ST JEROME'S CHURCH, LLANGWM, PEMBORKESHIRE: ARCHAEOLOGICAL WATCHING BRIEF (SM 99030 09380)

HERITAGE LLANGWM PROJECT

DAT Archaeological Services

Prepared by DAT Archaeological Services
For: Heritage Llangwm

REGISTERED ORGANISATION CIfA

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ST JEROME'S CHURCH, LLANGWM, PEMBROKESHIRE: ARCHAEOLOGICAL WATCHING BRIEF

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ARCHAEOLOGICAL WATCHING BRIEF

SUMMARY

Planning permission was granted in 2014 by Pembrokeshire County Council for the demolition of a boiler room and the erection of a new extension (Planning Application No. 14/0328/PA) at St. Jerome's Church in Llangwm, Pembrokeshire (SM 99030 09380). In 2016, further permission was granted by Pembrokeshire County Council to change drainage from mains connection to the installation of a cesspit (Planning Application No. 15/0885/PA).

Due to the potential for archaeological remains within the development area, the archaeological advisors to the Local Planning Authority recommended that archaeological mitigation be undertaken during works associated with the redevelopment. A change in the plans for the new extension meant that no groundworks were required, negating the need for a watching brief in that area.

Remedial works were also undertaken within the church, including replacement of the floors and installation of underfloor heating as well as re-plastering of much of the internal church walls. The archaeological advisor to the Diocesan Advisory Committee for The Church in Wales recommended that an archaeological watching brief be undertaken during these works to enable an appropriate level of recording of any archaeological deposits encountered to be made. This watching brief was carried out during the removal of floor surfaces and underlying rubble and debris within the church and the removal of plasterwork. It was decided that a Ground Penetrating Radar (GPR) survey of the nave and north transept would form part of the archaeological mitigation. Investigation using an endoscope camera of the possible tombs beneath the effigies located in the north transept of the church was also undertaken.

The restoration works at the church were part of the larger Heritage Llangwm Project, run by inhabitants of Llangwm and supported by the Heritage Lottery Fund amongst other funding sources. The overall aim of the group's investigations was to add to the sparse archaeological record of Flemish occupation of this part of Pembrokeshire. The project included geophysical survey and excavation by volunteers in the grounds of the ruins of a medieval mansion at Great Nash, just northwest of the village. These interventions were professionally overseen by DAT Archaeological Services and were reported on in a separate document.

Heritage Llangwm also commissioned DAT Archaeological Services to undertake the required watching briefs at the church, which they did over a total of seven days between February and July 2016. TerraDat undertook the GPR survey on behalf of DAT, over two days in March 2016.

One underfloor archaeological deposit was excavated within the church, of building rubble mixed with disarticulated and fragmented human remains. The nature of this deposit was no surprise as burials used to be common inside churches and were frequently cut into and disturbed during Victorian floor works. Victorian dwarf walls designed to support the floor and a Victorian underfloor heating system were revealed during the watching brief. The heating system comprised a stove in a purpose-built pit, horizontal chimneys and tuyeres receiving air from the outside at the base of the north and south walls of the nave. These components were excavated, recorded and then removed and await restoration and display. No further archaeological features were observed during or after the excavation through the underfloor rubble deposit to the final required depth of 0.3m throughout the nave and north and south transepts.

Areas of possible voiding, disturbed ground and infilled excavations were detected during the GPR survey, and it is thought that they probably represent burials. Watching briefs were not carried out during the removal of plaster work or the viewing of the potential tombs with an endoscope camera, because the archaeologist was not informed in time. It was noted by those present that nothing was observed on the walls and that the potential tombs were filled with stone rubble.

No burials were disturbed during the digging of the cess pit and its drainage channels, but some disarticulated human remains were excavated and put aside with those found inside the church for later reburial. The top of a burial was revealed at the base of the cess pit trench and the side of another was observed in section. One headstone, buried upright, was excavated from one of the drainage channels. Small sections of kerbstones from a former pathway were also discovered and removed. The deposits encountered during this part of the watching brief were building rubble and other dumps of material such as ash and sand that had been used to raise and level the ground surface.

The excavation of the underfloor heating system provided an opportunity for several Heritage Llangwm volunteers to undertake archaeological excavation and recording. Historical research by members of Heritage Llangwm revealed many new details of the De La Roche family tree that has helped in the identification of the two effigies in the church. They are thought to be Robert De La Roche (b.1315) and his grandmother, Lady Margaret Reade (b.1254). This conclusion was supported by Dr Rhianydd Biebrach, an expert in late medieval funeral monuments, who examined the effigies.

1 INTRODUCTION

1.1 Project Proposals and Commission

1.1.1 As part of the Heritage Llangwm project, renovation and repair works to St Jerome's Church were proposed. DAT Archaeological Services were commissioned by Heritage Llangwm to undertake an archaeological watching brief at St. Jerome's Church, Llangwm, Pembrokeshire (SM 99030 09380; Figures 1 and 2). The Heritage Llangwm project was developed out of the need to conduct essential repairs to St Jerome's Church, obtaining grants and funds from various sources, including the Heritage Lottery Fund and Cadw, to repair the church and conduct research into the history and archaeology of the village and specifically its Flemish origins.

1.1.2 The essential repairs to St Jerome's church included the installation of underfloor heating system and boiler room, repointing and internal rendering using lime based mortars, and the installation of a toilet and associated drainage. Internal works to the church included the removal of the existing floor surfaces in the nave and north transept before the underfloor heating and new floors were laid, and the removal of existing cement-based renders in the north transept and part of the nave.

1.1.3 The proposed works to the church were granted permission through a Faculty by the Diocesan Advisory Committee (DAC) for the Church in Wales. The archaeological advisor to the DAC recommended that an archaeological watching brief be undertaken during these works to enable an appropriate level of recording of any archaeological deposits encountered to be made. Additionally, some of the external works to the church had to be granted planning permission.

1.1.4 Planning permission was granted in 2014 by Pembrokeshire County Council for the demolition of the small boiler room adjacent to the porch, the erection of a new extension in the same location with a disabled toilet, and the installation of an external heat pump (Planning Application No. 14/0328/PA). In 2016, further permission had been granted by Pembrokeshire County Council to change drainage from mains connection to the installation of a cesspit (Planning Application No. 15/0885/PA).

1.1.5 A recommendation for archaeological mitigation was placed on both of the planning applications by the archaeological advisors to the local planning authority (Dyfed Archaeological Trust Development Management), as the proposed works could potentially expose, damage or destroy archaeological remains. As a result a planning condition was placed on planning applications 14/0328/PA and 15/0885/PA requiring that: "No development shall take place until the applicant, or their agents or successors in title, has secured the implementation of a scheme of investigation which has been submitted by the applicant and approved in writing by the Local Planning Authority." Reason: "To ensure the recording of any items of archaeological interest in accord with Policy GN.38 of the Local Development Plan for Pembrokeshire."

1.1.7 On behalf of DAT, a Ground Penetrating Radar (GPR) survey of the nave and north transept was made by TerraDat, in order to locate subsurface features. The report is shown in Appendix II.

1.2 Scope of the Project

1.2.1 A written scheme of investigation (WSI) for archaeological mitigation was prepared by DAT Archaeological Services, which was approved by the planning authority and the archaeological advisor to the DAC, prior to the commencement of the works (Appendix I). The project objectives were:

- Provision of a written scheme of investigation to outline the methodology by which DAT Archaeological Services will undertake the archaeological mitigation;
- To identify the presence/absence of any archaeological deposits;
- To establish the character, extent and date range for any archaeological deposits to be affected by the proposed ground works;
- To appropriately investigate and record any archaeological deposits to be affected by the ground works; and
- To produce an archive and report of the results.

1.2.2 The overall work was summarised as: *"The implementation of schemes of archaeological mitigation, to include watching briefs and building recording and any other subsequent mitigation necessitated by the works during the renovation and alterations at St Jerome's Church, Llangwm, Pembrokeshire. A report on the results and archive will be prepared."*

1.3 Report Outline

1.3.1 This report describes the location of the development works along with an archaeological background, and provides a summary and discussion of the archaeological watching brief and its results. It also contains a short summary of the GPR survey results.

1.4 Abbreviations

1.4.1 Sites recorded in the regional Historic Environment Record (HER) are identified by their Primary Record Number (PRN). Sites recorded in the National Monument Record (NMR) held by the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) are identified by their National Primary Record Number (NPRN). Scheduled Ancient Monument (SAM), Listed Building (LB). Sites are located by their National Grid Reference (NGR). Altitude is expressed to Ordnance Datum (OD).

1.5 Illustrations

1.5.1 Photographic images are to be found within the report. Printed map extracts are not necessarily reproduced to their original scale.

1.6 Timeline

1.6.1 The following timeline is used within this report to give date ranges for the various archaeological periods that may be mentioned within the text.

Period	Approximate date	
Palaeolithic –	*c.*450,000 – 10,000 BC	Prehistoric
Mesolithic –	*c.* 10,000 – 4400 BC	
Neolithic –	*c.*4400 – 2300 BC	
Bronze Age –	*c.*2300 – 700 BC	
Iron Age –	*c.*700 BC – AD 43	
Roman (Romano-British) Period –	AD 43 –*c.*AD 410	Historic
Post-Roman / Early Medieval Period –	*c.* AD 410 – AD 1086	
medieval Period –	1086 – 1536	
Post-Medieval Period –	1536 – 1750	
Industrial Period –	1750 – 1899	
modern –	20th century onwards	

