



Dunluce Castle Gardens, County Antrim

Geophysical investigations at the site of

Dunluce Castle Gardens, Co. Antrim

SMR No.: ANT 002:003

Grid Ref: C 9041 4126

On behalf of

Televisionary Ltd

Sapphire Mussen

CAF GSR 20

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1.0 Summary

1.1 Site Specific Information

<i>Site Name:</i>	Dunluce Castle gardens
<i>Townland:</i>	Dunluce
<i>SMR No.:</i>	Vicinity of ANT 002:003 (scheduled)
<i>Grid Ref.:</i>	C9041 4126
<i>County:</i>	Antrim
<i>Dates of Survey:</i>	17 th -21 st September 2012
<i>Surveyors present:</i>	Sapphire Mussen and Brian Sloan, Centre for Archaeological Fieldwork, Queens University Belfast.
<i>Size of area surveyed:</i>	Approximately 0.6 hectares
<i>Weather conditions:</i>	Inclement, gale force winds and heavy rainfall
<i>Geology:</i>	Bedrock geology of Antrim basalt
<i>Current land use:</i>	Grazing fields
<i>Survey type:</i>	Electrical Earth Resistance

1.2 Abstract

A geophysical survey was carried out in September 2012 covering an area immediately to the west of Dunluce Castle's landward buildings (Figure 1). This area is known to have contained terraced garden features and a bowling green at some stage during the 16th-17th century occupancy of the castle. The survey revealed a number of both high and low resistance anomalies, some of which appear to underlie the still visible garden terracing in this area. The fairly geometric nature of the anomalies in this area is likely evidence of walls and features associated with the gardens. Although every effort was made to survey the entire area, completion of the western edge had to be compromised due to dangerous working conditions and it was left partially unfinished. Interpretation and comprehension of the anomalies present is greatly aided by observance of aerial photography of the site and sketches made of the village field and garden features which may be found in the Northern Ireland Sites and Monuments Records database (Figure 2). These sources clearly show features which correspond to anomalies discovered during the 2012 geophysical survey of the site. Further survey work is not recommended as further understanding of the site would best be obtained by excavation of the anomalies discovered.

2.0 Cartographic evidence

Little has changed on Ordnance Survey maps of the area since the third edition of 1906 (Figure 3). From this date onwards there is nothing specific marked with regards the garden features to the west of the castle; the castle itself is marked as 'Dunluce Castle (in ruins)'. The ruins themselves also appear unchanged on the maps from 1906 to present day with the exception of the addition of modern pathways added at some stage between 1921 and 1950. A 'bowling green' is noted only on the second edition Ordnance Survey map of 1853, with a definite line, possibly representing a wall dividing the garden area from that known as the 'village field' to the south (Figure 3b). The remains of the castle directly to the east of the survey area also appear more extensive on the 1853 edition than on any of the later maps. The first edition Ordnance Survey map of the area shows a simple dashed outline of a double walled or earthen banked enclosure (Figure 3a), whether this represents a garden feature or the bowling green cannot be certain although it is also possible that it represents a misinterpretation of the terraced features of the site.

3.0 The Survey Site

The survey area covers the scheduled site of Dunluce Castle gardens which occupy the area immediately west of the western wall of the landward castle buildings and to the north of the 'village Field' which was previously surveyed in January of 2012 (Figure 1). On the northern and western sides the survey site is bounded by a wooden post and wire fence beyond which the land drops off in steep cliffs to the water's edge. The surveyed area covers approximately 0.6 hectares and slopes downwards in a series of earthen terraces from the 'village field' towards the northern cliff edge. The land is currently used as rough pastureland for grazing cattle and as a result the topography is fairly uneven underfoot with some areas being quite boggy. There appear to be a number of tumbled walls which are now apparent as steeply sloping lines of uneven ground which make the site cumbersome to traverse in places. The western edge of the survey area can be found in such a manner, with such a steeply sloping bank that it cannot be crossed with survey equipment. In the northern half of the survey area a number of low rectangular grassy platforms are visible which are likely to be remnants of garden features (Figure 2).

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

The area immediately to the west of the landward castle buildings were surveyed for the purpose of investigating the form and extent of the associated castle gardens and possibility of other unknown features. A survey grid with intervals of 20m was set out covering a total area of approximately 0.6 hectares (Figure 4). The majority of the gridded area was surveyed insofar as time constraints and health and safety considerations allowed.

