

**Malmesbury Abbey  
Malmesbury  
Wiltshire**

**A REPORT ON A GROUND PENETRATING RADAR SURVEY**

for

**Malmesbury History Society**

David Sabin and Kerry Donaldson

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ARCHAEOLOGICAL SURVEYS LTD

**Malmesbury Abbey  
Malmesbury  
Wiltshire**

Ground Penetrating Radar Survey

for

**Malmesbury History Society**

Fieldwork by David Sabin

Report by David Sabin BSc (Hons) MIFA and Kerry Donaldson BSc (Hons)

Survey dates - 8<sup>th</sup>, 9<sup>th</sup>, 12<sup>th</sup> to 16<sup>th</sup> & 20<sup>th</sup> March, 16<sup>th</sup>, 18<sup>th</sup> & 29<sup>th</sup> May, 6<sup>th</sup> & 15<sup>th</sup> June, 31<sup>st</sup>  
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Ordnance Survey Grid Reference – **ST 933 873**



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## SUMMARY

Ground penetrating radar survey was undertaken by Archaeological Surveys Ltd over several areas at Malmesbury Abbey, Abbey House Gardens and The Old Bell Hotel in Malmesbury Wiltshire. The survey was undertaken on behalf of Malmesbury History Society as part of a programme of research into the site.

The survey located a number of anomalies that could be clearly attributed to remains relating to the abbey. These include parts of the cloister, the crossing, north and south transepts and presbytery. Several other anomalies suggest structural features that may also be related to the abbey complex and include remains to the west of the cloister including to the rear of The Old Bell Hotel, possible structural remains to the north east of the cloister and to the north of the footprint of the demolished eastern part of the abbey. Structural remains relating to demolished parts of St Paul's church were also located to the south of the abbey.

Several anomalies to the north of the abbey, within the footprint of the cloister and to the north of the north transept, may represent structural remains pre-dating the Norman abbey. Although the features cannot be confidently interpreted, they have a different orientation to the abbey and may, therefore, pre-date it.

To the south and west of the abbey evidence for widespread and dense burials was located within the churchyard. There was no evidence of structural remains within these areas but given the density of burials and the associated ground disturbance, evidence of any early features may have been destroyed.

## 1 INTRODUCTION

### 1.1 Survey background

- 1.1.1 Archaeological Surveys Ltd was commissioned by Malmesbury History Society to undertake a ground penetrating radar (GPR) survey at Malmesbury Abbey. The present abbey church dates from the 12<sup>th</sup> century, with later alterations; however, the founding of a hermitage and the establishment of the monastery dates back to the 7<sup>th</sup> century. A conference on William of Malmesbury in 2017 included speaker Professor Rod Thomson of the University of Tasmania, who outlined that there should be an Anglo-Saxon monastery complex that preceded the later Norman buildings and suggested that a survey should be carried out in order to see if any traces of the earlier buildings survive.
- 1.1.2 The majority of the survey areas lie within the scheduled monuments of the *Benedictine monastery known as Malmesbury Abbey* (Historic England List Entry no: 1010136) and also *St Paul's Church tower and site of church* (Historic England List Entry no: 1004682) to the south. The geophysical survey was carried out with a licence under Section 42 of the Ancient

Monuments and Archaeological Areas Act 1979 (as amended) by Historic England within these scheduled areas. The survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by Archaeological Surveys (2018).

## 1.2 Survey objectives and techniques

1.2.1 The objectives of the survey are to use a non-intrusive GPR survey to attempt to answer a number of questions outlined by the Malmesbury History Society including:

- Is there any evidence of Anglo-Saxon abbey buildings in the cemetery or around or under the Norman abbey?
- Is there any trace of the Anglo-Saxon period building layout?
- Were any Anglo-Saxon buildings made of stone?
- Where were the Anglo-Saxon monks buried?
- How deep are the foundations of the East crossing (which can aid with the extension considered for the memorial gardens)?
- Is there anything to learn from the town burials after the dissolution?
- Is there any evidence of a castle?
- Are the remains of the missing parts of the Abbey identifiable?

1.2.2 The methodology is considered an efficient and effective approach to archaeological prospection. The survey and report generally follow the recommendations set out by: European Archaeological Council, 2015 *guidelines: EAC Guidelines for the Use of Geophysics in Archaeology* and the Chartered Institute for Archaeologists 2014: *Standard and guidance for archaeological geophysical survey*.

1.2.3 Archaeological Surveys Ltd carries out ground penetrating radar surveys under a Wireless Telegraphy Act licence from Ofcom (No. 078907/01). It is operated in accordance with Ofcom regulations (OfW 350 Requirements and Guidance Notes for Ground Probing Radar).

## 1.3 Site location, description and survey conditions

1.3.1 The site is located at Malmesbury Abbey in Wiltshire. It is centred on Ordnance Survey National Grid Reference (OS NGR) ST 933 873, see Figs 01 and 02. The scheduled areas cover the present church, the buried cloisters and other monastery buildings to the north and north east as well as the buried remains of the former abbey church to the east and west. The area also covers most of Abbey House Gardens to the east. The majority of the present churchyard to the south of the abbey is not within the scheduled area.

1.3.2 The geophysical survey covers approximately 6050m<sup>2</sup> split into 24 separate survey areas, see Fig 02. Surfaces consist mainly of short grass with areas of flagstones along paths. An area of tarmac was surveyed within Abbey House Gardens and a gravel surface to the rear of The Old Bell Hotel. The interior of

the abbey consists of flagstone flooring with parquet. The majority of the survey areas are flat. Further information relating to each survey area is set out within the Results.

- 1.3.3 The surface conditions across the site were generally considered to be favourable for the collection of ground penetrating radar data. All survey sessions were undertaken in dry weather.

#### *1.4 Site history and archaeological potential*

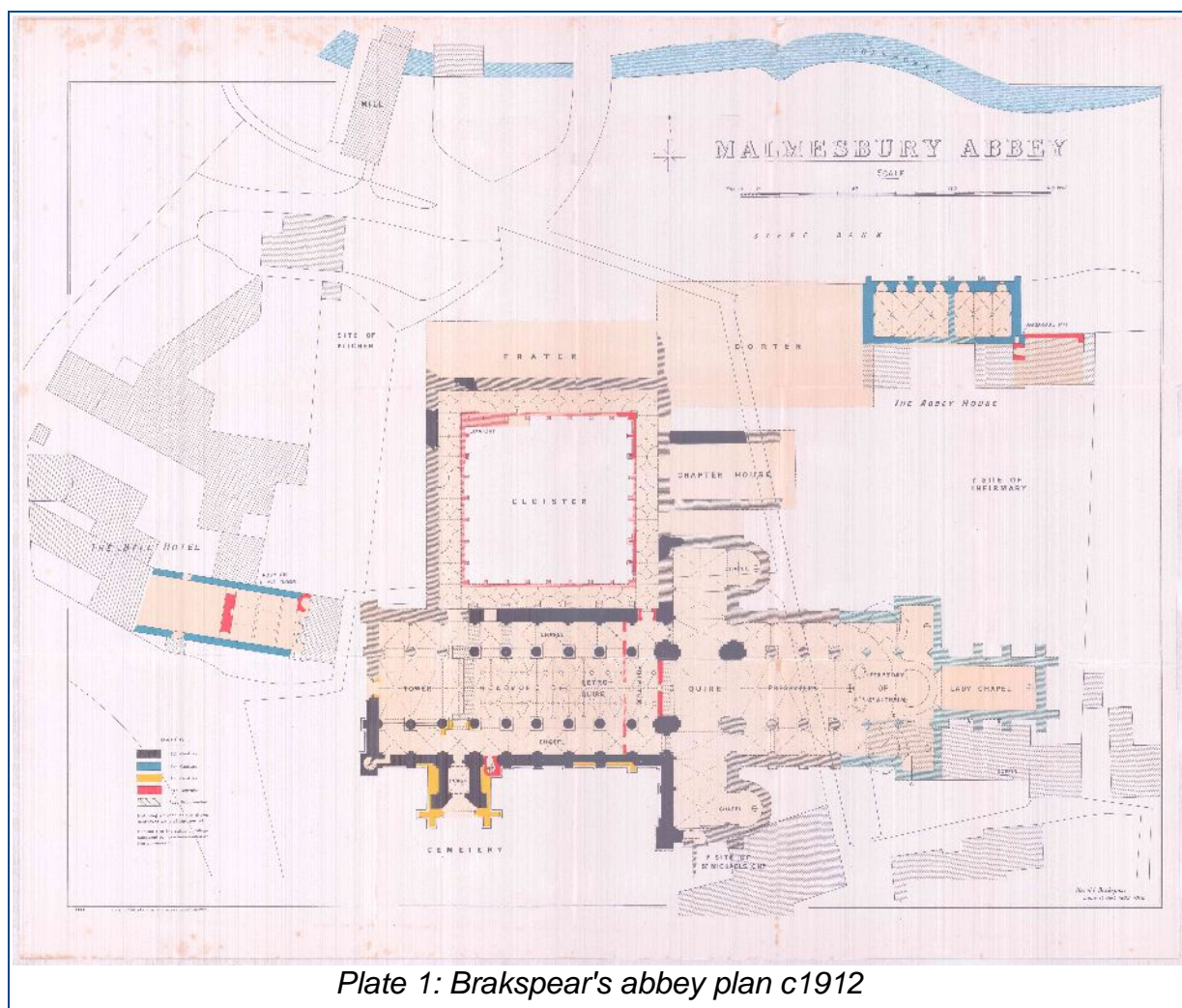
- 1.4.1 The earliest recorded settlement at Malmesbury dates to the Iron Age with successive hillfort ramparts and ditches showing evidence of possible timber and later limestone revetment 200m east of the site (Longman et al, 2006). During the 10<sup>th</sup> or 11<sup>th</sup> centuries an earth and stone bank was constructed along the line of the hillfort ramparts and subsequent medieval town walls also utilising them (Collard & Harvard, 2011). Residual pottery finds at the site of the Althestan Cinema, just to the south of the abbey, supports the evidence that there was settlement in this area during the Iron Age and Roman periods (Hart & Holbrook, 2011).
- 1.4.2 Most of the history of Malmesbury Abbey has come to us from the writings of William of Malmesbury (c1090-1143), who was librarian for the abbey during the 12<sup>th</sup> century. The earliest record relating to any religious establishment was in 637 when Irish monk Maeldulph (or Maeldub) founded a hermitage at Malmesbury. A monastery was established some time between 675 and 705 under abbot Aldhelm and was later under the Benedictine order some time between 965 and 974. Aldhelm built three churches, one in honour of Our Saviour, St Peter and St Paul which was considered the main church of the monastery, one in honour of St Mary and against this, one in honour of St Michael. Two further churches are also recorded, one dedicated to St Andrew and another to St Lawrence (Pugh & Crittall, 1956). It is possible that they were laid out in a linear formation, as at St Augustine's Abbey in Canterbury and Glastonbury Abbey (Robinson & Lea, 2002). However, no evidence for the location or remains of any of these Anglo-Saxon buildings has ever been established through archaeological investigation.
- 1.4.3 Aldhelm died in 709 and his remains were buried in the church of St Michael and in 837 King Ethelwolf had his bones to be replaced in a silver shrine. In the late 9<sup>th</sup> century the monastery burnt down, to be rebuilt by King Athelstan in the early 10<sup>th</sup> century who was buried under the altar of St Mary in the tower. The shrine of Aldhelm was then moved in the mid 10<sup>th</sup> century by Dunstan to the church of St Mary's and the relics taken from the shrine and placed in a grave on the north side of the altar. The monastery was destroyed by fire a second time in 1042. It is not clear when it was rebuilt, but it must have been done fairly rapidly.
- 1.4.4 In the 12<sup>th</sup> century these earlier buildings were replaced by a nave of nine bays, transepts with an eastern chapel on either side, a presbytery of four

bays with a round apse, the shrine to St Aldhelm and three chapels on the eastern end. These were believed to be commissioned by Bishop Roger of Salisbury between 1118 and 1139, although it is possible that it may have been commissioned later by French Cluniac abbot, Peter Maurant, possibly completed around 1170-1180. However, the majority of English abbeys and cathedrals were undergoing rebuilding in the first quarter of the 12<sup>th</sup> century, and Malmesbury would be the exception if it were the late 12<sup>th</sup> century (Robinson & Lea, 2002). Bishop Roger also constructed a castle in the abbey graveyard during the war between Stephen and Matilda, with it changing hands several times during the Anarchy period (1135-1153). It is not clear if this was sited to the west of the abbey under the site of the present Bell Hotel or to the east under the monastic graveyard as no clear evidence of its siting has been located.

- 1.4.5 In 1260 William of Colerne became abbot and commenced a period of construction and remodelling of the abbey and ancillary buildings. This included an eastward extension of the presbytery and the Lady Chapel was added with a charnel house and a chapel made for the disturbed bones. In the 14<sup>th</sup> century a timber and lead spire was added to the crossing and subsequently collapsed around the time of the dissolution. Around 1400 a square tower was built over the two western bays of the nave. A new building was erected over the south side of the nave in the 15<sup>th</sup> century and the cloisters were rebuilt and vaulted. The abbey remained under the Benedictine order until its dissolution on 15<sup>th</sup> December 1539, when it was sold to clothier William Stumpe. He built the present Abbey House over some of the monastic buildings in the east of the site and gave the nave of the abbey church to be used as the parish church for Malmesbury. John Leyland, visiting in 1542, wrote that the spire had fallen within living memory and that a small chapel joined the south side of the southern transept. Whether this was the church of St Michael, the church of Our Saviour or the church of St Laurence has been debated (Robinson & Lea, 2002).
- 1.4.6 The site and surrounding environs have been subject to a small number of archaeological investigations. During the early 20<sup>th</sup> century Harold Brakspear was commissioned to restore much of the present abbey buildings. During these restorations he conducted a number of excavations within the abbey precinct with grant funding from the Society of Antiquaries (Brakspear, 1914). He excavated in the area of the south transept and quire and found that apart from a small patch of tile paving all the foundations had been robbed out. He was informed that this area had been in private hands and that it previously contained large heaps of debris which had been removed during ground levelling.
- 1.4.7 A later grant in 1910 allowed Brakspear to trace the cloisters and surrounding buildings. Although much of the cloister foundations had been robbed, he found fragments of the inner cloister walls in the east and also the outer cloister walls in the north west along with floor tiles. He found evidence for the foundations of a lavatory where the monks would wash in the north western corner of the cloister, as at Gloucester Cathedral. He also established that the



15<sup>th</sup> century vaulting in the cloister was as elaborate as that at Gloucester. The northern foundation wall of the chapter house was also located; however, the southern wall was built on shallow bed-rock and no foundation was identified. He records a 12ft wide foundation with a rounded outer face lying some 80 feet to the east of the crossing which he ascribes to the ambulatory wall to the rear of the presbytery leading to the three chapels and which dated from the 12<sup>th</sup> century. This would place it on the western edge of the Abbey House Gardens. He produced a plan of the Norman and later abbey, Plate 1, based on the upstanding building as well as from his excavations and conjecture of the remainder of the church to the east. He does not appear to have located any structural remains pre-dating the Norman period.



- 1.4.8 A geophysical survey was carried out over the area of the cloisters, west end of the abbey as well as in Abbey House Gardens (Bartlett, 1997). Earth resistance survey (resistivity) supported the evidence from Brakspear's plan for the north wall of the west end; however, later evaluation in this area indicated that the north wall had been robbed out (Kenyon, 2003). The resistivity survey also indicated high resistance responses to the east of the

nave, the north wall of the chancel (presbytery) beneath the central crossing arches, the north and south chancel arcades and the eastern wall of the southern transept. There was also a correlation between Brakspear's planned reconstruction and the walling within the cloister. No anomalies could be clearly seen to correspond to the north transept and chapter house although a number of irregular high resistance responses could relate to fragmentary masonry remains. Within Abbey House Gardens a number of high resistance anomalies correspond with the 12<sup>th</sup> century apsidal east end of the church and the three radiating chapels, with a weaker response to the east possibly associated with the 13<sup>th</sup> century Lady Chapel. It is not clear if anomalies further to the east relate to former structures or to previous more recent paths and garden features.

- 1.4.9 In 2002 an archaeological excavation within the site of the former Athelstan Cinema, located immediately south of the southern transept, found evidence for two short sections of limestone walling and evidence for medieval floor make-up. This may relate to a probable chapel, possibly that seen by Leyland in 1542 in this area. There was no evidence to support an Anglo-Saxon origin for the probable chapel, although this could have remained beyond the exposures in the excavation (Hart & Holbrook, 2011). A number of burials were also located to the south, with evidence for disturbance and truncation of earlier graves by later burials. They were mainly male burials, which could relate to the monastery but there were some female and child burials indicating that the laity were also buried in this area. Several were laid out in evenly spaced rows and date no earlier than the mid 12<sup>th</sup> century and no later than the end of the 13<sup>th</sup> century.
- 1.4.10 In early 2003, during the replacement and installation of new external floodlighting at the abbey, a 19<sup>th</sup> century brick-lined grave and a modern or post-medieval wall were located within the cable trench immediately to the west of the path that leads from the south gate to the abbey porch. Within the trench to the north of the northern crossing arch, east of the abbey church were quantities of building rubble most likely to have been derived from the demolition of the former buildings. The majority of the finds within the trenches were of 18<sup>th</sup> - 20<sup>th</sup> century origin (Foundations Archaeology, 2003).
- 1.4.11 Further evaluation was also carried out immediately west of the abbey (Kenyon, 2003), which revealed seven phases of development, construction and demolition between the 12<sup>th</sup> and 20<sup>th</sup> centuries. Prior to the 12<sup>th</sup> century construction of the abbey, the ground was levelled through a combination of ground make-up and terracing upon which the west face of the abbey was constructed in a single phase. Although a previous geophysical survey (Bartlett, 1997) within this area identified possible flooring external to the original west doorway, no flooring evidence was seen during the evaluation. Post-dissolution, the flooring, together with tiles and walling, were removed from above ground and footings and this is likely to have begun just after the west tower collapsed in the later 16<sup>th</sup> century, but is likely to have continued into the post-medieval period. During the 18<sup>th</sup> century a number of stables, hovels and pig styes were removed from the western end of the church and



the remains of their flooring were evident. A 19<sup>th</sup> century plinth for the display of a Russian cannon from the Crimean War of 1854-5 was also uncovered. During the early 20<sup>th</sup> century renovations of the abbey by Brakspear, a number of drains were laid and two large charnel pits have been interpreted as being for the re-interring of human remains disturbed during the renovations. A vestry/office building had been constructed in the north eastern corner of the site and a number of services, many of which served the vestry building, were also located.

1.4.12 All that remains of the abbey is the nave of the church, the north and south aisles, the south porch, some of the western wall of the southern transept and part of the northern crossing. Brakspear's plan places the crossing in the centre of the building, with part of the presbytery in the garden of remembrance to the east of the abbey and the remainder in the abbey house gardens. Much of this lies under hedges and areas of planting and so was not accessible for survey.

1.4.13 The church today is known as St Mary and St Aldhelm's Abbey Church and the building, along with a wider area to the north and east including Abbey House and Gardens, is part of a scheduled monument of the *Benedictine monastery known as Malmesbury Abbey* (Historic England List Entry no. 1010136). This includes six bays of the nave that remained after the west tower fell down in the 16<sup>th</sup> century and also the buried remains of the medieval cloisters to the north, together with the chapter house to the east of the cloister and the dormer to the north of the chapter house. The site of St Paul's church, 50m to the south of the abbey, is a separate scheduled monument (*St Paul's Church tower and site of church*, Historic England List Entry no. 1004682). Although the earlier church of St Peter and St Paul may have stood on the site, the remains of the present church are believed to date to around 1300, with the spire added around 1400. The orientation of the tower is east north east to west south west, parallel with Oxford Street to the south, rather than the abbey church to the north which is east west. By the later 9<sup>th</sup> century, Malmesbury was one of the four *burhs* of Wiltshire and it is likely that the street plan was laid out around this time (Baggs et al, 1991).

1.4.14 From the writings of William of Malmesbury it appears that the monastery was originally constructed in the 7<sup>th</sup> century, but was burnt down and rebuilt at least twice in the late 9<sup>th</sup> and mid 10<sup>th</sup> centuries, prior to construction of the 12<sup>th</sup> century abbey church and buildings. These were later remodelled in the 13<sup>th</sup>, 14<sup>th</sup> and 15<sup>th</sup> centuries, with the central tower and spire collapse likely during the early 16<sup>th</sup> century and the remaining buildings in a generally very ruinous state from at least the late 18<sup>th</sup> century. There is no archaeological record of the location of the Anglo-Saxon monastery buildings; when Brakspear (1914) excavated in the early 20<sup>th</sup> century, he was able to imply the layout of the Norman abbey church, but he does not appear to have located anything pre-dating this. Archaeological evaluation to the south of the present southern transept may have located a chapel, possibly that of St Michael, but this too relates to the Norman abbey, with a number of 12<sup>th</sup>/13<sup>th</sup> century burials nearby, and none dating to before this period (Hart & Holbrook, 2011). No features

earlier than the 12<sup>th</sup> century were recorded to the west of the abbey church (Kenyon, 2003). However, the lack of identification of any Anglo-Saxon buildings could be due to several factors, such as no archaeological evaluation within the areas of the earlier buildings or that they lie directly underneath the later buildings. The GPR survey was undertaken within the present abbey church and in all accessible areas outside including the graveyard, cloisters and Abbey House Gardens in order to cover as wide an area as possible.

## 1.5 *Geology and soils*

- 1.5.1 The underlying geology across the majority of the site is from the Cornbrash Formation with Forest Marble Formation to the north of the abbey church (BGS, 2016).
- 1.5.2 The overlying soils across the southern part of the site are from the Sherborne association which are brown rendzinas. These consist of shallow, well drained, brashy, calcareous clayey soils over limestone. To the north the soils are from the Wickham 3 association which are typical stagnogley soils and consist of slowly permeable, seasonally waterlogged soils (Soil Survey of England and Wales, 1983).
- 1.5.3 However, due to the urban location and over 1300 years of use of the site for monastic purposes, as well as use of the site for burials, the soils are likely to be very mixed and contain large amounts of humic material and other urban build up.
- 1.5.4 GPR survey carried out across similar soils within the Cotswold region frequently produces very poor results. However, it is considered likely that the very long period of human activity at the site has significantly altered the characteristics of the soil, particularly where structural debris and layers are present. An initial trial survey carried out in the churchyard to the south of the abbey demonstrated the potential for useful results using a 400MHz antenna.

## 2 METHODOLOGY

### 2.1 *Technical synopsis*

- 2.1.1 Ground penetrating radar systems transmit an electromagnetic wave into the ground and record the time delay and amplitude of reflections from buried features. Reflections occur from changes in conductivity or dielectric permittivity.
- 2.1.2 Electromagnetic waves are increasingly attenuated as frequency increases and, therefore, lower frequencies provide greater penetration into the subsurface. However, the longer wavelengths associated with lower frequencies reduce the resolution of buried features. Typical frequencies chosen for archaeological

prospection are around 500 and 200 MHz.

## 2.2 *Equipment configuration and data collection*

- 2.2.1 Ground penetrating radar data were acquired using an Utsi Electronics Groundvue 3A cart mounted system with a 400MHz shielded antenna with positional information derived from a wheeled encoder. A dielectric constant of 10 was used in the field to set up the instrument and view data. The value is for display purposes only and does not affect the recorded data. A value of 80ns (nanoseconds) was chosen for the time sweep (two way GPR signal travel time) in order to balance potential depth of penetration and resolution.
- 2.2.2 Data were collected from scans recorded at 0.0295m along parallel traverses separated by 0.25m. The data captured along each traverse were logged to an internal disk drive to allow further processing and analysis.

## 2.3 *Survey referencing and base mapping*

- 2.3.1 Ground penetrating radar data were collected along parallel traverses perpendicular to baselines within each survey area. Baseline coordinates (Ordnance Survey OSGB36) were recorded using a Leica GS10 RTK GNSS that has an accuracy of around 20mm.
- 2.3.2 Data are plotted along with Ordnance Survey Mastermap digital mapping. However, it is clear from site measurements with RTK GNSS that the abbey is very poorly mapped. For survey areas within the abbey data are plotted along with a digitised paper plan of the building.

## 2.4 *Data processing*

- 2.4.1 Ground penetrating radar data were analysed using REFLEX v8 software. Each traverse was analysed as an individual profile to allow a manual assessment of anomalies. In addition, profiles across each survey area were combined and processed in order to create time slices showing the variation in reflector amplitude at various depths. The following processing has been carried out on GPR data captured during this survey:
- background removal - improves the appearance of the data by removal of strong horizontal bands,
  - gain - increased with time in order to amplify weaker reflections from deeper features,
  - bandpass filtering - lowers noise by the removal of energy below 200MHz and above 800MHz.
- 2.4.2 Time slices were analysed using both absolute and envelope reflectivity strengths. The latter use a square root function of the energy at an instant in time and is generally the preferred option; however, occasionally the absolute values provide more detailed anomalies.