Table 1: Archaeological and Historical Timeline for Wales

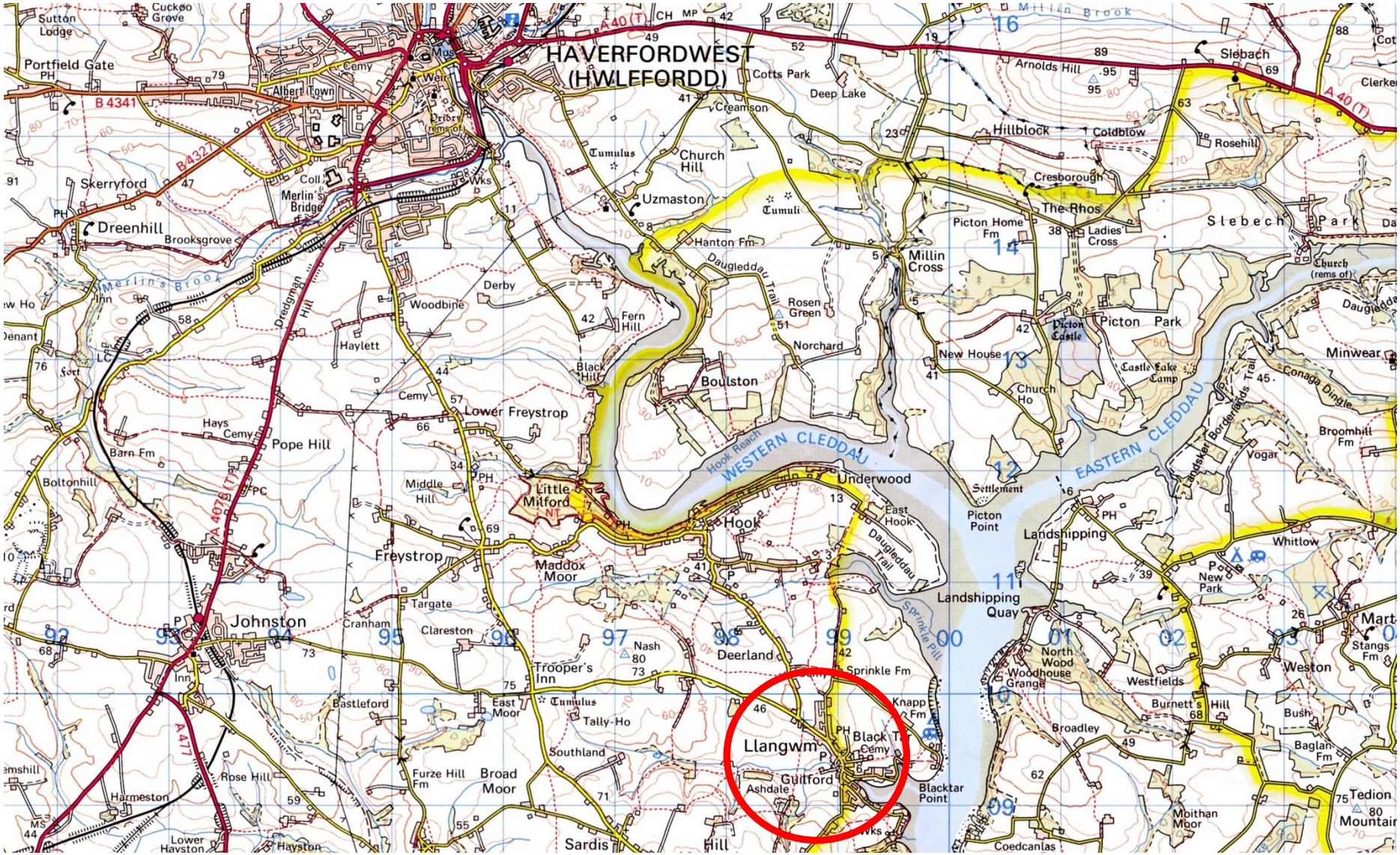

Figure 1: Location map showing Llangwm, Pembrokeshire (red circle)

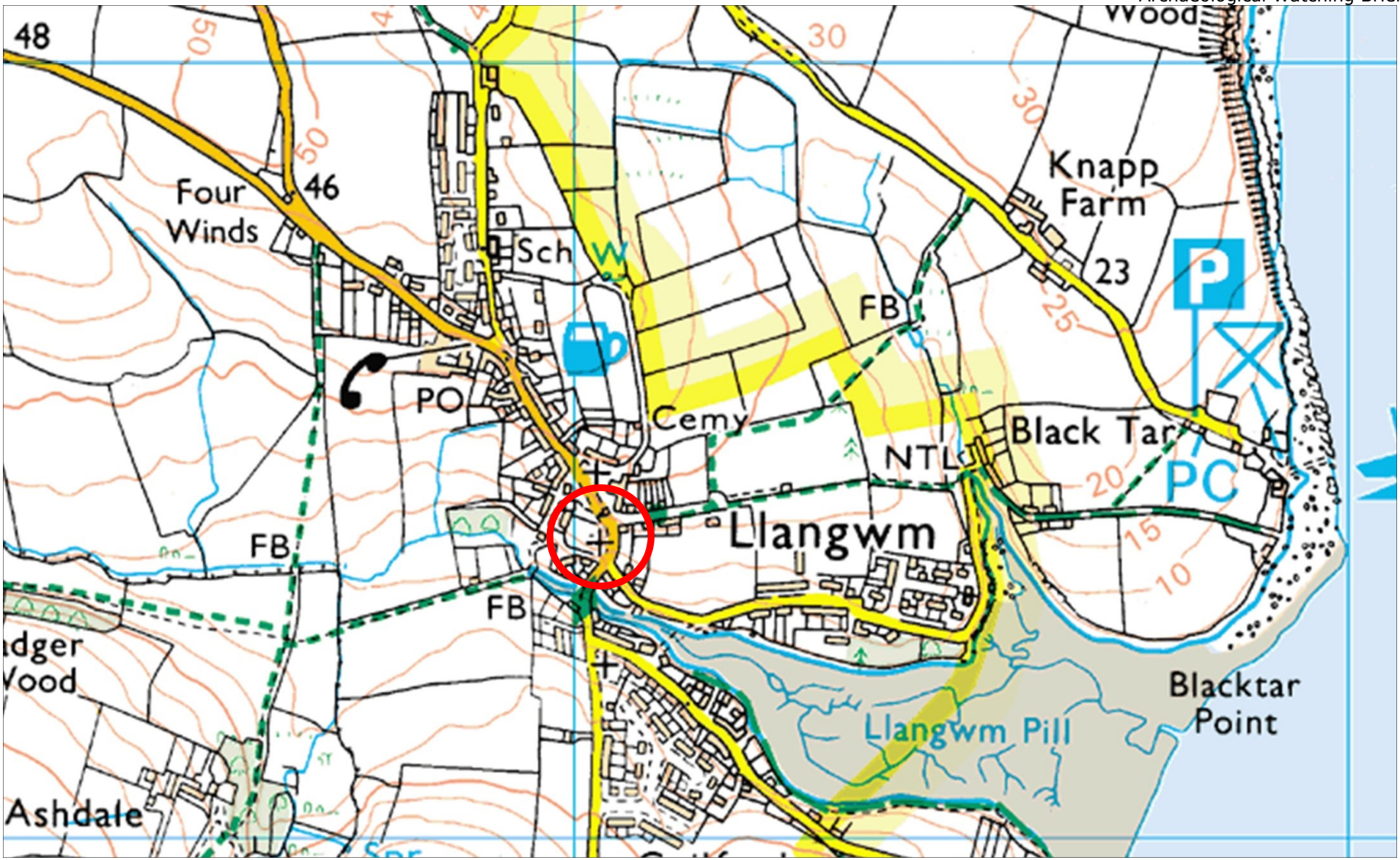

Figure 2: Location map showing St Jerome's Church, Llangwm (red circle)

2 SITE LOCATION, TOPOGRAPHY AND GEOLOGY

2.1 St. Jerome's Church is located in the centre of the village of Llangwm in the county of Pembrokeshire (SM 99030 09380; Figures 1 and 2; Photos 1-3). A village green lies immediately to the north, which is used as a car park and also provides pedestrian access to the church. The main road through the village runs past the east side of the site. The churchyard slopes gently downwards from north to south, but the roadway is steeper; when viewed from the south the topography is such that the church is elevated above street level.

2.2 The churchyard, formerly a graveyard, but now used only for cremation burials, is grass covered and bounded by mortared stone walls on its north, east and south sides. Headstones taken from graves neatly line the insides of the boundary walls.

2.3 The underlying solid geology of the site consists of interbedded sandstone and conglomerate of the Twrch Sandstone Formation Member unit of the Namurian epoch. There are two geological faults mapped: one runs through the northeast corner of the churchyard and the other just on the outside and parallel to the northern boundary wall of the churchyard. Geological information has been obtained through the British Geological Survey mapping portal.

Photo 1: St. Jerome's Church, Llangwm, Pembrokeshire, looking southeast, showing the church and sloping churchyard

Photo 2: St. Jerome's Churchyard, Llangwm, looking east, showing that most of the headstones have been removed

Photo 3: St. Jerome's Churchyard, Llangwm: Headstones removed from their original positions and stacked against the north boundary wall

3 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

3.1 History of the Area and the Church

3.1.1 There are no records of early medieval activity in the vicinity, although it is thought the village name of Llangwm possibly derives from the Norse 'Langheim' (lang heimr - the long village), from between the 8th to 10th centuries. Being located near to Freystrop, another Norse derived place name (Freya's Thorpe), this is a distinct possibility.

3.1.2 The name of the village has been recorded in documents in many forms: 1287 – Landigan; 1303 – Landegumme; 1376 – Lantigorn; 1441 – Landegon; 1861 – Langum. It is only in 1870 that the present Welsh spelling of the village name 'Llangwm' comes into effect, following the decision that the name must have derived from Llan (church) and cwm (valley).

3.1.3 During the medieval period Llangwm became part of the lands owned by the de la Roche family, descendants of Flemish migrants to west Pembrokeshire. The Norman Conquest of England and Wales (1066 / 1086) had been assisted by nobles and soldiers of Flanders, one third of the army was Flemish mercenaries. This may have been due to the fact that William of Normandy's wife, Matilda, was a Flemish princess. A number of the higher ranking families retained good relationships with the Norman rulers and a number were granted lands in central England which were also settled by Flemish soldiers and families. By the time of the succession of Henry I, their social and political power is thought to have been seen as getting too great. As a move to both remove the Flemish from England and also as a means to subdue the native Welsh they were handed the cantrefi of Rhos and Daugleddau in west Pembrokeshire by policies of Henry I, which occurred between 1107 and 1111 (Rowland 1980, p147; Oskansen 2008, p265).

3.1.4 Further Flemish migration to west Wales may have occurred due to a series of floods which had laid waste to parts of the low lying Flanders area of Belgium at the turn of the 12th century. It is likely that as the Flemish lords became established in west Wales, that more migrants from Flanders followed gradually, increasing their numbers (Rowland 1980, p147). This effectively caused clearance of the native Welsh from their own lands.

3.1.5 The de la Roche family who became the owners of Llangwm during the medieval period were descended from a Flemish noble known as Godebertus Flandrensis (Godebert the Fleming), who was born in Pembroke Castle in 1096, (a wooden and earthwork castle at this time). It is highly likely that his grandfather or even his father was one of William's mercenaries, but we can find no trace of their name. Godebert's family had moved into and taken the lands of Roch, northwest of Llangwm towards St David's.

