wa-archaeology.com

DESK BASED ASSESSMENTS
ARCHAEOLOGICAL EVALUATION
ARCHAEOLOGICAL EXCAVATION
GEOPHYSICAL SURVEY
TOPOGRAPHIC AND LANDSCAPE SURVEY
HISTORIC BUILDING RECORDING
ENVIRONMENTAL SERVICES

MUSGRAVE CHURCH FIELD
GREAT MUSGRAVE,
CUMBRIA

GEOPHYSICAL SURVEY
REPORT

wardell armstrong
archaeology

Wardell Armstrong Archaeology Limited
Cocklakes Yard, Carlisle, Cumbria CA4 0BQ, United Kingdom
Telephone: +44 (0)1228 564820 Fax: +44(0)1228 560025 www.wa-archaeology.com

DATE ISSUED: September 2014
JOB NUMBER: CP10612
GRID REFERENCE: NY 7664 1323

MUSGRAVE CHURCH FIELD TRUST

MUSGRAVE CHURCH FIELD,

GREAT MUSGRAVE, CUMBRIA

GEOPHYSICAL SURVEY REPORT

PREPARED BY:

Martin Railton Senior Project Manager

APPROVED BY:

Frank Giecco Technical Director

CONTENTS

ILLUSTRATIONS

FIGURES (APPENDIX 2)

SUMMARY

On 4th and 5th September 2014 Wardell Armstrong Archaeology (WAA) undertook geophysical surveys of land at Musgrave Church Field, Great Musgrave, Cumbria, at the invitation of the Musgrave Church Field Trust. The geophysical surveys were conducted by volunteers under the supervision of WAA staff as part of a community project funded by the Heritage Lottery Fund (HLF).

Musgrave Church Field comprises 1.5ha of land immediately to the west of St Theobald's Church, on the north bank of the River Eden, adjacent to Musgrave Bridge (centred on National Grid Reference NY 76641323). The survey site is *c*.300m to the south of the village of Great Musgrave, in the Parish of St Theobald, Musgrave, in the Eden Valley, Cumbria

Musgrave Church Field contains a number of earthworks, which are believed to be the remains of an 18th century rectory, including an orchard and gardens. Given the archaeological interest of the site, the geophysical surveys were undertaken to provide further information on the possible presence/absence, nature and extent of potential archaeological features within the survey area.

Earth resistance and magnetic surveys were conducted at Musgrave Church Field, targeting the location of a former rectory and gardens. The geophysical surveys detected the rubble remains of the former rectory and outbuildings (demolished in 1884), and features associated with the associated garden enclosure. Some potential additional features were also detected including a possible enclosure boundary and tree throws. An earlier alignment of the drive crossing Musgrave Church Field was detected to the north of the existing road. Agricultural features were also detected within the field, including possible land drains/ditches, and possible evidence for former cultivation ridges.

The results of the geophysical survey thus enhanced the findings of a previous topographic survey, and suggest that the remains of the rectory and enclosure survive sub-surface. Given the substantial nature of the rubble deposits at the site, detailed mapping out of foundations was not possible using geophysical survey. However, further information on the form and development of the buildings could be achieved through the excavation of a number of targeted archaeological trial trenches at the site.

1 INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT (FIGURE 1)

1.1.1 On 4th and 5th September 2014 Wardell Armstrong Archaeology (WAA) undertook geophysical surveys of land at Musgrave Church Field, Great Musgrave, Cumbria, at the invitation of the Musgrave Church Field Trust. The geophysical surveys were conducted by volunteers under the supervision of WAA staff as part of a community project funded by the Heritage Lottery Fund (HLF).

1.1.2 The survey site is c.300m to the south of the village of Great Musgrave, in the Parish of St Theobald, Musgrave, in the Eden Valley, Cumbria (Figure 1). Musgrave Church Field comprises 1.5ha of land immediately to the west of St Theobald's Church, on the north bank of the River Eden, adjacent to Musgrave Bridge (centred on National Grid Reference NY 76641323). The B6259 road between Kirkby Stephen and Warcop bounds the field on the east side. The field is subdivided by a driveway, lined by an avenue of mature chestnut trees (Figure 2).

1.1.3 The present St Theobald's Church was constructed in 1845 to a design by G.R. Appleby. However, the earliest church on the site is believed to date to the 12th century. A 13th century stone coffin lid is contained in the east wall of the present church. Musgrave Church Field contains a number of earthworks, which include field banks and the possible remains of a building. It was the presence of these earthworks that instigated an earthwork survey, conducted by North Pennines Archaeology in 2007.

1.1.4 Historic Ordnance Survey maps and an early tithe map of the site were consulted as pat of this work, along with a number of other pertinent primary and secondary documentary sources (Railton 2007). These suggested that a rectory had been present at the site since at least the 13th century. The survey recorded the remains of an earthen dyke of medieval or post-medieval date, post-medieval field boundaries, and the earthwork remains of an 18th century rectory, including an orchard and gardens.

1.1.5 Given the archaeological interest of the site, the geophysical survey was undertaken to provide further information on the possible presence/absence, nature and extent of potential archaeological features within the survey area, and the presence/absence of any known modern features within the survey area, which may affect the results.

1.1.6 This report outlines the results of the geophysical survey undertaken, and includes an interpretation of the geophysical survey results in light of the archaeological and historical background of the site.

2 METHODOLOGY

2.1 STANDARDS

2.1.1 The survey work undertaken was consistent with English Heritage guidelines (English Heritage 2008), and in accordance with the standard and guidance of the Institute for Archaeologists (IfA 2011). The survey work was undertaken by project volunteers under the supervision of professional staff from Wardell Armstrong Archaeology.

2.2 GEOPHYSICAL SURVEYS

2.2.1 ***Technique Selection:*** earth resistance survey was chosen as the most appropriate technique as it was thought this survey might prove most effective in detecting building foundations and walls of the former rectory. When a small electric current is injected into the ground it encounters sub-surface resistance, which is measured. This resistance relates to the ability of the soil to retain moisture and can correspond to the location of cut archaeological features or buried stonewalls etc. Earth resistance survey was therefore undertaken to target the earthwork remains at the site.

2.2.2 Geomagnetic survey was also undertaken to provide a complementary set of data to the earth resistance survey. This was considered an appropriate technique, given the non-igneous environment, and the expected presence of cut archaeological features at depths of no more than 1.5m. This technique involves the use of hand-held gradiometers, which measure variations in the vertical component of the earth's magnetic field. These variations can be due to the presence of sub-surface archaeological features. Because geomagnetic survey is a rapid technique, it was possible to cover a wider area.

2.2.3 ***Field Methods:*** Geomagnetic survey was undertaken the majority of Musgrave Church Field, which comprised *c.*1ha of cut meadow at the time of the survey. A 30m grid was established across the field, and tied-in to known Ordnance Survey points using a total station with datalogger.

2.2.4 Measurements of earth resistance were determined using a Geoscan RM15 Resistance Meter, with parallel twin probes set 0.50m apart. The survey was undertaken using a zig-zag traverse scheme, with data being logged in 20m grid units. A sample interval of 1m was used, with a traverse interval of 1m, providing 400 sample measurements per grid unit.

2.2.5 Geomagnetic measurements were determined using a Bartington Grad601-2 dual gradiometer system, with twin sensors set 1m apart. It was expected that significant archaeological features at a depth of up to 1.5m would be detected using this arrangement. The survey was undertaken using a zig-zag traverse scheme, with data being logged in 20m grid units. A sample interval of 0.25m was used, with a traverse interval of 1m, providing 1,600 sample measurements per grid unit, with measurements being recorded at the centre of each grid cell.

2.2.6 Data were recorded by the instruments and downloaded on site into a laptop computer for processing and storage.

2.2.7 ***Data Processing:*** geophysical survey data were processed using Terra Surveyor software, which was used to produce 'grey-scale' images of the raw data. Positive magnetic anomalies are displayed as dark grey, and negative magnetic anomalies are displayed as light grey. A palette bar shows the relationship between the grey shades and geomagnetic values in nT.

2.2.8 Regions of anomalously high resistance are displayed as dark grey, and regions of anomalously low resistance are displayed as light grey. A palette bar shows the relationship between the grey shades and earth resistance values in ohm.

2.2.9 Raw data were processed in order to further define and highlight the archaeological features detected. The following basic data processing functions were used:

Despike: to locate and suppress random iron spikes in the gradiometer data and erroneous readings in the resistance data (despike was performed on all survey grids using a window of 11x3 and threshold of 2.0).