## 2.5 Data presentation

- 2.5.1 An abstraction and interpretation is offered for all geophysical anomalies located by the survey. A brief summary of each anomaly, with an appropriate reference number, is set out in list form within the results (Section 3) to allow a rapid and objective assessment of features within each survey area. Approximate depths to anomalies is added to the abstraction and interpretation plot.
- 2.5.2 The main form of data display prepared for this report are colour plots derived from Reflex as TIF files. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing.
- 2.5.3 The raster images are combined with base mapping using ProgeCAD Professional 2016 creating DWG file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. A digital archive, including raster images, is produced with this report, see Appendix D below.

## 3 RESULTS

### 3.1 General overview

- 3.1.1 The GPR survey was carried out across 24 separate survey areas which are labelled Areas 1 – 23 with Area 17 split into 17a and 17b. The area numbering represents the order of surveying and reference should be made to Fig 02 when considering the results from each area. The total area surveyed was approximately 6050m<sup>2</sup>.
- 3.1.2 GPR wave velocity was calculated using hyperbola matching which produced a figure of 0.07m/ns where useful hyperbolas were visible. The velocity was used in the calculation of depth below the surface although many anomalies produced variable and often complex reflections and the depths given are an approximation.
- 3.1.3 Anomalies relating to services and other features of modern origin have not been abstracted or discussed. In addition, graves within the churchyard have also not been abstracted as the results indicate that they are so numerous that they often intercut; it appears likely that 18<sup>th</sup> and 19<sup>th</sup> century graves alone completely fill the churchyard.

### 3.2 Statement of data quality

- 3.2.1 The GPR data were collected with due consideration given to surface conditions, obstructions and area constraints. GPR signals appear to have achieved moderate penetration of around 1.5m with the exception of a zone of buried ash within Area 5 to the west of the abbey, which appears to have prevented propagation to beyond about 0.4m deep, and the internal parts of

the abbey (Areas 13 – 16) where poorly bonded flooring and/or the characteristics of the subsurface make-up also limit propagation. Within Area 4, the former crossing, GPR reflections appear to indicate propagation to a depth of over 2.5m which may relate to very different subsurface make-up in this area.

- 3.2.2 The abstraction and interpretation has been problematic due to the very fragmented, complex and frequently weak GPR reflections recorded. It is likely that this is a consequence of stone robbing and landscaping.

### 3.3 *Data interpretation*

- 3.3.1 The list of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the survey. A basic explanation of the characteristics of the radar anomalies is set out for each category in order to justify interpretation, a basic key is indicated to allow cross referencing to the abstraction and interpretation plot. CAD layer names are included to aid reference to associated digital files (.dwg/.dxf). Sub-headings are then used to group anomalies with similar characteristics for each survey area.

### 3.4 *Area 1 - Description of ground penetrating radar anomalies*

North west of abbey centred on OS NGR 393260 187349, see Figs 03 & 04.



*Plate 2: Area 1 looking south*

- 3.4.1 Area 1 is located north west of the abbey and immediately west of the cloister. The survey covered part of a flagstone path and area of rough vegetation beneath trees.



- 3.4.2 Shallow reflections relate to extant and former pathways within the survey area. Anomalies of archaeological potential appear confined to the northern part of the survey area.
- 3.4.3 A rectangular anomaly **(1)** has dimensions of approximately 4.3m x 0.85m and appears at a depth of approximately 1.1m. The long axis of the feature appears to have a similar orientation to the eastern side of the cloister but it appears to be too far west to be located within them. The GPR response suggests the feature is defined by a narrow outer wall, perhaps forming part of a tank or large drain. According to Brakspear's plan, it is located close to the possible site of the kitchens, to the west of the cloister and frater.
- 3.4.4 The northern part of the survey area also contains a zone of weak reflections, anomaly **(2)**, at a similar depth to anomaly **(1)** possibly indicating a former surface layer or structural debris, although it may also indicate a natural interface such as a change to more solid geology.
- 3.4.5 A linear feature near the northern end of the survey area, anomaly **(3)**, has a north west to south east orientation and a potential depth of 1.2m. It may be associated with drainage from the north western corner of the cloister.
- 3.4.6 Immediately to the east of the extant western boundary wall a shallow linear anomaly **(4)** was located. The feature may relate to a wide wall foundation, up to 1m wider than the extant structure. It is possible that the anomaly relates to an earlier more substantial wall.

### 3.5 Area 2 - Description of ground penetrating radar anomalies

North of abbey centred on OS NGR 393281 187353, see Figs 05 & 06.



*Plate 3: Area 2 looking north west*

- 3.5.1 Area 2 is located to the north of the abbey and covers an area of grass and a flagstone path along the southern side. The area is mainly flat although the path is banked up slightly along the southern side, with paths immediately west and east of the surveyed area similarly banked. The surveyed zone is thought to cover much of the cloister. Shallow reflections associated with the southern path and banks were located.
- 3.5.2 High amplitude GPR reflections **(5)** were located within the north western part of the survey area at a depth of approximately 0.6m. It is possible that these relate to the lavatory within the northern range of the cloister as indicated on Brakspear's plan. The strong reflections may indicate good survival of floors or substantial masonry features. Similar high amplitude reflections **(6)** were located within the north eastern part of the area and these too may represent structural remains associated with the cloister.
- 3.5.3 Low amplitude GPR reflections located within the northern, western and eastern parts of the survey area, anomalies **(7)**, are likely to be associated with the cloister. They may represent a buried surface or layer perhaps containing demolition debris at approximately 0.4m deep.
- 3.5.4 Low amplitude reflections forming linear and rectilinear elements of archaeological potential were located in the central part of the survey area, anomalies **(8)**. The anomalies may be associated with structural remains at depths of approximately 0.5m – 1.1m which appear to have a different orientation to the abbey and cloister.
- 3.5.5 Very weak linear anomalies **(9)** were located in the south eastern part of the area. The origin of the reflections is uncertain although they occur at approximately 0.8m which may indicate that they are archaeologically significant.
- 3.5.6 Several discrete features of uncertain origin were located at shallow depth along the northern edge of the survey area, anomalies **(10)**. It is possible that they are associated with the modern covered area immediately adjacent.

### 3.6 Area 3 - Description of ground penetrating radar anomalies

North east of abbey centred on OS NGR 393306 187350, see Figs 07 & 08.



*Plate 4: Area 3 looking south*

- 3.6.1 Area 3 is located to the north east of the abbey and covers an area of grass, flagstone path and metalled paths. The area rises slightly towards the east and contains several trees and garden features. The surveyed zone possibly covers part of the eastern side of the cloister, north transept, chapter house and dorter.
- 3.6.2 At the southern end of the survey area weak reflections at approximately 0.4 – 0.5m deep, anomalies **(11)**, probably relate to the remains of the northern transept. The anomalies do not appear to extend to any great depth and are not consistent with substantial foundations suggesting extensive stone robbing and disturbance in this area.
- 3.6.3 Patchy and very variable reflections in the northern part of the survey area, anomalies **(12)**, may relate to further structural remains to the north east of the cloister. These appear to be dissected by a linear zone of attenuation, anomaly **(13)**, that may have been caused by the fill of a ditch, trench or drain.
- 3.6.4 A roughly rectangular zone (approximately 8m x 6m) of weak reflections is clearly resolved between a depth of 0.8m and 1.7m, anomaly **(14)**. The feature may indicate deep structural remains in this area which appear to have a different orientation to that of the abbey.



### 3.7 Area 4 - Description of ground penetrating radar anomalies

East of abbey centred on OS NGR 393309 187317, see Figs 09 & 10.



*Plate 5: Area 4 looking north west*

- 3.7.1 Area 4 is located immediately east of the abbey and covers an area of flat grass and garden bed. The surveyed zone includes the former crossing, parts of the northern and southern transepts and presbytery.
- 3.7.2 The survey located very variable and weak reflections at a depth of approximately 1.2m relating to the abbey walls, anomalies **(15)**. The very weak and fragmented nature of most of the anomalies suggests total robbing of the abbey walls, the GPR response probably relates to only fragments of stone and mortar within the foundation trenches. Reflections appear to extend to a depth of over 2.5m below ground surface although it is likely that this has been raised.
- 3.7.3 Slightly stronger reflections, possibly from some larger pieces of masonry, appear to be associated with the main south eastern pillar within the crossing, anomalies **(16)**. These may represent more substantial foundations for supporting the weight of the tower and spire.
- 3.7.4 At the northern end of the survey area, a linear feature, anomaly **(17)** has been resolved at a depth of approximately 0.7m. Although this may represent a wall, its orientation is dissimilar to the abbey.
- 3.7.5 Several linear features crossing the area appear to relate to drains between 0.4m and 0.6m below surface, anomalies **(18)**.

### 3.8 Area 5 - Description of ground penetrating radar anomalies

North west of abbey centred on OS NGR 393258 187323, see Figs 11 & 12.



*Plate 6: Area 5 looking south east*

- 3.8.1 Area 5 is located immediately north west of the abbey and to the north of the remains of the west door. The area was mainly grass covered with a zone of open soil adjacent to the abbey walls. Archaeological excavation has been carried out within this area (Kenyon, 2003).
- 3.8.2 High magnitude and complex reflections were located at very shallow depth across most of the survey area. Several fragmented linear anomalies relate to services and rectangular zones may be associated with former excavation trenches.
- 3.8.3 No coherent anomalies of archaeological potential could be confidently abstracted within the area. With reference to the excavation report, it is apparent that the ground make-up consists of a topsoil, varying from 0.1m – 0.3m in thickness, overlying a thick ash layer, approximately 0.3m – 0.4m thick, which overlies a buried topsoil up to 0.4m thick in places. The change in dielectric constant from topsoil to ash to buried topsoil is causing the GPR wave to strongly reflect from these upper layers with little or no penetration to depth.

### 3.9 Area 6 - Description of ground penetrating radar anomalies

East side of abbey churchyard centred on OS NGR 393284 187277, see Figs 13 & 14.



*Plate 7: Area 6 looking south*

- 3.9.1 Area 6 covers the south eastern portion of the churchyard to the south of the abbey. The area is grass covered and contains numerous gravestones. The ground is increasingly built up close to the abbey so that immediately adjacent to the building the surface has been raised by approximately 1m, presumably due to centuries of use for burial.
- 3.9.2 All parts of the churchyard contain GPR reflections consistent with burials, and it is considered likely that the majority visible in GPR profiles as classic hyperbola date to the post medieval. Earlier burials are likely to have been very disturbed although some may have survived particularly if they are deeper. Some burials appear to be associated with high magnitude reflections suggesting the presence of air voids and/or caskets with metal plates and linings.
- 3.9.3 The survey also located cables associated with lighting at an approximate depth of 0.4m – 0.5m.
- 3.9.4 Moderate to high amplitude reflections, anomalies **(19)**, were located at shallow depth, approximately 0.3m, in a broad zone running down the central part of the survey area and within the south eastern part. The shallow depth would indicate a layer of reflective material of uncertain origin, although the broad zone may indicate that it has been brought up from depth by grave digging and, therefore, be of archaeological significance.



### 3.10 Area 7 - Description of ground penetrating radar anomalies

St Paul's Church centred on OS NGR 393266 187236, see Figs 15 & 16.



*Plate 8: Area 7 looking west*

- 3.10.1 Area 7 covers a paved zone immediately to the east of the surviving tower of St Paul's church. The majority of the survey area is considered likely to cross the central and northern parts of the interior of the church.
- 3.10.2 High magnitude GPR reflections are present within about 0.5m from the surface and these are likely to be associated with shallow layers of different dielectric constant. A large proportion of the GPR wave energy is likely to be lost in these upper layers with little penetration to lower levels.
- 3.10.3 Variable reflections form a linear feature with an east north east to west south west orientation running through the central part of the survey area, anomaly **(20)**. The feature has a similar orientation to St Paul's tower and can be seen to extend from the south eastern corner of the tower at a depth of approximately 0.5m. A ground plan drawn by Jeremiah Webb in the mid 19<sup>th</sup> century indicates a line of circular features, presumably columns running through the central part of the church, on the north side of which is located the north aisle. The GPR response appears to correlate with this line but is more consistent with a wall footing, possibly a sleeper wall for the columns or an earlier north wall to the church itself prior to the addition of the aisle and tower.
- 3.10.4 Deep reflections (0.7m) were located that have a similar orientation to St Paul's tower and are considered likely to indicate further structural remains related to the church, anomalies **(21)**.

### 3.11 *Area 8 - Description of ground penetrating radar anomalies*

Abbey House drive centred on OS NGR 393324 187340, see Figs 17 & 18.

- 3.11.1 Area 8 is to the east and north east of the abbey and covers a metalled driveway to Abbey House. The southern part of the survey area is likely to cross over the presbytery with the northern part possibly crossing the chapter house.
- 3.11.2 Shallow reflections of high magnitude probably relate to the make up of the drive although antenna ground coupling is good allowing deep reflections to be recorded. However, the narrow width of the survey area limits the information available for interpretation.
- 3.11.3 A linear wall-like feature located in the central part of the survey area at a depth of approximately 1.3m may well relate to the north wall of the presbytery, anomaly **(22)**. To the north of it a zone of variable reflections could be consistent with a layer of structural debris, anomaly **(23)**. To the north of this two other possible walls separated by an area of structural debris were located at an approximate depth of 1.5m, anomalies **(24)**. Although they do not appear to correlate with the purported location of the chapter house, they are likely to be of archaeological potential, perhaps relating to some unknown structure.
- 3.11.4 A complex area of anomalies may relate to linear features and structural debris within what would have been the central part of the presbytery, anomalies **(25)**. Characteristic reflections within the time slices and GPR profile may infer the presence of several burials also. A single grave-like feature, anomaly **(26)**, has also been located near the southern end of the survey area. Dipping reflections located to the north of it, anomaly **(27)**, may relate to an infilled depression or hollow and may be of archaeological potential.

### 3.12 *Area 9 - Description of ground penetrating radar anomalies*

Abbey House Gardens west lawn centred on OS NGR 393349 187334, see Fig 19.

- 3.12.1 Area 9 covers a lawn in the western part of Abbey House Gardens. The area is surrounded by hedges and garden beds and may cross over part of the presbytery.
- 3.12.2 Shallow, variable GPR reflections appear to relate to former garden beds and other garden features. The area appears likely to have been landscaped which may have disturbed or buried features of archaeological potential.

- 3.12.3 A linear anomaly in the north eastern part of the survey area **(28)** is orientated east to west at a depth of approximately 0.7m and could potentially relate to the abbey, although other structures or garden features should also be considered. Other low magnitude linear trends at a similar depth were located to the south of it and these may be related.
- 3.12.4 The survey also located several amorphous areas of moderately strong GPR reflections, anomalies **(29)**, that may indicate structural debris or layers.

### 3.13 *Area 10 - Description of ground penetrating radar anomalies*

East side of Abbey House Gardens centred on OS NGR 393389 187328, see Fig 20.

- 3.13.1 Area 10 covers a small area of lawn in the eastern part of Abbey House Gardens. The area may lie outside of the footprint of the abbey. Near surface GPR reflections relate to former garden beds and roots. Two possible features were abstracted but it is considered unlikely that they are archaeologically significant.

### 3.14 *Areas 11 & 12 - Description of ground penetrating radar anomalies*

South west paths, Abbey House Gardens centred on OS NGR 393351 187320, see Fig 21.

- 3.14.1 Areas 11 and 12 cover narrow lawns used as paths in the south western party of Abbey House Gardens. The areas are considered likely to cross part of the presbytery.
- 3.14.2 Two possible walls were located by the survey at a depth of approximately 0.7m, anomalies **(30)**, and these may relate to the abbey. Two other responses were located at a depth of around 0.9m, anomalies **(31)**, and these may also be associated with abbey remains.

### 3.15 *Areas 13 to 16 - Description of ground penetrating radar anomalies*

Abbey interior centred on OS NGR 393284 187318, see Fig 22.

- 3.15.1 The majority of accessible areas within the abbey were surveyed. Flooring

consists of flagstones and parquet. There are numerous memorial stones set into the floor, some contain brass plaques. Area 15, at the eastern end of the abbey, is slightly raised.

- 3.15.2 The GPR survey proved disappointing due to poor propagation of energy below the surface and possible absorption in lower layers. The majority of anomalies are visible at very shallow depth indicating that they relate to surface and near surface features. Very few of the numerous floor memorials are associated with anomalies, none showing the characteristics expected for underfloor burials. The area of parquet appears particularly poor at energy propagation and this may relate to poor bonding. Slightly better energy transfer occurs below the stone flooring, although energy absorption is rapid possibly indicating relaying of sub-base floor material during renovations.
- 3.15.3 Several discrete features were abstracted, one likely to relate to a grave with others possibly associated with graves.

### 3.16 Area 17a - Description of ground penetrating radar anomalies

West side of abbey churchyard centred on OS NGR 393257 187270, see Fig 23.



- 3.16.1 Area 17a covers the western portion of the churchyard to the south west of the abbey. The area is grass covered and contains numerous gravestones, there are also several trees and benches.
- 3.16.2 All parts of the churchyard contain GPR reflections consistent with burials, and it is considered likely that the majority visible in GPR profiles as classic hyperbola date to the post medieval. Earlier burials are likely to have been very disturbed although some may have survived particularly if they are



deeper. Some burials appear to be associated with high magnitude reflections suggesting the presence of air voids and/or caskets with metal plates and linings.

- 3.16.3 No significant anomalies could be identified other than the dense reflections associated with burials. Several zones containing very shallow reflections along the southern and eastern sides of the survey area are considered likely to be associated with relatively recent ground make-up, landscaping or levelling.

### 3.17 *Area 17b - Description of ground penetrating radar anomalies*

North western part of abbey churchyard centred on OS NGR 393250 187295, see Fig 24.

- 3.17.1 Area 17b covers the north western portion of the churchyard to the south west and west of the abbey. The area is grass covered and contains numerous gravestones and several trees.
- 3.17.2 Clear evidence of dense burials was located by the survey. No significant anomalies could be identified with the exception of a possible deep linear feature of uncertain origin. A service appears to run along the northern limit of the survey area.

### 3.18 *Area 18 - Description of ground penetrating radar anomalies*

Immediately north of abbey centred on OS NGR 393280 187337, see Fig 25.



*Plate 10: Area 18 looking west*



- 3.18.1 Area 18 covers a narrow strip immediately to the north of the abbey that could not be surveyed at the same time as Area 2 due to the presence of tall vegetation. The area had short grass cover at the time of survey. It is likely to cross the southern part of the cloister.
- 3.18.2 A linear zone of variable reflections was located at an approximate depth of 0.4m, anomaly **(32)**. It is considered likely that these reflections are associated with structural debris or remains relating to the cloister. A small, discrete feature **(33)** towards the western end of the survey area, at a depth of approximately 0.5m, may also relate to the cloister.

### 3.19 Areas 19 & 20 - Description of ground penetrating radar anomalies

West end of abbey centred on OS NGR 393250 187306, see Figs 26 & 27.



*Plate 11: Areas 19 and 20 looking north*

- 3.19.1 Area 19 is a small grass covered area immediately to the west of the south porch of the abbey. Area 20 is a zone of grass mainly located to the west of the west door with an extension towards the north east into Area 5.
- 3.19.2 Area 19 contains anomalies indicative of graves and a service. No other anomalies considered to be archaeologically significant were abstracted from the data. Within Area 20, several graves were located and four weak linear anomalies of uncertain origin have been abstracted from depths of 0.4m – 0.8m. The north easterly extension demonstrates high magnitude near surface reflections from a buried ash layer (see Area 5).

### 3.20 *Area 21 - Description of ground penetrating radar anomalies*

Lawn to the rear of The Old Bell Hotel centred on OS NGR 393250 187364, see Figs 28 & 29.

- 3.20.1 Area 21 covers a small lawn to the rear of The Old Bell Hotel. The site tends to slope down towards the north and is bounded to the east and west by garden beds, to the north by a sunken patio area with the hotel to the south. The area is located to the west of the cloister.
- 3.20.2 The GPR survey located a pipeline and soakaway in the central southern part of the lawn at a depth of approximately 0.4m. Shallow reflections associated with a garden bed were also located near the northern end of the survey area.
- 3.20.3 A substantial linear feature with a north south orientation was located along the eastern side of the survey area, anomaly **(34)**, at a depth of approximately 0.4m. The response appears wall-like and extends to below 1m from the surface. A small section of a similar feature was located along the western side of the area at a depth of approximately 0.6m, anomaly **(35)**. Weak linear features at a similar depth and with a similar orientation were located in the central part of the lawn, anomalies **(36)**. It is possible that this group of anomalies represents a former abbey structure although earlier garden features or boundaries should also be considered. The well-defined and substantial wall-like anomalies **(34)** and **(35)** contrast with the poorly defined abbey features located in other areas; however, it is possible that the apparent good survival of features relates to a difference in land use over the last few centuries.

### 3.21 *Areas 22 & 23 - Description of ground penetrating radar anomalies*

Patio areas on the north side of the The Old Bell Hotel centred on OS NGR 393235 187341, see Figs 30 & 31.

- 3.21.1 Area 22 covers a patio with a gravel surface immediately north of the hotel. Area 23 is a small raised patio with a stone surface located to the east of Area 22.
- 3.21.2 GPR reflections of high magnitude were located at a depth of approximately 0.25m and suggest a former surface or transition to soil below the compacted gravel and modern surfacing. Area 23 also produced shallow high magnitude reflections that are probably related to small air voids or poor bonding below the current stone surface.
- 3.21.3 A linear feature was located in Area 22 at a depth of approximately 1.1m,

anomaly **(37)**. Although it is possible that it relates to a service, GPR profiles indicate that it is more consistent with a wall-like feature orientated east west. The orientation may infer a feature associated with the abbey rather than the hotel.

- 3.21.4 Several linear anomalies appear to cross Area 23 with three at approximately 0.3m and one slightly deeper at 0.6m. It is possible that they relate to former garden features below the current stone surface. The orientation of the features appears similar to adjacent buildings.

## 4 DISCUSSION

### 4.1 *Assessment of the efficacy of GPR survey across the site*

- 4.1.1 In general it can be stated that GPR survey has been effective in assessing the archaeological potential of the site. Depth penetration is variable, at approximately 1.2m to over 2m, but likely to be sufficient in most areas for the location of former structural remains, perhaps with the exception of Areas 5 & 13 – 16 where GPR propagation seems poor (see below). GPR anomalies are very weak where wall robbing has taken place, and it is possible that only the larger backfilled robber trenches are visible.
- 4.1.2 Ground coupling was variable due to differences of surface cover and shallow subsurface make-up. Areas of grass cover produced moderate penetration with better results obtained along the metalled drive of Abbey House Gardens and very poor penetration immediately north west of the abbey (Area 5) and within the interior (Areas 13 - 16). The lack of GPR penetration within the abbey is probably associated with poorly bonded surface materials, parquet and flagstones, but may also be associated with changes to the subsurface during renovation works. Poor penetration to the north west of the abbey is related to a thick spread of ash in the shallow subsurface.
- 4.1.3 Several factors also resulted in a much extended survey period. Interest by the public caused significant delays during almost all of the survey sessions and survey was abandoned on several occasions due to the presence of significant numbers of visitors. Physical obstructions, including vegetation and gravestones, added significant complexity to data collection in some of the survey areas. Site accessibility was also difficult due to lack of nearby parking which resulted in lengthy periods carrying equipment.

### 4.2 *Anomalies related to the abbey*

- 4.2.1 GPR anomalies potentially related to the abbey are set out in Fig 32. The interpretation is guided by Brakspear's plan and other abbey complexes built around the same time. Attempts to georeference Brakspear's plan proved

difficult and potentially misleading, and it is unclear how missing parts of the abbey were located and mapped. In addition, no accurately surveyed digital plan of extant structures exists against which to assess the accuracy of the same structures drawn by Brakspear.

- 4.2.2 Elements that are likely to fit with the plan are associated with the cloister, the crossing, parts of the northern and southern transepts and parts of the presbytery. Several other anomalies are also likely to be associated with the complex based on similar orientation to the abbey but not clearly linked to features on the plan. To the west of the cloister features may represent the site of kitchens and patchy anomalies to the north east of the cloister may be attributed to the dormer. Within Abbey House Gardens several anomalies appear further north than the expected footprint for the eastern part of the abbey and may indicate unknown abbey structures in this area.

#### *4.3 Anomalies potentially indicative of structures earlier than the 12<sup>th</sup> century abbey*

- 4.3.1 A small number of anomalies of archaeological potential were located with an orientation dissimilar to the abbey complex. These may represent earlier features and are set out in Fig 32.
- 4.3.2 Anomalies within the central part of the cloister and to the north of the north transept appear to demonstrate a similar north west to south east orientation quite dissimilar to the west to east orientation of the abbey. The GPR responses could be consistent with structural remains or debris at depths of 0.5m – 1.1m.
- 4.3.3 It would appear unlikely that these anomalies relate to features built during the use of the abbey or since the dissolution and earlier structures should be considered. It is not possible to ascertain their function due to the generally weak and fragmented nature of the GPR anomalies and their limited extent.
- 4.3.4 GPR anomalies representing the orientation of walls associated with St Paul's church have also been included within Fig 32. The orientation of these elements is also dissimilar to the abbey being more west south west to east south east and reflecting the adjacent street pattern. If the street pattern is considered to relate to the Saxon layout of Malmesbury, it is possible that the origins of the church and unknown features to the north of the abbey date to a period prior to the construction of the abbey.