3.1.6 The name of 'de Rupe', taken from the Latin for rock, changed over time to the French 'de la Roch' (of the Rock) directly referencing the rocky outcrop on which Roch castle was built. The first castle at Roch is attributed to Adam de Rupe, the grandson of Godebert, who was born in around 1160AD. Adam also founded Pill Priory. His younger brother, David de Rupe (c.1165 to 1195), acquired lands at Llangwm which must have occurred in the later 12th century. It is presumed that he would have built a large house here at that time, which would most likely have been located at Great Nash.

3.1.7 A deed exists dated from 1303 (which has occasionally been misdated to 1244), whereby David de Rupe's son, also called David, grants land in the

Preseli hills to Whitland Abbey for the period of 7 years. David de Rupe is described as lord of 'Landegumme et Maynclochanc' (Llangwm and Maenclochog). The De la Roche family is recorded as founding St Jerome's Church and the site of a mansion later known as Great Nash.

3.1.8 The de la Roche family remained a wealthy and influential family in Pembrokeshire (and also in Ireland) throughout much of the medieval period. Members of the family are interred at St Jerome's church. In the north transept there are two medieval effigies, a male and female, believed to represent members of the De la Roche family, and that part of the church is believed to have been built in around 1375 as a De la Roche family chapel. The two effigies in the church have recently been studied as part of the Heritage Llangwm project by Dr Rhianydd Biebrach. Based on her research it is thought that the knight effigy represents Robert De La Roche (b.1315), son of Lady Johanna de la Roche and Sir David de la Roche (distant cousins who married in 1315). The second effigy is most likely to represent a late 13th century carving, possibly that of Robert's grandmother, Lady Margaret Reade (b.1254), who was married to Sir Thomas de la Roche (great, great grandson of Robert de la Roche, brother of David de la Roche, lord of Langumme).

3.1.9 Farming and fishing were the traditional activities at Llangwm, and by the early nineteenth century many people had specialised into oyster fishing. There was also a prosperous herring fishing fleet here until the nineteenth century. Fenton (1811) described the village as 'miserable' when he passed through, and briefly described the oyster fishermen but spent more time detailing the church and the history of the De la Roche family. Conversely, a visiting minister who dwelt for a year in the village in 1864-5 described the place as a beautiful spot and described the lives of the ordinary people in detail (Unknown 1865). Coal production also gradually became a widespread occupation throughout the Post-Medieval period until its decline in the 1930s. Llangwm contains many traditional Pembrokeshire fishermen's cottages: Long and narrow single-storey buildings made of stone. There are now two nonconformist chapels in the village, a primary school, a pub and a pharmacy and shop.

3.1.10 The parish church was dedicated to St Jerome in 1786, and is now believed to have been dedicated to Heiriom (Jerome in Latin) before that. The church dates from at least the 13th century, but was extensively renovated in the 1870s. Many of its medieval features have been removed, but some of the features from that time remain, such as two stones standing out from the wall above the pulpit that are understood to be the last remnants of a medieval staircase that led to a minstrel's gallery. The font is thought to date back to the 13th century. The Pevsner Architectural Guide (2004) for Pembrokeshire contains this description of the church:

Attractively compact village, on the w bank of the Cleddau estuary. A fishing village in the C19, noted for its robust fisherwomen.

Much restored, but with some good Dec work intact. Chancel and long nave. Large N transept of the C14, small s transept with barrel vaulted roof, C14 or C15. Restored in 1840 by William Lewis, of Haverfordwest; his work replaced 1879-82 by E H Lingen Barker, who added the Dec windows and the s porch. But the E window in the N transept is genuinely Dec; of two lights with ogee-shaped trefoils and quatrefoil above. The splendid N transept is entered through a two-bay arcade of moulded arches on an octagonal pier, its N wall occupied by fine large tombs (see below). On the E wall a fine piscine. Rounded bowl with large blank

shields, set on a pedestal. Shields along the edge of the niche. Cusped canopy above with more shields, rising to the tall pinnacle. Dec work of this quality is rarely encountered in this area. – Font. Square Norman bowl, chamfered to circular pedestal. – Fittings by Lingen Barker, including the Bath stone pulpit, with coloured marble colonnettes. – Stained glass. E window of 1908, - Inscribed stones. Small slab with inscribed Latin cross, the arms contained within a circle, simple cusping. Another slab, head only, a similar pattern, but the cusping creating a more pronounced quatrefoil. Both probably C9. – Monuments. Two C14 effigies in the N chapel, traditionally of the Roch family, presumably the builders of the transept. Both set in large ogee-headed, cusped and crocketed recesses in the N wall, with pinnacles. Craved fronts with quatrefoil panels, some with shields. Knight with sword and shield, crossed feet resting on a lion. Mailwork around the neck. The other figure, much worn with simple drapery in loose folds, may be the female effigy which Fenton saw in the chancel.*

3.1.11 A more comprehensive study of the church and its history, which is reproduced in Appendix III, was made during the Cadw Welsh Historic Churches Project (Ludlow 1998).

3.2 Known archaeology in the area

3.2.1 The village has been recorded as a Historic Landscape Characterisation Area and is described as: "…….a village that has developed around the head of a branch of the Milford Haven waterway. Although medieval in origin, the settlement expanded in the 19th century as a coal-mining centre and coal port, but little now survives to indicate this former function. Late 20th century housing surrounds the historic village core."

3.2.2 There are no Scheduled Ancient Monuments in the Village and there is only one listed building: St. Jerome's Church. It has grade II status and its listing description gives the reason for its statutory protection as: "It is a much restored church of medieval origins especially notable for the fine fourteenth century tombs and piscina in the N transept."

3.2.3 Twenty know heritage assets are recorded in the village in the HER and NMR databases, including the church. They are shown in Table 2 and Figure 3. They range in age from medieval to the present day, however the majority are post-medieval. Apart from the church, only three other sites are listed as medieval: A mill, a manor house and some stepping stones. There is no actual evidence for the medieval origin of the stepping stones. Post-medieval remains include chapels, wells and mills.

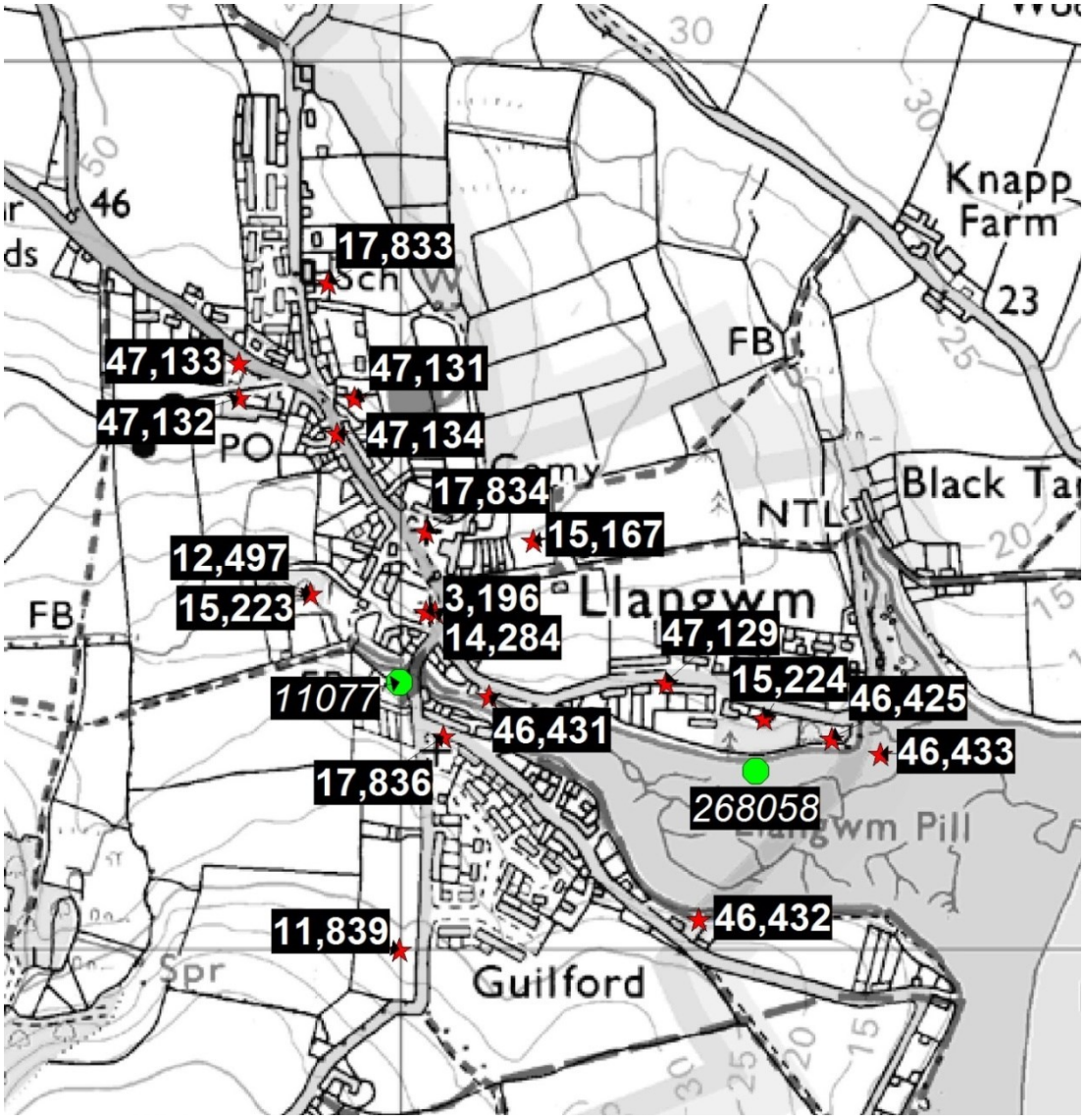

Figure 3: Map showing HER (red stars) and NMR sites (green circles, where there is only an NMR record for that site) in Llangwm Village, Pembrokeshire. NMR record numbers are in italics. Number 3196 is St. Jerome's Church.