An earth resistance survey of the gridded area was carried out between the 17th and 21st September 2012 using a Geoscan RM15 meter and MPX15 multiplexer. The survey 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
r1a-d	<p>Linear high resistance anomalies running along the same orientations as the landward castle buildings. r1a measures approximately 27m in length in a northwest to southeast direction in the southern half of the survey area, less than 1m in width. r1b and r1c run parallel with each other and perpendicular to the western wall of the castle with a maximum length of 60m. Each 'dog-leg' at approximately 35m from the castle wall. r1b has a north-western return whilst r1c has a south-eastern return. Both are less than 1m in width. r1d sits in the northern half of the site at the end of r1c and measures a maximum of 2m by 2m.</p>	<p>The appearance of these anomalies strongly suggests that they represent the subterranean remains of stone-built walls associated with landscaped castle garden features. r1a creates a square enclosed area between r1b, r2, and a windowless portion of the western wall of the castle, and possibly served as a private garden or space once occupied by the 17th century bowling green. r1b and r1c run perpendicular to the castle wall and 'dog-leg' in a curious fashion towards each other approximately 35m from the wall. It could be suggested that r1b served as a revetment wall for the southernmost terrace as it runs along the top edge of a terraced slope, however r1c does not also follow this and runs along the bottom edge of a terraced slope which would serve no purpose in holding back the garden soils behind it. The area between r1b and r1c is that which would have been directly overlooked by the lodging rooms of the landward part of the castle. It is possible that they were once walls of at least 2m height which would have enclosed a formal decorative garden accessed by a door and possible pathway leading from the lodging buildings. Whether or not such walls were in place at the same time as the earthen terracing of the site is uncertain and could only be investigated through excavation of the site. r1d may possibly represent a more disturbed continuation of r1c or the entrance way to the northernmost garden features of the site. Its indefinite nature makes further interpretation difficult.</p>
r2	<p>Very high resistance anomaly running in a northeast to</p>	<p>One end of this anomaly meets the southern corner of one of the landward</p>

	<p>southwest direction along the southern edge of the survey area, measuring approximately 1m in width.</p>	<p>buildings and runs in a line perpendicular to the western wall of the castle towards the cliff at the southwest corner of the survey area, possibly turning at a right angle to follow the cliff edge back towards the north. When walking over the site this anomaly is encountered in the ground surface as a line of grass covered earth and stones which marks a drop in the ground level from north to south by a depth of approximately 0.6m. It is possible that this anomaly represents the remains of a stone wall which ran from the castle to the cliff edge dividing the garden features from the village field to the south. It may be likely that it stood to height of at least 3m, similar to the remains of a wall which can be found at the northern edge of the site, jutting out at an angle from the landward castle buildings. This would have made the castle gardens a private area, obscuring view from and into the village field to the south. The land is significantly lower and less sloping to the north of this anomaly than it is to the south(beyond the survey area), an indication of the purposeful terracing and maintenance of the land in this area, the uneven land to the south seeing more heavy practical usage as part of the village grounds.</p>
r3	<p>Broken line of high resistance running perpendicular to the end of r2 and in a northwest to southeast direction along the same line as the western wall of the landward castle buildings.</p>	<p>The linearity of this anomaly and its situation in relation to the castle and r2 suggest that it may be evidence of a returning section of r2 providing a western boundary limit to the gardens which once occupied the site. In the topography of the site this anomaly presents as a definite stony ridge which drops steeply off to the western side ever more increasingly towards its northernmost end. A wall along this edge would not only have served as a boundary but also as a revetment for the contained garden soils, barrier to the elements and protection from the immediate cliff edge.</p>

r4	<p>Rectangular area of mid-level high resistance measuring approximately 22m by 12m and situated within the centre of the survey area along a northeast to southwest alignment.</p>	<p>The geometric appearance of this anomaly and fairly homogenous resistance levels can be taken to represent a garden plot or feature with the remains of cultivated soils lying within the surface strata of the site. Its alignment with respect to the western wall of the landward castle buildings also supports this supposition. It is positioned opposite what appears to have once been an entranceway through the western wall of the lodging buildings which may have been a main point of access to the gardens although no evidence of a pathway leading from such an entranceway was discovered during the geophysical survey of the site. This anomaly is encountered as a raised area in the ground as one crosses over the site and can be observed from aerial photography of the area. As it stands alone in a central location and not alongside other similar features in a regular pattern as with the r5 anomalies it is unlikely that this was used for any other purpose than as a decorative garden feature.</p>
r5	<p>Rectangular areas of mid-level resistance occupying the north-western area of the site. Maximum dimensions of 7m width and 16m length. Each is separated from the other by wide strips of low resistance up to 3m across. These anomalies lie along the same alignment as the western wall of the landward castle buildings, in a northwest to southeast running direction.</p>	<p>The fairly homogenous nature of the resistance in these rectangular areas could be suggestive of cultivated garden soils. Their regular geometric form and placement along the same alignment as the castle walls would suggest that they represent evidence of garden features associated with occupation of the castle. The low resistance regular wide banding which surrounds and separates these rectangular anomalies can be taken as trodden pathways separating each of the garden plots for ease of movement and access. Walking over the site today, some of these rectangular features can be identified as raised areas in the grass.</p>
r6	<p>Vaguely linear anomaly of very high resistance set within</p>	<p>The position of this anomaly along the line of r1c and r1d could be taken to</p>