#### *4.4 Churchyard to the south and west of the abbey*

- 4.4.1 GPR profiles indicate large numbers of burials within all parts of the churchyard to the south and west of the abbey. Clear and characteristic hyperbola indicative of graves demonstrate dense burial probably relating to the 17<sup>th</sup> - 19<sup>th</sup> centuries; however, weaker responses are likely to indicate older graves disturbed by later burials. Excavations to the east of the churchyard demonstrated dense burial from the earlier medieval, and it is likely that these

extend across much of the area to the south of the abbey given the height of the surface build up.

- 4.4.2 With the GPR survey indicating very dense burial within the churchyard it is presumed that the area was used for centuries by the population of Malmesbury and, therefore, could contain thousands of graves with many earlier ones disturbed by later burial. The survey failed to locate any significant structural remains within the churchyard indicating that either the area remained free of structures for centuries or that any remains have been completely removed and truncated by the very long period of use for burial. Within the eastern part of the churchyard the survey located a broad but shallow zone of variable reflections that could indicate redeposited material from a highly disturbed feature but this interpretation is tentative.

## 5 CONCLUSION

- 5.1.1 The results of the GPR survey demonstrate fragmented survival of remains relating to the abbey most likely due to disturbance and truncation associated with wall robbing. Fragments of the cloister, crossing, north and south transepts and presbytery were located. The survey also located several possible structures likely to be associated with the abbey but not depicted on Brakspear's plan.
- 5.1.2 To the north of the abbey, within the cloister area and to the east of it, several features were located that appear to have a north east to south west orientation dissimilar to the east west orientation of the abbey. It is possible that these are archaeologically significant and may represent structures or features that pre-date the Norman abbey. The anomalies are too fragmented to provide a confident interpretation of their function.
- 5.1.3 The survey also located structural elements relating to St Paul's church and indicate that its orientation is reflected in the extant street pattern that was probably established within the Saxon period. Although the GPR response is likely to be to walls and other remains constructed in the medieval period, the potential that these overlie earlier features with a similar orientation should be considered.
- 5.1.4 GPR profiles from the churchyard to the south and west of the abbey indicate widespread and dense burials. Clear reflections from graves, probably dating from the 17<sup>th</sup> - 19<sup>th</sup> centuries, appear along with more variable and fragmented responses suggesting much disturbance and truncation of earlier graves. No significant anomalies relating to structural remains were located within the churchyard, but given the density of burials, it is likely that any remains would have been removed or at least highly disturbed.



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## 7 ACKNOWLEDGEMENTS

Archaeological Surveys Ltd acknowledge the generous donations from the following individuals and organisations:

Professor Rod Thomson  
Professor Michael Winterbottom  
Friends of Malmesbury Abbey  
Malmesbury Civic Trust  
Malmesbury History Society  
Malmesbury Town Council.

We would also like to thank the following for their support and assistance during the project:

Barbara Pollard - Abbey House Gardens  
Malmesbury Abbey  
The Old Bell Hotel.



GPR Survey  
Malmesbury Abbey  
Wiltshire

Map of survey location



● Survey location

Site centred on OS NGR  
ST 933 873

SCALE 1:25 000



SCALE TRUE AT A3



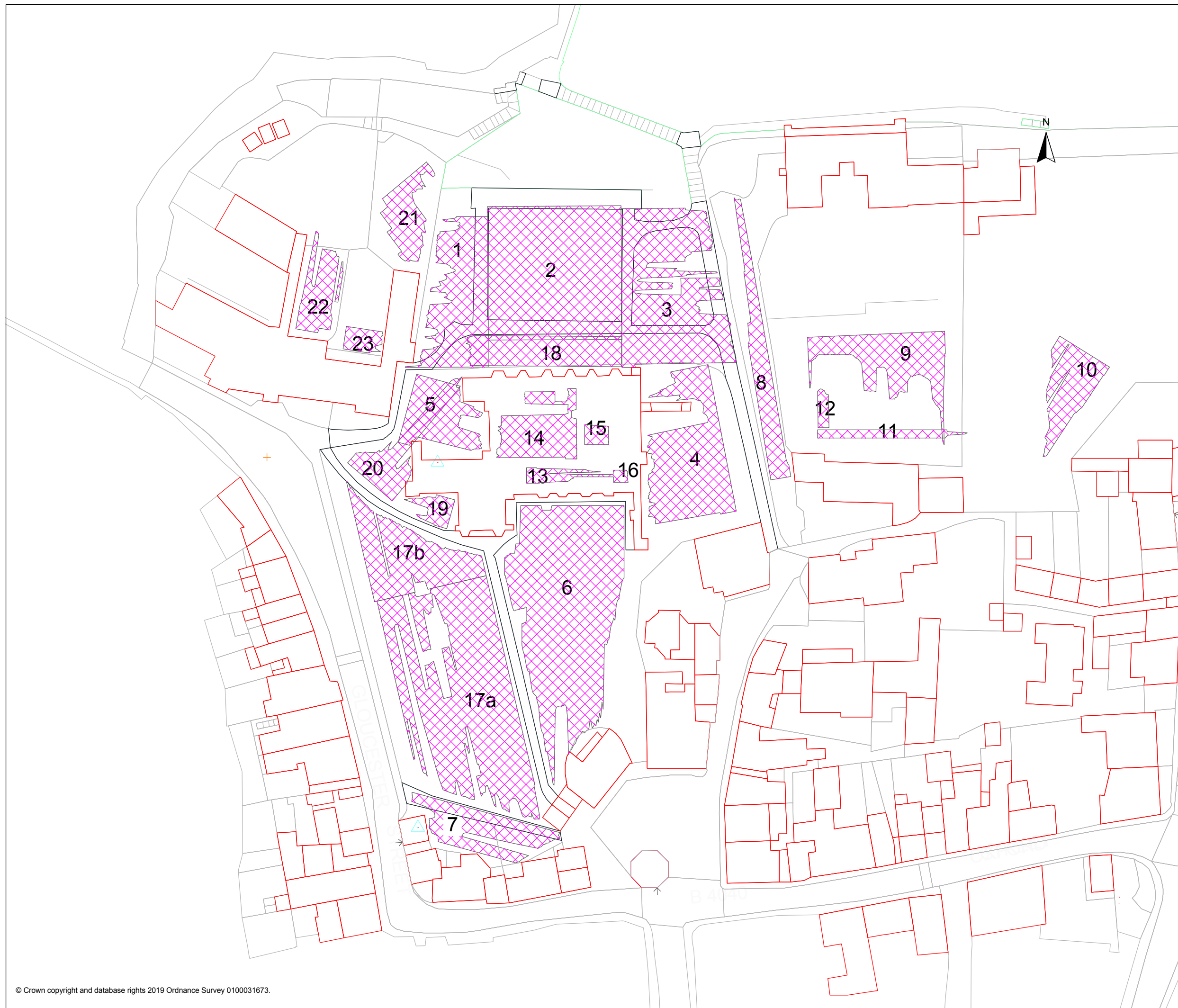
Survey location



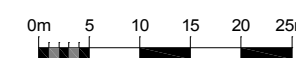


**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Map of survey areas**



**SCALE 1:750**



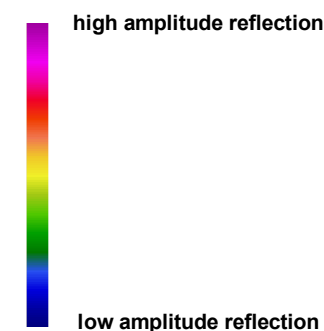
SCALE TRUE AT A3



**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information and  
time slices - Area 1  
(north west of abbey)**

Referencing to OSGB36 datum



SCALE 1:250



SCALE TRUE AT A3

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FIG 03



Additional files M270 - M279

**Area 1**

Files M001 - M154  
and M270 - M279  
0.25m separation  
parallel traverses  
with offset section  
avoiding obstacles

**Area 1 referencing**

**Time slice at 13.438ns (approximately 0.6m)**

**Time slice at 21.638ns (approximately 0.8m)**






**Time slice at 25.313ns (approximately 0.9m)**



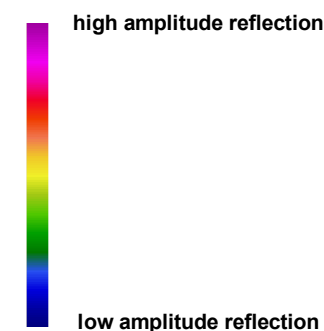


**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Time slices and  
abstraction/interpretation - Area 1  
(north west of abbey)**

-  Structural feature of archaeological potential
-  Linear anomaly of archaeological potential
-  Weak reflections of archaeological potential - structural debris or layers
-  Linear anomaly of uncertain origin - possible shallow wall or path
-  (0.5m) Approximate GPR anomaly depth

1 Anomaly label



SCALE 1:250



SCALE TRUE AT A3

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DJS

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KTD

FIG 04



Time slice at 26.875ns (approximately 0.9m)

Time slice at 28.438ns (approximately 1m)

Time slice at 29.688ns (approximately 1m+)

Area 1 abstraction and interpretation

Area 1

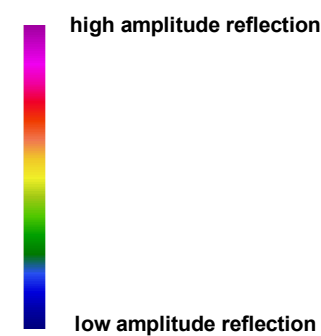




**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information and  
time slices - Area 2  
(north of abbey)**

Referencing to OSGB36 datum

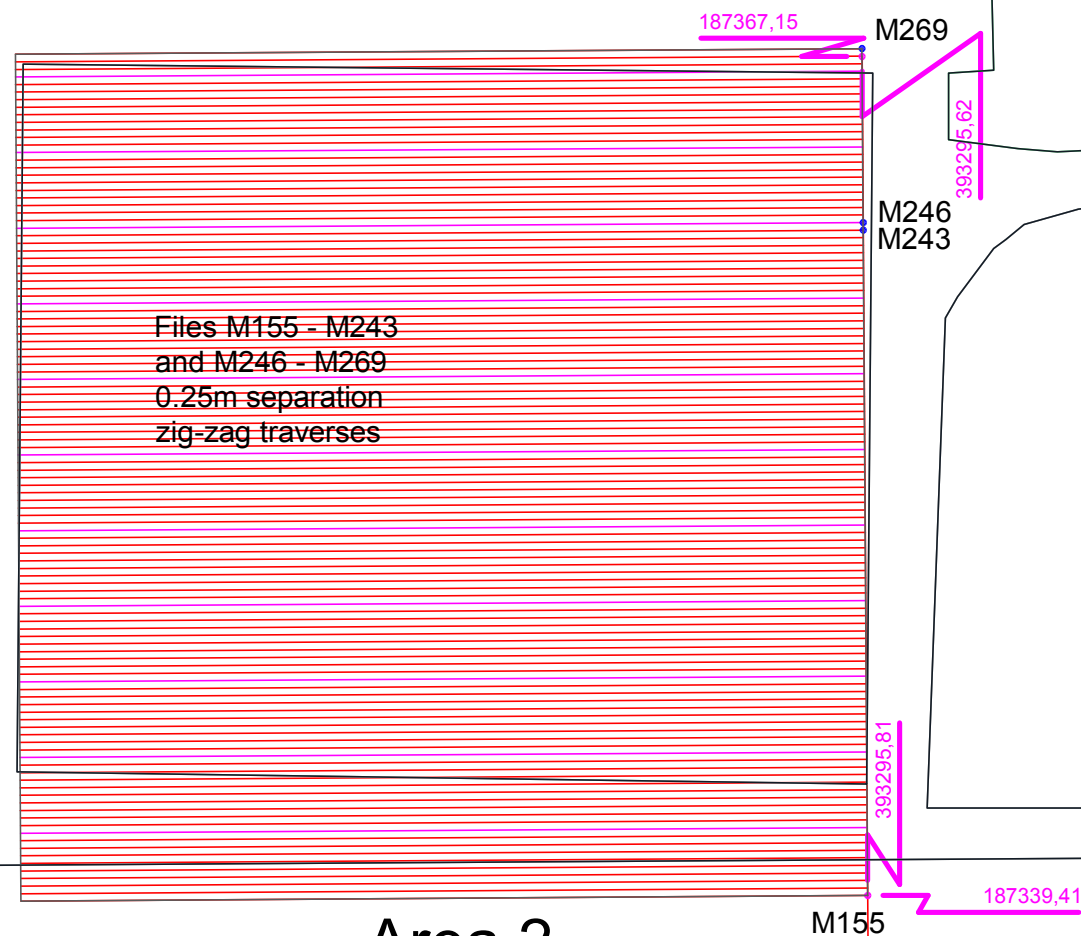


SCALE TRUE AT A3

DRAWN BY  
DJS

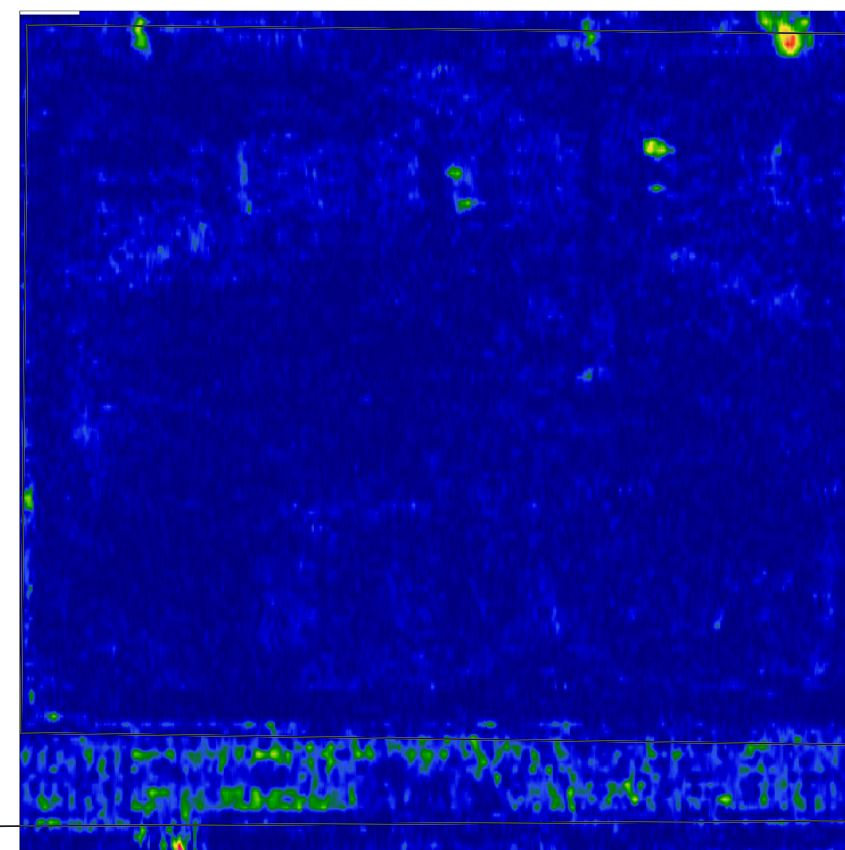
CHECKED BY  
KTD

FIG 05

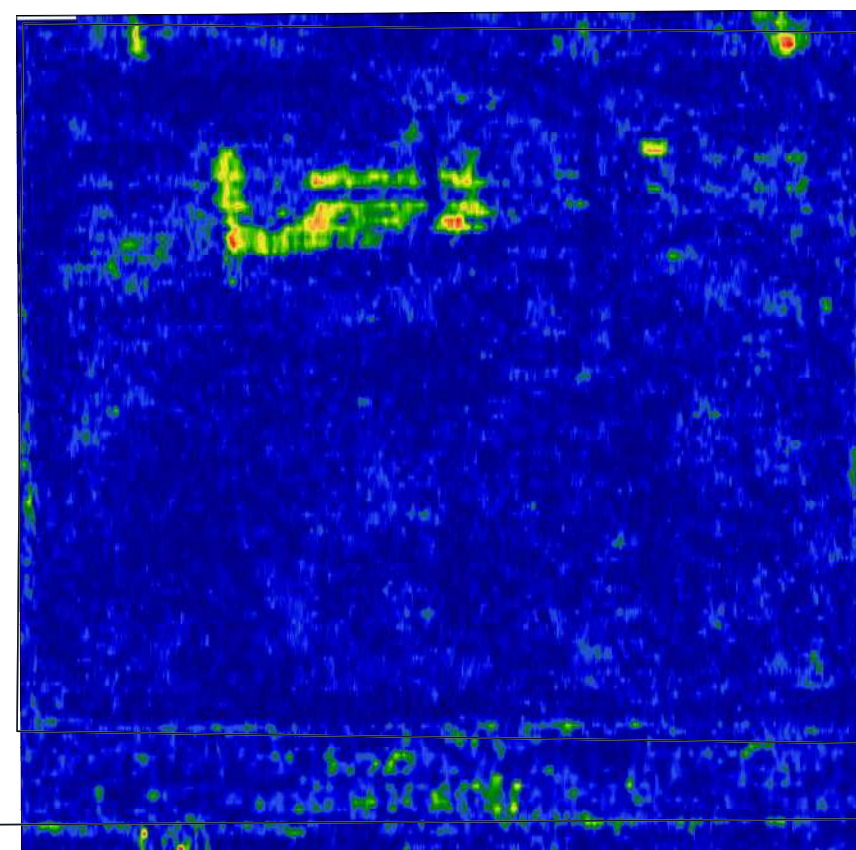


Area 2

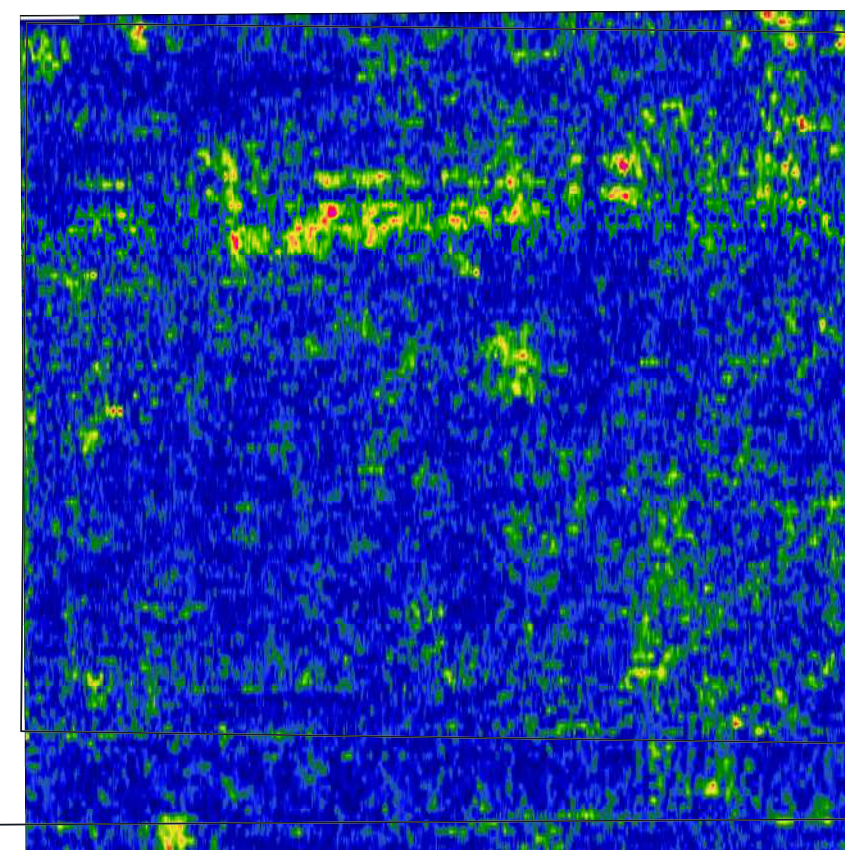
Area 2 referencing



Time slice at 15.313ns (approximately 0.5m)



Time slice at 18.38ns (approximately 0.6m)



Time slice at 25.625ns (approximately 0.9m)





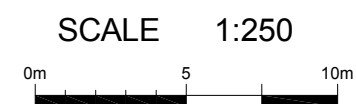
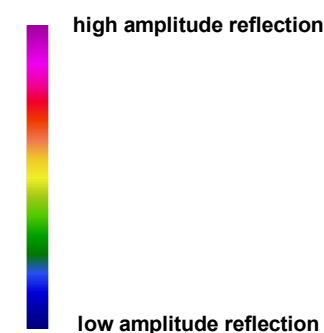
**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Time slices and  
abstraction/interpretation - Area 2  
(north of abbey)**

- Structural feature of archaeological potential - possible cloister laver
- Weak reflections related to structural debris and/or layers associated with cloisters
- Weak reflections of archaeological potential - possible structural remains
- Anomaly of uncertain origin - possible modern feature
- Linear feature of archaeological potential