PRN / *NPRN*	Name	Period	Summary	NGR
3196; 14284 / *400362*	Llangwm Parish Church	Post-Medieval, Medieval	Medieval parish church, medium-sized, 'cruciform'. Consists of chancel, nave, transeptal north aisle, south transept. South porch added in the 1880s. Not listed in the Taxation of 1291. Subrectangular churchyard. Nuclear to post-conquest? recorded as St Jerome's / St Heirom's	SM990309380
11839	Langwm	Medieval	A medieval manor house at approximately this grid reference is mentioned by H. Owen in Archaeologia Cambrensis 6th Series Vol.14, 1914, page 443. The grid reference is too general to pinpoint an exact location.	SM9909
12497	Llangwm	Medieval	A water mill marked on William Rees' 1932 map of South Wales and the Border in the fourteenth century. It is in a similar location to the grist mill (PRN 15223).	SM989094
15167		Post-Medieval	This cemetery, post-dating the 2nd edition OS 6" maps, is now full. In 1978 a new cemetery (PRN 46426) was established to the north of Llangwm, and now serves as the official cemetery for Llangwm and Hook.	SM99150946
15223	Grist Mill	Post-Medieval	Site of a grist mill recorded on the 1875 1st edition Ordnance Survey map and shown as disused on the 1908 2nd ed. There is a possible association with a mill site (PRN 12497) recorded in the vicinity.	SM98900940
15224		Post-Medieval	A former rectory, now a privately owned. The current building appears to be late 18th to early 19th C in date. 2 storeys and a 3 bayed facade with a central doorway. The roof is gabled with square end chimneys.	SM99410926
17833	Llangwm VC School	Post-Medieval	The school, with house for master, opened in 1870 as a public elementary mixed school for 170 children. 1872 inauguration stone. Late Victorian with later additions/extensions. Mobile classes added in 2001.	SM98920975
17834/ *11078*		Post-Medieval	This Wesleyan chapel was built in 1897, but a society was formed as early as 1822. The building is rectangular in stone with yellow brick quoins and dressings and a slated gable roof.	SM99030947
17836 / *10957*	Galilee Chapel	Post-Medieval	The present Baptist Chapel in Llangwm, Galilee, was built in 1904 and still holds services. It is stone built, rectangular, with painted yellow quoins and dressings. It has two storeys with a gallery.	SM99050924
46425		Modern	A modern concrete slipway, 3m wide, situated at the confluence of Edwards Pill and Llangwm Pill. It allows access to the water from the boatyard situated immediately to the north.	SM9948609237
46431	Stepping Stones	Post-Medieval, Modern, Medieval	Stepping stones set in place in 1998 to ford the upper reaches of Llangwm Pill allowing access between Guilford and Llangwm. Stepping stones are represented here on the 1st edition 6" Ordnance Survey map.	SM9910109285

46432		Modern	Modern gabion style sea defence protecting the cliff on the Guilford side of Llangwm Pill. This substantial multi-tiered defence highlights the threat that the tidal effects of the sea pose to the weaker cliffs around the Cleddau.	SM9933609034
46433		Modern	Sea defences constructed on the Llangwm side of Edwards Pill, in the gabion style, to protect against tidal erosion.	SM99540922
47129		Post-Medieval	A well, marked on the 1st edition 6" OS map but not on subsequent editions.	SM99300930
47131		Post-Medieval	A well, marked on the 1st edition 6" OS map but not on subsequent editions.	SM98950962
47132		Post-Medieval	A well, marked on the 1st edition 6" OS map but not on subsequent editions.	SM98820962
47133		Post-Medieval	A well, marked on the 1st edition 6" OS map but not on subsequent editions.	SM98820966
47134		Post-Medieval	A well, marked on the 1st edition 6" OS map but not on subsequent editions.	SM98930958
11077	Hen Gapel	Post-Medieval	Baptist Sunday School; Old Chapel), Llangwm	SM990093
268058	Llangwm	General	Village.	SM994092

Table 2: Heritage assets recorded in the HER and the NMR within Llangwm Village, in order PRN (mapped in Figure 3)

3.3 Cartographic Evidence

3.3.1 The Llangwm Parish Tithe map of 1841 (Figures 4 and 5) is the first available map of the village centre and seems to show the church as a very rough cross shape. Its representation in this way makes it seem likely that this is not a particularly accurate depiction of its shape or position. The plot of land to the south of the church is listed in the tithe apportionment of 1841 as 'church,' and extends all the way to the stream. Plot of land 334, immediately to the west of this, is listed as a garden. To the northeast of the church, there is a small plot on its own, number 329, which is described as a cottage, as are the two small plots 330 and 331 to the south of it (and immediately to the west of the church). The occupants of the cottage on plot 330 are recorded as 'parish officers.'

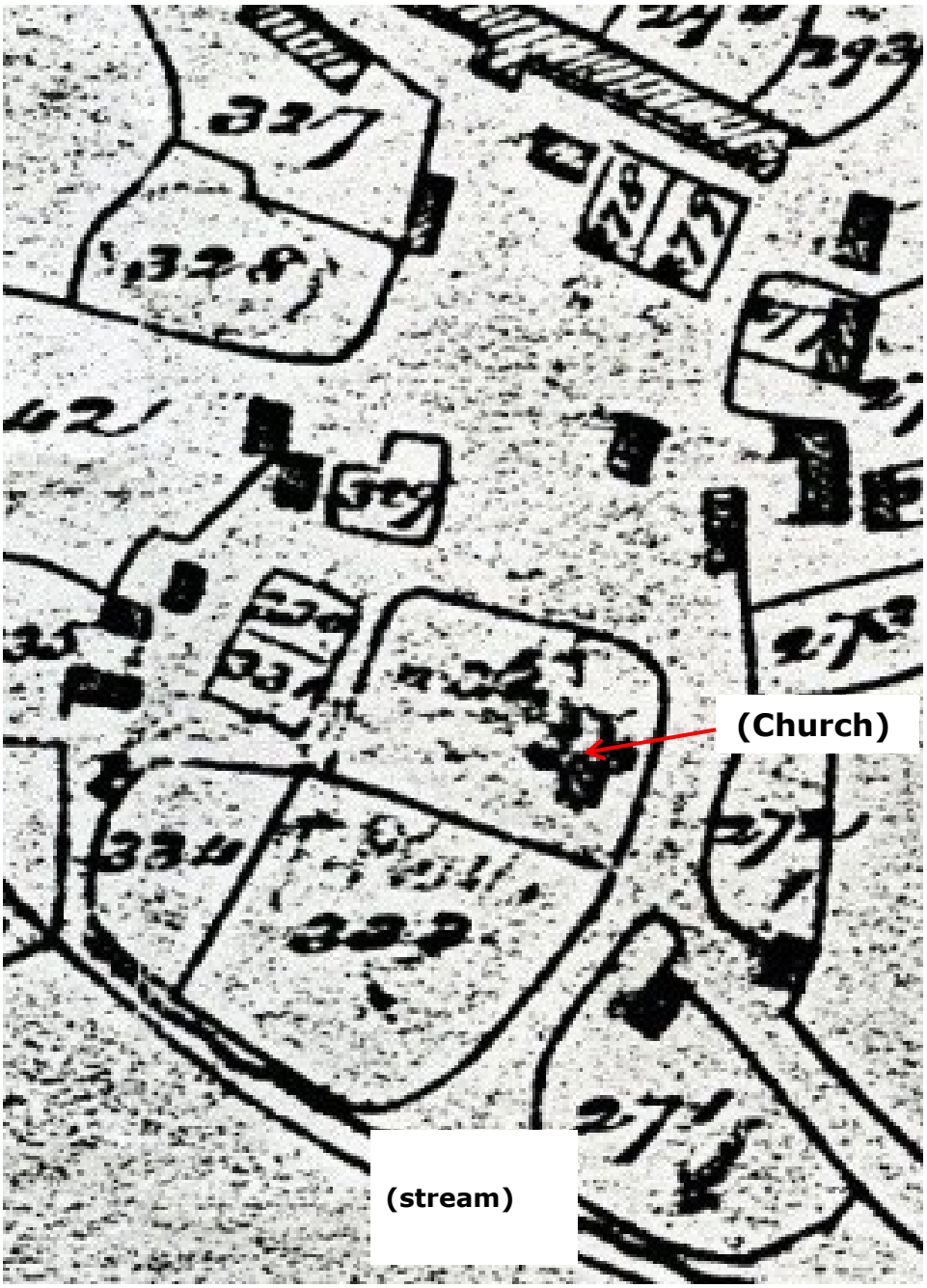

Figure 4: An extract from the 1841 Llangwm Parish Tithe Map, showing Llangwm Church and the other buildings and plots of land at the centre of Llangwm Village

Figure 5: An extract from the 1841 Llangwm Parish Tithe Map, showing Llangwm Village and its environs

3.3.2 The detailed map of the village centre is the 1st edition 1:2500 OS Map of 1875 (Figure 6). This is far more detailed than the tithe map, but there are no descriptions to go with the field numbers. The plot of land around 'St Hierom's Church' is marked as 'Grave Yard,' which is its function to the present day. The field to the south belonging to the church on the tithe map is not annotated on the 1875 map, giving us no further indication of its use.