	a semi-rectangular area of high resistance. Maximum dimensions of 6m by 15m. The very high resistance area has a maximum width of approximately 2m.	suggest evidence of an associated stony feature or continuation of the wall. The marked difference in resistance levels as it disappears under a terraced edge may be indicative of a stone built structure which predates terracing of the site. Given the nature of the spread of high resistance in this area, it is possible that it is imaging the remnants of a stone revetment, stone clearance for gardening purposes, or geological outcropping and its linearity purely coincidental.
r7	Marked change in the resistance levels across the site moving from mid-level resistance to low level resistance.	These divisions mark the top of slope where a terraced edge was encountered in traversing the site. The area south of each division is of higher resistance and likely to comprise of material built up to form the terraces. The areas north of each division are of lower resistance and represent areas down slope, which have now become waterlogged through natural drainage of the site.
r8a-c	Linear high resistance anomalies running from northwest to southeast across the site. r8a-b run centrally through the site and measure a maximum of 30m in length. r8c measures approximately 28m in length and runs roughly parallel to the western wall of the landward castle buildings along the eastern edge of the survey area. All anomalies measure no more than 0.5m in width.	It is likely that these anomalies represent stone-lined field drains running down slope through the site towards the cliff edge. Further investigation would be needed to ascertain whether or not these are field drains and if so of what date. As r8a-b arbitrarily cut across the site without respect to any of the other anomalies or upstanding castle walls it could be suggested that they are later addition to the site, possibly 18 th -19 th century. In contrast to this, r8c runs almost parallel to the western castle wall and lies directly between r1b and r2 which could imply that it is representative of a wall or walkway associated and contemporary with the castle's gardens.
r9	Linear anomaly of very high and very low resistance readings running from northwest to southeast along the	This anomaly is most certainly caused by the existence of a large plastic waste water pipe which runs along the western wall of the landward castle

	<p>eastern edge of the survey area and western wall of the landward castle buildings.</p>	<p>buildings. Thick grass has grown over the pipe in many places but it can still be seen running along the castle wall as it has been placed directly onto the ground surface and not buried. The combination of very high and very low readings has arisen from a combination of bad contacts with the earth where the pipe obstructs the probes and from the electrical current passing through the pipe itself which is hollow. The pipe is clearly a modern addition and serves to divert waste water from the offices and amenities in the landward part of the castle.</p>
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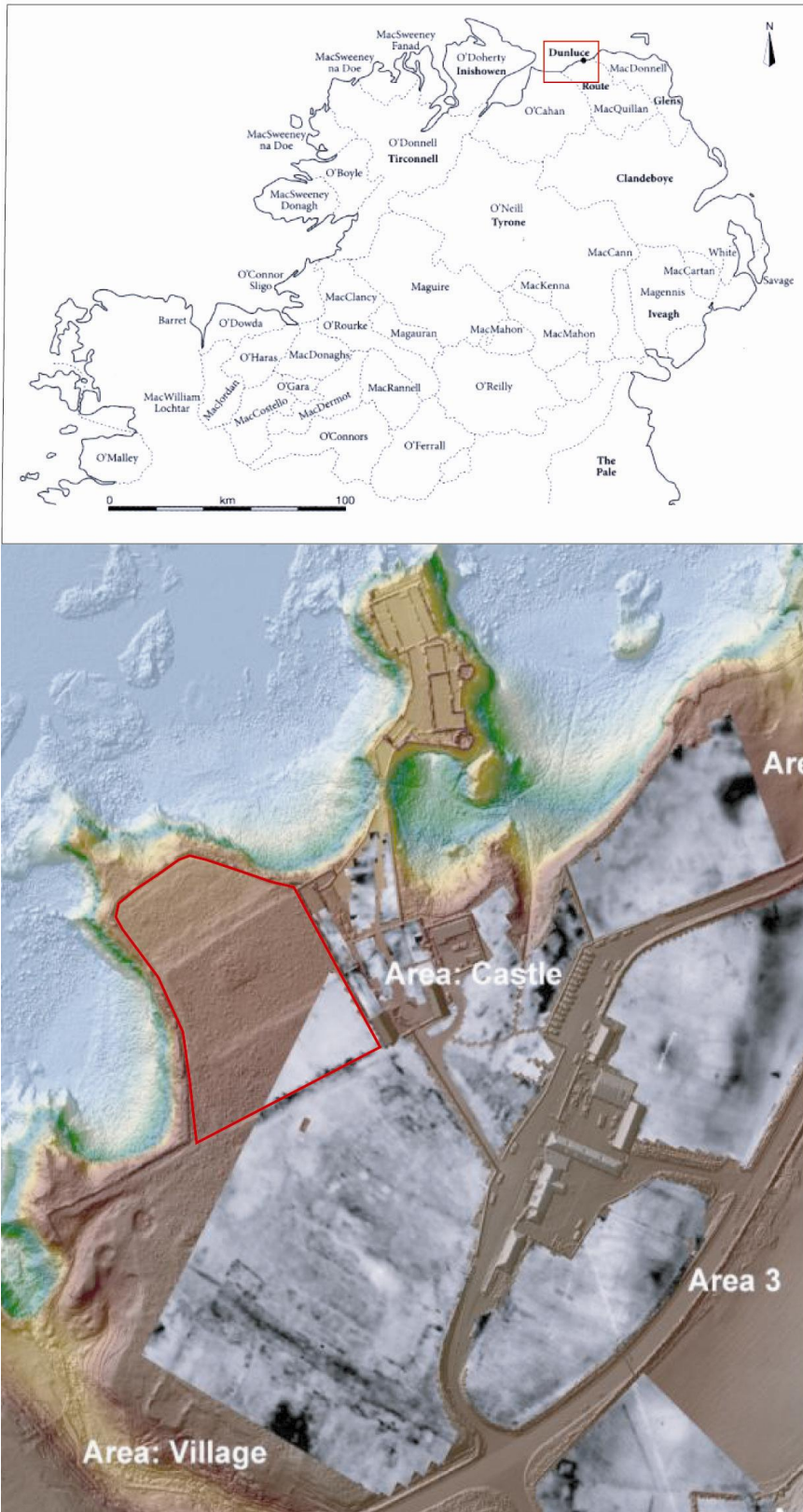