(0.5m) Approximate GPR anomaly depth

1 Anomaly label

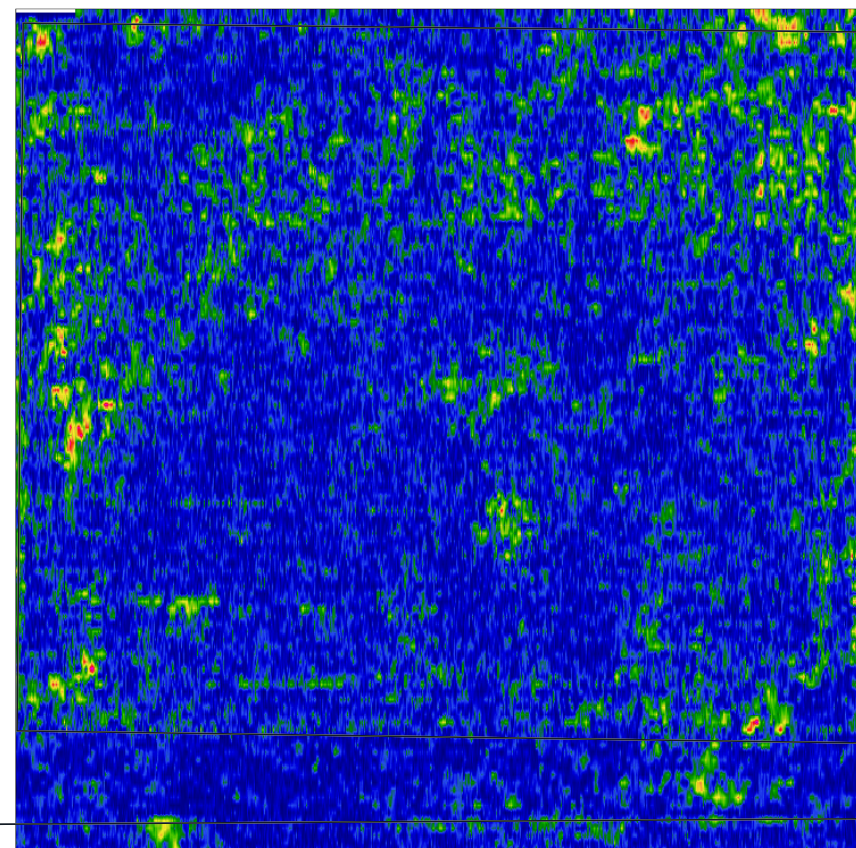


SCALE TRUE AT A3

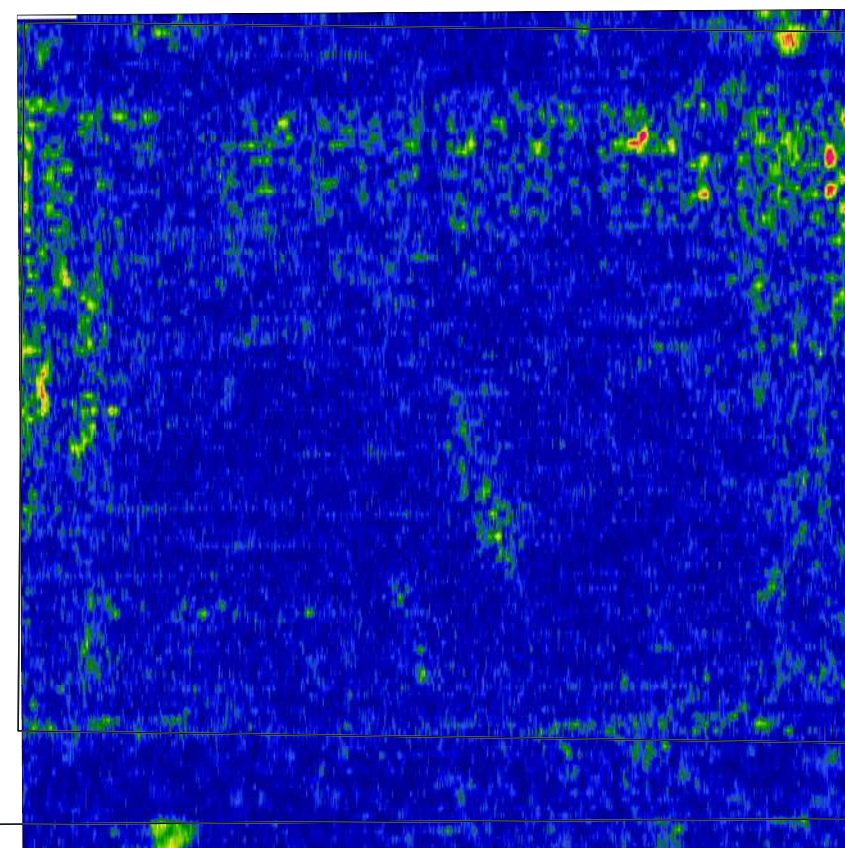
DRAWN BY  
DJS

CHECKED BY  
KTD

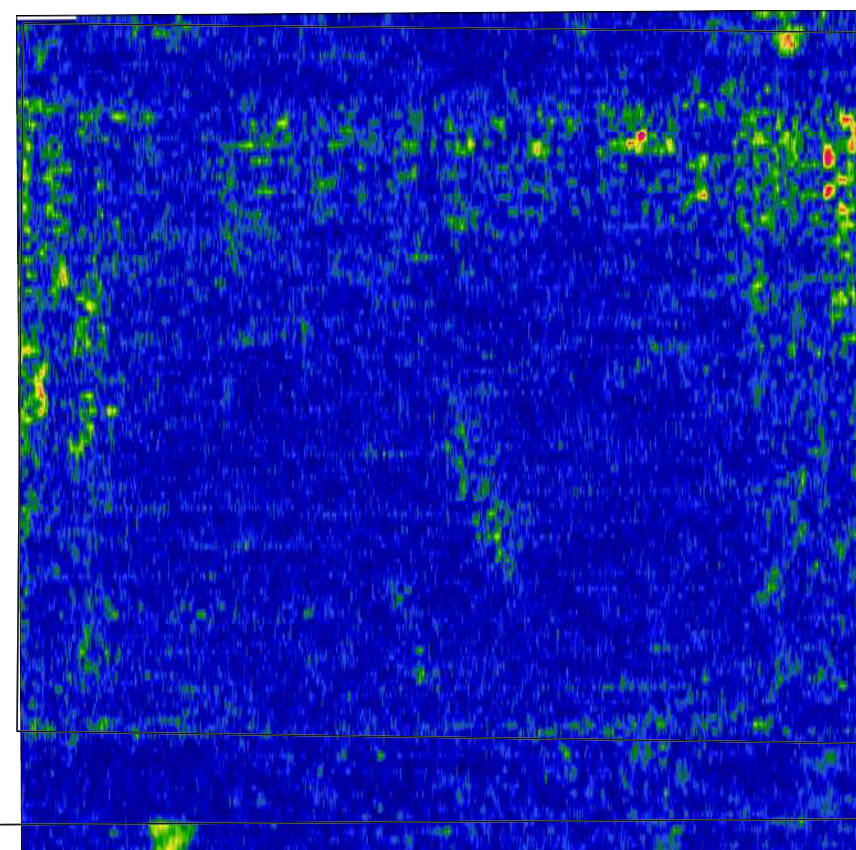
FIG 06



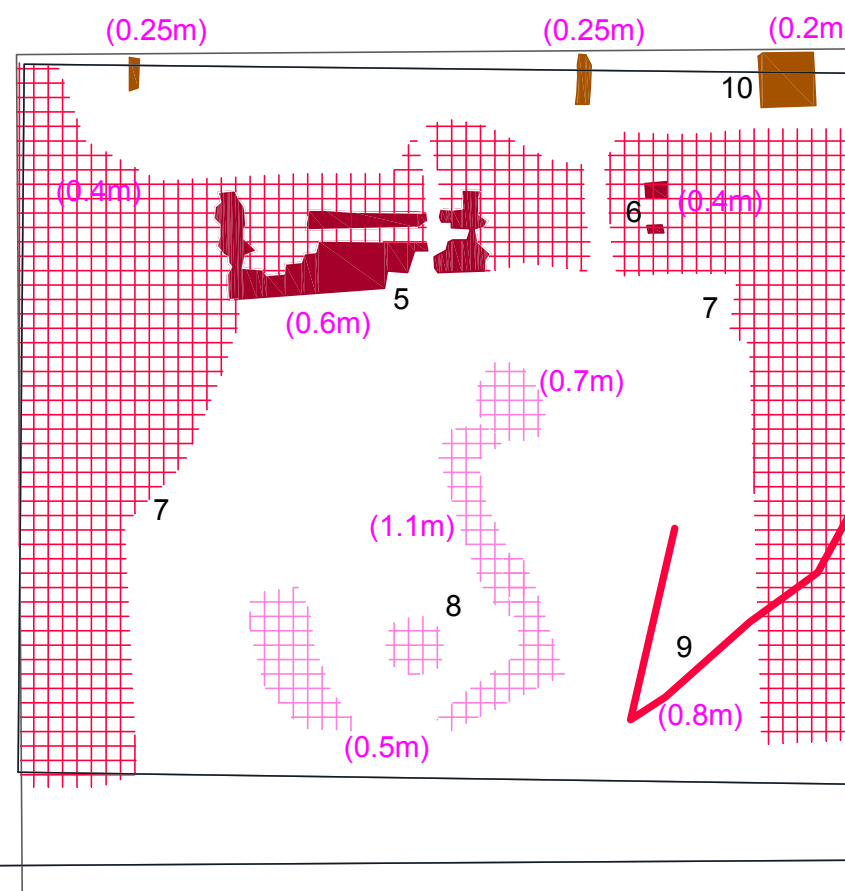
Time slice at 30.625ns (approximately 1.1m)



Time slice at 35.625ns (approximately 1.2m)



Time slice at 36.25ns (approximately 1.3m)



Area 2 abstraction and interpretation

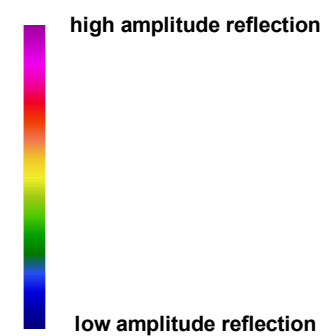




**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information and  
time slices - Area 3  
(north east of abbey)**

Referencing to OSGB36 datum



SCALE 1:250



SCALE TRUE AT A3

DRAWN BY  
DJS

CHECKED BY  
KTD

FIG 07

**Area 3**

Files M280 - M449  
0.25m separation  
parallel traverses  
with offset section  
avoiding obstacles

**Area 3 referencing**

**Time slice at 14.375ns  
(approximately 0.5m)**

**Time slice at 19.063ns  
(approximately 0.7m)**

**Time slice at 25.313ns  
(approximately 0.9m)**

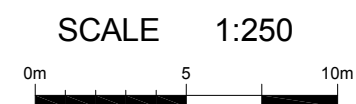
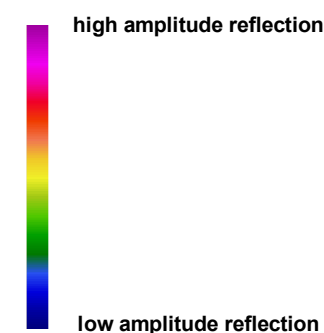




**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Time slices and  
abstraction/interpretation - Area 3  
(north east of abbey)**

- Variable reflections possibly relating to former structures north east of the cloister
- Weak reflections of archaeological potential - possible structural remains
- Weak reflections of archaeological potential - part of abbey north transept
- Linear zone of GPR wave attenuation - possible ditch / trench / drain?



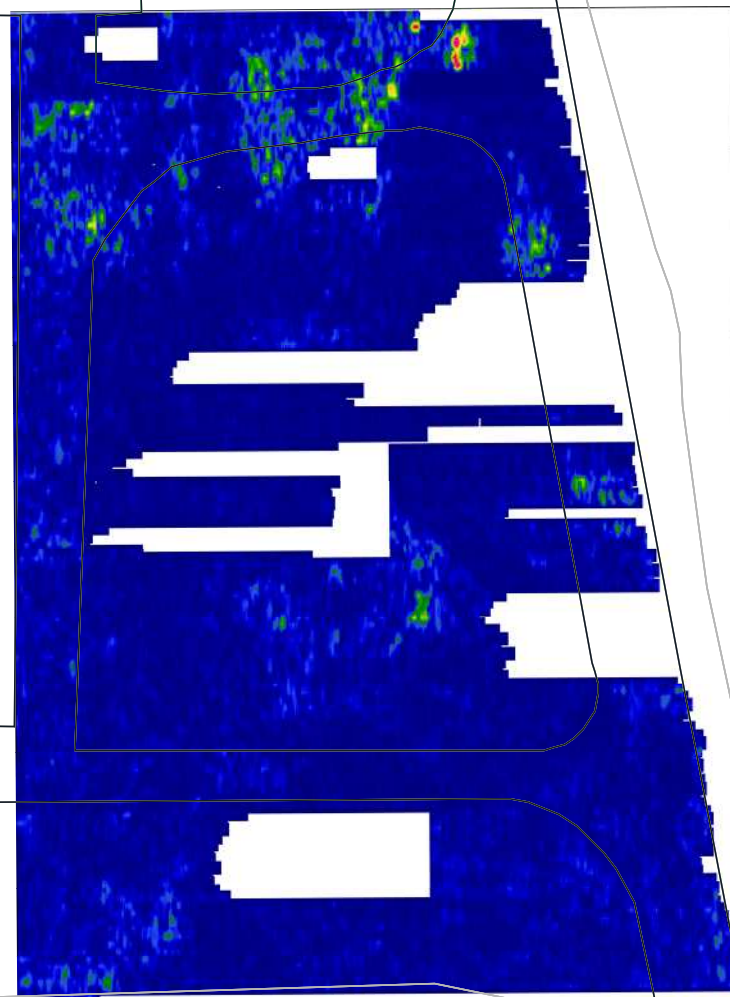
SCALE TRUE AT A3

DRAWN BY  
DJS

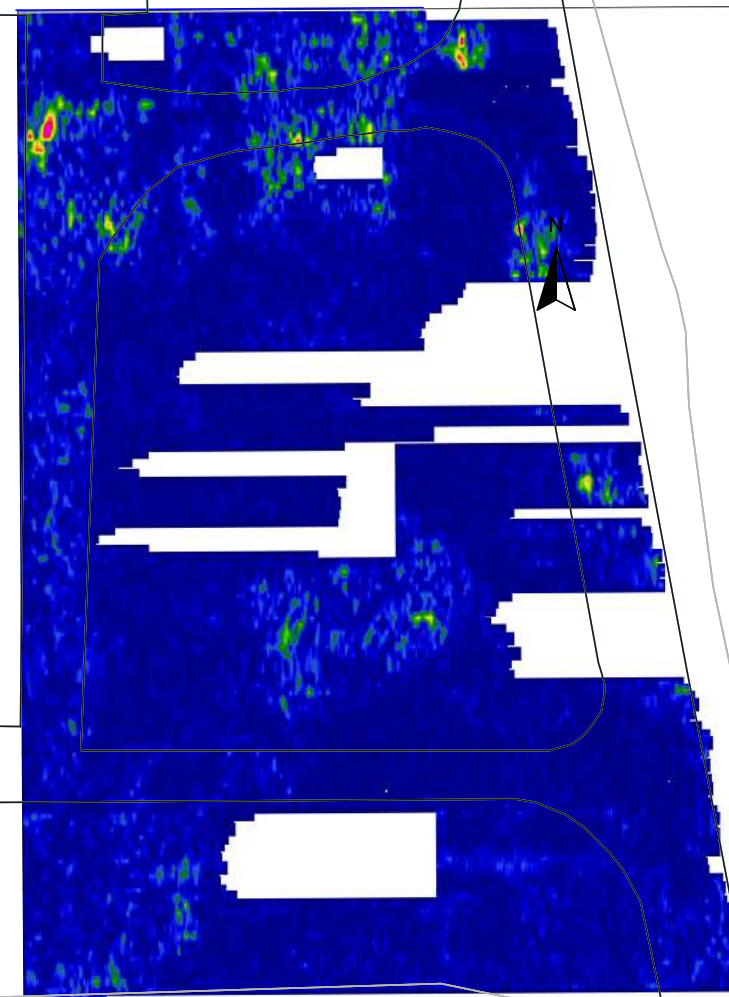
CHECKED BY  
KTD

FIG 08

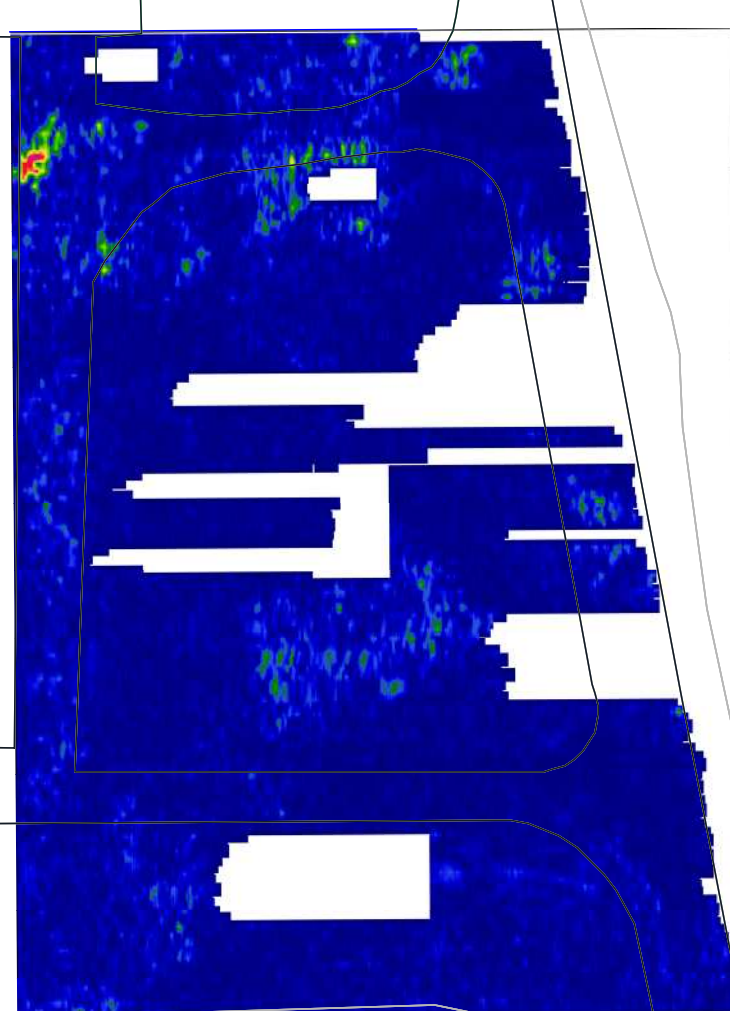
**Time slice at 25.938ns  
(approximately 0.9m+)**



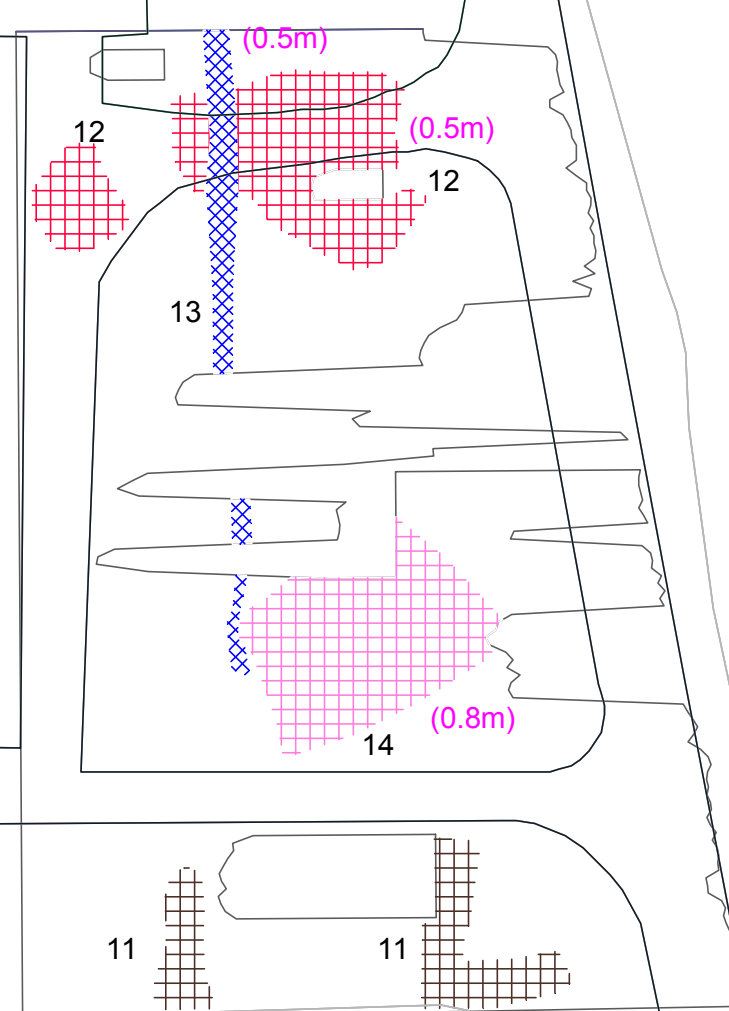
**Time slice at 28.125ns  
(approximately 1m)**