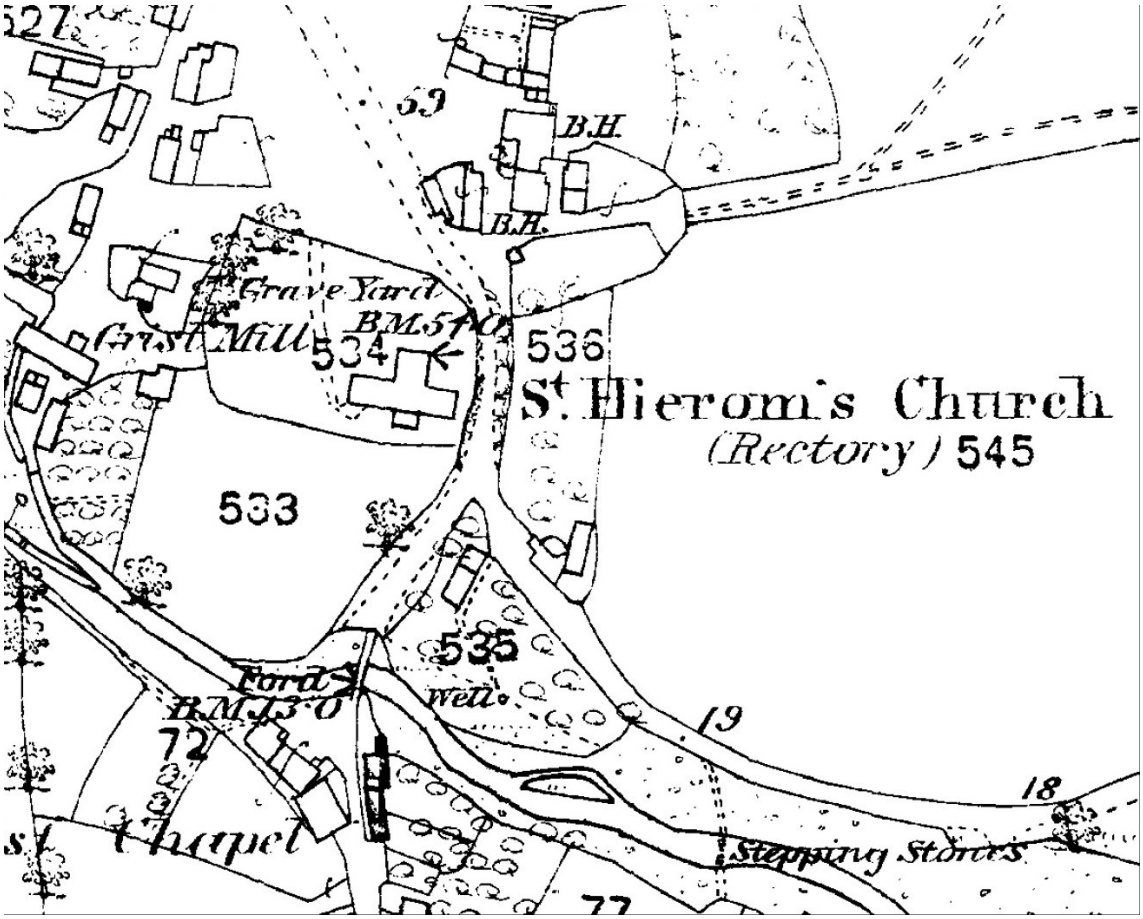

Figure 6: Extract of the 1875 1st edition OS 1:2500 Map

3.3.3 Figure 7 shows the 2nd edition 1:2500 scale OS map of 1908. The church is now depicted with its newly built porch.

3.3.4 The 1:10560 OS maps of 1953 and 1964 (not illustrated) show the field to the south of the church divided into two parts of roughly equal area by an east-west boundary. The 1968 1:2500 OS map (not illustrated) shows the existing housing development built in these two plots of land.

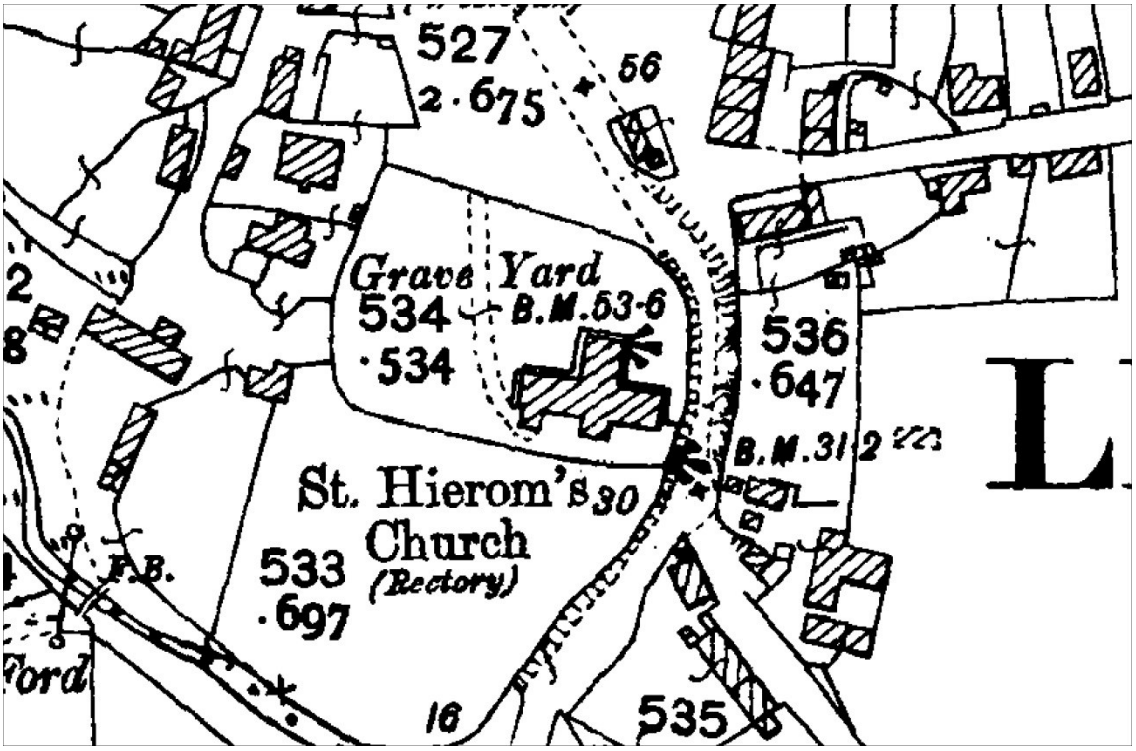

Figure 7: Extract of the 1908 2nd edition OS 1:2500 Map

4 WATCHING BRIEF METHODOLOGY

4.1 Fieldwork

4.1.1 This watching brief was undertaken in accordance with the Chartered Institute of Archaeologists' (CIfA) Standard and Guidance for an Archaeological Watching Brief (2014). The Written scheme of Investigation (Appendix 1), detailing the archaeological works proposed, was approved by the archaeological advisor to the local planning authority and Diocesan Advisory Committee prior to the works commencing.

4.1.2 Recording of all archaeological features or deposits conformed to best current professional practice and was carried out in accordance with the Recording Manual[1] used by DAT Archaeological Services.

4.1.3 Archaeological exhumation licences were obtained from the Ministry of Justice before intrusive works were undertaken within the church, and a separate licence was also obtained before the excavation of the cess pit and drainage trenches.

4.2 Timetabling of Fieldwork

4.2.1 The watching brief of the removal of flooring and under-floor deposits was conducted over six days: The 17th and 19th of February and the 7th, 8th, 9th and 11th of March 2016. The watching brief undertaken during the excavation of the cesspit and drainage was carried out on the 4th and 6th of July 2016. The design of the new extension was altered such that groundworks were no longer required, and therefore no watching brief was needed in this area. The timing of visits was determined by the contractor's programme of work. In all seven and a half days of visits were made to the site for the purposes of the Watching Brief.

4.3 Post-Fieldwork Reporting and Archiving

4.3.1 All data recovered during the fieldwork will be collated into a site archive structured in accordance with specifications in Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation (Brown 2011), and the procedures recommended by the National Monuments Record, Aberystwyth.

4.3.2 The results of the fieldwork have been assessed in local, regional and wider contexts. The report includes a desk-based research element to ensure that the site is placed within its wider archaeological context.

4.3.3 A report fully representative of the results of the fieldwork has been prepared.

[1] DAT Archaeological Services have adopted the Recording Manual developed by English Heritage Centre for Archaeology.

5 RESULTS AND DISCUSSION

5.1 Removal of Flooring and Underfloor Deposits inside the Church

5.1.1 Groundworks associated with the removal of the Victorian flooring in the nave and north and south transepts of the church prior to installation of underfloor heating and new floor surfaces were observed. The initial removal of the suspended timber flooring on either side of the aisle north and south pew aisles of the nave, and on the west side of the north transept, were undertaken without an archaeologist being present as no intrusive works were being carried out. Upon encountering human remains directly below the floors, a halt in proceedings occurred until an archaeologist could be present. No archaeological remains were discovered during groundworks in the south transept.

5.1.2 Photo 4 shows the state of the works in the nave when the archaeologists arrived on the 17th of February 2016. A layer of building rubble mixed with disarticulated and fragmented human remains was present below the suspended timber floors. Very rough dwarf walls supporting the former timber floor were present along the outer edges of the nave and along either side of the tiled path through the centre of the nave (Photos 4 and 5). Similar features were also present in the North Transept, although only present on the western side.

5.1.3 Photo 5 shows a small sample of the human bone found on the surface. The human remains had been previously disturbed and did not represent in-situ burials. It is most likely that they represent burials within the nave that were disturbed and mixed up during excavation and backfilling when the Victorian floor was created. Burials are frequently found inside the naves of churches and it is common for them to have been disturbed by Victorian restoration works, especially where new floors were inserted into the church and supporting walls were constructed.

5.1.4 Ground works continued by hand shovel observed closely by an archaeologist on the 19th of February. Loose rubble was removed from the areas beneath the former timber floors in the nave and north transept to the required depth of approximately 0.3m. The material was shovelled into a wheelbarrow by hand, whereupon human bone and small finds were extracted. The cleared areas were then recorded by photography (Photo 7). Photo 8 shows a short section of the dwarf walling that supported the Victorian floor. Apart from human bone, the rubble contained small corroded ferrous objects (mainly nails), fragments of white wall plaster, oyster shells and modern rubbish.

5.1.5 Approximately halfway along the north wall of the nave, near to the base of the excavation, a ceramic pipe with a diameter of *c.*0.2m was discovered, which appeared to come through the wall of the church. It was angled down and westwards from the wall and hence disappeared below the excavated ground level (Photo 8). Another ceramic pipe was discovered about halfway along the south wall of the nave, mirror-imaging the first. Their function was unclear.

5.1.6 A similar process was undertaken on the western side of the north transept (Photo 9). Two slabs that appeared to be part of former headstones were also removed with the rubble, but neither had any markings upon them (Photo 10).

Photo 4: The northern side of the nave following removal of the suspended timber floors, 1m scale

Photo 5: Example of some of the previously disturbed and disarticulated human remains found beneath the suspended timber floor of the nave, 0.5m and 1m scales

Photo 6: The nave after hand excavation of the underfloor rubble deposit to a depth of about 0.3m along the two pew aisles, 2 x 1m scales. The tiled Victorian central aisle is as yet unexcavated

Photo 7: A short section of the dwarf wall foundations supporting the Victorian floor above, 1m scale

Photo 8: The ceramic pipe unearthed about halfway along the north wall of the nave, 0.5m scale

Photo 9: Western side of the north transept after hand excavation of most of the underfloor rubble deposit, 2 x 1m scales.

Photo 10: Two slabs found in the underfloor rubble that are thought to be the remains of headstones, 0.5m scale

5.1.7 Once the rubble layer had been levelled at the required depth, it was clear that there was no evidence for any archaeological features. No graves or tombs were seen, nor was there any evidence for a former earth floor layer for the church, pre-dating the Victorian restoration. If these features had existed they were likely to have been found below the rubble layer.

5.1.8 The human remains recovered from beneath the suspended floors and rubble removal were sorted and a minimum number of individuals of twelve was estimated based of the presence of fragments belonging to twelve different right femurs.