Figure 1: Top; Map showing location of Dunluce castle, Bottom; Location of survey area (outlined in red) in relation to the castle and showing resistance plots from geophysical survey areas studied between 2009 and 2012 draped over a LiDAR survey model of the area (R. McHugh, CAF Geophysical Survey report 17).

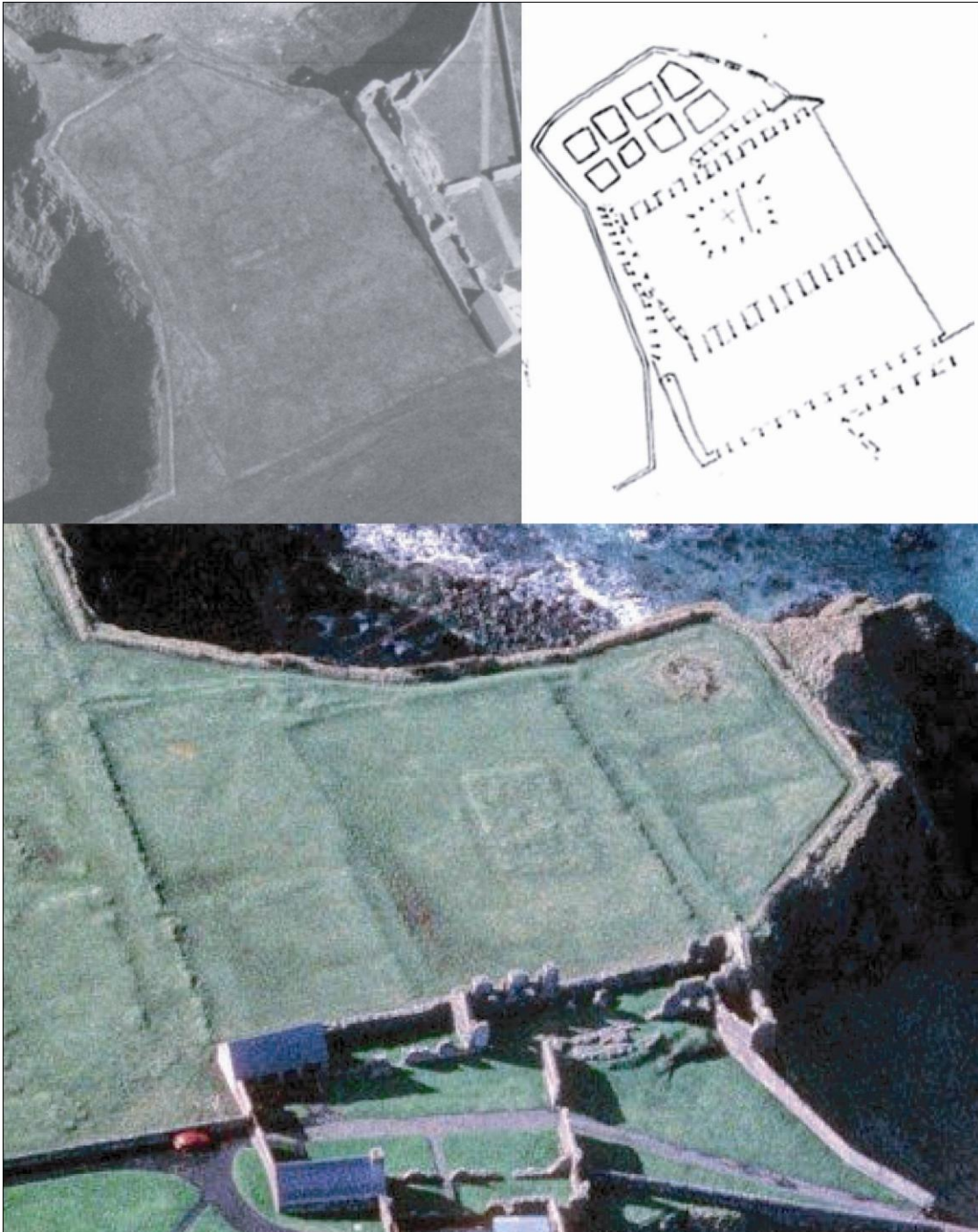


Figure 2: Photographic images and sketch plan of the site showing topography of the survey area, its relationship to the castle, and visibility of features in the ground surface;

Top left; aerial photograph taken 12 June 1995 (QUB map library)

Top Right; sketch plan provided in the NISMR database (ANT 002:003)

Bottom; Aerial photograph, date unknown (QUB map library)