Destripe: to reduce the effect of striping in the gradiometer data, sometimes caused by misalignment of the twin sensors (zero mean traverse was performed on all survey grids using a threshold of 2 standard deviations).

Destagger: to reduce location inaccuracies in the gradiometer data, sometimes caused by operator error (destagger applied in both x directions by -2 readings).

Clip: to clip data to specified maximum and minimum values, in order to limit large noise spikes in the geophysical data (gradiometer data clipped from -3nT to 3nT and resistance data from 0 to 80 ohm).

Interpolate: to match the resolution of the sample intervals in the x and y directions (doubled in the y direction).

2.2.10 ***Interpretation:*** three types of geophysical anomaly were detected in the gradiometer data:

positive magnetic: regions of anomalously high or positive magnetic data, which may be associated with the presence of high magnetic susceptibility soil-filled features, such as pits or ditches..

dipolar magnetic: regions of paired positive and negative magnetic anomalies, which typically reflect ferrous or fired materials, including fired/ferrous debris in the topsoil, modern metallic structures, or fired structures, such as kilns or hearths.

negative magnetic: regions of anomalously low or negative magnetic data, which may be associated with features of low magnetic susceptibility, such as stone-built features, geological features, land-drains or sub-surface voids.

2.2.11 Two types of geophysical anomaly were detected in the earth resistance data:

high resistance: regions of anomalously high resistance, which may be associated with the presence of stone-built features, geological features or sub-surface voids

low resistance: regions of anomalously low resistance, which may be associated with cut features which contain a higher moisture content than the surrounding material, such as pits or ditches

2.2.12 ***Presentation:*** the grey-scale images were combined with site survey data and Ordnance Survey data to produce the geophysical survey figures. Colour-coded geophysical interpretation diagrams are provided, showing the locations and extent of areas of high resistance and low resistance, and positive, negative and dipolar geomagnetic anomalies.

2.2.13 An archaeological interpretation diagram is also provided, which is based on the interpretation of the geophysical survey results.

2.2.14 A trace plot of the raw unprocessed data is included in Appendix 1, which are clipped for display purposes only from -10nT to 10nT (magnetic data) and 0-80 ohms (resistance data).

2.3 ARCHIVE

2.3.1 The data archive for the geophysical survey has been created in accordance with the recommendations of the Archaeology Data Service (ADS 2013). This archive is currently held at the company offices at Carlisle, Cumbria. The archive comprises the geophysics data, documentation (metadata), and other project material (report and field notes).

2.3.2 One copy of the final report will be deposited with the County Historic Environment Record, where viewing will be available on request.

3 BACKGROUND

3.1 LOCATION AND GEOLOGICAL CONTEXT

3.1.1 Musgrave Church Field comprises 1.5ha of land immediately to the west of St Theobald's Church, on the north bank of the River Eden, adjacent to Musgrave Bridge (Figure 1).

3.1.2 The geology of the area comprises New Red Sandstone overlain by deposits of glacial boulder clay (BGS 2001). The proximity of the site to the River Eden, means that the field is prone to flooding, and alluvial deposits of river sand and gravel are likely to be present.

3.1.3 The field lies within a glacial river channel, and is predominantly level, with elevations ranging between 144.7m and 145.5m OD. Ground rises steeply along the northern edge of the field towards Great Musgrave. A slight knoll is located on the western side.

3.2 ARCHAEOLOGICAL BACKGROUND

3.2.1 The archaeological and historical background below is based on a combination of documentary and map research, undertaken during 2007 for the topographic survey (Railton 2007). This included a search of records held by the Cumbria County Council Historic Environment Service (HER), the Cumbria Record Office in Kendal, and the consultation of various online sources, including the Archaeology Data Service (ADS). The results of this research are presented in chronological order below, with additional information provided by the Musgrave Church Field Trust (2013).

3.2 PREHISTORIC AND ROMAN PERIODS (TO 5TH CENTURY)

3.2.1 There is no conclusive evidence for prehistoric or Roman activity in the immediate vicinity of the site. A number of Roman stones were reputedly found at the east end of Musgrave Church Field, when the old rectory was demolished in 1884 (Ousby 1984). However, it is possible that were reused stones, originally from the Roman fort of *Verteris*, located *c*.2.5km to the northeast of the site at Brough.

3.3 MEDIEVAL PERIOD (5TH CENTURY TO 1540)

3.3.1 Great Musgrave takes its name from the Musgrave family who resided there for several generations (Nicolson & Burn 1777). The remains of the medieval village of Great Musgrave are preserved as earthworks around the village, and are protected as a Scheduled Ancient Monument (SAM No.393). These remains include two possible house plots (crofts) in fields to the east of the present village, which can be seen as low rectangular mounds (HER No.2767). To the

west of the village an associated sub-rectangular enclosure, and boundary banks are visible (HER No.4119). Two lynchets in a field of pasture immediately southeast of the village, at the north end of Church Lane, are probably also medieval (HER No.4120). Prominent lynchets are also visible in a field to the east of the village close to Hall Garth Farm.

3.3.2 It is not known when St Theobald's Church was first founded, but a church and rectory have existed at the present site since at least the 13th century. The church was appropriated to the Abbey of St Mary's York. However, the parish revenues being small, the abbot and convent of St Mary's could not maintain a vicar, so it continued as a rectory (Nicolson & Burn 1777). In 1248 the patronage of the church was granted to the Bishop of Carlisle.

3.3.3 In the Antique Taxatio Ecclesiastica survey of 1291 for Pope Nicholas IV, the church is valued at £13/6/8 per annum with a pension to the abbot of York of five shillings. By the Novo Taxatio survey in 1318 the value is reduced to just £1, following Scottish raids in 1314 and the plague in 1317.

3.3.4 The earthworks of the medieval village of Little Musgrave are visible in fields *c.*1km to the west of Musgrave Church Field (HER No.6516). These earthworks comprise field banks, cultivation features and possible house platforms. The neighbouring field to the west of Musgrave Church Field contains the slight remains of ridge and furrow earthworks, which could be medieval or post-medieval in date.

3.4 POST-MEDIEVAL PERIOD (1541 TO 1899)

3.4.1 St Theobald's Church was originally located a few yards from the river but was prone to flooding. The present St Theobald's church was built in 1845 on higher ground to the previous building at a cost of £550 (Wheelen 1860). This followed the 'great flood' of 1822, during which the church and rectory stood 3 or 4 feet in water, and most of the bridges on the River Eden were destroyed. This church was restored following a fire in 1921.

3.4.2 The Valor Ecclesiasticus survey for Henry VIII in 1535, explicitly mentions a 'Mansion and Glebe' with an annual value of £16/8/10½. Subsequent surveys gave values of £66/13/4 (in 1649) and £46/13/4 (in 1657).

3.4.3 A rectory stood at the east end of Musgrave Church Field, until it was demolished in 1884 (HER No.4118). The development of this building, and the associated barn, byre, stables and other buildings, can be followed in many archive documents such as Glebe Terriers, Probate Inventories and Tithe records.

3.4.4 From 1663, regular Glebe Terriers give details of the property belonging to Musgrave Parish. A typical extract from 1739 reads 'The Parsonage house, a Barn two Byers a Stable and a Brewhouse, A Garden an Orchard, and a parcel of Ground called the Green Garth'. Probate Inventories from 1670, 1684 and 1719 give full details of the contents of the Rectory and other buildings.

3.4.5 The Glebe Terrier in 1749 records 'the Rectory consisting of a Kitchen, Parlour, Celler and Milkhouse, below stairs, Three Chambers or Lodging Rooms above stairs with Garrets over them, a Barn, two Byers, a Stable and a Brewhouse. A Garden An Orchard, and a parcel of Ground called the Green Garth'. This change in description indicates that the Rectory was rebuilt in the 1740s by the Rev Simon Pindar.

3.4.6 Nicolson and Burn (1777) state: "The parsonage house stands about 50 yards west of the church. It is a good strong building, erected by Mr Pinder, beautifully situated on the north bank of the River Eden. Both house and church are subject to inundation by high flood. The outhouses were rebuilt by the late incumbent Mr Knowsley". The gardens may also date to this period. Mr Knowsley was clerk to the Bishop of Carlisle in 1756, and was rector until 1775. The Musgrave Parish Registry for 1759 states 'The Barn built by Ed. Knowsley Rector'. Therefore, at least some of the outbuildings associated with the rectory are likely to date from the late 18th century.