**Time slice at 30.313ns  
(approximately 1.1m)**



**Area 3 abstraction  
and interpretation**



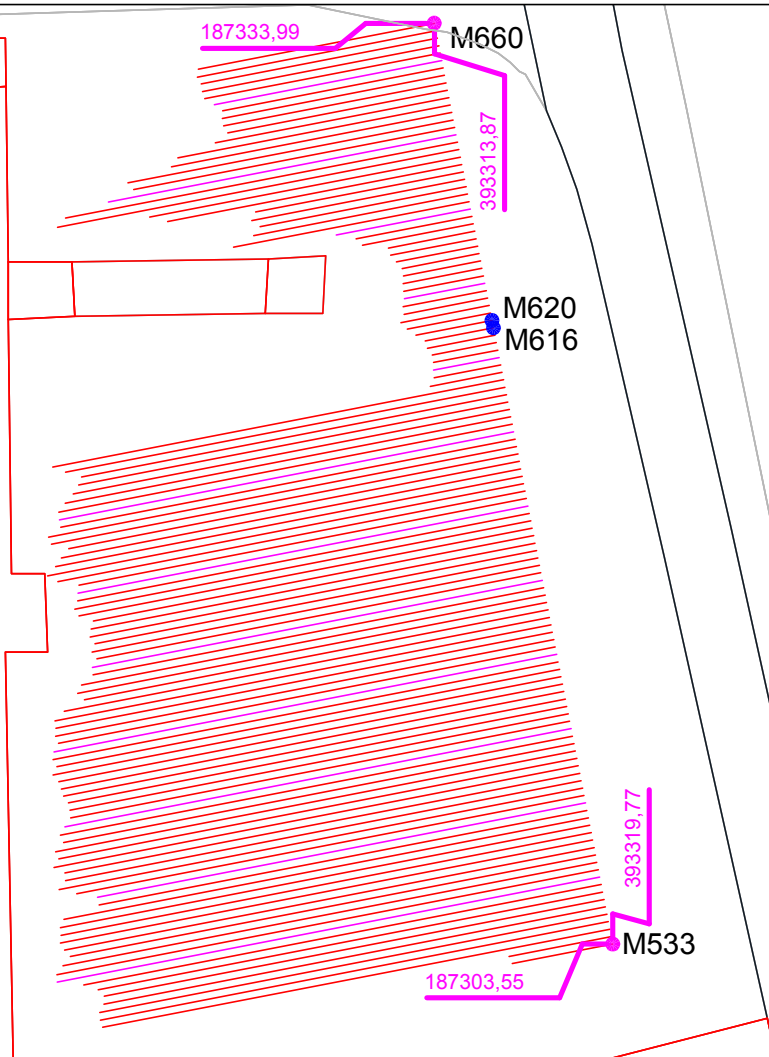




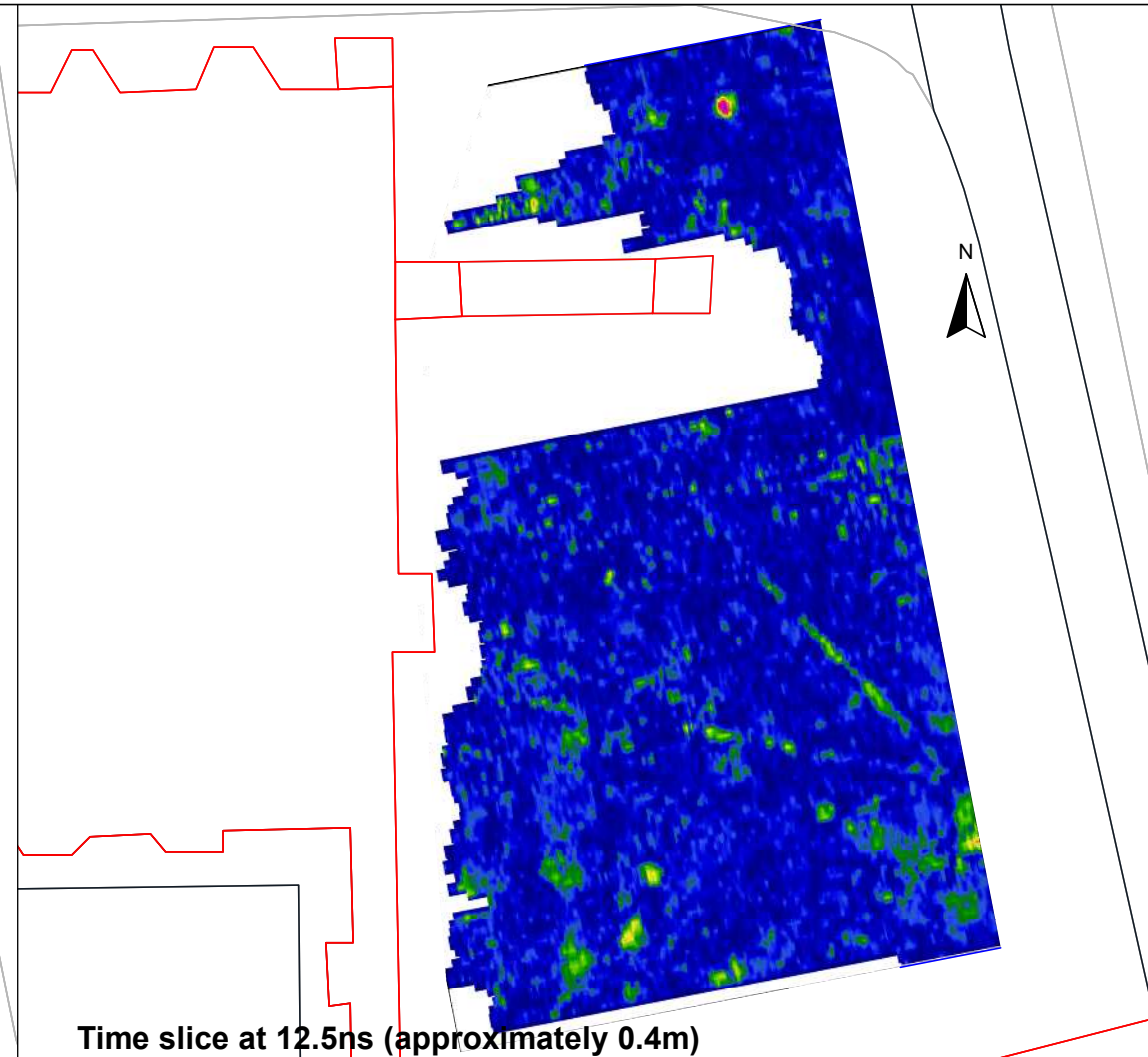
# Area 4

Files M533 - M616  
and M620 - M660  
0.25m separation  
parallel traverses

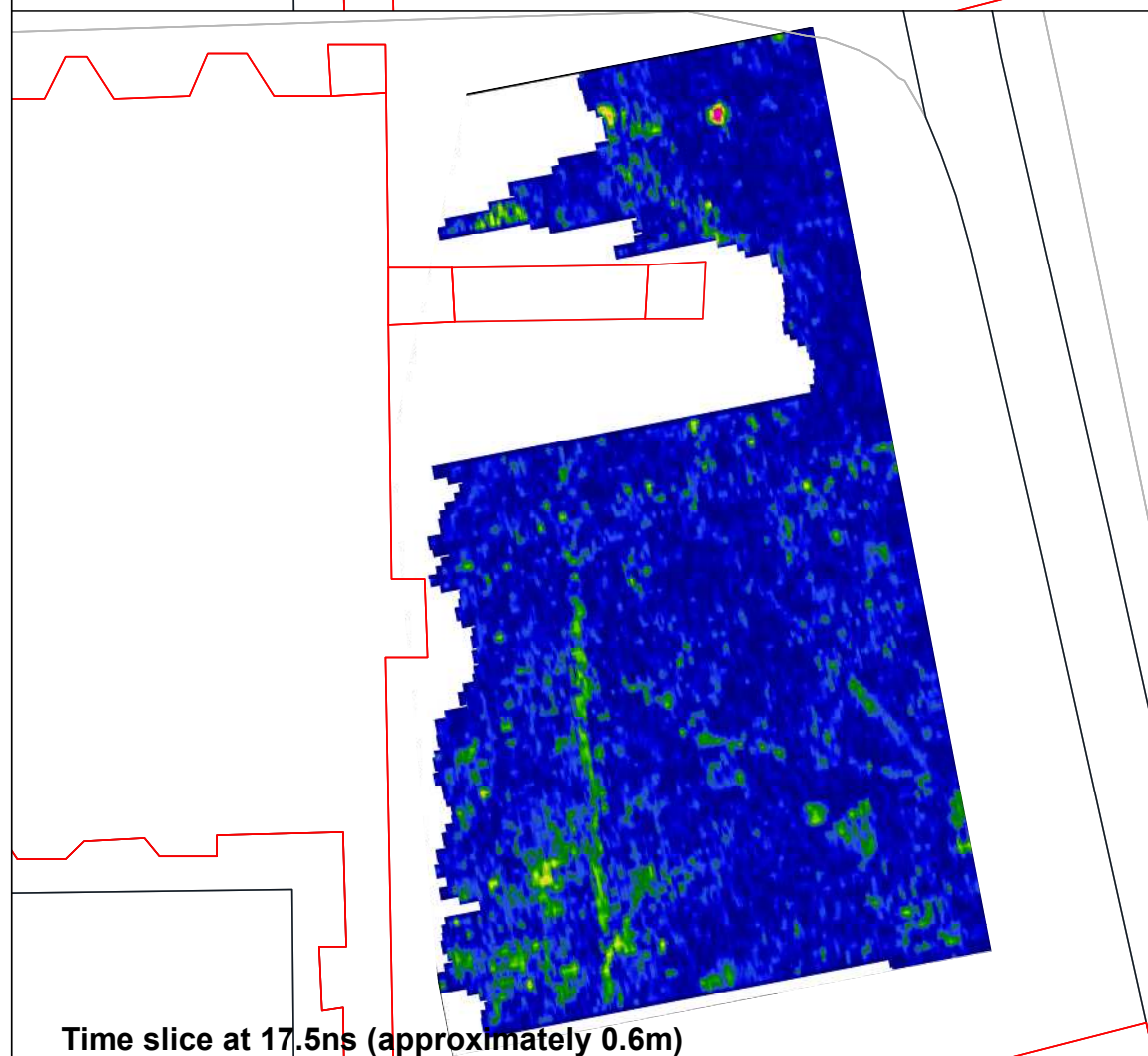
Area 4 referencing



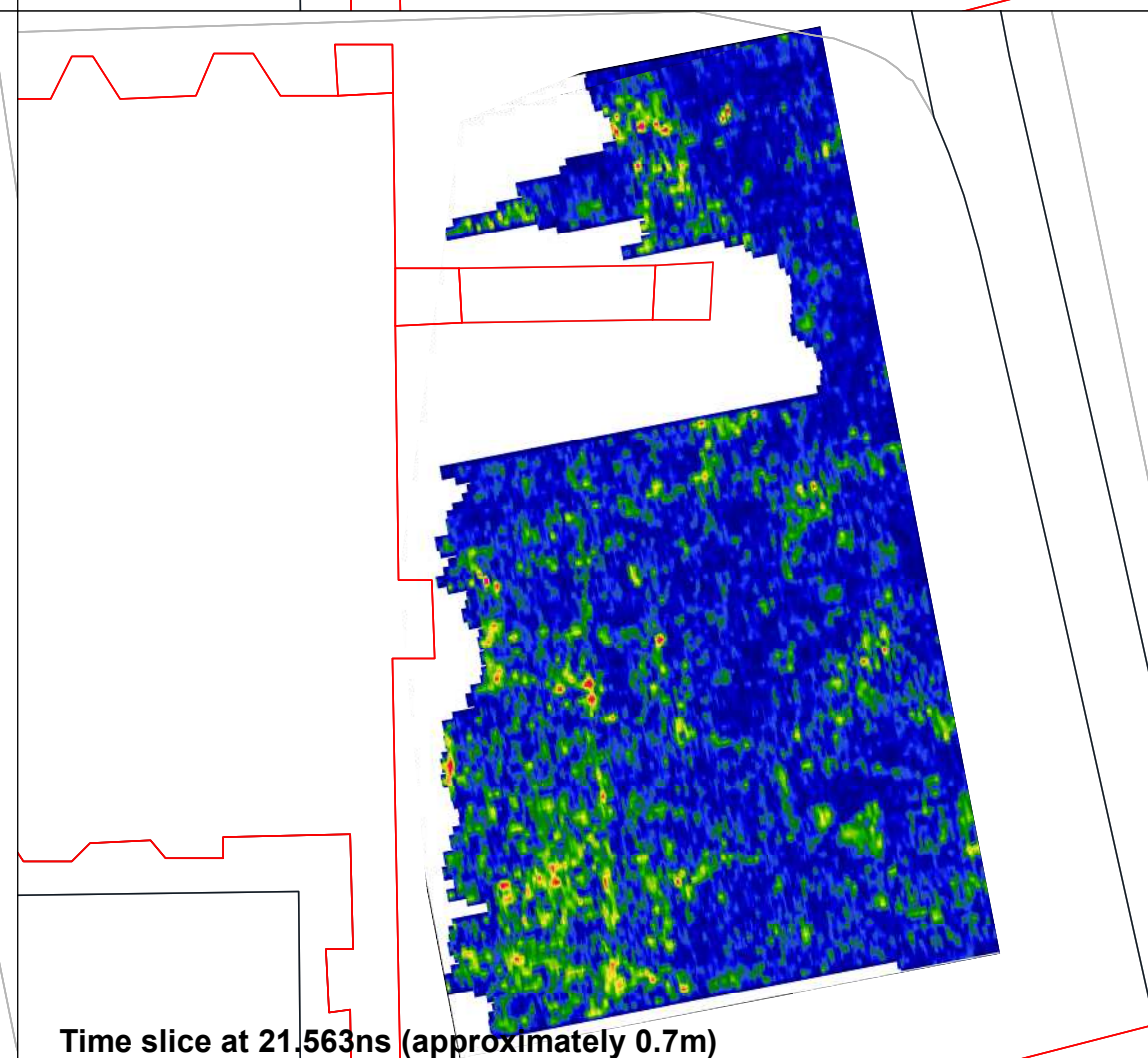
Time slice at 12.5ns (approximately 0.4m)



Time slice at 17.5ns (approximately 0.6m)



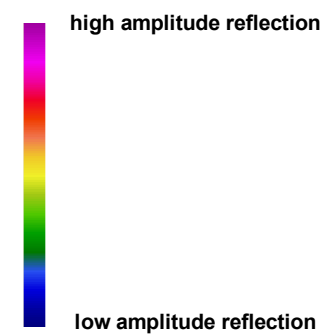
Time slice at 21.563ns (approximately 0.7m)



## GPR Survey Malmesbury Abbey Wiltshire

### Referencing information and time slices - Area 4 (east of abbey)

Referencing to OSGB36 datum



SCALE 1:250



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FIG 09

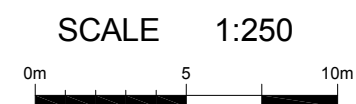
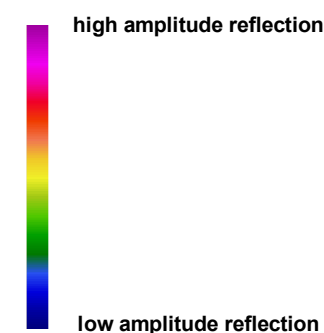




**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Time slices and  
abstraction/interpretation - Area 4  
(east of abbey)**

- Variable reflections relating to former abbey walls
- Variable reflections of archaeological potential - possible wall
- Linear anomaly - probable drain



SCALE TRUE AT A3

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FIG 10

Time slice at 31.563ns (approximately 1.1m)

Time slice at 38.438ns (approximately 1.3m)

Time slice at 39.063ns (approximately 1.4m)

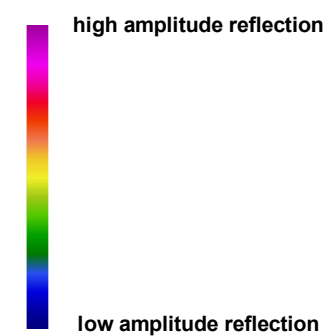
Area 4 abstraction and interpretation



**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information and  
time slices - Area 5  
(north west of abbey)**

Referencing to OSGB36 datum



SCALE TRUE AT A3

DRAWN BY  
DJS

CHECKED BY  
KTD

FIG 11

**Area 5**

Files M661 - M719  
0.25m separation  
parallel traverses

M661

187331.97

393252.84

M719

187317.98

**Area 5 referencing**

**Time slice at 8.593ns**

**Time slice at 14.453ns**

**Time slice at 20.313ns**

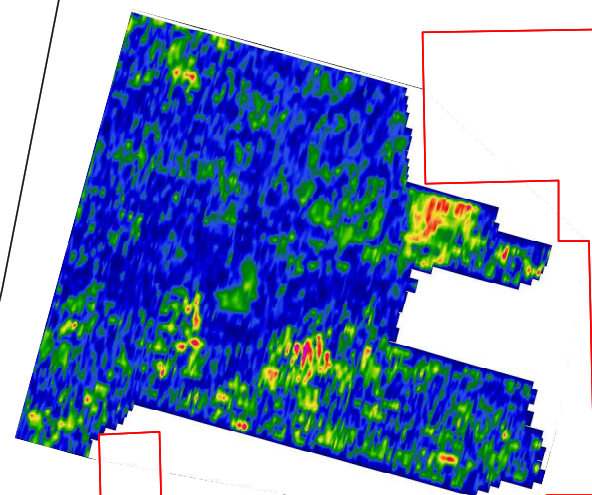




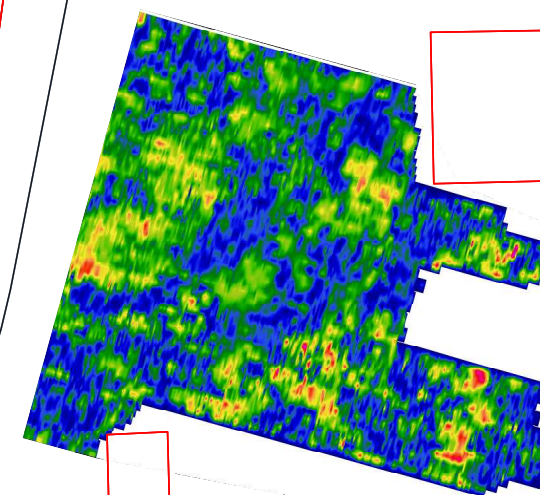
**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Time slices and  
abstraction/interpretation - Area 5  
(north west of abbey)**

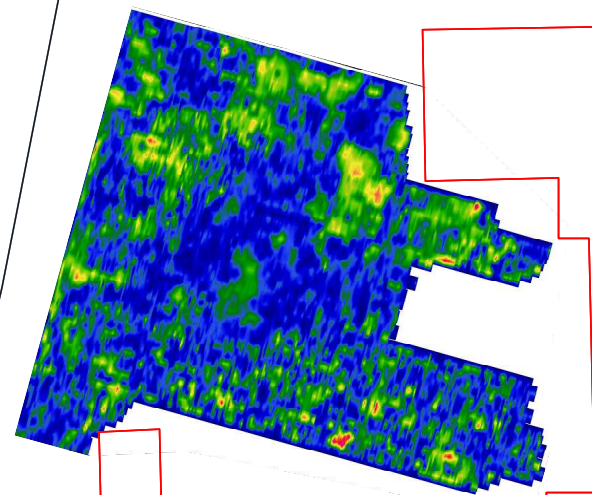
**Time slice at 23.047ns**



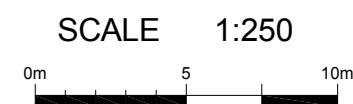
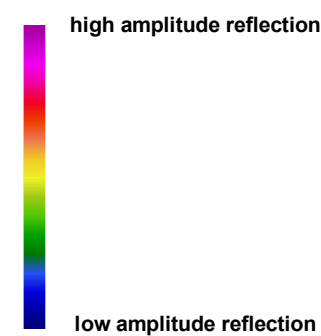
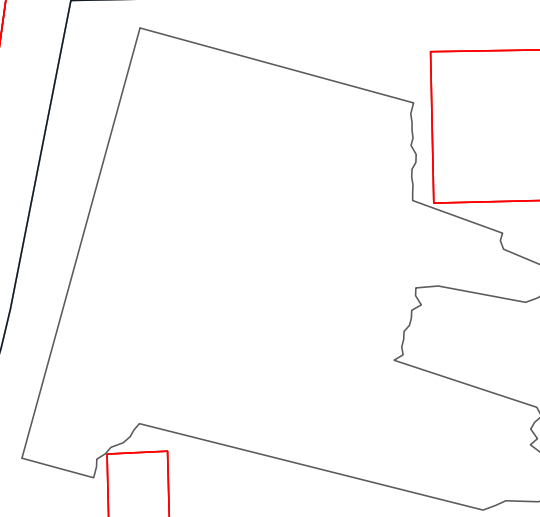
**Time slice at 28.906ns**



**Time slice at 34.375ns**



**Area 5 abstraction and interpretation**



SCALE TRUE AT A3

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**DJS**

CHECKED BY  
**KTD**

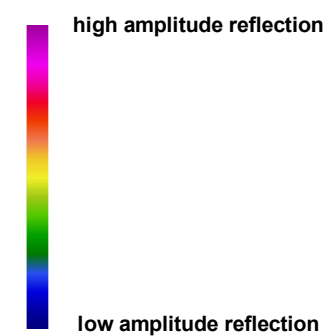
**FIG 12**



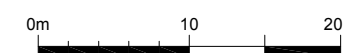
**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information and  
time slices - Area 6  
(south east of abbey)**

Referencing to OSGB36 datum



**SCALE 1:500**



SCALE TRUE AT A3

DRAWN BY  
DJS

CHECKED BY  
KTD

FIG 13

**Area 6**

Files M849 - M1066  
0.25m separation  
parallel traverses

**Area 6 referencing**

**Time slice at 8.75ns (approximately 0.3m)**

**Time slice at 13-75ns (approximately 0.5m)**

**Time slice at 15ns (approximately 0.5m+)**





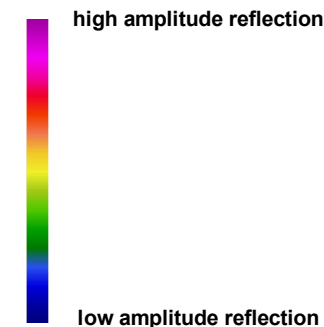
**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Time slices and  
abstraction/interpretation - Area 6  
(south east of abbey)**

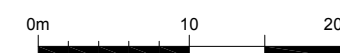


Variable and complex reflections - shallow  
layer possibly of disturbed material?

Note: survey area within churchyard  
contains widespread anomalies relating to  
a large number of graves which have not  
been abstracted.



**SCALE 1:500**



SCALE TRUE AT A3

DRAWN BY  
DJS

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KTD

FIG 14

**Time slice at 28.438ns (approximately 1m)**

**Time slice at 32.813ns (approximately 1.1m)**

**Time slice at 38.125ns (approximately 1.3m)**

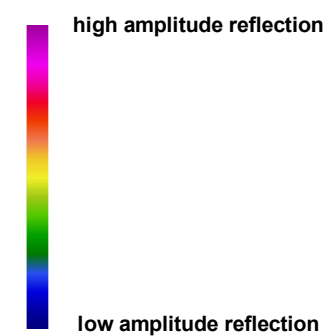
**Area 6 abstraction and interpretation**



**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information and  
time slices - Area 7  
(St Paul's church)**

Referencing to OSGB36 datum



**SCALE 1:250**



SCALE TRUE AT A3

DRAWN BY  
DJS

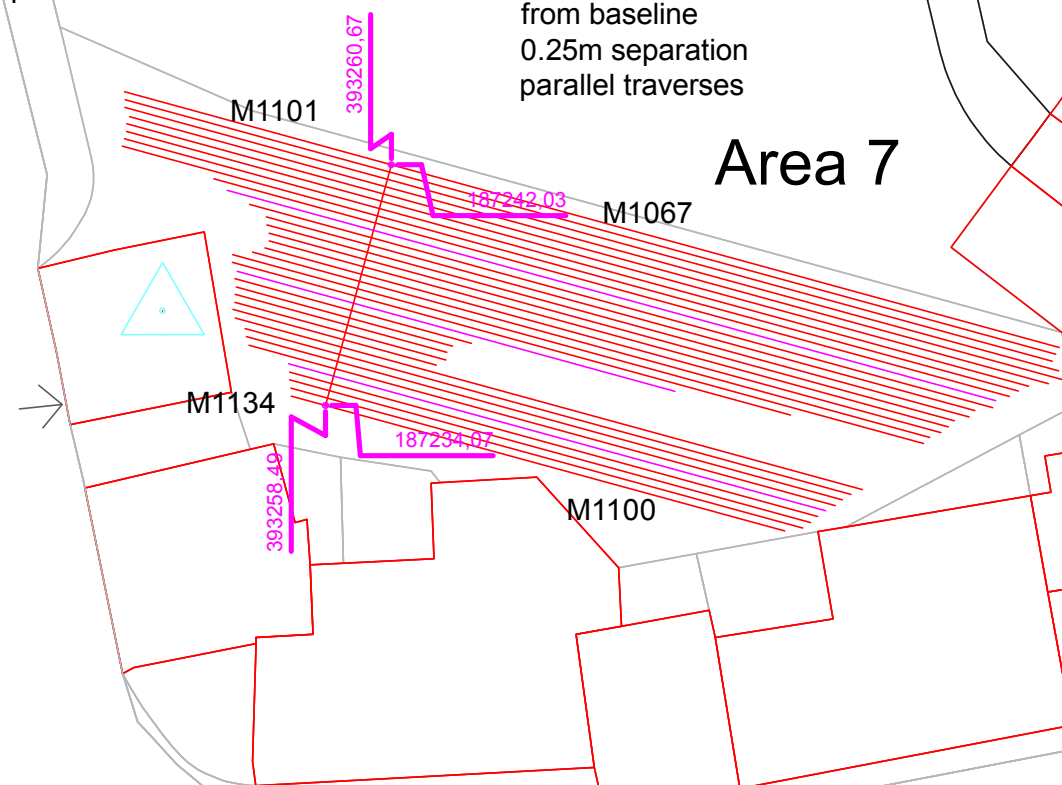
CHECKED BY  
KTD

FIG 15

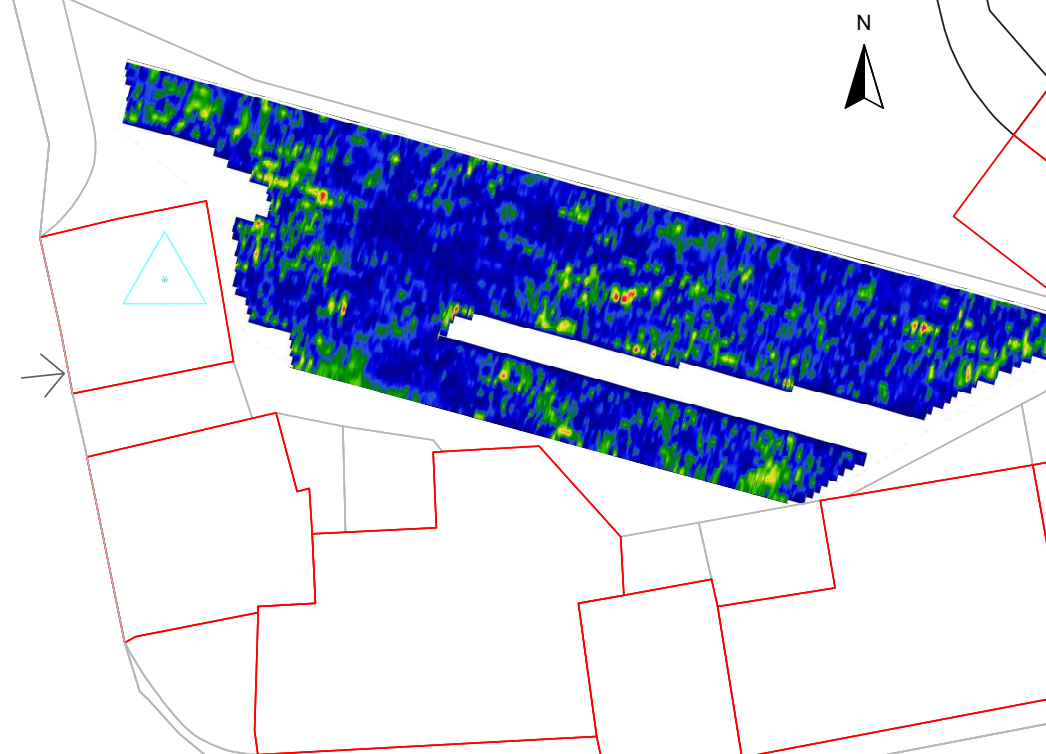
Files M1101 - M1134  
heading north west  
from baseline  
0.25m separation  
parallel traverses

Files M1067 - M1100  
heading south east  
from baseline  
0.25m separation  
parallel traverses

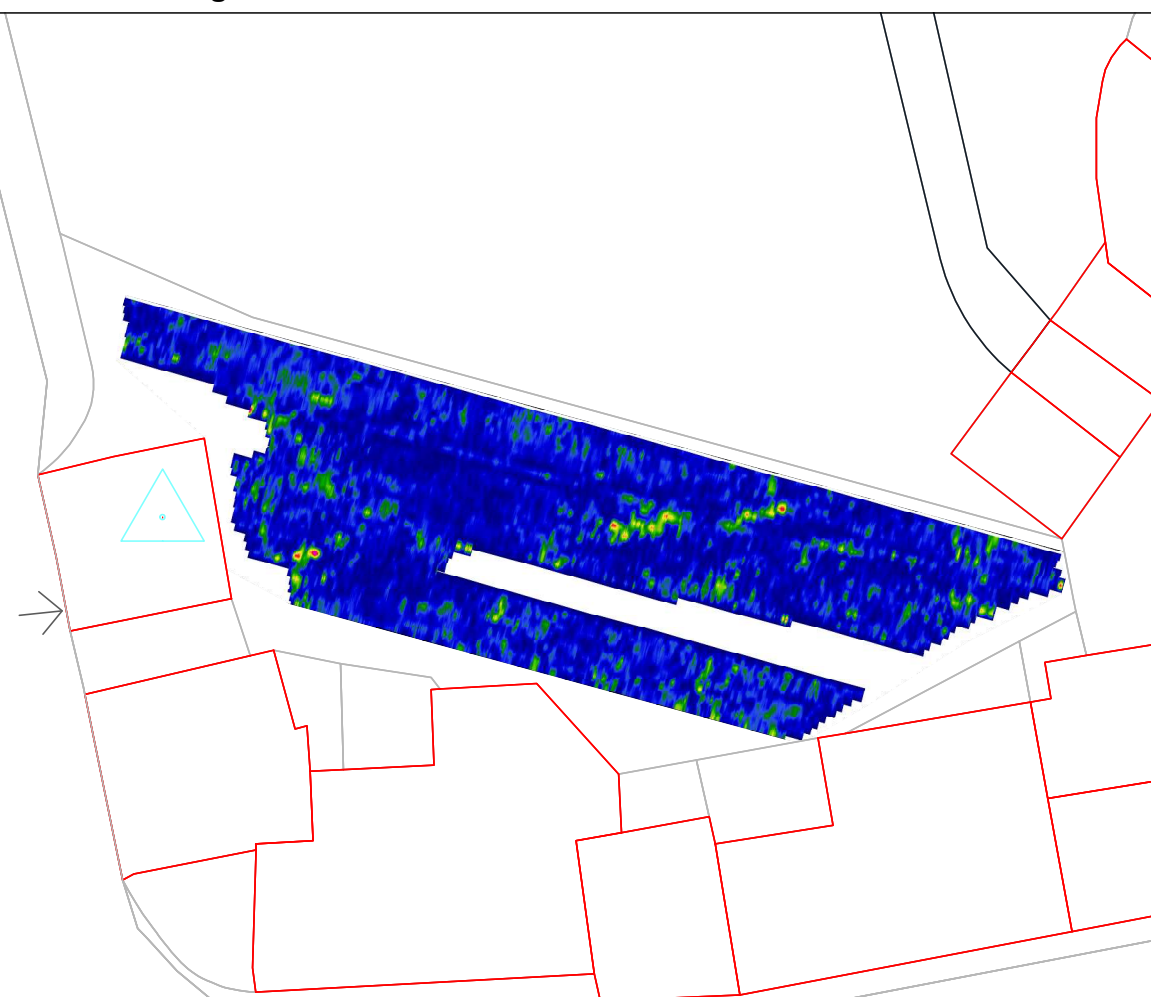
**Area 7**



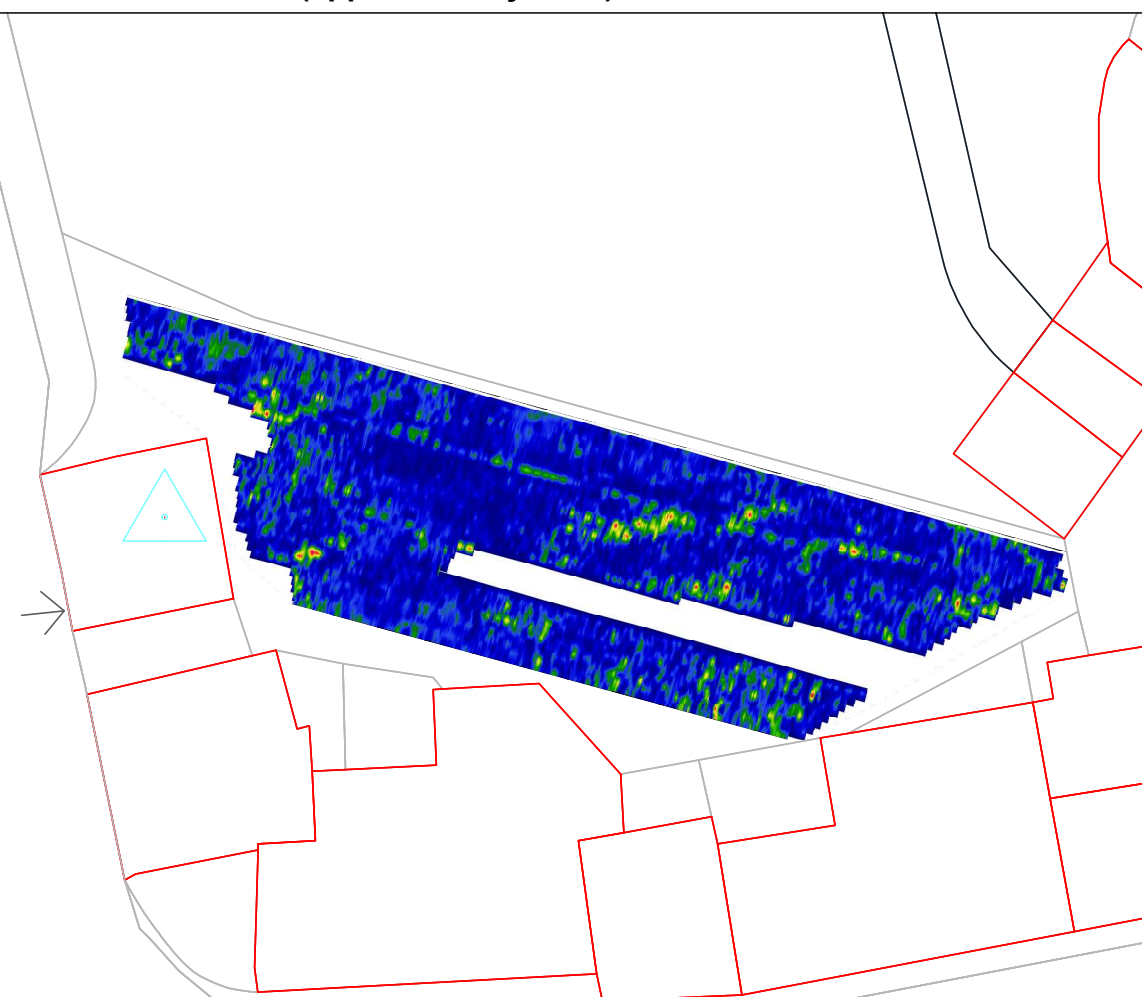
**Area 7 referencing**



**Time slice at 14.375ns (approximately 0.5m)**



**Time slice at 16.875ns (approximately 0.6m)**



**Time slice at 17.5ns (approximately 0.6m+)**



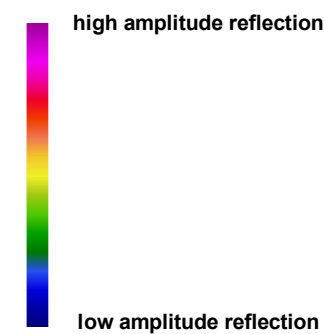


**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Time slices and  
abstraction/interpretation - Area 7  
(St Paul's church)**