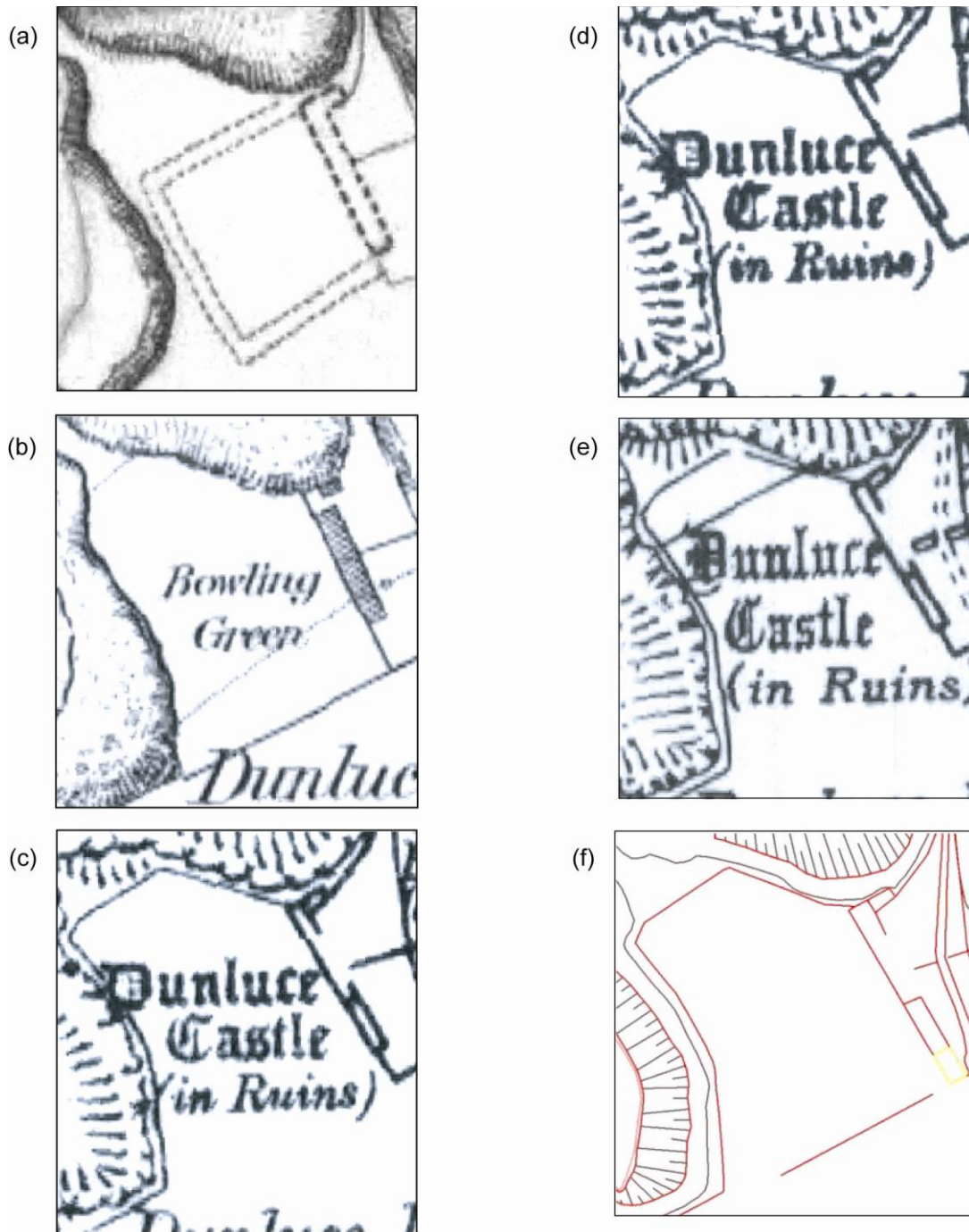


Figure 3: Comparison of cartographic representations of the survey area from 1831 to 1950.

- (a) First edition Ordnance Survey 1831-1832
- (b) Second edition Ordnance Survey 1853
- (c) Third edition Ordnance Survey 1906
- (d) Fourth edition Ordnance Survey 1921
- (e) Fifth edition Ordnance Survey 1946-1950



Figure 4: Location and outline of the gridded survey area (each grid square measures 20mx20m).



Figure 5: Shade plot of raw resistance data.