3.4.7 W. Wheelen described the rectory as "a plain commodious building, which the present rector has modernised and otherwise improved." (Wheelen 1860, 759). The earthwork remains immediately in front of St Theobald's Church have previously been interpreted as the site of this building (Ousby 1984). An oil painting in the church dated to 1880, depicts the rectory in this location, facing the church at the bottom of church lane. The building was a plain square, two-storey building with a pitched roof, and five windows at first floor level. Chimneys were located at either end of the building. An abutment is also illustrated below the church on the north bank of the river, but no trace of this now survives. A drawing of the rectory in 1827 (Plate 1) shows the building in some detail with an associated outbuilding to the northwest, and a pond to the northeast separated from the gardens by a stone wall running east-west (Hill 1861, 407-409).

3.4.8 The earliest documentary reference to a bridge at Musgrave is dated 18th July 1649, when Musgrave Bridge was listed at the Assize held in Appleby as one of 16 bridges in need of repair following the Civil War (Curwen 1932, 9-16). This timber bridge was rebuilt in 1732, but collapsed two years later and was again repaired.

3.4.9 The present stone Musgrave bridge (HER No.15793) was built in 1825. However, this bridge exacerbated the flooding of the church and rectory, so in 1829 a 'tunnel' was built next to the bridge to take the overflow water (Curwen 1932, 175-82). It is popularly believed that this bridge replaced a medieval packhorse bridge near the church (HER No.15300), which was destroyed in the floods of 1822.

3.4.10 A number of river-management features have been identified to the south of Musgrave Church Field, including the Musgrave Dykes (HER No.15761). These are located either side of the river, and were presumably intended as a flood defence although their date is unknown. Part of the northern dyke extends into

the west side of the site. A number of timber bridge piles (HER No. 15762) have been identified on the south side of the river, to the west of the present bridge, close to a river channel.

3.4.11 The earliest available plan of Musgrave Church Field (1840) is included with the Great Musgrave Tithe Award, dated 4th November 1842 (Ref. WDRC/8/175). This plan shows the rectory and garden, which was occupied by Rev. Alfred Heslop at the time of the award. To the south of the garden is a narrow strip of pasture, bordering the river known as 'Island'. The remainder of Musgrave Church Field was known as 'Green Garth' and was also pasture. Both fields were rented by Rev. Heslop. A number of outbuildings are shown to the north and east of the rectory. St Theobalds's Church and church yard are to the east. This church was replaced in 1845.

3.4.12 The 1st Edition Ordnance Survey map of 1862 shows the same buildings as the 1840 plan, with the addition of an outbuilding immediately northeast of the rectory building. Two tracks are shown crossing Musgrave Church Field; one runs along the south side of the field from the bottom of Church Lane towards Musgrave Bridge, and the other runs from the northwest corner, eastwards across the field to the north of the present barn and stables. A field boundary is shown running along the west side of the field, parallel with the road.

3.4.13 The rectory was demolished in 1884, and does not appear on the 2nd Edition Ordnance Survey map of *c.*1898. Field boundaries clearly demarcate the location of the former rectory enclosure, gardens and orchard. A field boundary is also shown running across the south side of the field in a similar location to the 1840 tithe plan. This boundary aligns with a linear earthwork depicted in the neighbouring field to the west. The field had been enlarged slightly by this time, by the removal of a field boundary on the west side of the field, which was shown on the 1st Edition Ordnance Survey map. The new church building is illustrated on this map. The only buildings within Musgrave Church Field at the end of the 19th century, were a barn and shed in the locations of the present buildings, with a smaller shed and yard to the northwest.

3.5 MODERN PERIOD (1900 TO PRESENT)

3.5.1 By the time of the 3rd Edition Ordnance Survey map (c.1915) a small shed had been added to the existing farm buildings on the east side of the site. The field boundaries enclosing the former rectory site had been largely abandoned by this time; only the orchard appears to have been intact at this time.

3.5.2 In 1937 new stables were constructed adjacent to the barn and shed by Rev. Keith Fraser. The small shed to the north of these was demolished during the 20th century. The track running from the northwest corner of Musgrave Church Field was diverted at its east end to join Church Lane to the south of the barn, and a new gateway was constructed, cutting through the earlier field boundaries in this area. The orchard was also finally abandoned, and the site reverted to a single field of pasture.

3.5.3 Musgrave Church Field Trust was formed in 2004 as a charity to buy the Field and Barn buildings from the Diocese of Carlisle for the local community, with grants from charities and benefactors. The Tithe Barn was restored in 2013 with grants from Natural England, the Heritage Lottery Fund and others. It is NOW available for community and educational use.

Plate 1: *Drawing of Musgrave Rectory in 1827 (from Collections for the History and Antiquities of the County of Westmorland by John Hill Esq*)

3.3 PREVIOUS ARCHAEOLOGICAL WORK

3.3.1 In 2007 the well-preserved earthwork remains of St Theobald's Rectory were recorded in plan and in profile. These comprised the remains of at least two buildings, and earthen banks forming the rectory enclosure. Banks and ditches enclosed the site of the former rectory orchard and gardens. It was considered that all were likely to date to the 18th century. These were situated on the north side of an earthen dyke, which had previously been constructed along the north side of the River Eden as a flood defence (Railton 2007).

4 THE GEOPHYSICAL SURVEY

4.1 INTRODUCTION (FIGURE 2)

4.1.1 The geophysical surveys were undertaken on 4th and 5th September 2014. Earth resistance survey was undertaken over an area of approximately 0.5ha targeting the remains of the former rectory and gardens. Geomagnetic survey was undertaken the majority of Musgrave Church Field, which comprised *c*.1ha of cut meadow at the time of the survey.

4.1.2 The field was bounded to the north by field boundaries consisting of hedges and some post and wire fences. These fences produced strong magnetic disturbance on the northern edge of the magnetic survey area. A tarmac drive crossed the north side of the survey area, which also produced strong magnetic disturbance in the gradiometer data and high resistance anomalies in the earth resistance survey.

4.1.3 A number of trees were present, particularly along the drive, which had to be excluded from the geophysical surveys. Some of the earthwork banks also had to be excluded from the resistance survey due to the impracticalities of surveying earthworks.

4.1.4 Small discrete dipolar magnetic anomalies were detected across the whole of the study area in the magnetic survey. These are almost certainly caused by fired/ferrous litter in the topsoil, which is typical for modern agricultural land. These anomalies are indicated on the geophysical interpretation drawings, but not referred to again in the subsequent interpretations.

4.1.5 An archaeological interpretation of the geophysical surveys is included in Figure 7, which is related to the 2007 earthwork survey. Numbers in the text refer to features identified on this figure.

4.2 EARTH RESISTANCE SURVEY (FIGURES 3 & 4)

4.2.1 High resistance anomalies were detected as expected over the earthwork mounds on the east side of the survey area, confirming the presence of rubble deposits associated with the former buildings [1 & 2]. High resistance anomalies were also detected over the banks of the former enclosure and adjacent to the drive.

4.2.2 An area of higher resistance was detected within the enclosure on the west side of the survey area [6], and outside the enclosure to the north and west, which probably reflects slight changes in the underlying soils or geology.

4.2.3 Another area of high resistance was detected on the north side of the survey area, immediately to the south of the drive [7], which is probably due to deposits/dry ground associated with the drive.

4.2.4 Low resistance anomalies were detected within the ditches on the north side of the enclosure due to the higher moisture content of the soils.

4.2.5 A series of very weak parallel linear high resistance anomalies were detected crossing the northwest side of the survey area, aligned north to south. These were spaced on average *c*.7m apart and may possibly indicate the presence of former cultivation ridges [9].

4.3 MAGNETIC SURVEY (FIGURES 5 & 6)

4.3.1 Strong dipolar magnetic anomalies were detected along the northern edge of the survey area, due to the presence of modern fences, and along the drive, due to the tarmac surface. Strong dipolar magnetic anomalies were also detected on the west side of the survey area due to the presence of a bonfire and accumulated ferrous material in this area.

4.3.2 Strong dipolar magnetic anomalies were also detected over the earthwork mounds on the east side of the survey area, in the area of the former buildings [1 & 2] indicating the presence of extensive deposits of rubble and/or ferrous materials.

4.3.3 Strong positive linear magnetic anomalies were also detected over the surface of the drive. A similar positive linear magnetic anomaly was detected to the north east, aligned approximately east to west, which corresponds to the location of the original drive as shown on historic Ordnance Survey maps [8]. This was re-aligned in the 20th century.

4.3.4 Further positive linear magnetic anomalies were detected immediately to the south of the drive on the east side of the survey area, which may indicate the presence of an enclosure or boundary feature associated with the former rectory [3], but this is uncertain.