Complex reflectors of archaeological  
potential - structural remains relating to St  
Paul's church



SCALE 1:250

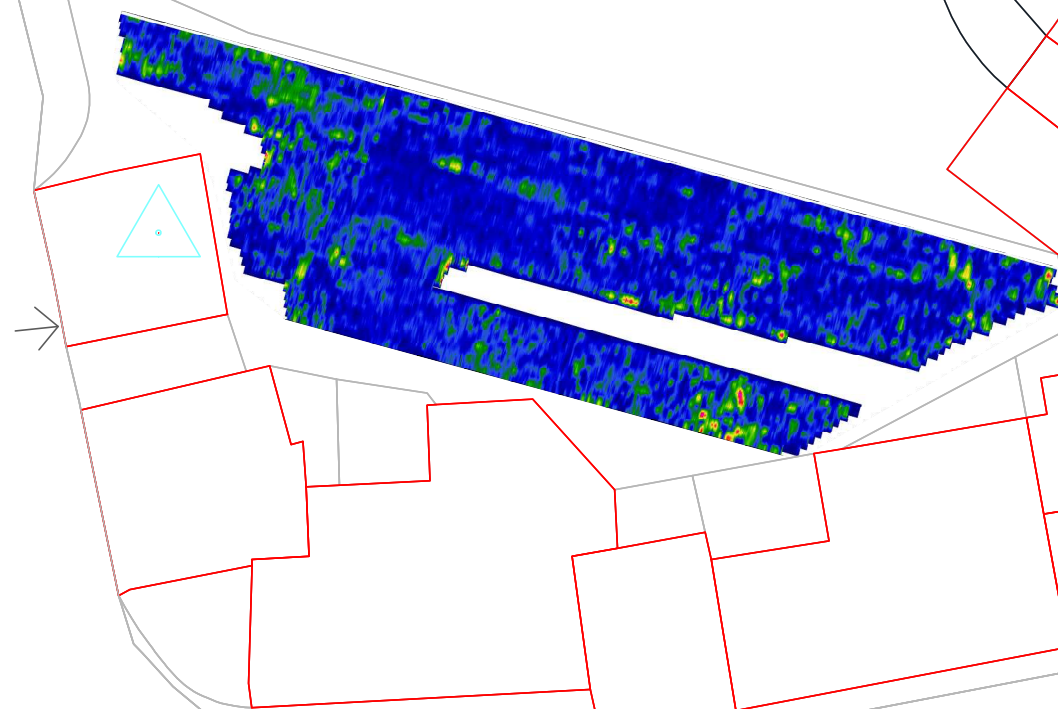


SCALE TRUE AT A3

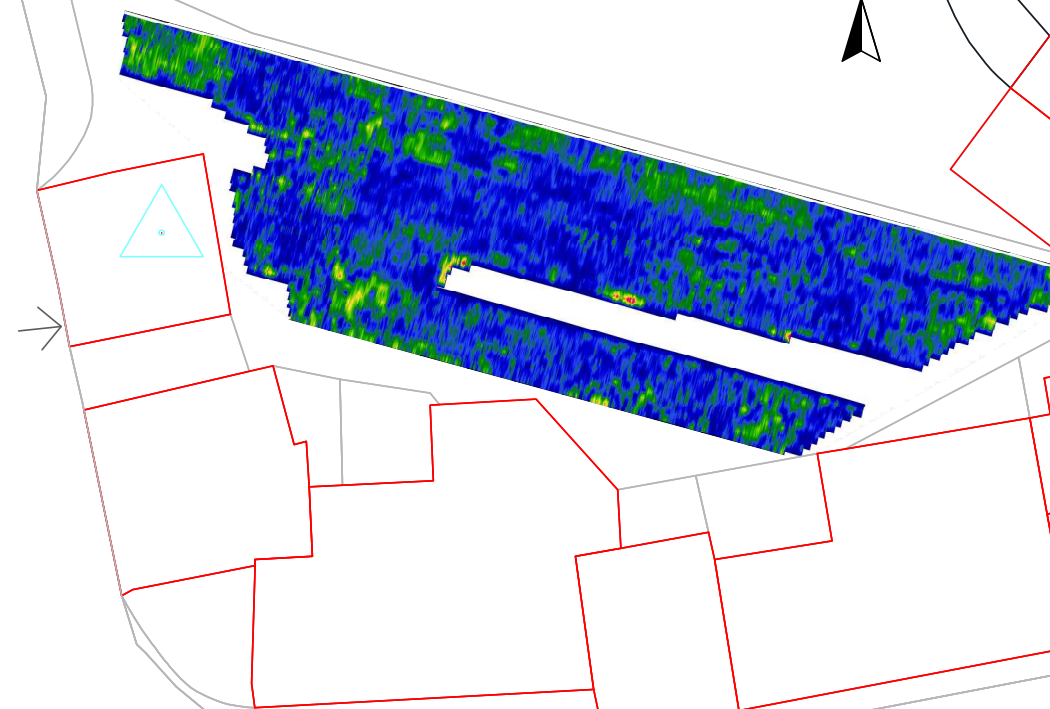
DRAWN BY  
DJS

CHECKED BY  
KTD

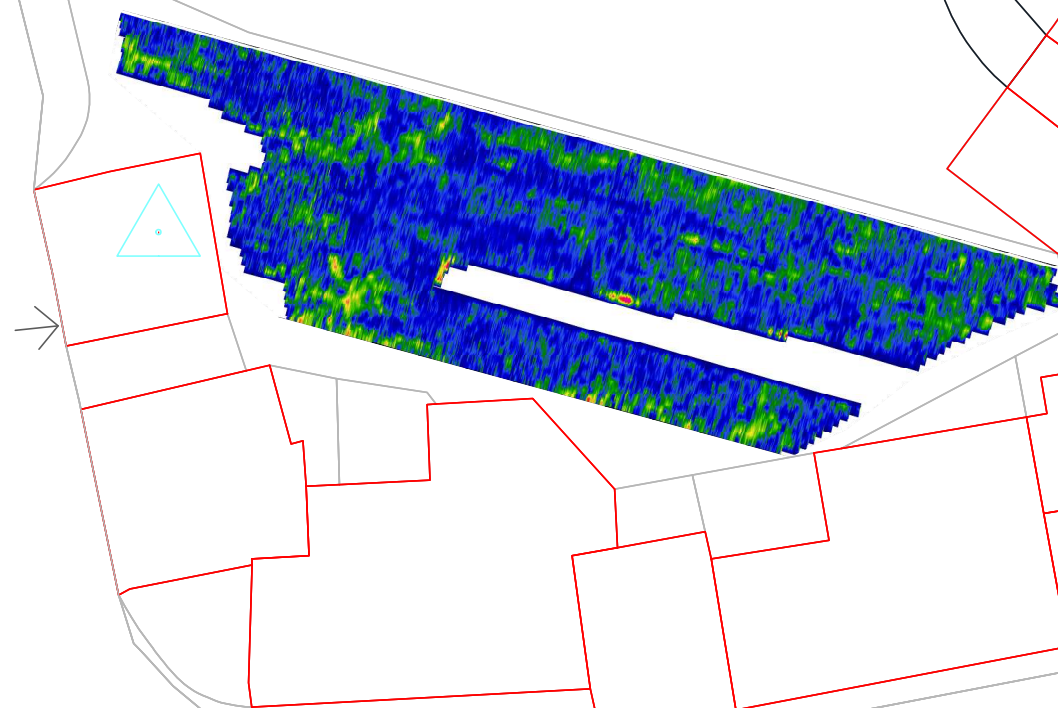
FIG 16



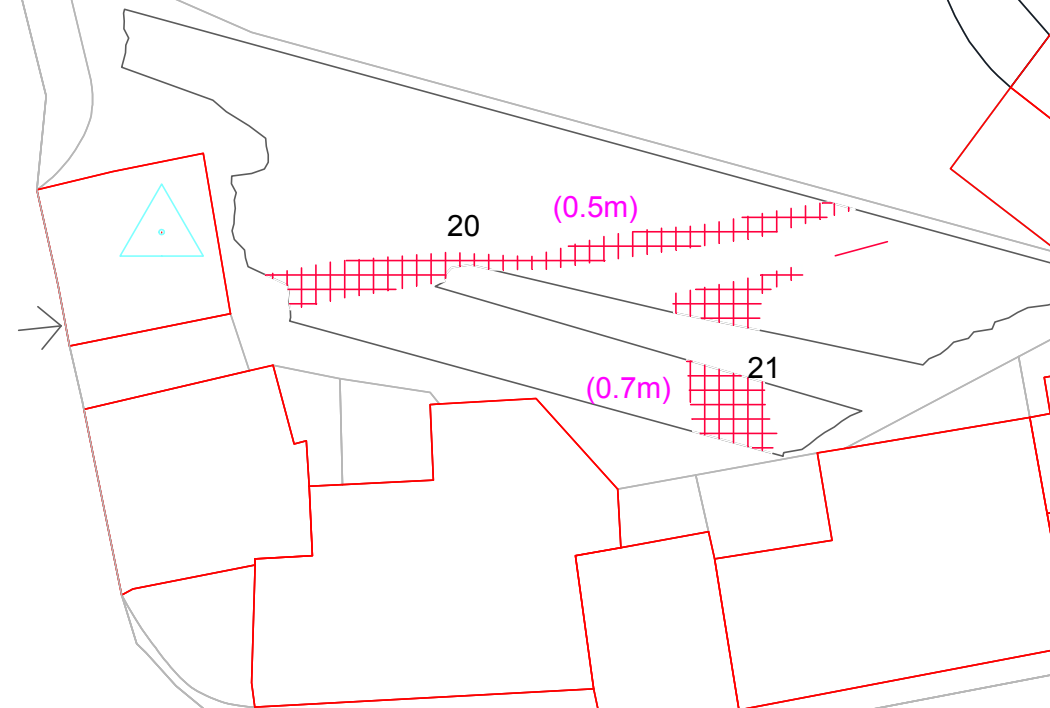
Time slice at 21.563ns (approximately 0.8m)



Time slice at 28.75ns (approximately 1m)



Time slice at 30ns (approximately 1.1m)



Area 7 abstraction and interpretation

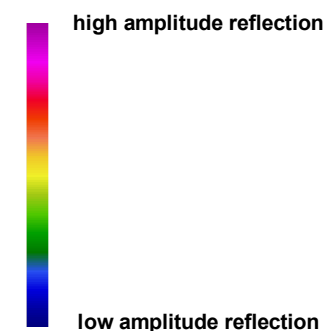




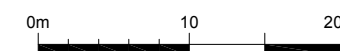
**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information and  
time slices - Area 8  
(Abbey House drive)**

Referencing to OSGB36 datum



**SCALE 1:500**



SCALE TRUE AT A3

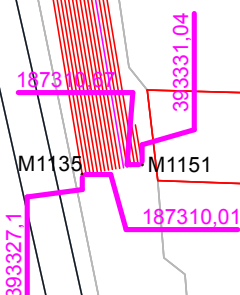
DRAWN BY  
DJS

CHECKED BY  
KTD

FIG 17

**Area 8**

Files M1135 - M1151  
0.25m separation  
parallel traverses



**Area 8 referencing**

**Time slice at 11.25ns (approximately 0.4m)**






**Time slice at 16.25ns (approximately 0.6m)**

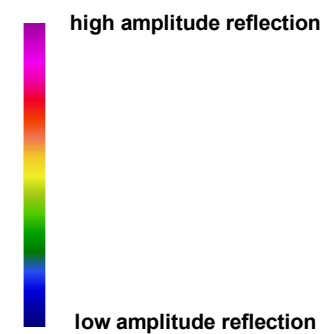
**Time slice at 28.125ns (approximately 1m)**



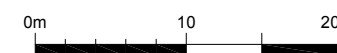
**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Time slices and  
abstraction/interpretation - Area 8  
(Abbey House drive)**

-  Linear anomaly - probable wall associated with abbey structures
-  Variable reflections of archaeological potential - structural debris/ layer
-  Discrete feature - possible grave
-  Area of graves
-  Infilled depression/ hollow



**SCALE 1:500**



SCALE TRUE AT A3

DRAWN BY  
**DJS**

CHECKED BY  
**KTD**

**FIG 18**

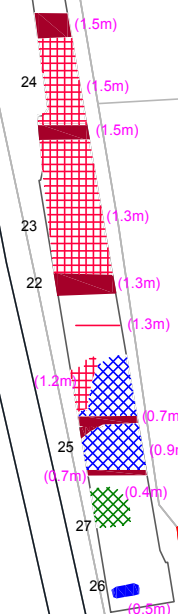


**Time slice at 31.875ns (approximately 1.1m)**

**Time slice at 35.313ns (approximately 1.2m)**

**Time slice at 44.063ns (approximately 1.5m)**



**Area 8 abstraction and interpretation**



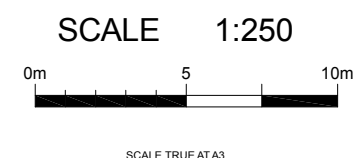
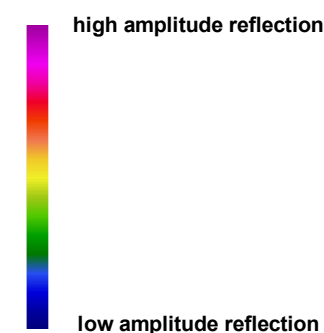


**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information,  
time slices and abstraction with  
interpretation - Area 9  
( western lawn of Abbey House  
gardens)**

-  Linear anomaly - possible wall of archaeological potential
-  Variable reflections of archaeological potential - structural debris/ layer

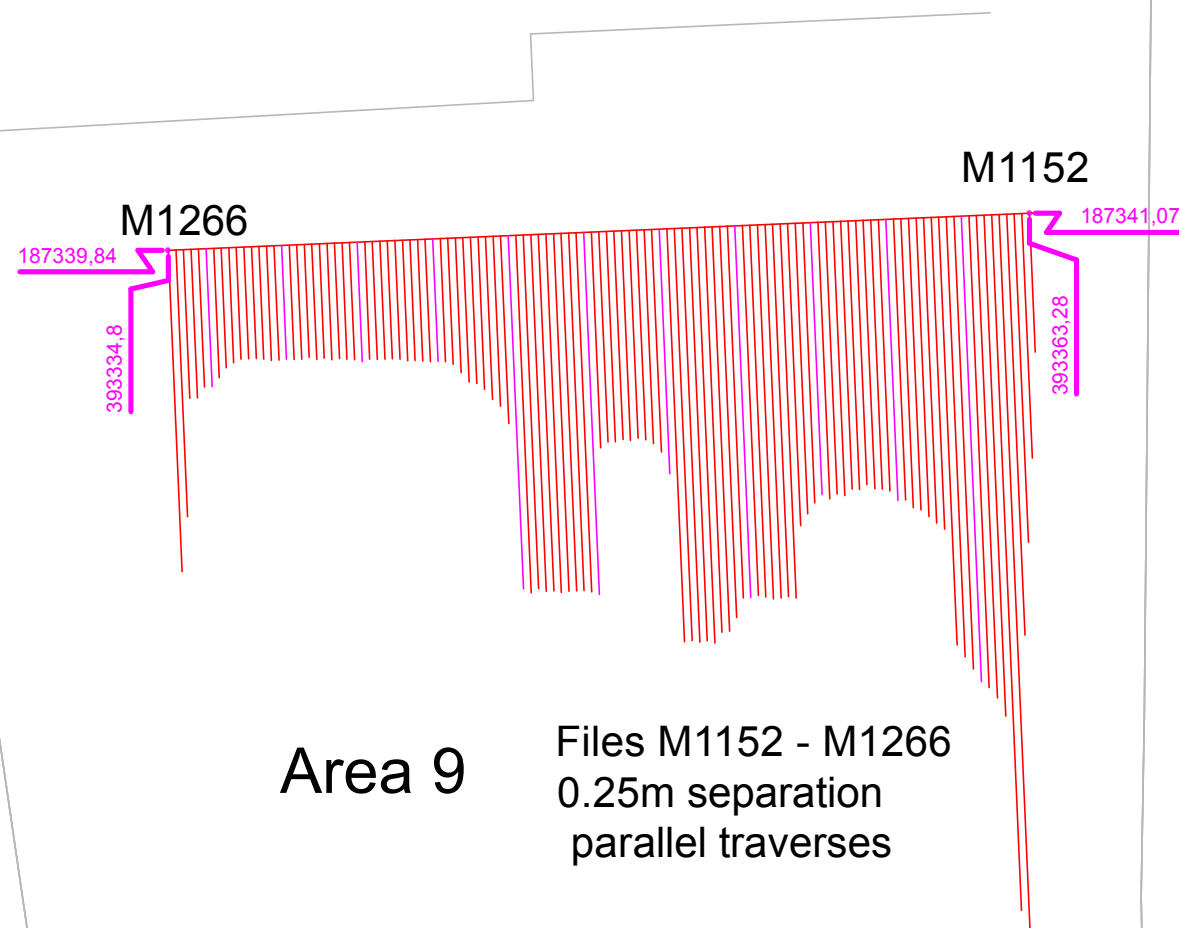
Referencing to OSGB36 datum



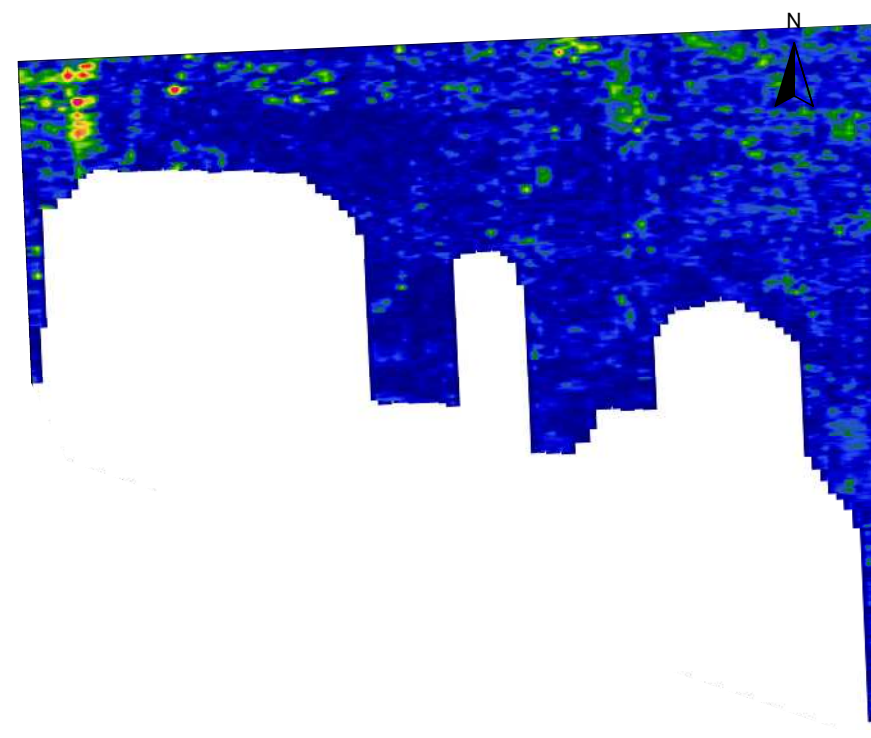
DRAWN BY  
DJS

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KTD

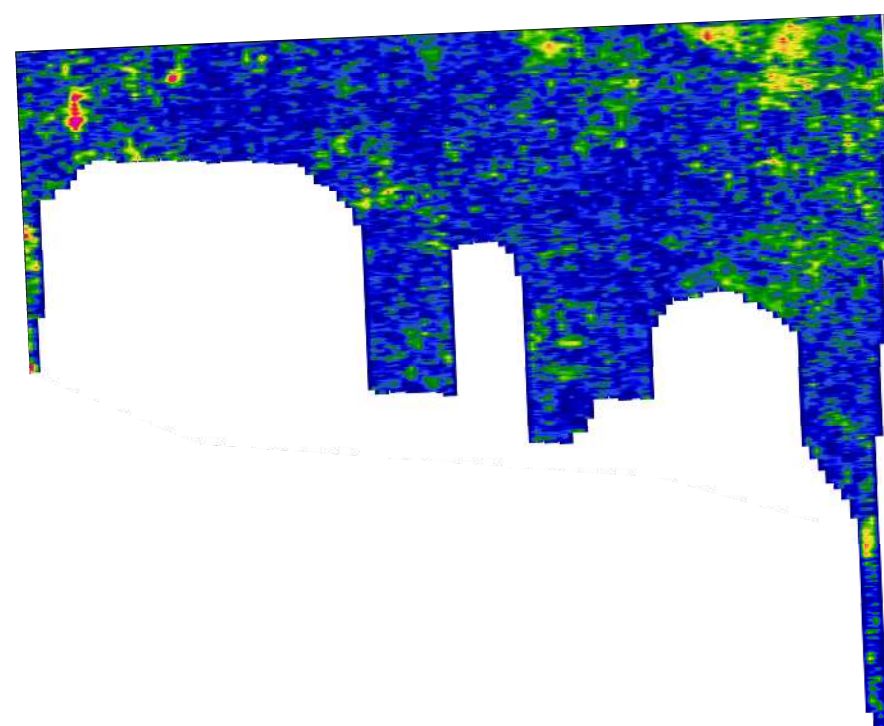
FIG 19



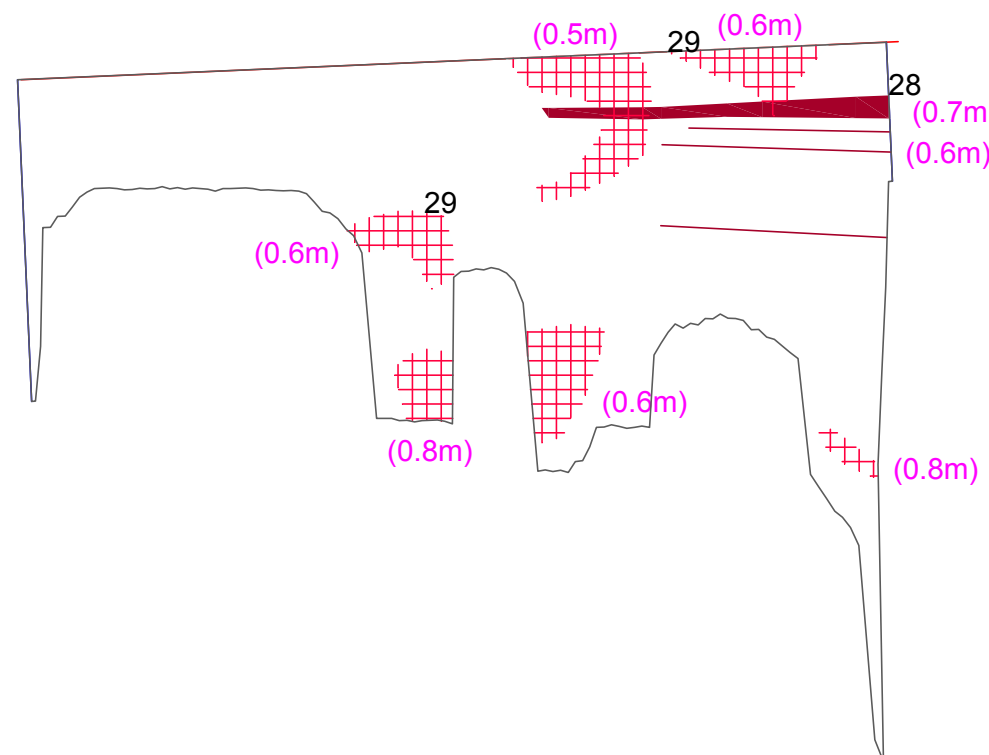
**Area 9 referencing**



**Time slice at 15.625ns (approximately 0.5m)**



**Time slice at 23.125ns (approximately 0.8m)**






**Area 9 abstraction and interpretation**



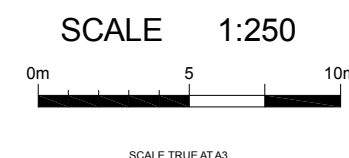
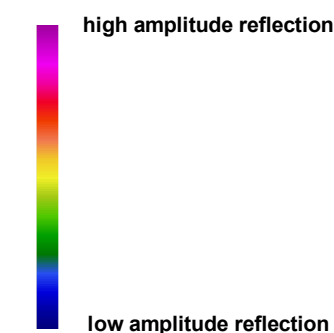