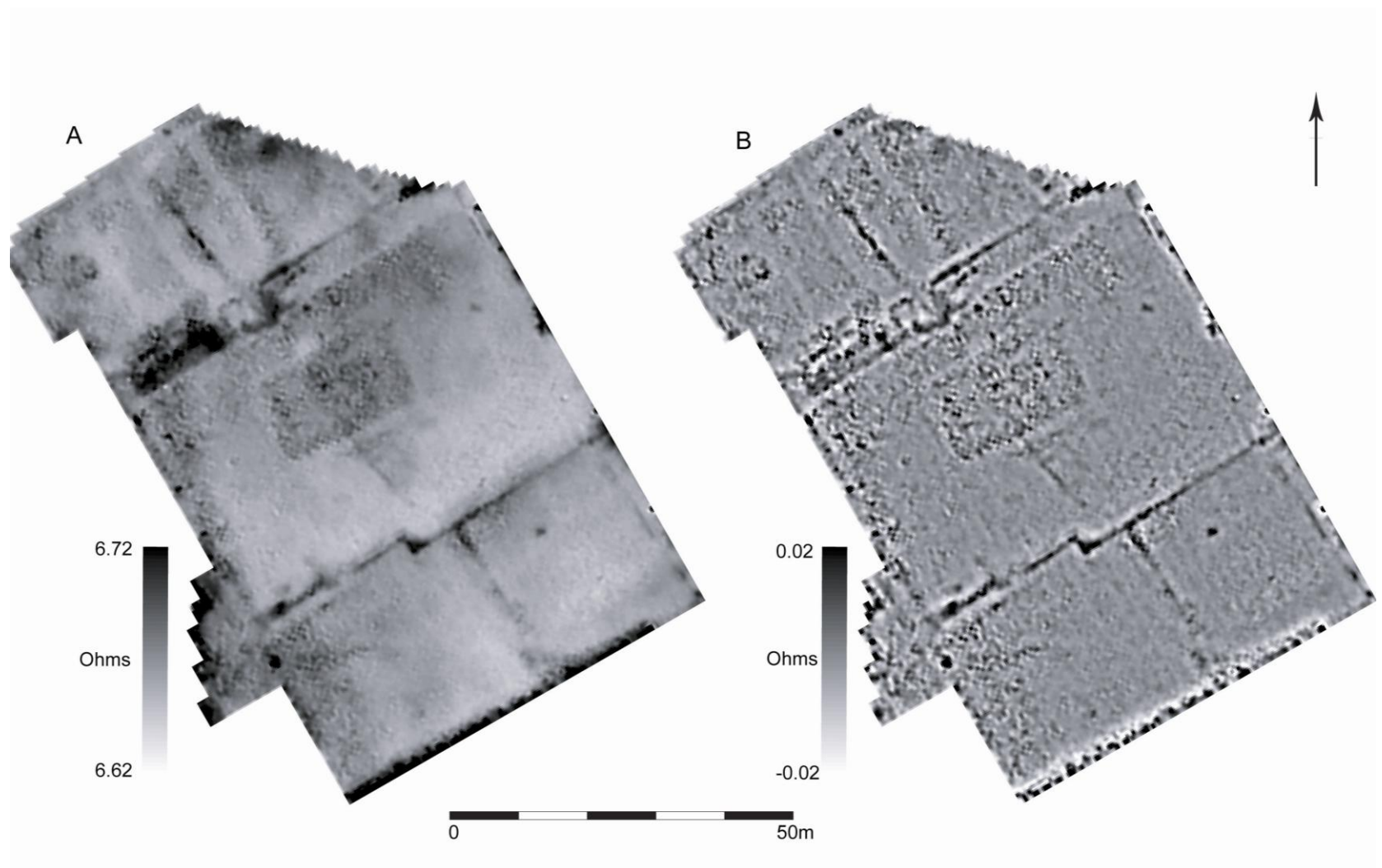


Figure 6: Comparison of a shade plot of the raw data results (A) with a shade plot of the results after the application of High Pass Filter (B) which has the effect of filtering