4.3.5 Positive linear magnetic anomalies were detected on the south side of the survey area in the vicinity of the enclosure banks and ditches [4]. Irregular positive magnetic anomalies were also detected in this area, which may represent soil-filled features, possibly the hollows or pits left by trees (tree throws) which previously occupied the site [5].

4.3.6 A linear positive magnetic anomaly was detected crossing the west side of the survey area, aligned northwest to southeast, which may represent a soil-filled ditch or land drain [10]. Several other linear positive magnetic anomalies were detected to the north, which may represent further land drains or ditches, but these were not as clearly-defined.

4.3.7 A number of parallel weak linear positive and negative magnetic anomalies were detected on the western edge of the survey area, which corresponded to the location of an earthwork ditch and bank.

4.4 DISCUSSION (FIGURE 7)

4.4.1 The results of the geophysical surveys have confirmed the presence of extensive rubble deposits on the east side of the survey area, as indicated by the previous topographic survey. These correspond to the location of the former rectory [1] and outbuildings [2] as depicted on the Great Musgrave Tithe Award of 1840.

4.4.2 The magnetic survey may indicate the presence of an enclosure in the area of the rectory [3], but the results are uncertain due to the presence of numerous strong dipolar magnetic anomalies, which may have masked the presence of other potential archaeological features in this area.

4.4.3 Further resistance and magnetic anomalies were detected associated with banks and ditches of the former garden enclosure [4] to the southwest. In addition, a number of features were detected, which may indicate the locations of trees, which have since been removed leaving soil-filled hollows/tree throws [5].

4.4.4 An area of higher resistance on the northwest side of the enclosure is probably due to underlying soil/geological conditions [6]. Similarly an area of higher resistance adjacent to the drive is probably also due to modern deposits and/or drier ground close to the road [7].

4.4.5 The remains of an earlier road alignment were detected on the northeast side of the survey area [8]. This track is depicted on historic Ordnance Survey maps running from the northwest corner of Musgrave Church Field in this location, but was diverted at its east end along its current route to join Church Lane in the 20th century.

4.4.6 The surveys have produced tentative evidence for former cultivation practices on the northwest side of the site [9]. The anomalies are typical of ridge and furrow cultivation, but this interpretation is uncertain, and they could also relate to drainage.

4.4.7 At least one drainage ditch has been detected on the west side of the site [10]. A number of other possible linear features were detected, which may also relate to drainage.

5 CONCLUSIONS

5.1 CONCLUSIONS

5.1.1 Earth resistance and magnetic surveys covering up to *c.*1ha of land have been conducted at Musgrave Church Field, targeting the location of a former rectory and gardens, as part of a project funded by the Heritage Lottery Fund.

5.1.2 The geophysical surveys detected the rubble remains of the former rectory and outbuildings (demolished in 1884), and features associated with the associated garden enclosure. Some potential additional features were also detected including a possible enclosure boundary and tree throws.

5.1.3 An earlier alignment of the drive crossing Musgrave Church Field was detected to the north of the existing road. Agricultural features were also detected within the field, including possible land drains/ditches, and possible evidence for former cultivation ridges.

5.1.4 The results of the geophysical survey have thus enhanced the findings of the previous topographic survey, and suggest that the remains of the rectory and enclosure survive sub-surface. Given the substantial nature of the rubble deposits at the site, detailed mapping out of foundations was not possible using geophysical survey. However, further information on the form and development of the buildings could be achieved through the excavation of a number of targeted archaeological trial trenches at the site.

6 BIBLIOGRAPHY

6.1 SECONDARY SOURCES

Archaeology Data Service (2013) *Geophysical Data in Archaeology: A Guide to Good Practice*, Arts and Humanities Data Service

British Geological Survey (2001) *Solid Geology Map: UK North Sheet, 4th Edition*

Curwen, J F (1932) *The Later Records Relating to North Westmorland or the Barony of Appleby,* Institute of Historical Research

English Heritage (1991) *Management of Archaeological Projects (MAP2)*, London: English Heritage

English Heritage (2008) *Geophysical survey in Archaeological Field Evaluation*, Research and Professional Services Guideline No.1, 2nd Edition, London

Hill, J (1827) *Collections for the History and Antiquities of the County of Westmorland*, Volume 7, 407-409

IfA (2011) *Standard and guidance for archaeological geophysical survey*, Institute for Archaeologists, Birmingham

Musgrave Church Field Trust (2013) *Musgrave Church Field and Tithe Barn* (Ed: MJ Lea)

Nicolson and Burn (1777) *The History and Antiquities of the Counties of Westmorland and Cumberland*, Vol 1

NPPF (2012) *National Planning Policy Framework: Archaeology and Planning*. Department for Communities and Local Government

Ousby, R (1984) *Short History of Musgrave*, Pamphlet

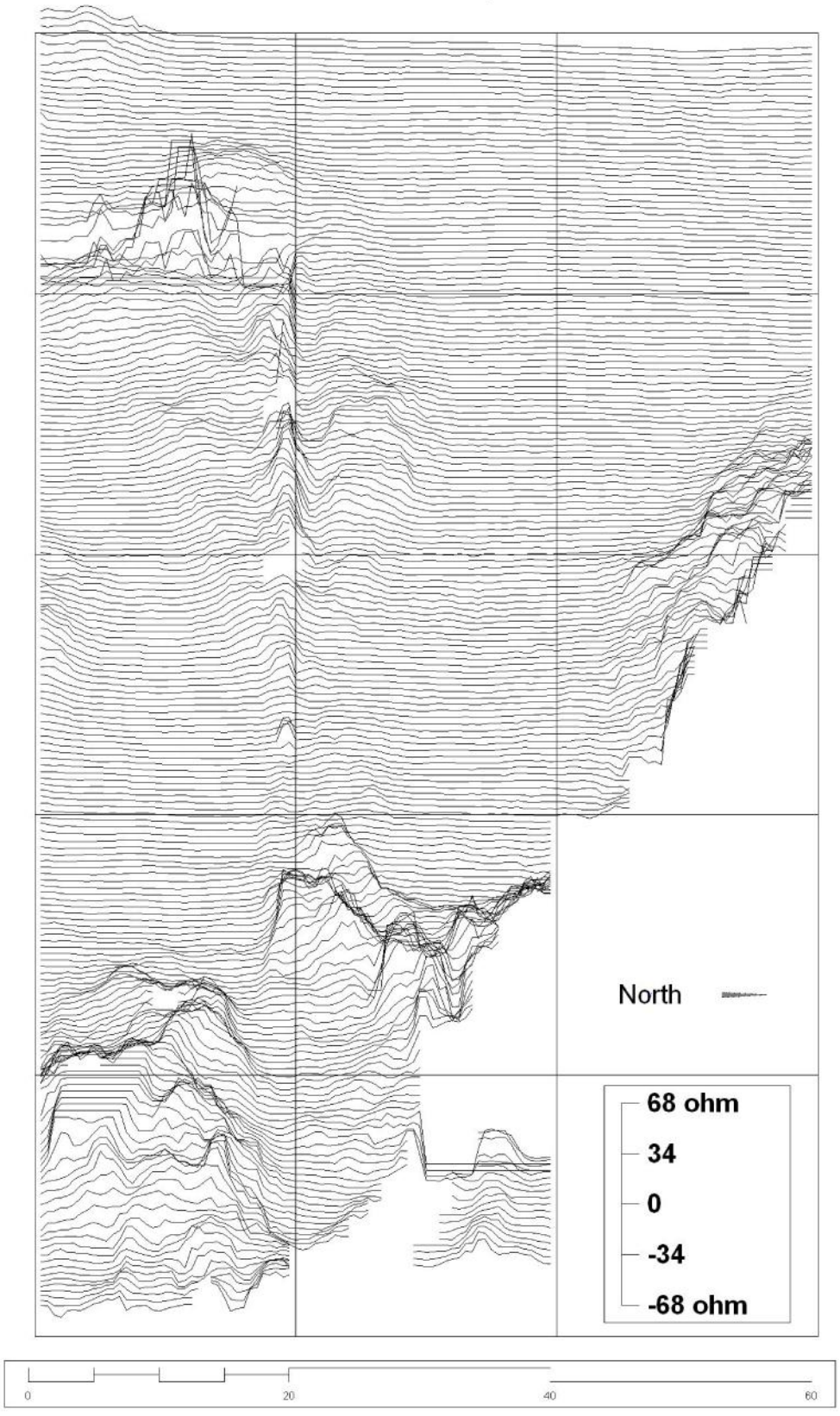
Railton, M (2007) *Musgrave Church Field Survey, Great Musgrave, Cumbria*, Unpublished Report, North Pennines Archaeology Ltd. Ref. CP402