**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information,  
time slices and abstraction with  
interpretation - Area 10  
(eastern side of Abbey House  
gardens)**

-  Linear anomaly of uncertain origin - possible garden feature or drain
-  Planar reflections - possible path
-  (0.5m) Approximate GPR anomaly depth

Referencing to OSGB36 datum

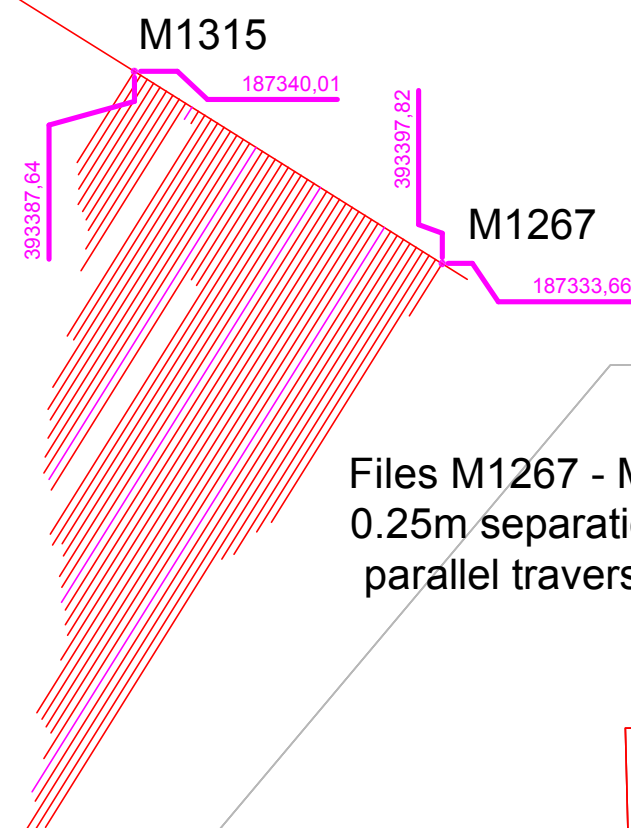


DRAWN BY  
DJS

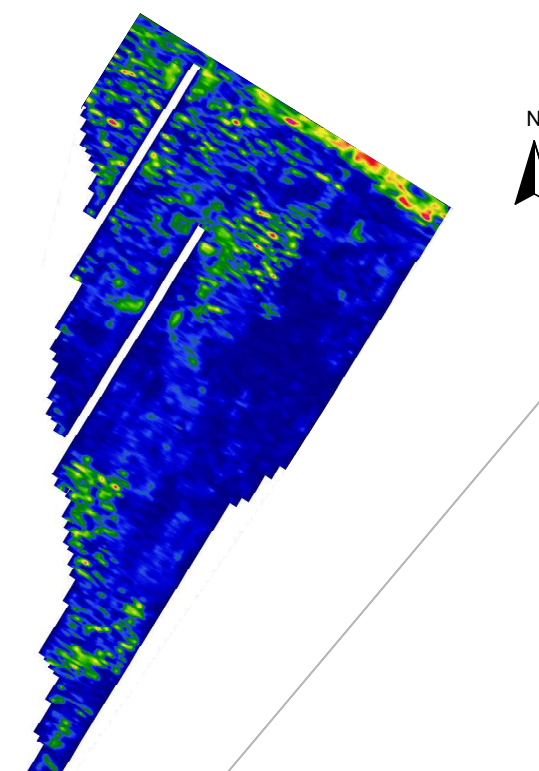
CHECKED BY  
KTD

FIG 20

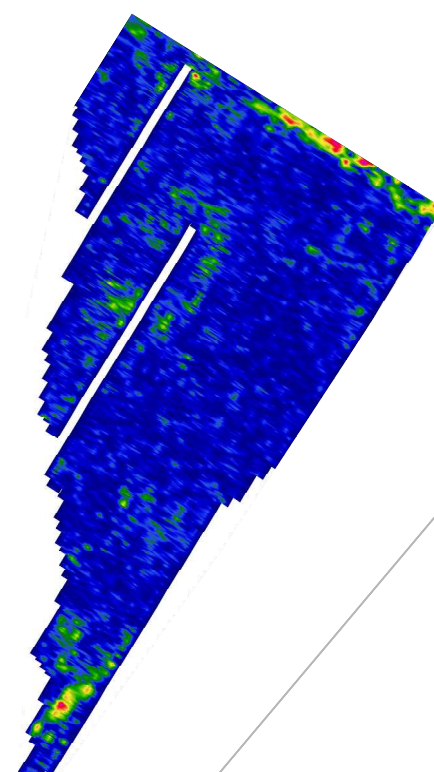
**Area 10**



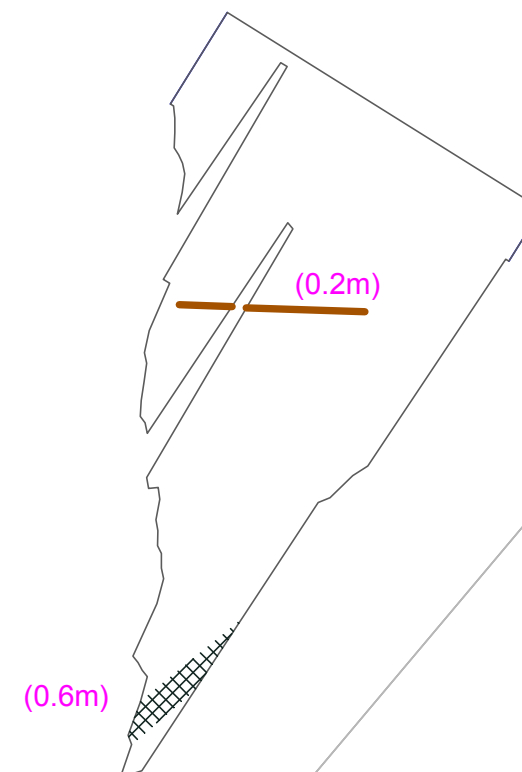
**Area 10 referencing**



**Time slice at 7.18ns (approximately 0.3m)**



**Time slice at 18.75ns (approximately 0.7m)**





**Area 10 abstraction and interpretation**

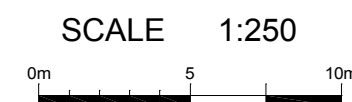
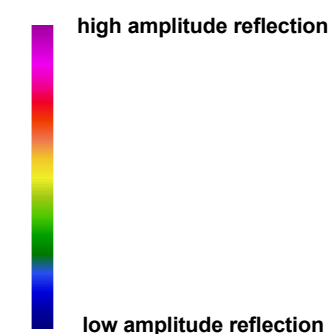


**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information and  
time slices - Areas 11 & 12  
(south west paths of Abbey House  
gardens)**

-  Linear anomaly - possible wall associated with abbey structures
-  Variable reflections of archaeological potential - structural debris?

Referencing to OSGB36 datum



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FIG 21

Files M1323 - M1331  
heading north from baseline  
0.25m separation parallel  
traverses

M1323 M1331

Area 12

187320,89 393337,05 393330,06 187320,92 187320,34

M1316

M1322

Area 11

Files M1316 - M1322  
heading east from baseline  
0.25m separation parallel  
traverses

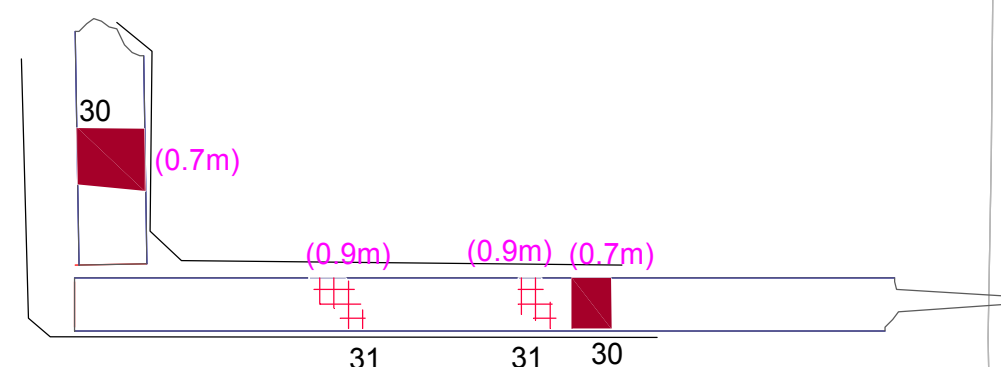
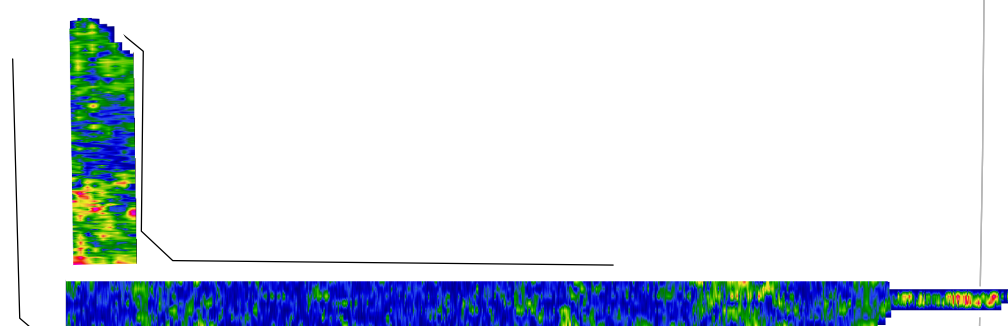
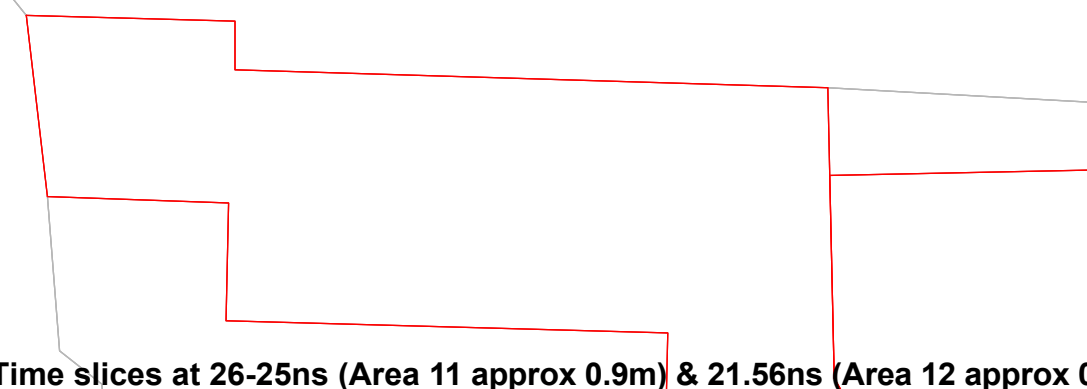
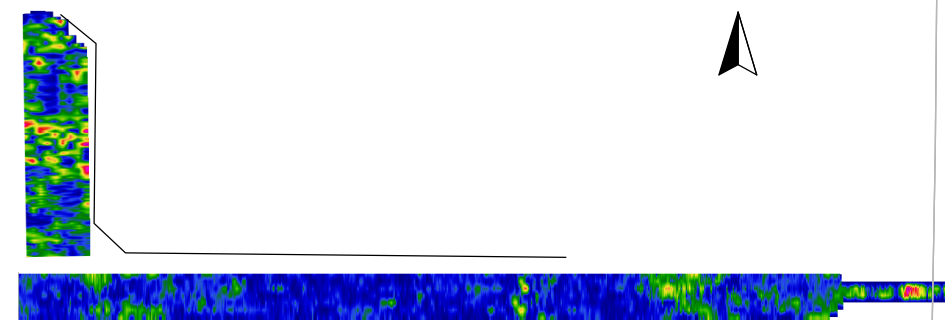
393336,79 187318,84 393336,79

Areas 11 & 12 referencing

Time slices at 26-25ns (Area 11 approx 0.9m) & 21.56ns (Area 12 approx 0.8m)

Time slices at 30.31ns (Area 11 approx 1.1m) & 46.25ns (Area 12 approx 1.6m)

Areas 11 & 12 abstraction and interpretation





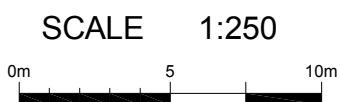
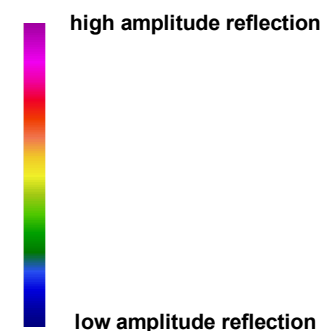




**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information and  
time slices - Areas 13 -16  
(internal areas)**

-  Discrete feature - possible grave
-  Linear and discrete anomalies of uncertain origin



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FIG 22

**Area 14**

Files M1350 - M1434  
0.25m separation parallel  
traverses

Files M1345 - M1348 & M1336 - M1344  
0.25m separation parallel traverses

**Area 13**

**Area 15**

Files M1372 - M1388  
0.25m separation parallel  
traverses

M1388

Files M1435 - M1444  
0.25m separation parallel  
traverses

**Area 16**

**Areas 13 - 16 referencing**

**Time slice at 14.375ns (approximately 0.5m)**

**Time slice at 29.063ns (approximately 1m)**

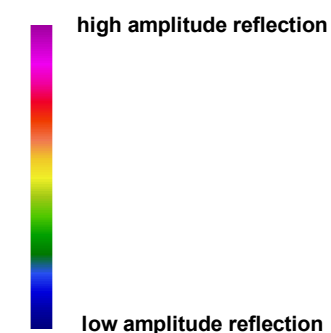
**Areas 13 - 16 abstraction and interpretation**

**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information,  
time slices and abstraction with  
interpretation - Area 17a  
(south west of abbey)**

(0.5m) Approximate GPR anomaly depth

Referencing to OSGB36 datum



SCALE 1:500

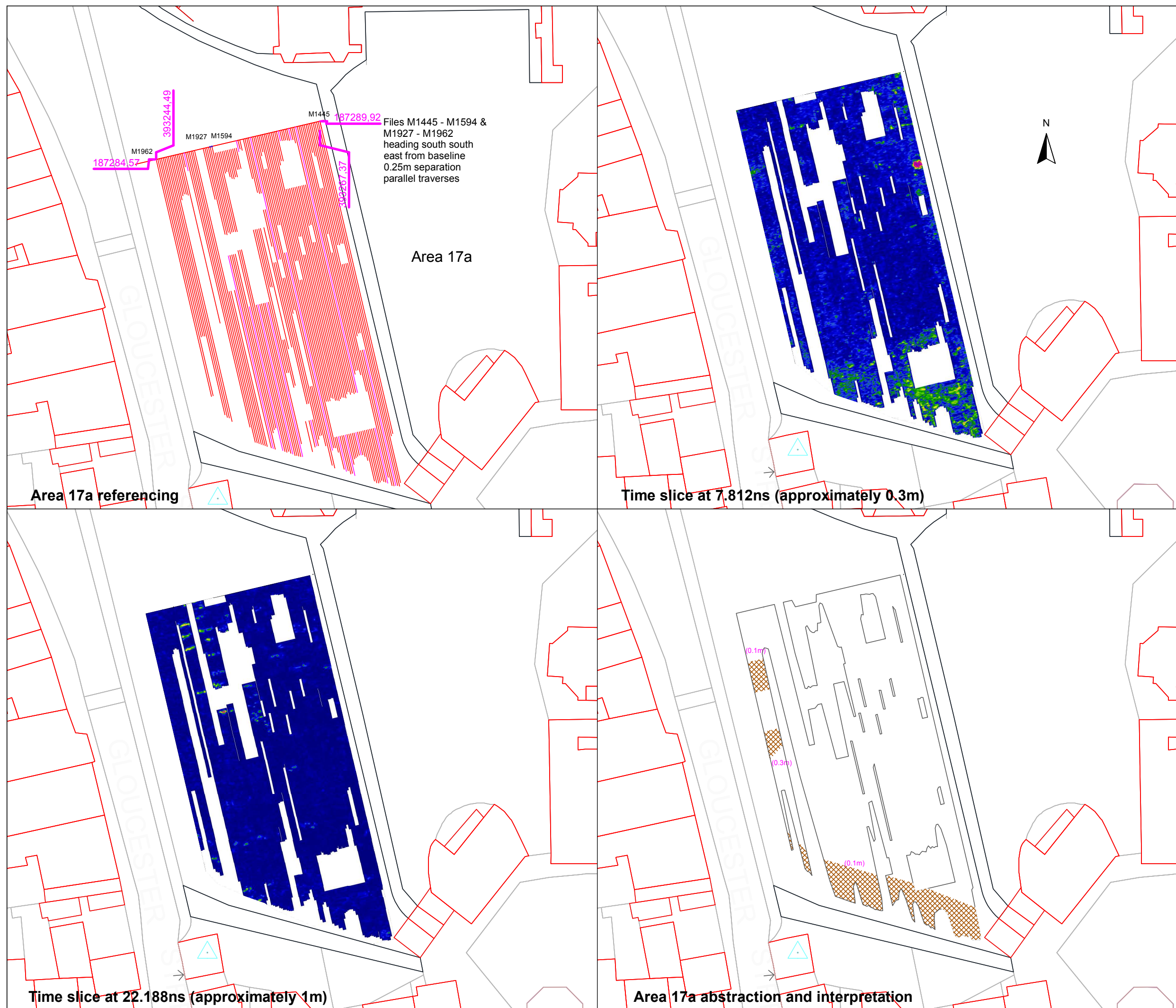


SCALE TRUE AT A3

DRAWN BY  
DJS

CHECKED BY	KTD
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FIG 23







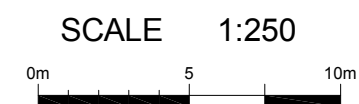
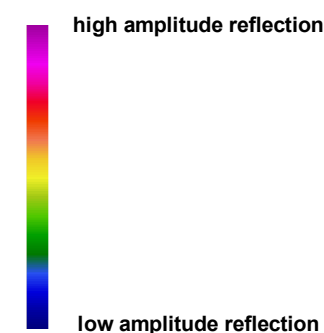


**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information,  
time slices and abstraction with  
interpretation - Area 17b  
(south west of abbey)**

-  Possible deep linear anomaly
-  (0.5m) Approximate GPR anomaly depth

Referencing to OSGB36 datum



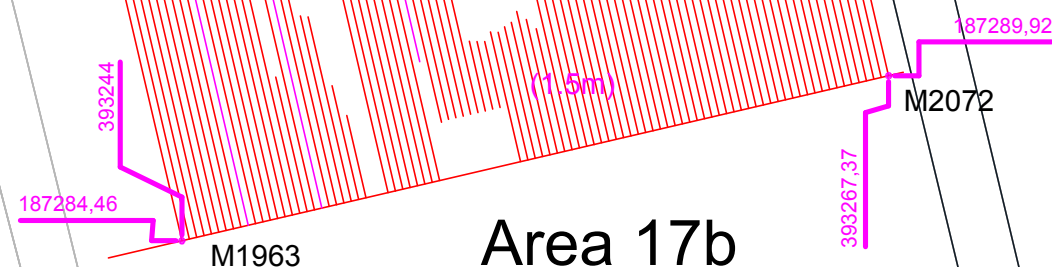
SCALE TRUE AT A3

DRAWN BY  
DJS

CHECKED BY  
KTD

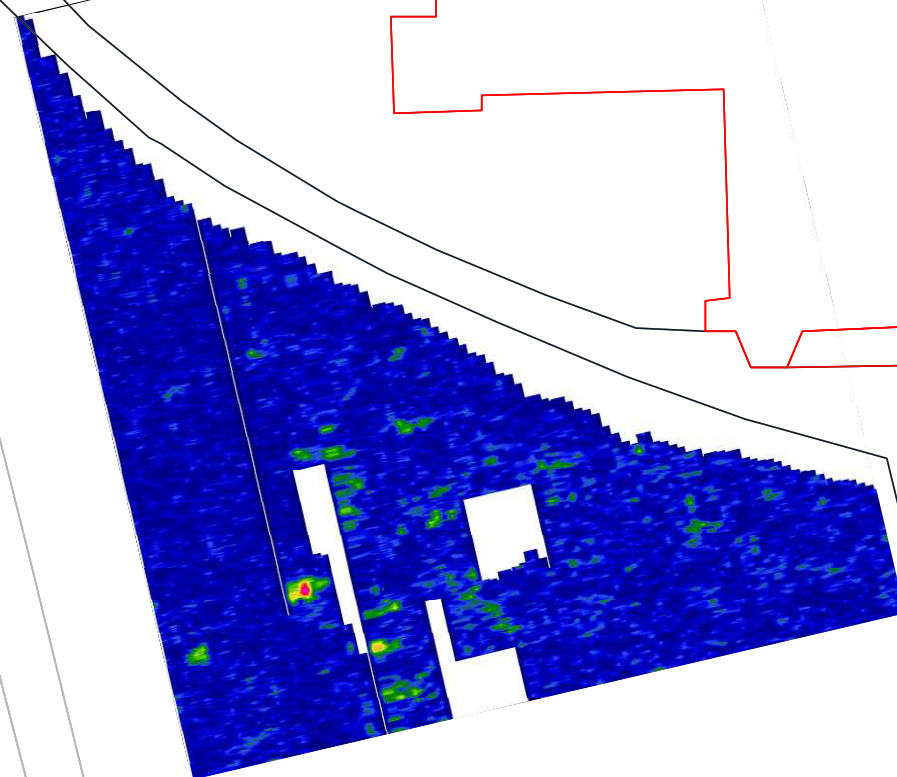
FIG 24

Files M1963 - M2072  
heading north north west from baseline  
0.25m separation parallel traverses



Area 17b referencing

Time slice at 30.313ns (approximately 1.3m)



Time slice at 37.5ns (approximately 1.7m)






Area 17b abstraction and interpretation

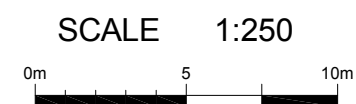
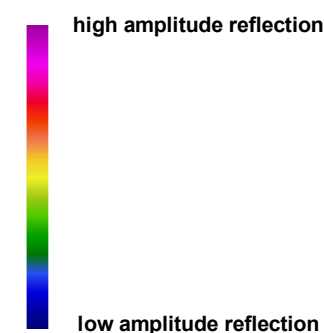


**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information and  
time slices - Area 18  
(north of abbey)**

-  Structural feature of archaeological potential
-  Reflections related to structural debris and/or layers associated with cloisters
-  (0.5m) Approximate GPR anomaly depth

Referencing to OSGB36 datum



SCALE TRUE AT A3

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DJS

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FIG 25

Files M1708 - M1732  
heading west from baseline  
0.25m separation parallel  
traverses