5.1.9 On the 7th of March, the concrete and tiled floor remaining in the north transept and the nave was broken up with a pneumatic drill (Photo 11). Further ceramic piping *c.*25cm in diameter was found in two locations: just below the concrete near to the squint on the corner between the north transept and the chancel (Photo 12) and under the concrete about halfway down the central aisle of the nave (Photo 13). Both sections were laid horizontally.

Photo 11: Breaking of the concrete and tile floor on the eastern side of the north transept

Photo 12: A small void shows where part of a ceramic pipe was partially drilled through on the corner between the north transept and the chancel

Photo 13: Part of a ceramic pipe was partially drilled through about halfway down the centre aisle of the nave

5.1.10 The works continued westward along the nave, and soon uncovered a series of walls and the top of a large metal object. Clearing around the area, mainly by hand, revealed a Victorian underfloor stove and horizontal chimney in a stone-walled pit measuring approximately 1.2m by 1.6m with a depth of about 0.9m (Figure 8). This pit had been covered with large, flat stone flooring slabs, supported by long metal bars, and had been filled in with what appeared to be beach shingle. There was a very large stone at the bottom, which was presumed to be a step facilitating entry and exit to the pit for fuelling the fire. It was suspected that all the ceramic pipework that had previously been found was connected to the stove. A web search resulted in little information on this particular make of stove, and only one comparable example was found, at Mamble Church in Worcestershire[2]. On the 8th of March, local volunteers belonging to the Heritage Llangwm project (and also the Llangwm Local History Society) assisted in the excavation and recording of this heating system in advance of its removal. Photos 14 and 15 show the volunteers at work, near to completion of the excavation.

5.1.11 The previously discovered ceramic pipes running to the walls of the nave turned out to be tuyeres (air intakes) for the stove (Photo 16). The other two ceramic pipe sections that had been observed during machining proved to be parts of the horizontal chimney of the stove. Photo 17 shows a vertical view of the chimney where it left the square-sectioned metal chimney. Its top was damaged by machining and inside can be seen a quantity of soot and a partially burned fragment of newspaper that was recovered for further scrutiny. Photos 18 – 22 show the heating system and details of it after excavation. Photos 23 and 24 show the route of the chimney up from the floor to the roof of the church at the corner between the north transept and the chancel.

[2] http://www.hevac-heritage.org/items_of_interest/heating/churches_&_chapels/mamble_church/mamble_church.htm

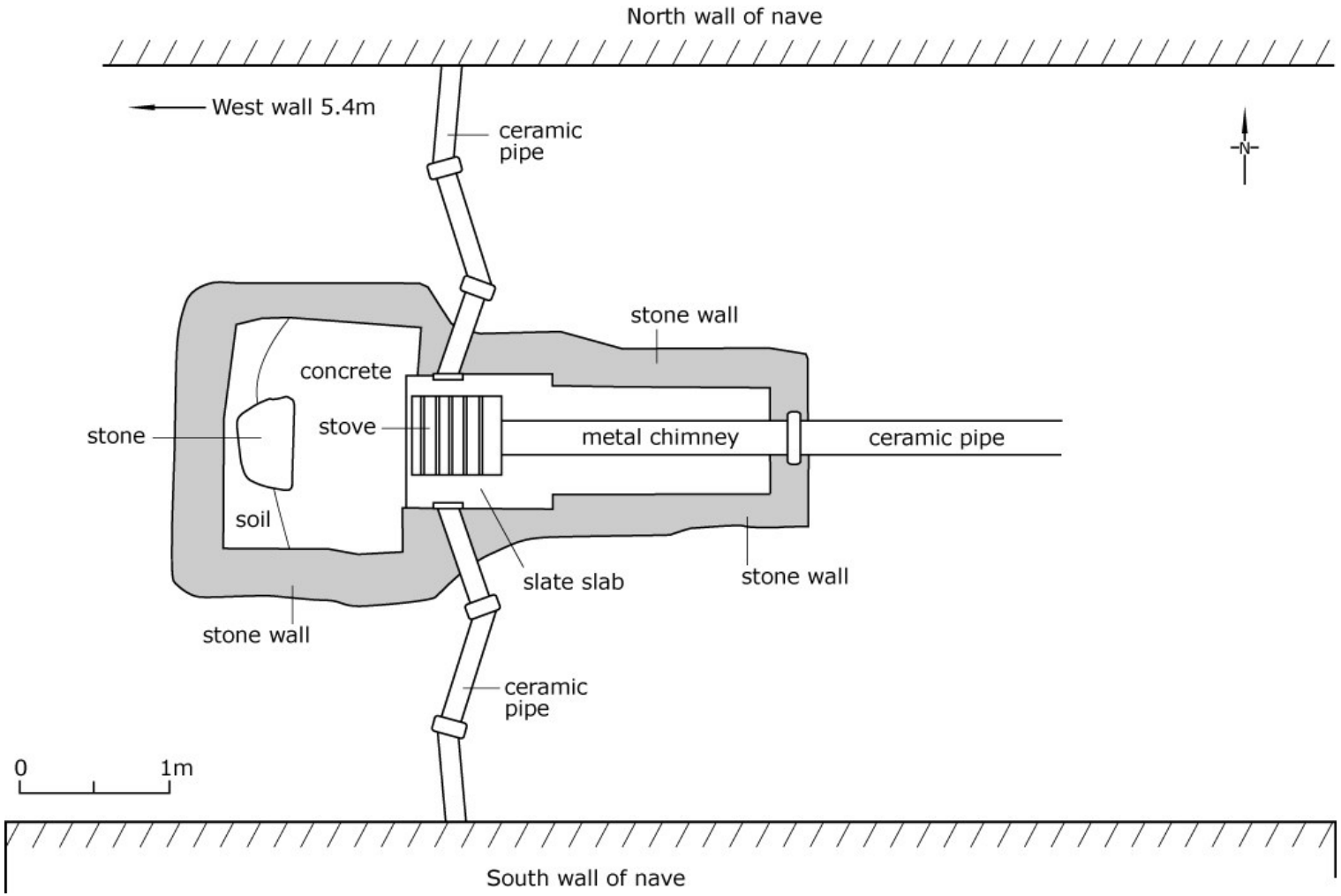

Figure 8: Plan of the nave showing the Victorian stove system

Photo 14: Volunteers from Heritage Llangwm assisting in the excavation of the Victorian stove found under the old floor

Photo 15: Volunteers from Heritage Llangwm assisting in the excavation of the Victorian stove found under the old floor

Photo 16: The stove pit and stove, with the northern tuyere coming from the northern wall of the nave and through the base of the small wall to the north of the stove, to provide air for the stove. The near scale is 0.5m long and the far one is 1m long.

Photo 17: Plan view, facing north, of the section of ceramic chimney where it was joined to the metal chimney. Soot and a partially burned fragment of newspaper remain in the chimney, next to the 0.5m scale.

Photo 18: The main part of the heating system after excavation, looking west, with one 0.5m and two 1m scales

Photo 19: The stove and the fuelling pit with the large stone for a step, looking west, one 0.5m and two 1m scales

Photo 20: The stove and its square-sectioned metal chimney within small walls, looking north, with 0.5m and 1m scales

Photo 21: The main part of the heating system after excavation, looking southeast

Photo 22: The stove and chimneys, with walls of the pit either side. At the bottom of each wall the end of each tuyere can be seen.

Photo 23: Cross-section through the horizontal ceramic chimney below the previous floor level, and above it in the wall between the north transept and the chancel can be seen components of the vertical chimney embedded in it

Photo 24: The chimney running up to the crest of the roof from the corner between the north transept and the chancel

5.1.12 On the 9th of March, the stove having been removed, the rubble created by the pneumatic drill was removed from the church and the entire nave and north transept areas to be re-floored were excavated by machine under watching brief conditions to the required depth of 0.3m. More disarticulated human remains were recovered and similar small finds to previous days. A large piece of concrete resembling the base of a pillar was also recovered (Photo 25), although its actual function is not known. A square metal frame (ferrous) was also recovered which may have been a surround for an opening or for the base of an object (Photo 26).

5.1.13 Photos were taken of the excavated areas after completion of the rubble removal (Photos 27 and 28). The levelled surface was examined carefully and once again there was no evidence for any archaeological features at all. Photos 29 and 30 show part of the church after the first layer of the new floor was laid down - plastic sheeting. Also evident in Photo 30 are 'ghosts' of four rows of pews in the wall plaster at the north end of the west wall of the north transept. These were the same shape and size to the ones in the nave and it can also be seen that the area was later covered by a large cupboard (which was there right up until these works at the church commenced), indicated by the rectangular mark and holes where it was fixed to the wall. The render in this area was very cement-based and therefore not of great antiquity. There were also four pew marks on the opposite, east, wall of the north transept. Photo 31 shows a section of floor after it had later had its underfloor heating components and concrete added, and plasterwork had taken place which hid the pew ghosts.

Photo 25: The concrete pillar-base found in the rubble under the old floor, 0.5m scale

Photo 26: The ferrous object resembling a surround for an opening or the base of an object, with 0.5m and 1m scale

Photo 27: The east end of the nave after completion of excavation of the rubble layer beneath the old wooden floor to the required depth of 0.3m

Photo 28: The west end of the nave after completion of excavation of the rubble layer beneath the old wooden floor to the required depth of 0.3m

Photo 29: The south side of the nave after the laying down of plastic sheeting as a base for the new floor. 'Pew ghosts' line the wall, with a 1m scale.

Photo 30: The 'pew ghosts' on the west wall of the north transept, partially covered by subsequent plastering, and surrounded by a large rectangular mark left by a cupboard that was there until recently. Plastic sheeting has been laid down as a base for the new floor. 1m scale.

Photo 31: The west end of the nave after insertion of underfloor heating components and concrete flooring, and after plastering of the bases of the walls, covering the pew ghosts.

5.2 Creation of Drainage and a Cess-pit Outside the Church

5.2.1 A watching brief was carried out on the 4th and 6th of July 2016 for groundworks associated with the excavation of drainage and a cess pit to service the new toilet housed in a new structure recently built immediately to the east of the porch. The works started with the excavation by machine of the drainage trench through the tarmac path on the outside of the toilet building, to a depth of approximately 0.4m. This trench travelled south for about 1.6m before turning west towards the graveyard west of the church. Photo 32 shows the new toilet building and the initial cutting of the tarmac for the drainage trench.

Photo 32: The new toilet building to the east of the porch and the initial cutting of the tarmac for the drainage trench. The stove excavated inside the church is on the grass in the foreground.