RCHME (1999) *Recording Archaeological Field Monuments: A descriptive specification*, London

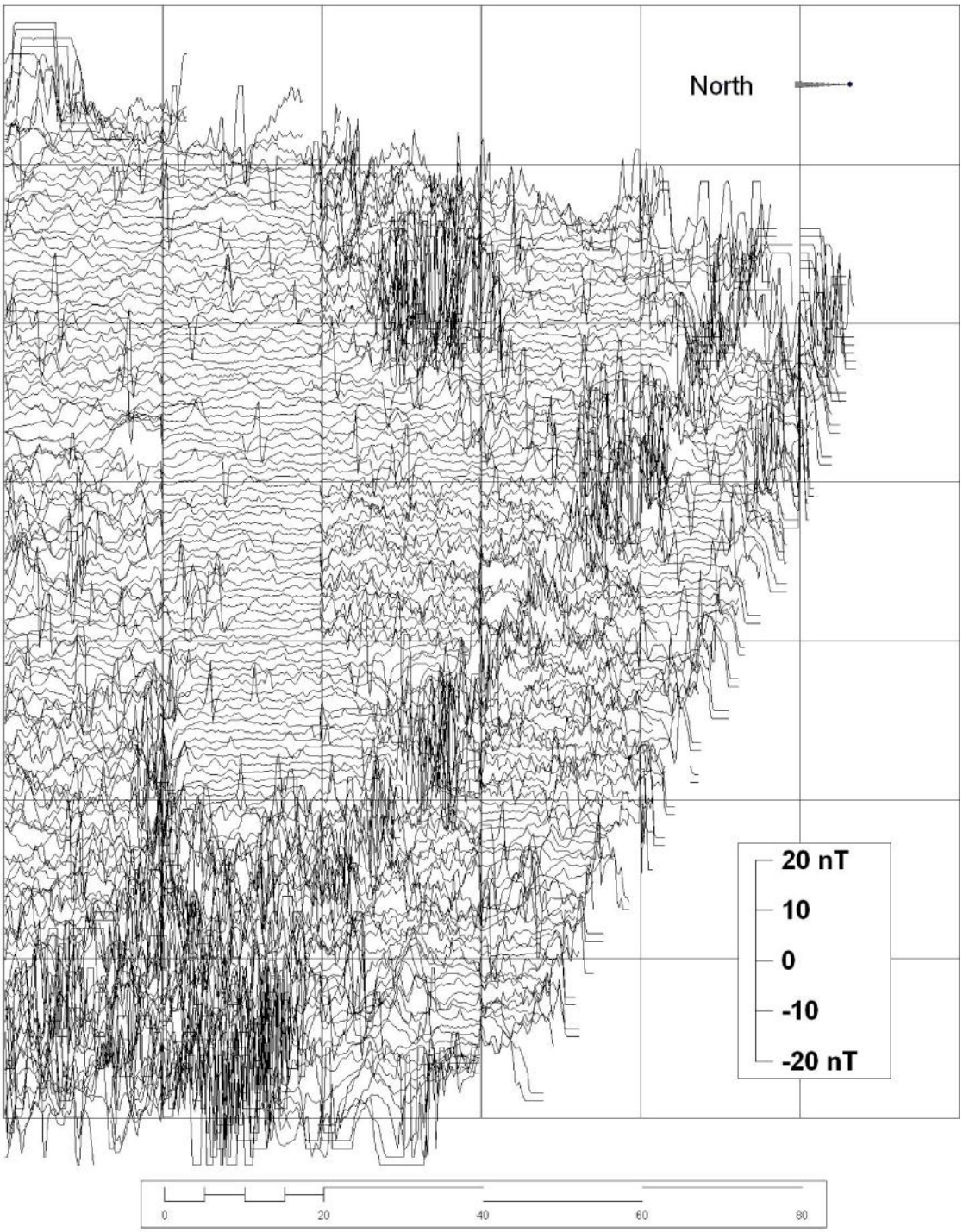
Wheelan, W (1860) *History and Topography of Cumberland and Westmorland*

APPENDIX 1: TRACE PLOTS

Resistance Survey Data



Magnetic Survey Data



APPENDIX 2: FIGURES

wa-archaeology.com

Wardell Armstrong Archaeology:

CUMBRIA
Cocklakes Yard
Carlisle
Cumbria
CA4 0BQ
Tel: +44 (0)1228 564820

STOKE-ON-TRENT
+44 (0)845 111 7777

CARDIFF
+44 (0)29 2072 9191

EDINBURGH
+44 (0)131 555 3311

GREATER MANCHESTER
+44 (0)1942 260101

LONDON
+44 (0)20 7287 2872

NEWCASTLE UPON TYNE
+44 (0)191 232 0943

SHEFFIELD
+44 (0)114 245 6244

TRURO
+44 (0)1872 560738

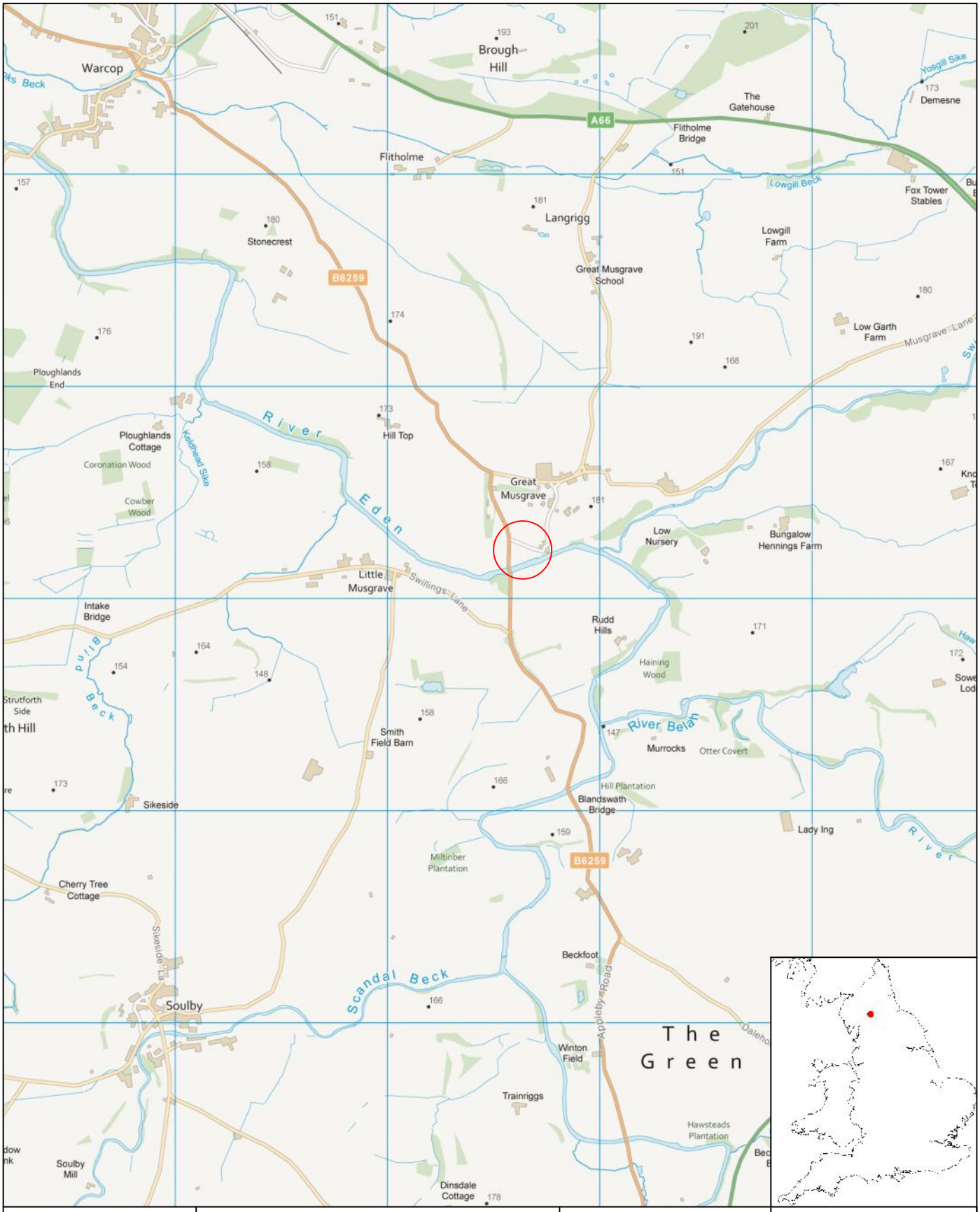
WEST BROMWICH
+44 (0)121 580 0909

International offices:

ALMATY
+7-727-3341310

MOSCOW
+7 (495) 980-07-67

wardell armstrong
archaeology



wardell armstrong archaeology	PROJECT:	Musgrave Church, Great Musgrave, Cumbria
	SCALE:	1:25,000 at A4
	REPORT No:	CP10612
	CLIENT:	Musgrave Church Field Trust
	DRAWN BY:	AB
	DATE:	September 2014
	FIGURE:	1

KEY:

Site location

Wardell Armstrong Archaeology 2014

Figure 1: Site location.