**Area 18**

M1732

393295.75

187339.8

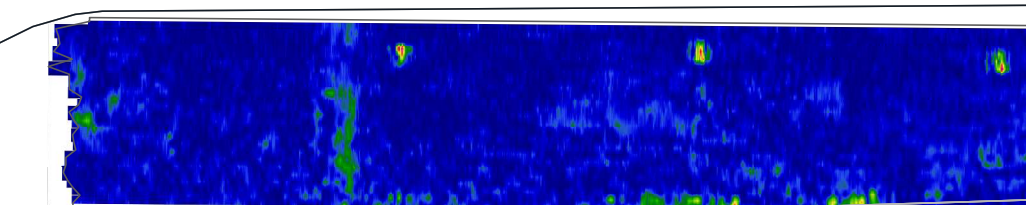
187333.8

393295.7

M1708

**Area 18 referencing**

**Time slice at 15ns (approximately 0.5m)**



**Time slice at 32.188ns (approximately 1.1m)**



**Area 18 abstraction and interpretation**

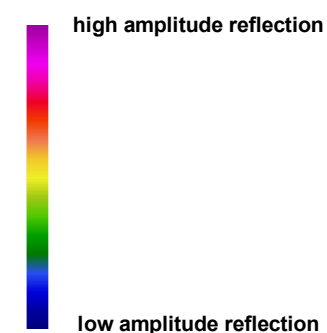




**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information and  
time slices - Areas 19 & 20  
(west of abbey)**

Referencing to OSGB36 datum

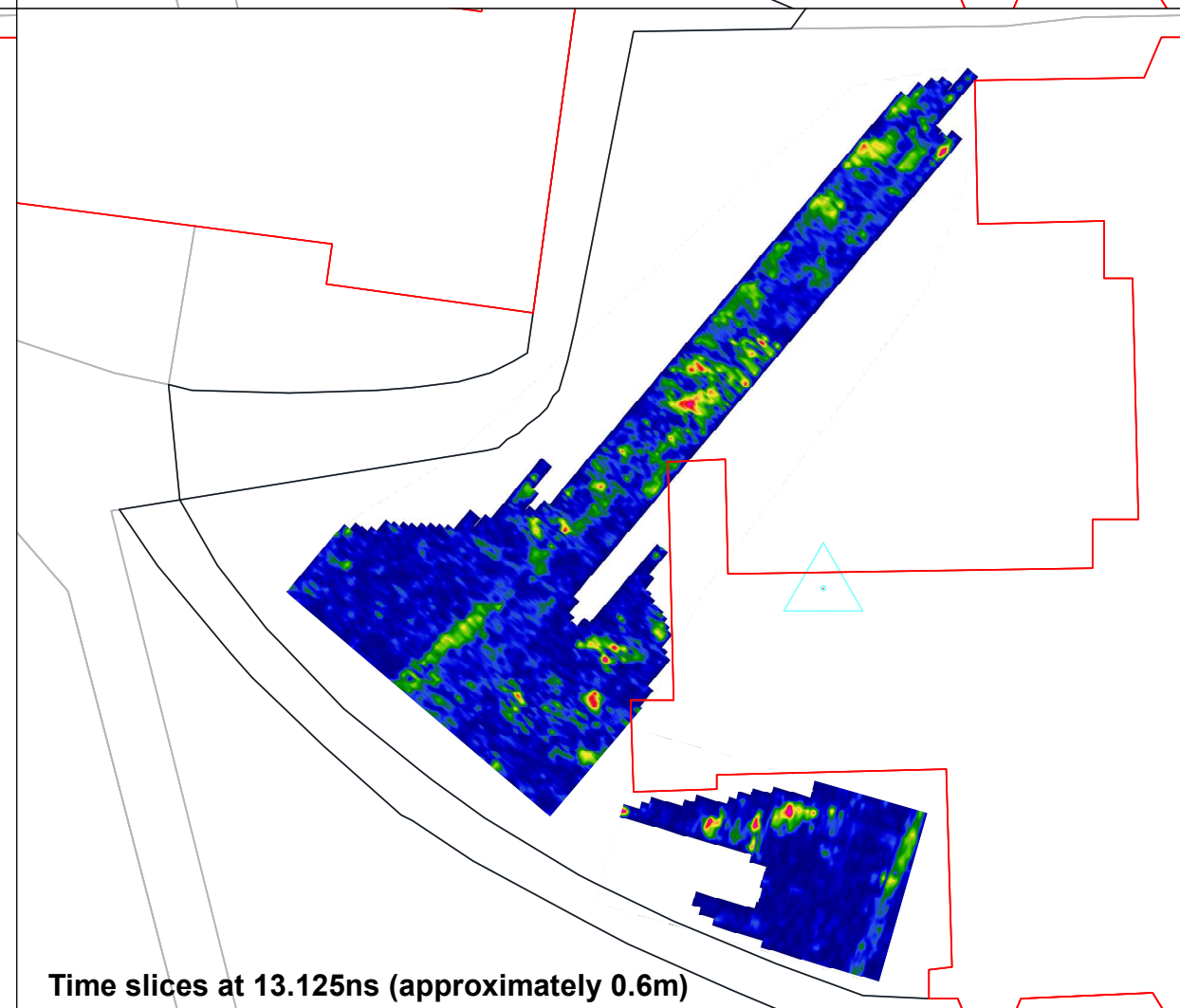
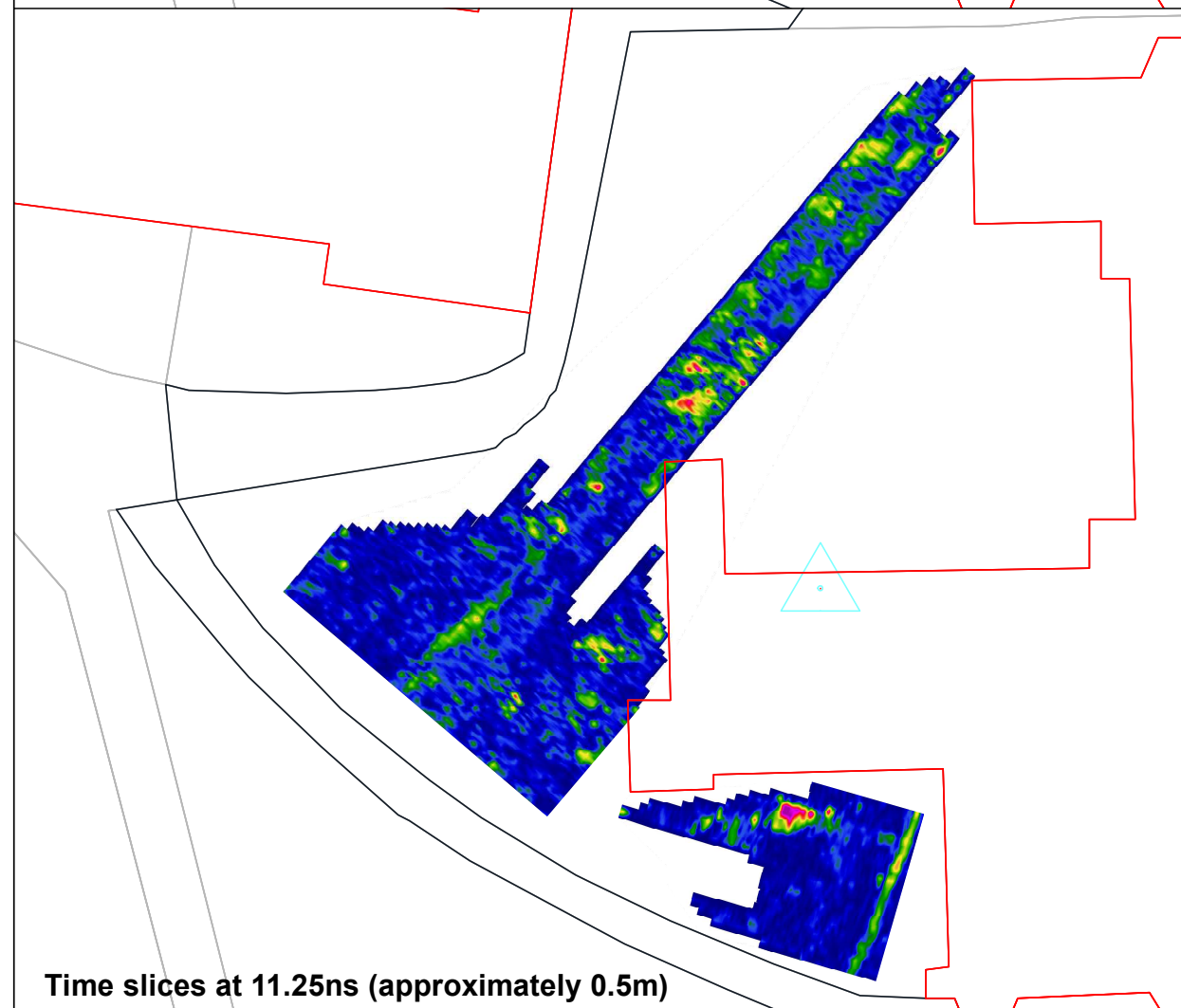
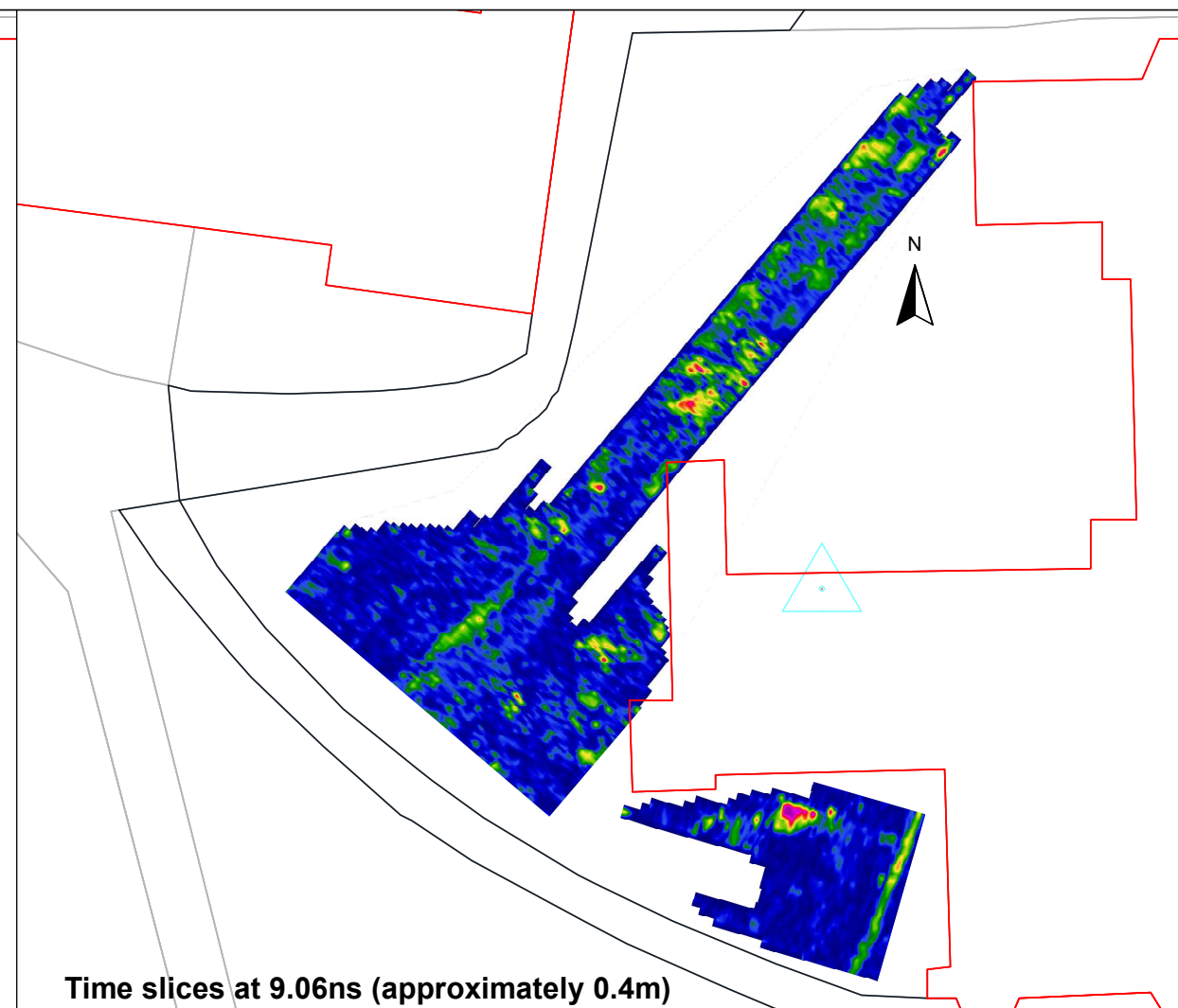
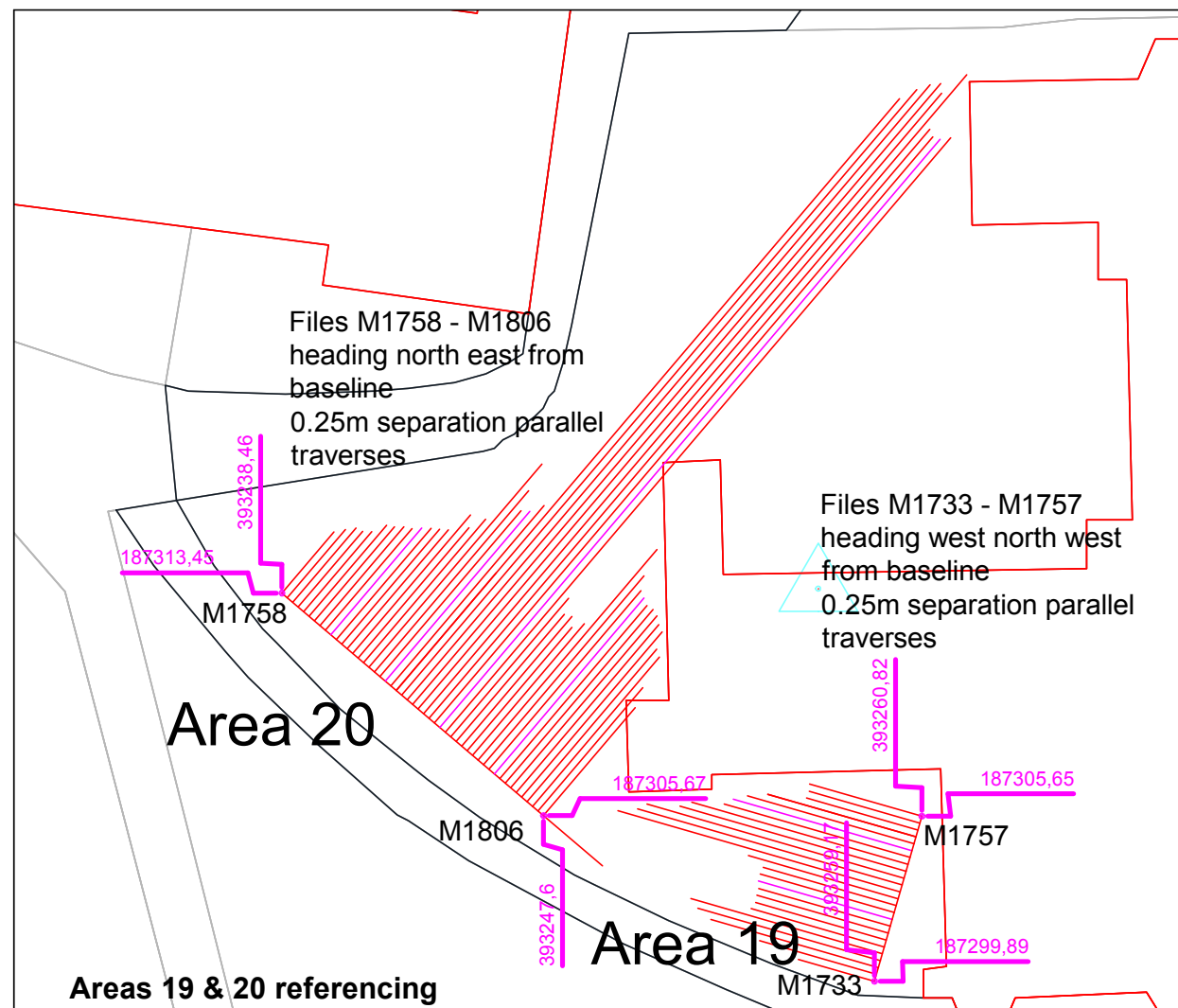


SCALE TRUE AT A3

DRAWN BY  
DJS

CHECKED BY  
KTD


FIG 26

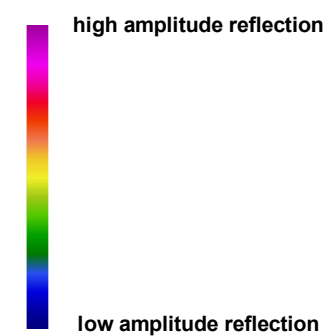




**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Time slices and  
abstraction/interpretation -  
Areas 19 & 20  
(west of abbey)**

 Linear anomaly of uncertain origin -  
possible archaeological potential



SCALE 1:250



SCALE TRUE AT A3

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DJS

CHECKED BY  
KTD

FIG 27

Time slices at 18.75ns (approximately 0.8m)

Time slices at 24.063ns (approximately 1.1m)

Time slices at 28.125ns (approximately 1.3m)

Area 19 & 20 abstraction and interpretation

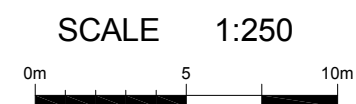
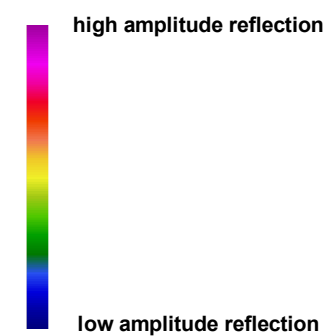




**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Referencing information and  
time slices - Area 21  
(lawn to the rear of The Old Bell)**

Referencing to OSGB36 datum



SCALE TRUE AT A3

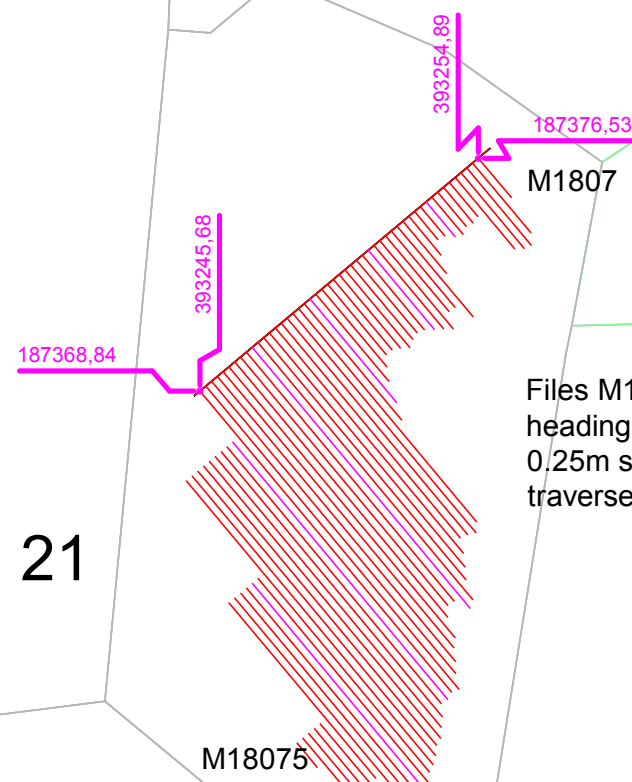
DRAWN BY  
DJS

CHECKED BY  
KTD

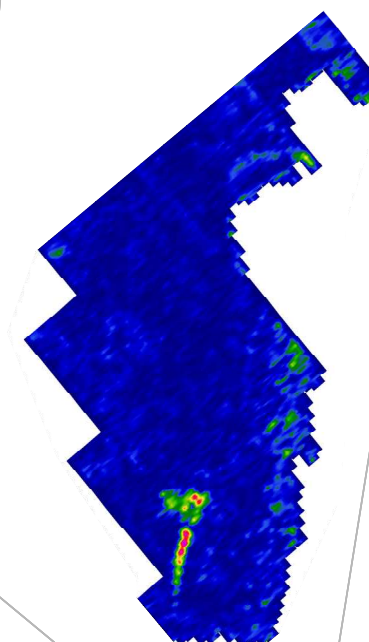
FIG 28

Area 21

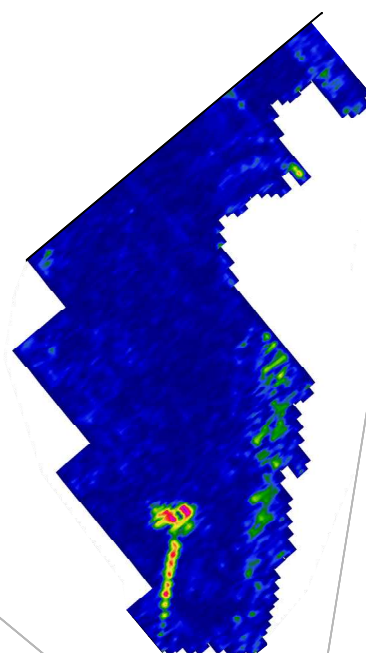
Area 21 referencing



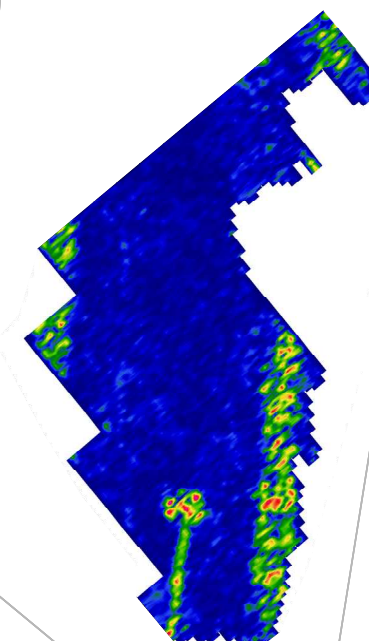
Time slice at 9.688ns (approximately 0.4m)



Time slice at 11.25ns (approximately 0.5m)



Time slice at 15.313ns (approximately 0.7m)










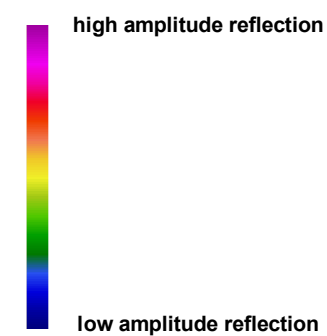
**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Time slices and  
abstraction/interpretation - Area 21  
(lawn to the rear of The Old Bell)**

 Linear anomaly - structural feature of archaeological potential

 (0.5m) Approximate GPR anomaly depth

 Anomaly label



SCALE 1:250



SCALE TRUE AT A3

DRAWN BY  
DJS

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KTD

FIG 29

Time slice at 19.688ns (approximately 0.9m)

Time slice at 30.313ns (approximately 1.4m)

Time slice at 39.063ns (approximately 1.7m)

Area 21

Area 21 abstraction and interpretation

(0.6m)

(0.6m)

(0.5m)

M1807

35

36

34

M18075



**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Time slices and  
abstraction/interpretation -  
Areas 22 & 23  
(to the rear of The Old Bell)**

Referencing to OSGB36 datum

Area 22

Files M1876 - M1907  
heading north north east from baseline  
0.25m separation parallel traverses

M1907

Files M1908 - M1926  
heading east south east from baseline  
0.25m separation parallel traverses

393238.12

M1908

M1926

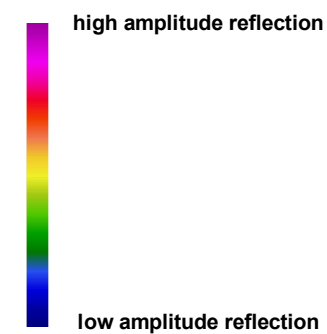
Area 23

Areas 22 & 23 referencing

Time slice at 9.063ns (approximately 0.4m)

Time slice at 10.625ns (approximately 10.5m)

Time slice at 16.563ns (approximately 0.7m)



SCALE 1:250



SCALE TRUE AT A3

DRAWN BY  
DJS



CHECKED BY  
KTD

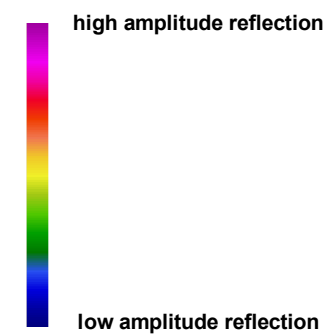
FIG 30



**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**Time slices and  
abstraction/interpretation -  
Areas 22 & 23  
(to the rear of The Old Bell)**

-  Linear anomaly - possible structural feature of archaeological potential
-  Linear anomaly of uncertain origin



SCALE 1:250



SCALE TRUE AT A3

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FIG 31



Time slice at 23.75ns (approximately 1.1m)

Time slice at 31.875ns (approximately 1.4m)

Time slice at 37.188ns (approximately 1.7m)

Areas 22 & 23 abstraction and interpretation

37

(1.1m)

(0.3m)

(0.6m)

(0.3m)




(0.3m)



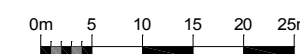


**GPR Survey  
Malmesbury Abbey  
Wiltshire**

**GPR anomalies relating to  
structural features of  
archaeological potential**

-  Structural feature relating to 12th century abbey complex
-  Structural debris or layer relating to 12th century abbey complex
-  Structural debris or layer not clearly relating to 12th century abbey complex

**SCALE 1:750**



SCALE TRUE AT A3

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**DJS**

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**KTD**

**FIG 32**