5.2.2 An old dry drainage pipe was encountered on almost exactly the same alignment as the new trench in the first part dug next to the toilet (Photo 33). It was in two parts, one made of iron, joining another made of lead. The iron part had a diameter of approximately 0.10m and the lead part a diameter of *c.*0.07m. It is likely that this was for rain water drainage and associated with a downpipe in the corner between the porch and the nave. The downpipe was no longer there.

5.2.3 Underneath the tarmac path, the deposits contained no archaeological finds save for layers of building material that had presumably been laid down to build up and level the ground in preparation for the laying of the tarmac path. There were different layers of sand, soil, gravel and various types of stone (Photo 34).

Photo 33: An old drainage pipe is revealed during excavation of a new drainage trench, just south of the new toilet building. The end of the new drainage pipe can also be seen, already put in place when the toilet was built.

Photo 34: Different layers of sand, soil, gravel and various types of stone were found in layers making up the ground beneath the present day tarmac path

5.2.4 A drainage trench was also required for a sink in the southwest corner of the nave, and so an additional section of trench was excavated running south-southwest from the outside of the nave on the west side of the porch, to join the drainage trench from the toilet after about 2.7m. The excavation of the drainage trench for the toilet is shown in Photo 35, and Photo 36 shows the drainage trenches for the toilet and sink after completion, in the area of the tarmac path. Digging continued on the same alignment beyond the tarmac path into the former graveyard, in an area with no visible headstones. A buried headstone, standing in situ, was encountered about 3m beyond the tarmac path to the west, and after being recorded by photograph (Photo 37) it was removed. The headstone had only the letters M D engraved on its eastern face. The area of the burial, assuming there was one, would have laid to the north of the drainage trench and so was not disturbed by the groundworks.

Photo 35: The section of drainage trench outside the porch during excavation

Photo 36: The drainage trenches from the sink and toilet after excavation and insertion of plastic pipe, in the area of the tarmac path outside the porch

Photo 37: Buried headstone found in situ just below the topsoil during excavation of the new drainage trench

5.2.5 Photos 38 and 39 show collapsed kerbstones of a buried former pathway that were uncovered and then removed during the further excavation of the drainage trench, about 2m west of where the buried headstone had been found. Throughout this section of drainage trench dug through the grass, the only deposits encountered were topsoil and, underneath it, stone building rubble containing artefacts of post-medieval and modern date such as glass bottles, glazed china ware, clay pipe and a small aluminium container. Other occasional finds included disarticulated human bone fragments, small corroded ferrous items, oyster shells and fragments of brick, plaster and mortar.

Photo 38: Kerbstones of a former pathway, discovered just below the topsoil during excavation of the new drainage trench, 0.5m and 1m scales

Photo 39: Collapsing kerbstones on either side of a former pathway, discovered just below the topsoil during excavation of the new drainage trench, 0.5m and 1m scales

5.2.6 The cess pit trench was dug by a machine in level spits, so that archaeological deposits could be more easily identified. For the first 1m of depth, the ground beneath the topsoil consisted of the same rubble deposit encountered during the excavation of the drainage trench, with similar artefacts included in it. The skulls at the head of two burials, possibly a double grave as they were so close to each other, were encountered just below 1m depth in the west-facing section of the trench (Photo 40). No other burials were encountered until the full required depth of the trench was reached at *c.*1.6m. Photo 41 shows the very top of a burial in the base of the cess pit trench, which was partly cleaned with a trowel to define it and confirm its orientation, located in the south east corner of the trench.

Photo 40: Damaged during machining, the tops of two skulls discovered at a depth of about 1m in the west-facing section of the cess pit trench, with a 0.5m scale. Corroded Iron nails can also be seen below the most prominent skull.

Photo 41: Facing south, a plan view of the burial found at the base of the cess pit trench, with the mandible and upper vertebrae most visible

5.2.7 At the eastern end of the trench, buried topsoil was recorded at a depth of *c.*0.6m (and continuing below the base of the trench). Towards the west end of the trench, the buried topsoil inclined upwards. Its maximum depth was *c.*0.7m, and directly below it was light yellow brown silty sandy subsoil (see section in Photo 42). The right side of an east – west aligned inhumation burial was slightly exposed in the south facing section of the cess pit trench at a depth of *c.*0.8m (Photo 43). The right humerus of the burial was dislodged and removed. No other burials were encountered within the excavated cess pit trench. Photos 44 and 45 show views of the fully excavated cess-pit tank trench, and Photo 46 shows the tank after insertion into the pit. Figure 9 shows a plan of the works.

Photo 42: The north-facing section of the cess-pit trench, showing *c.*1m of buried building rubble beneath the topsoil, and then *c.*0.6m of buried topsoil with the subsoil showing at the bottom at the west end, with a 2m scale

Photo 43: The void in the south-facing section of the pit where the right humerus of a burial was removed. Parts of other bones can be seen around the void, and the scale is in metres.

Photo 44: Looking east at the completed excavation of the cess-pit trench and the drainage channels from the porch of the church

Photo 45: Looking west at the cess-pit trench after excavation

Photo 46: The new cess-pit tank after positioning in its trench

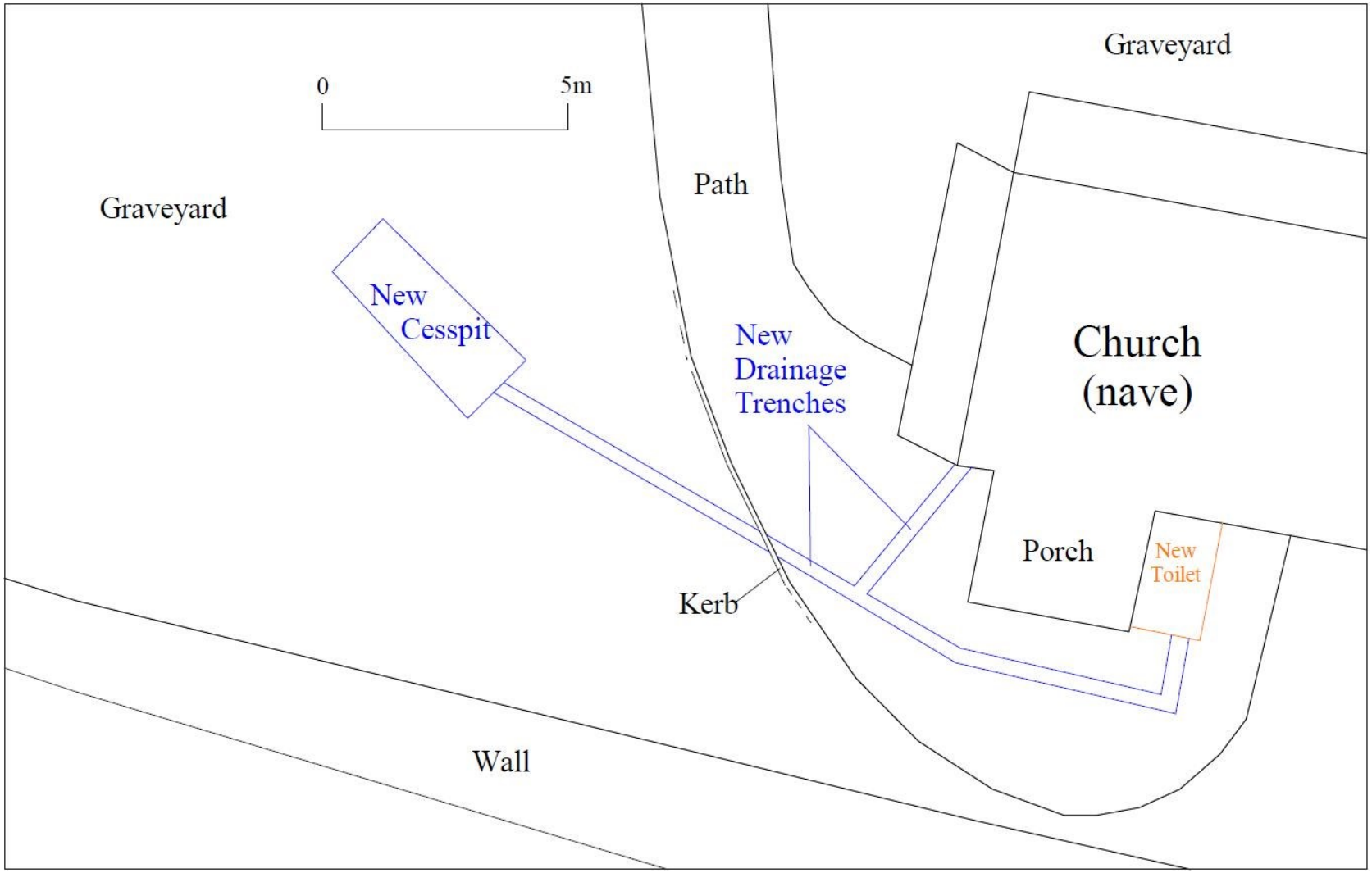

Figure 9: Plan of the new drainage channels and cess pit (in blue) outside St Jerome's Church

5.3 GPR Results (Appendix II)

5.3.1 A GPR survey of the nave and the north transept (the De la Roche chapel) was undertaken by TerraDat on the 1st and 15th of March 2016 in order to locate subsurface features (Photo 47). It was hoped that a vault, graves or voids might be found. A copy of the report can be found in Appendix II.

5.3.2 The first organised visit was undertaken after the suspended wooden floors had been removed, but the central aisle was still in place (concealing beneath it the Victorian stove). Some results were obtained, but TerraDat generously said they would come back to survey the whole of the church following the levelling of the inside of the church to the formation level of the new floors (following removal of the central aisle and stove). During the second visit, the floors in both areas had been covered in a rubble-gravel mix, levelled and topped with a polystyrene sheet in preparation for laying concrete.

5.3.3 Areas of possible voiding, services, areas of disturbed ground and infilled excavations were detected. In the De la Roche chapel, a rectangular shaped anomaly was seen. The report concludes that: The survey has distinguished areas which appear to show definite outlines [next] to the southeast wall, and in the north close to the church walls. Scattered responses with some linear features have been distinguished which could relate to underground structures.

5.3.4 All of the features detected (apart from the services) could be consistent with graves, in situ, collapsed, or disturbed. This would not be surprising in a church of this age, as inside burials were common in the medieval era and sometimes later, as exemplified by the human remains discovered during the watching brief for the creation of the new floor. It had been hoped that the survey would reveal features indicative of a burial vault within the north transept which could have potentially been associated with the De la Roche family. In the event no clear evidence for a vault was found, although smaller graves were possibly present.