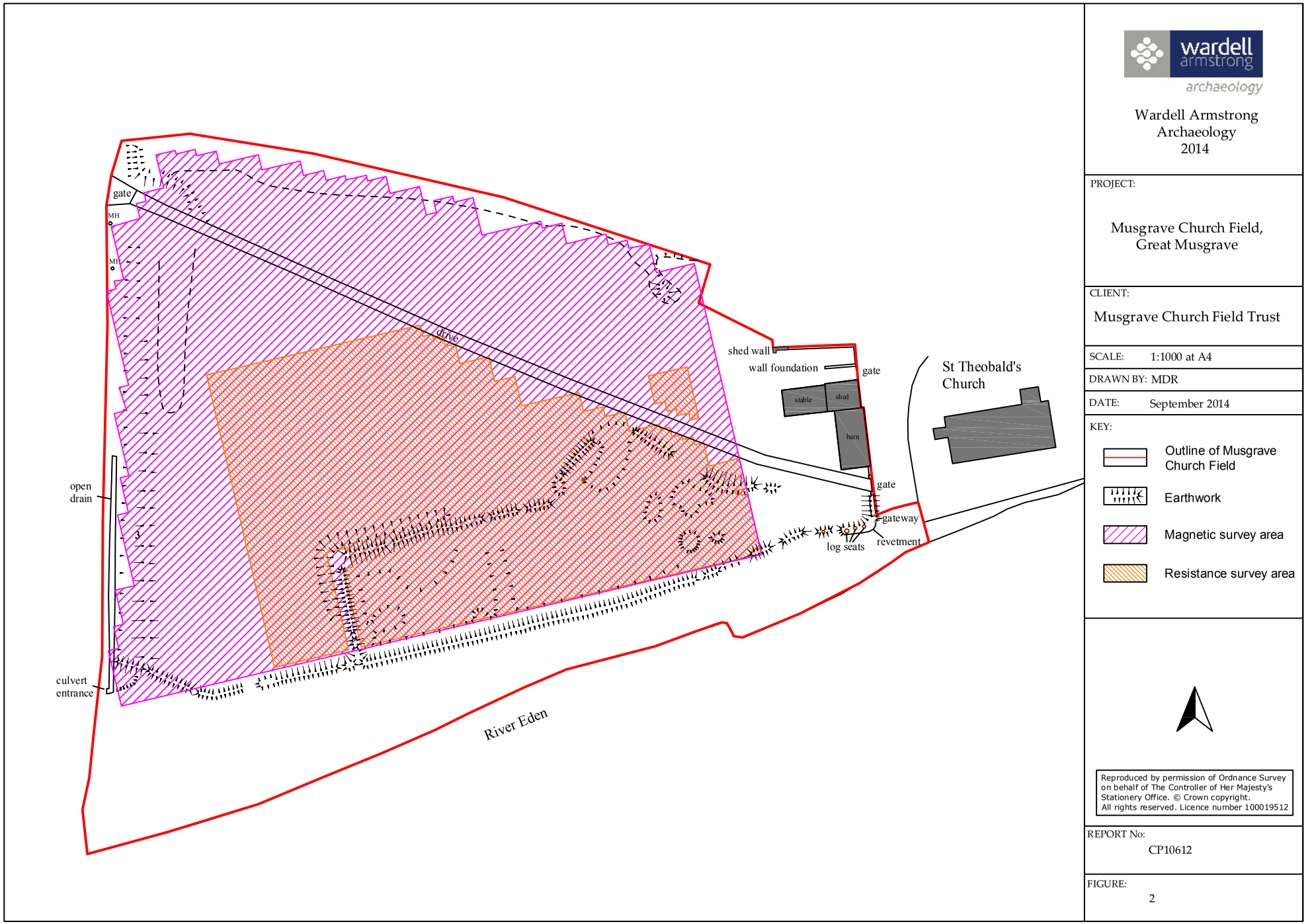


Figure 2: Location of the geophysical survey areas in relation to the 2007 topographic survey