out broader trends and emphasises the detail of smaller and fainter trends.

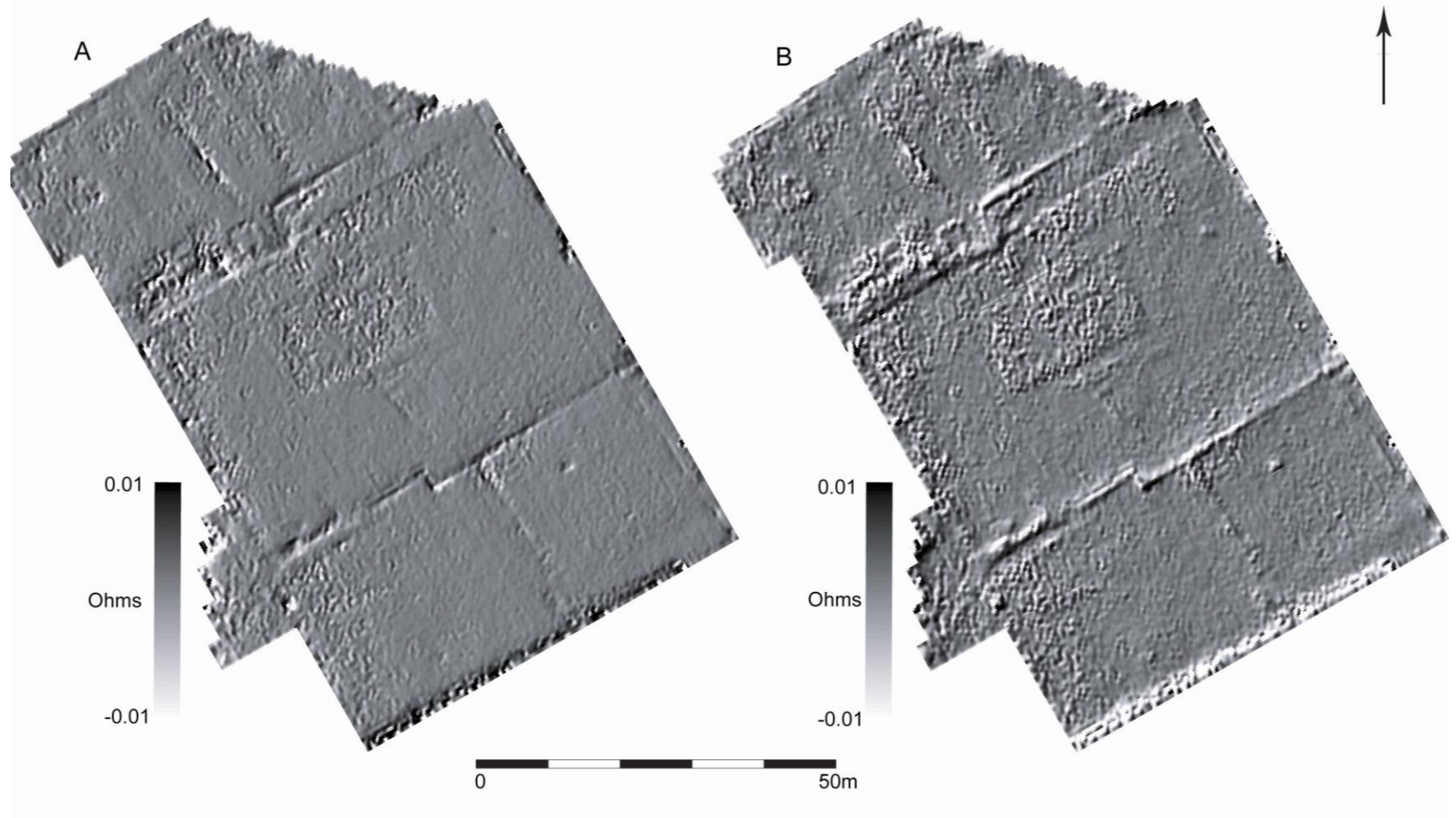


Figure 7: Shade relief plots of the raw resistance data highlighting the anomalies present.

