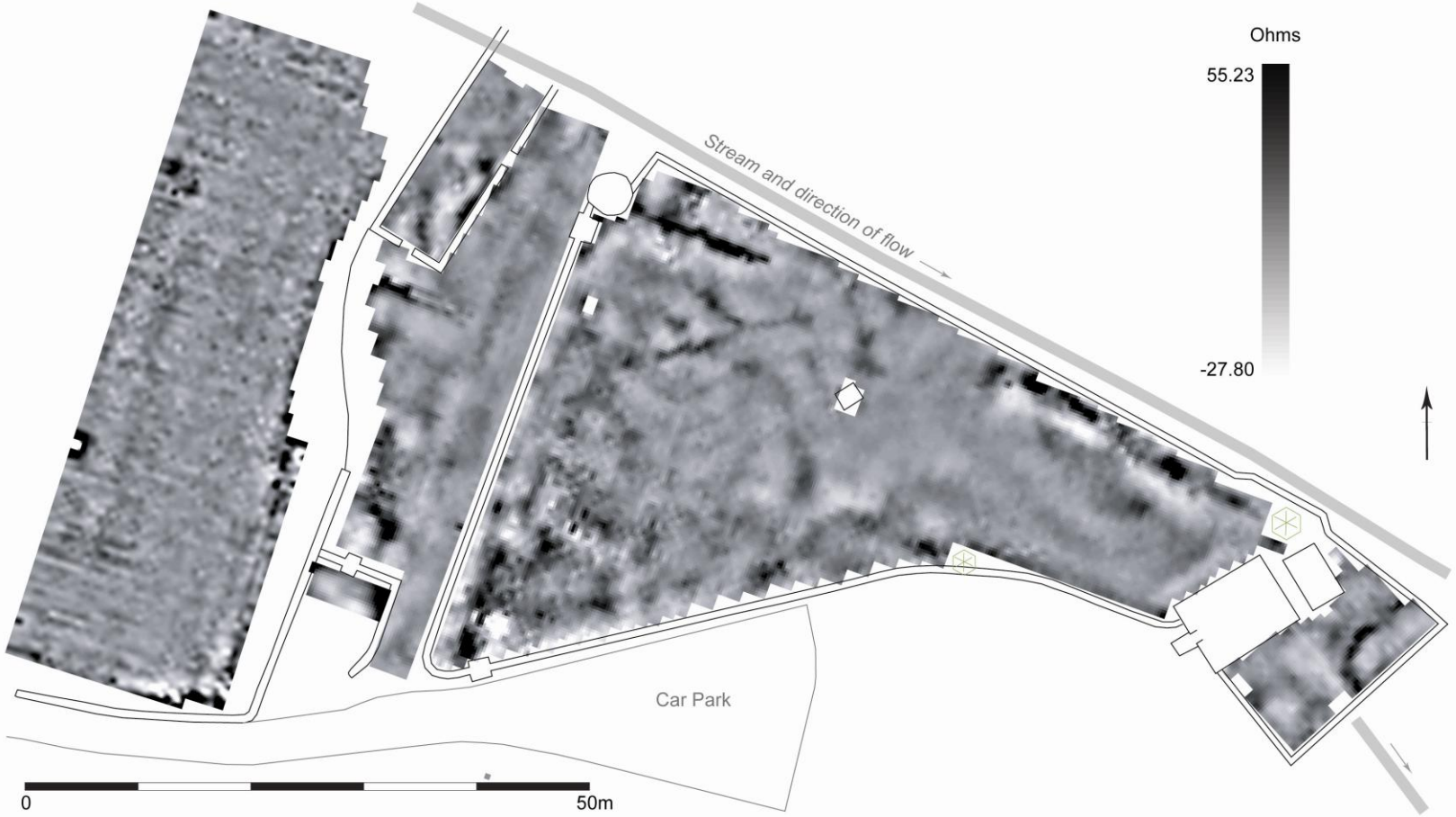
Shade relief plot of resistance data

PROJECT:

Struell Wells 2012

FIGURE:

6



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DETAILS:

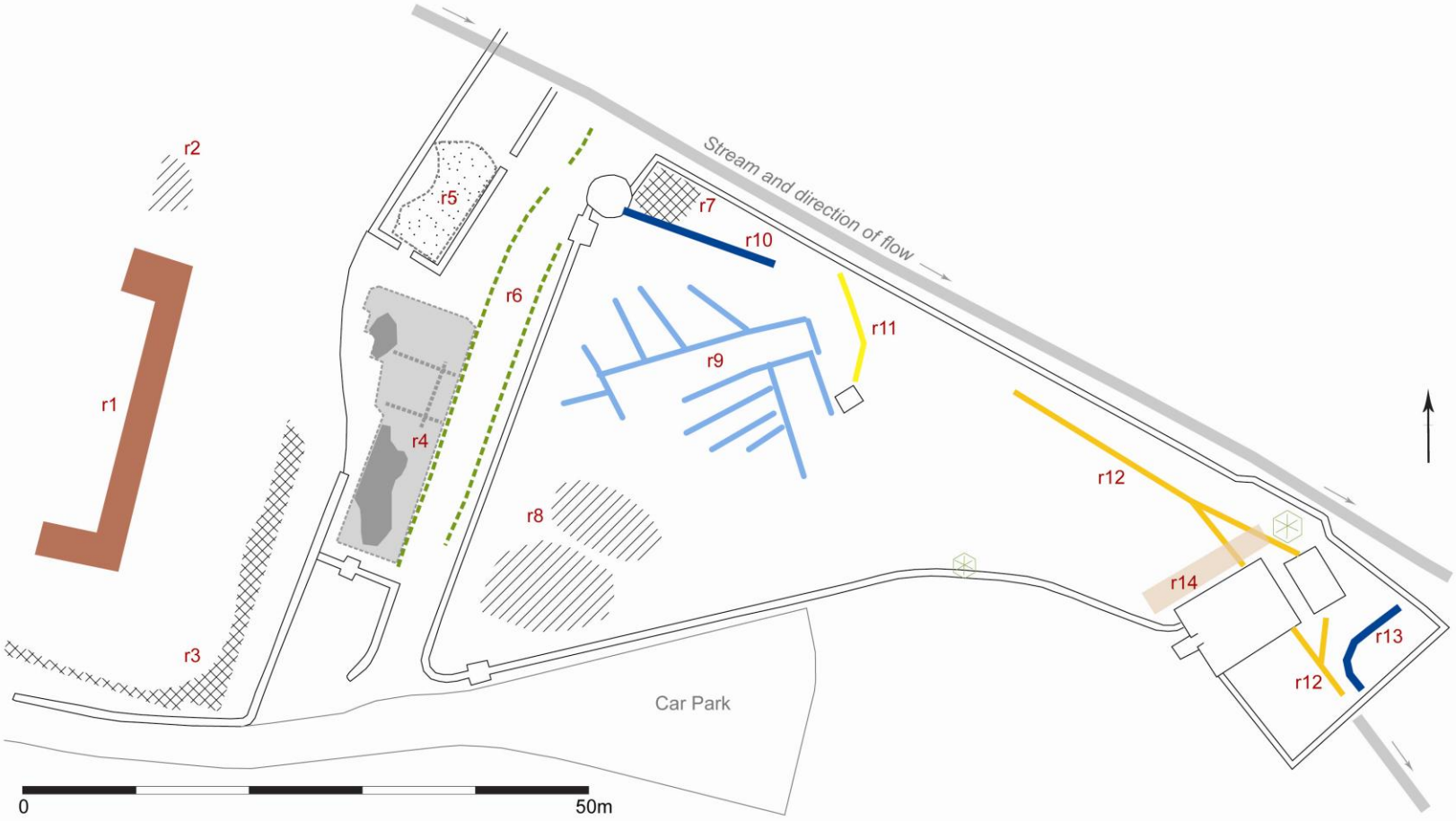
Shade plot of resistance data following the application of High Pass Filter. This has the effect of filtering out broad trends and emphasises the detail of smaller and fainter anomalies.

PROJECT:

Struell Wells 2012

FIGURE:

7



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CLIENT: NIEA Northern Ireland Environment Agency www.ni-environment.gov.uk

DETAILS:

Simplified interpretation of earth resistance survey results

PROJECT:

Struell Wells 2012

FIGURE:

8