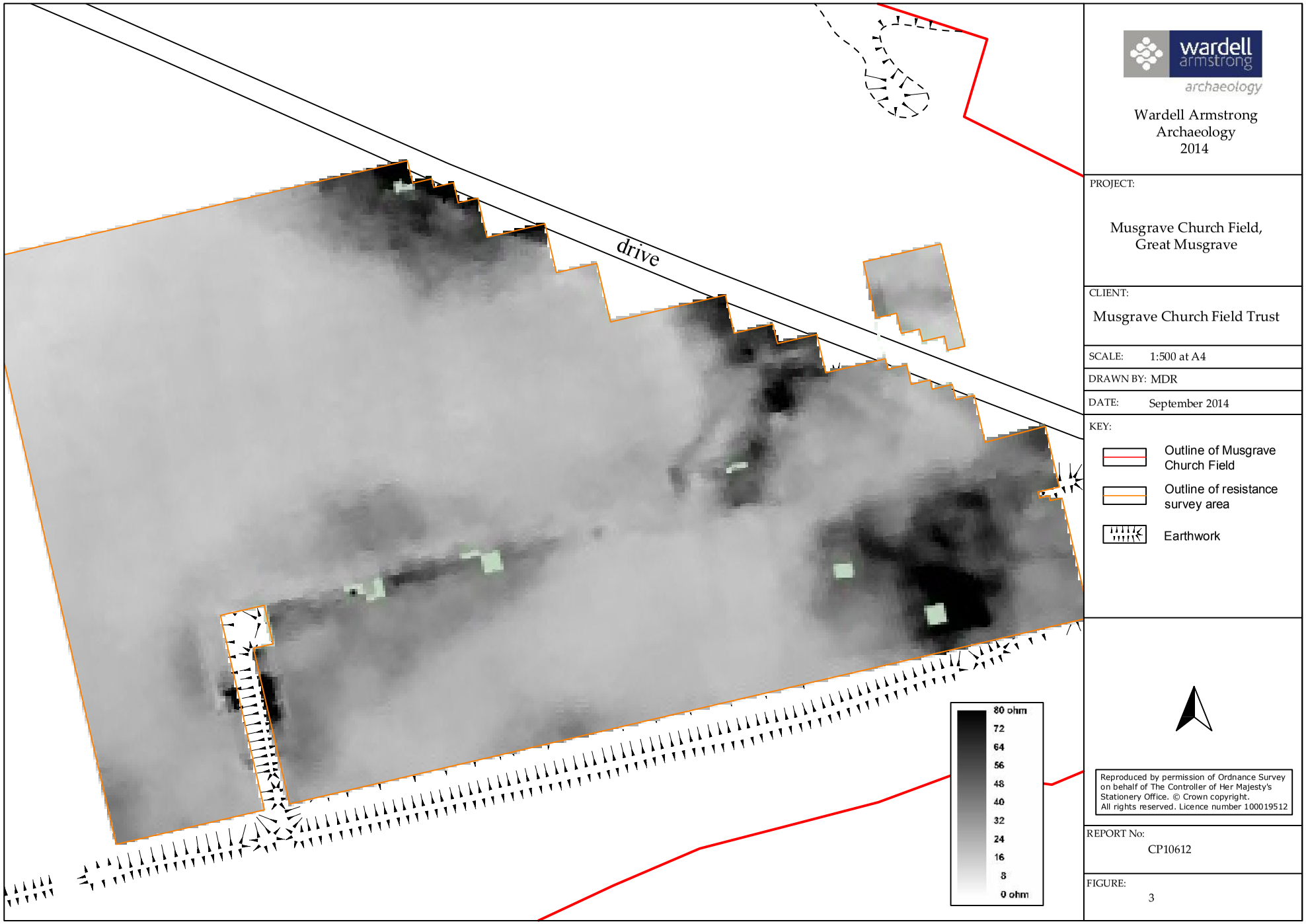


Figure 3: Earth resistance survey

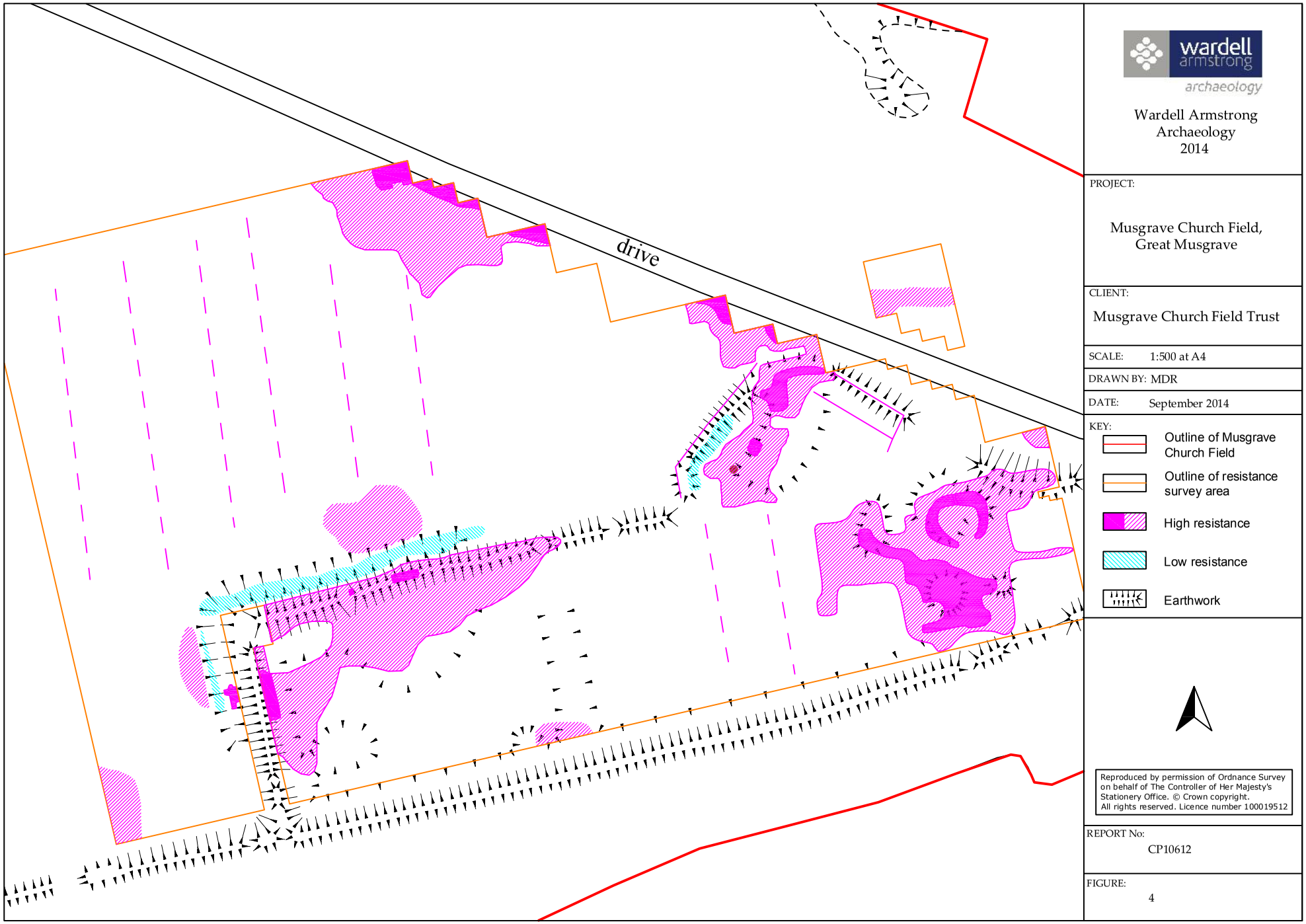
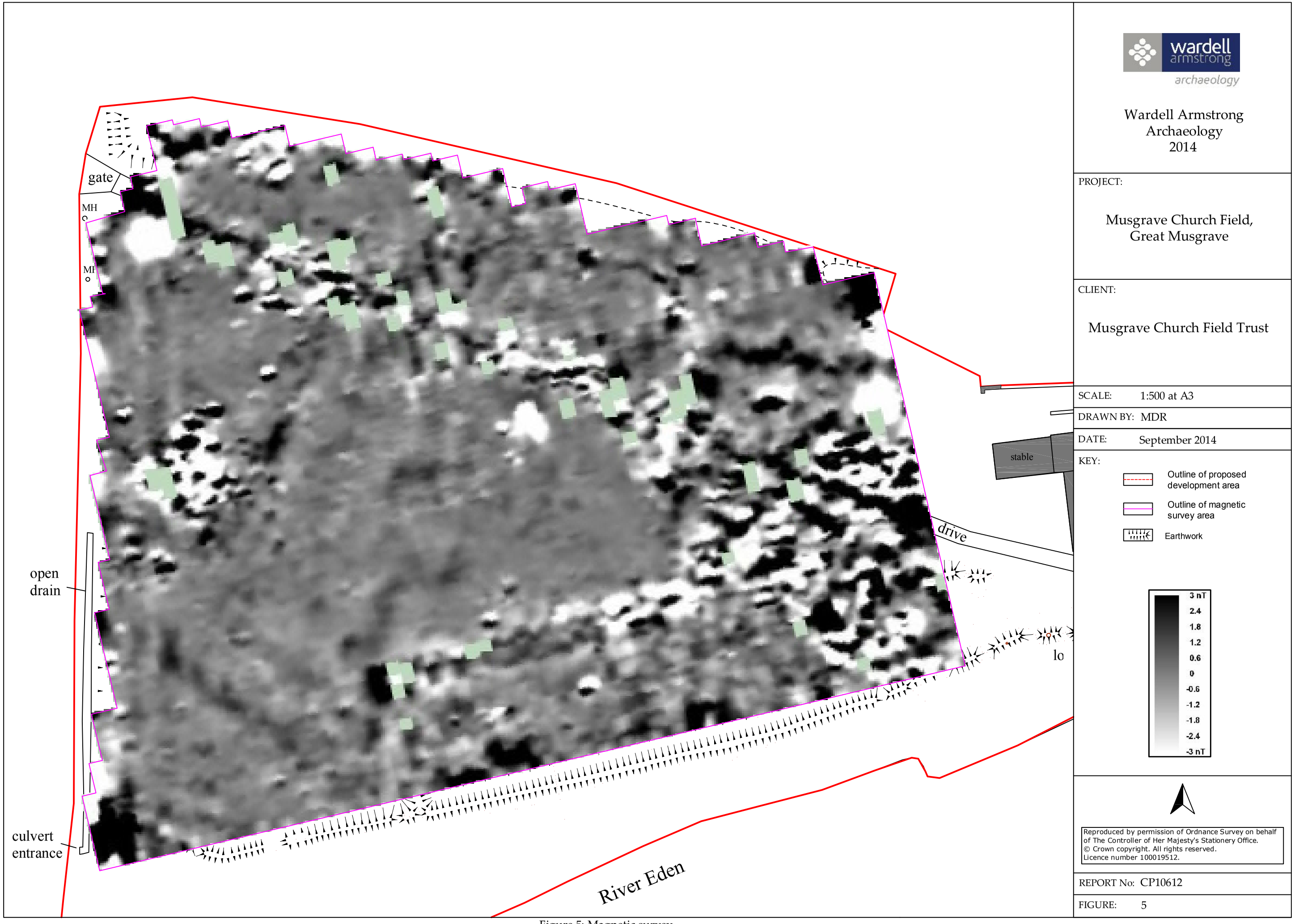


Figure 4: Geophysical interpretation of the earth resistance survey



wardell armstrong
archaeology

Wardell Armstrong
Archaeology
2014

PROJECT:

Musgrave Church Field,
Great Musgrave

CLIENT:

Musgrave Church Field Trust

SCALE: 1:500 at A3

DRAWN BY: MDR

DATE: September 2014

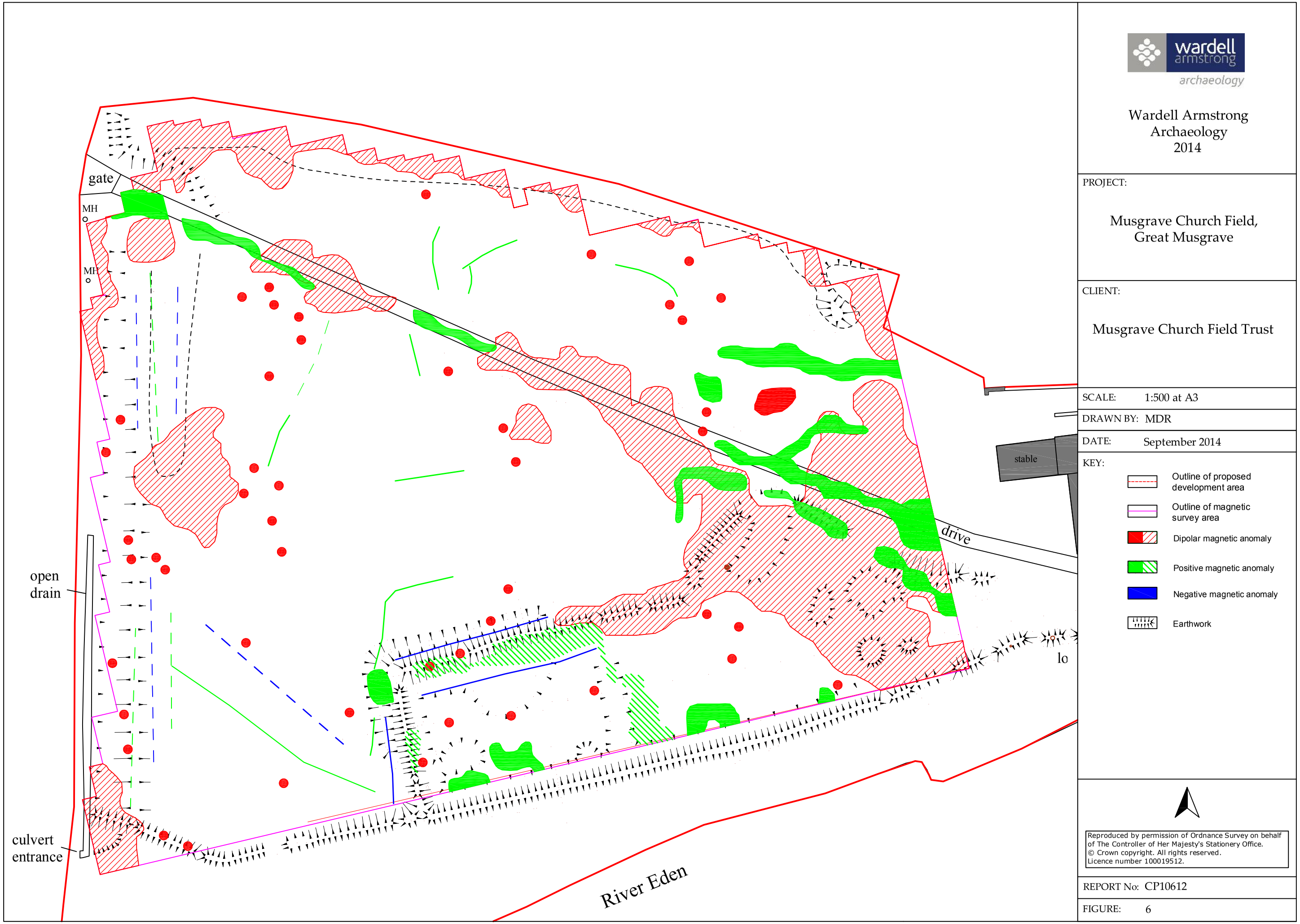
KEY:

- Outline of proposed development area
- Outline of magnetic survey area
- Earthwork

REPORT No: CP10612

FIGURE: 5

Figure 5: Magnetic survey



Wardell Armstrong
Archaeology
2014

PROJECT:

Musgrave Church Field,
Great Musgrave

CLIENT:

Musgrave Church Field Trust

SCALE: 1:500 at A3

DRAWN BY: MDR

DATE: September 2014

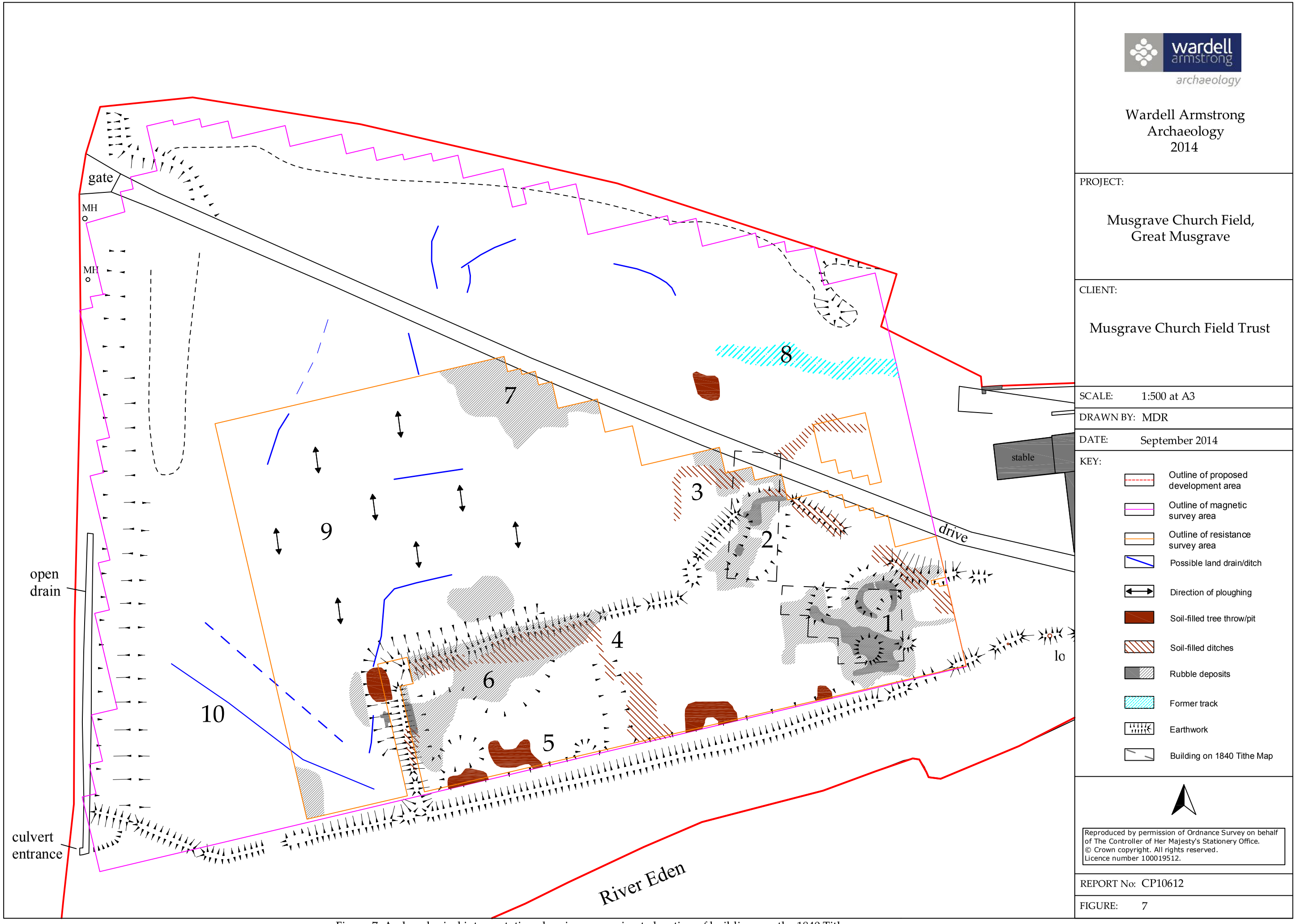
KEY:

- Outline of proposed development area
- Outline of magnetic survey area
- Dipolar magnetic anomaly
- Positive magnetic anomaly
- Negative magnetic anomaly
- Earthwork

REPORT No: CP10612

FIGURE: 6

Figure 6: Geophysical interpretation of the magnetic survey



wardell armstrong
archaeology

Wardell Armstrong
Archaeology
2014

PROJECT:

Musgrave Church Field,
Great Musgrave

CLIENT:

Musgrave Church Field Trust

SCALE: 1:500 at A3

DRAWN BY: MDR

DATE: September 2014

KEY:

- Outline of proposed development area
- Outline of magnetic survey area
- Outline of resistance survey area
- Possible land drain/ditch
- Direction of ploughing
- Soil-filled tree throw/pit
- Soil-filled ditches
- Rubble deposits
- Former track
- Earthwork
- Building on 1840 Tithe Map

REPORT No: CP10612

FIGURE: 7

Figure 7: Archaeological interpretation showing approximate location of buildings on the 1840 Tithe map