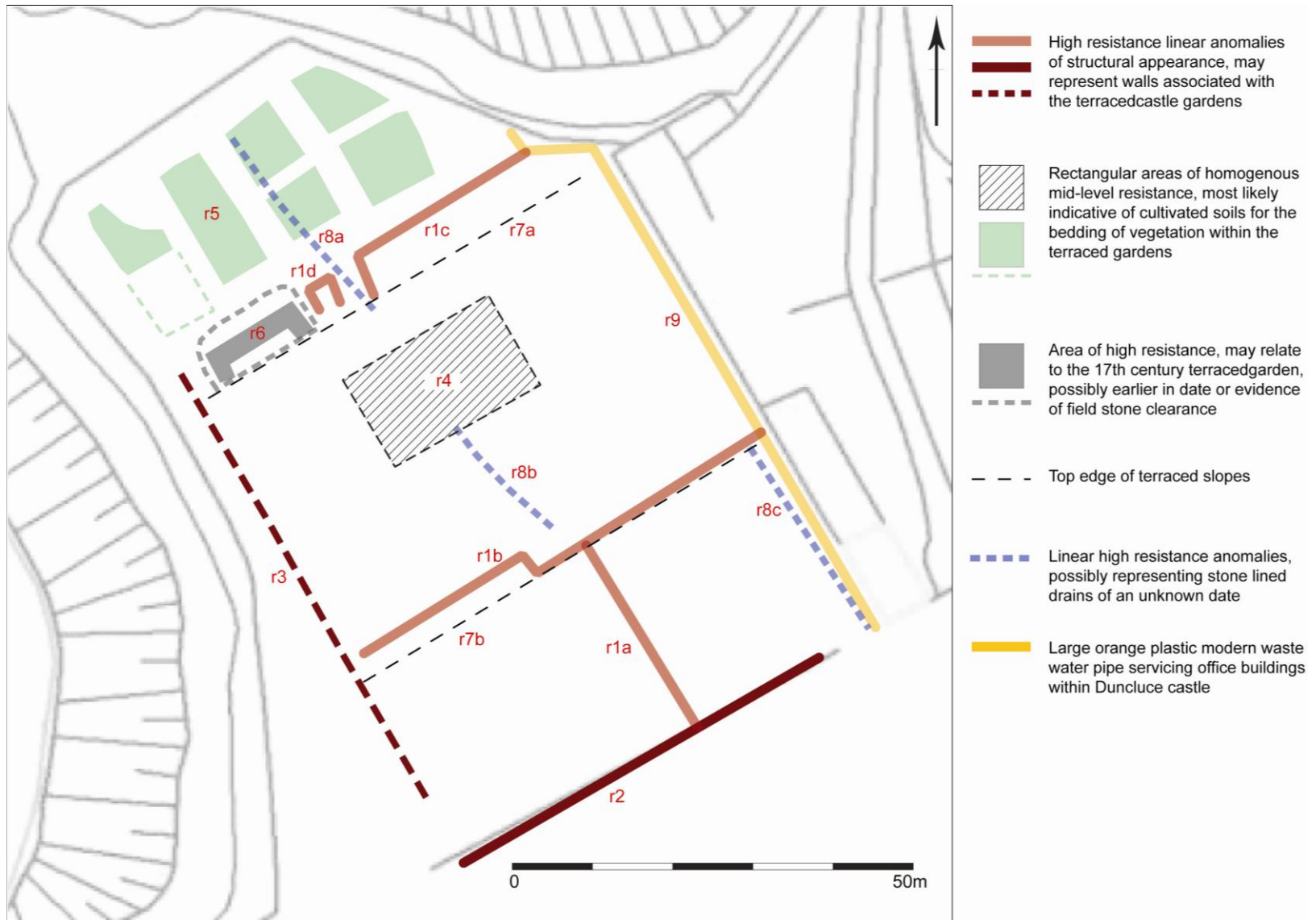


Figure 8: Graphic summary of earth resistance anomalies; to be read in conjunction with the interpretative results given in Section 5.