Photo 47: GPR survey in action in the nave

5.4 Plasterwork

5.4.1 It was intended that an archaeologist would be present during the removal of plasterwork within the nave and north transept of the church in order that any potential earlier wall coverings or wall paintings could be identified. Unfortunately this work was undertaken before the archaeologists were informed, although members of Heritage Llangwm were present. No earlier surfaces or possible wall paintings were identified.

5.4.2 Based on the information recorded in the nave and north transept, during recording of the ghosts of the pews left in the walls, the wall coverings were of a thick cement based render, presumably put up in the Victorian period during renovations and supplemented with modern patching. Victorian wall surfaces such as these usually almost totally remove or destroy earlier wall coverings. The stone walls were normally exposed, before a thick, coarse base render was applied. This was then scratched in readiness for the coats of finishing plaster. Removal of the base coat of the render would expose the stone wall beneath. Sometimes elements of former lime wash or paint can be seen beneath this coat, but at Llangwm we have been told this was not the case although this cannot be confirmed.

5.5 Investigation beneath the Effigies in the North Transept

5.5.1 Members of the Heritage Llangwm team investigated what lay beneath the effigies in the north transept using an endoscope camera. Following drilling in one spot on each plinth, the camera showed only stone rubble within. The presence of rubble filling these spaces implies a possible previous use for them, and so although no further evidence was found it is still possible that they were tombs, and it is not impossible that underneath the rubble human remains still lie.

5.5.2 It had been intended that an archaeologist would be present during this investigation, but this did not happen because in the event the specialist contractor who drilled the holes arrived and carried out the work earlier than anticipated.

6 CONCLUSIONS

6.1 The archaeological watching brief has provided an appropriate record of groundworks carried out during the improvement of facilities at St. Jerome's Church, Llangwm, Pembrokeshire. These works involved:

- Removal of the Victorian floor surface and underfloor deposits to a depth of approximately 0.3m in the nave and the north transept of the church;
- Removal of plasterwork from the walls of the nave and north transept;
- Excavation of drainage channels from a new toilet at the east side of the porch and a sink in the southwest corner of the nave;
- Excavation of a trench for holding a cess-pit tank in the churchyard about 6m to the west of the porch;
- Investigation of a tomb using an endoscope camera

6.2 Within the church there was only one underfloor archaeological deposit, of building rubble mixed with disarticulated and fragmented human remains. The remains are interpreted as having originally been intact burials within the nave that were disturbed and mixed up during excavation and backfilling when the Victorian floor underfloor stove system were created. Burials frequently used to be made in the naves of churches and it was also common for them to be disturbed during later Victorian restoration projects. These often included the installation of dwarf walls for suspended wooden floors and underfloor heating systems. By examining the human remains, a minimum number of twelve individuals was estimated based of the presence of fragments belonging to twelve different right femurs.

6.3 The underfloor deposit was excavated to a depth of *c.*0.3m, and Victorian dwarf walls and an underfloor heating system were revealed. The heating system consisted of a stove in a purpose-built stone-walled pit, horizontal chimneys, and tuyeres receiving air from the outside at the base of the north and south walls of the nave. These components were excavated, recorded and then removed and await restoration and display. The vertical chimneys of the heating system were also observed to be intact, and were not disturbed. It was probably of later 19th century date, associated with renovations in the 1880s.

6.4 After excavation through the underfloor rubble deposit to the final required depth of 0.3m throughout the nave and north and south transepts, the resulting surface was closely examined for archaeological features and none were found.

6.5 The GPR survey detected areas of possible voiding, areas of disturbed ground and infilled excavations, and it is thought that they probably represent burials.

6.6 No burials were disturbed during the digging of the cess pit and its drainage channels, although a number were exposed. Some disarticulated human remains were excavated and put aside with those found inside the church for later reburial. The top of a burial was revealed at the base of the cess pit trench and the side of another was observed in section. One headstone, buried upright, was excavated from one of the drainage channels. Short sections of kerbstones from a former pathway were also discovered and removed. The deposits encountered during this part of the watching brief were building rubble and other dumps of material such as ash and sand that had previously been used to raise and level the ground surface.

6.7 Watching briefs were not carried out during the removal of plaster work or the viewing of the potential tombs with an endoscope camera, because the archaeologist was not informed in time. It was noted by those present that nothing was observed on the walls and that the potential tombs were filled with stone rubble.

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Llangwm Parish Tithe Map	1841
Llangwm Parish Tithe Map Apportionment	1841
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APPENDIX I:

ST JEROME'S CHURCH, LLANGWM, PEMBROKESHIRE
ARCHAEOLOGICAL Mitigation
WRITTEN SCHEME OF INVESTIGATION

1. INTRODUCTION

1.1 This written scheme of investigation presents a proposed methodology for archaeological mitigation to be implemented at St Jerome's Church, Llangwm, Pembrokeshire (SM 9903 0938) during restoration work at the church and conversion of the north transept into a chapel dedicated to the De La Roche family and its history.

1.2 The request for the WSI has been made by the Llangwm Local History Society to support their Heritage Lottery Fund bid to undertake the proposed works.

1.3 As the church is a Grade II Listed building and of archaeological and historical interest, the design and implementation of an appropriate scheme of archaeological mitigation has been required by the Diocesan Advisory Committee before a faculty can be issued. This WSI will also be used to support an application for Listed Building consent/Planning consent. This WSI provides details on the design of the archaeological works.

1.4 The proposed works within the church that will require archaeological mitigation can be summarised as follows:

- Excavation of drainage to connect with a cess pit within the churchyard (Planning application 15/0885/PA);
- Demolition of exiting boiler room and new extension (toilet) and installation of heat pump (Planning application 14/0328/PA);
- Removal of existing floor surfaces within the church and removal of underlying rubble and debris within main body of church;
- Possible ground penetrating radar survey across entire church footprint;
- Removal of 19th century plasterwork inside the church.
- These are discussed in more detail with the appropriate archaeological mitigation in section 3 below.

1.5 The planning applications for both the new extension and cess pit have the following archaeological conditions placed upon them:

'No development shall take place until the applicant, or their agents or successors in title, has secured the implementation of a programme of archaeological work in accordance with a written scheme of investigation which has been submitted by the applicant and approved in writing by the local planning authority'. This WSI addresses part of the planning condition for the developments.

1.6 The nave and chancel of St Jerome's Church are probably of 13th or early 14th date. It is a 5-cell church of cruciform shape and constructed in limestone rubble. It is a medieval church with 75% pre-19th century core fabric surviving. The chancel, nave, transeptal north aisle and south transept are all medieval. The south porch was added in the 1880s.

1.7 Restoration work undertaken at St Jerome's church in the 19th century included replastering of the north transept and movement of the two tomb effigies and surrounding moulded stone work. A concrete floor was also added to the north transept probably at the same time as movement of the tomb effigies.

1.8 The specification is in accordance with the relevant Institute for Archaeologists Standard and Guidance (Chartered Institute for Archaeologists (CIfA), 2014). The mitigation will include elements of watching brief, building recording and possibly excavation and wall painting recording.

1.9 The Trust always operates to best professional practice. DAT Archaeological Services has its own Health and Safety Policy, and all works are covered by appropriate Employer's Liability and Public Liability Insurances. Copies of all are available on request.

1.10 Dyfed Archaeological Trust is an IfA Registered Archaeological Organisation.

1.11 All permanent staff members of DAT Archaeological Services are CSCS[3] registered.

2. Aim and objectives of the project

2.1 This document provides a scheme of works for:

The implementation of schemes of archaeological mitigation, to include watching briefs and building recording and any other subsequent mitigation necessitated by the works during the renovation and alterations at St Jerome's Church, Llangwm, Pembrokeshire. A report on the results and archive will be prepared.

2.2 The following tasks will be completed:

Provision of a written scheme of investigation to outline the methodology by which DAT Archaeological Services will undertake the archaeological mitigation;

- To identify the presence/absence of any archaeological deposits;
- To establish the character, extent and date range for any archaeological deposits to be affected by the proposed works;
- To appropriately investigate and record any archaeological deposits to be affected by the ground works and plaster removal;
- To produce an archive and report of any results.

[3] *Construction Skills Certification Scheme (Health and Safety Tested)*

3. ARCHAEOLOGICAL MITIGATION METHODOLOGY

3.1 Drainage works and improvements around the perimeter of the church and connection to a cess pit within the churchyard

3.1.1 It is proposed that a new drainage system will be inserted at the church to connect with a new cess pit to be located within the churchyard.

3.1.2 It is proposed that a watching brief is maintained during all of these ground reduction works. If any significant remains or structures are revealed during these works, then it will be necessary to halt the ground reduction until any such remains have been recorded or a more detailed scheme of archaeological recording is implemented.

3.1.3 The proposed site of the cess pit will be within the churchyard area and is very likely to encounter burials, although no marked graves presently exist and it is understood that this part of the churchyard has not been used for well over 100 years. It is anticipated that if burials are encountered and human bone survives, that these will be subject to archaeological excavation and removal, and the remains reinterred elsewhere in the churchyard. The full scope of any such excavation required will be determined on-site during the works and through discussion with the archaeological advisor to both the local planning authority and the DAC.

3.2 Demolition of existing boiler room adjacent to entrance to church and erection of a new extension (toilet block) and ground heat pump

3.2.1 The existing boiler room at the church is of relatively modern and poor construction and also contains asbestos. There is considered to be no need for any detailed recording of the structure prior to its demolition (plenty of photographs of the structure already exist). Similarly there is considered to be no need for archaeological monitoring during its demolition to ground level.

3.2.2 An archaeological watching brief will be maintained during below ground works associated with the structure, when the footings of the existing building are removed, which could expose earlier remains. Observation during the installation of new footings may also be required.

3.2.3 Photographs should be taken of the area following demolition of the structure to provide a simple record of the original church wall behind the boiler room.

3.3 Removal of existing floor surfaces within the church and partial removal of underlying rubble and debris

3.3.1 The present floors of the church include suspended timber floors through the middle of the nave (and possibly the chancel?). The north transept floor mostly appears to comprise a concrete floor but also a patch or wooden flooring the purpose of which is not known as yet.

3.3.2 The timber floors are suspended on small dwarf walls adjacent to the outer wall and central passage. These are likely to date from 19th century renovations. The floors are all to be removed in the nave and chancel and a loose 19th century debris will be removed onto the underlying ground surface. Under floor heating will then be installed and the floors built up.

3.3.3 Floors will be removed with an archaeologist present and any rubble or debris should be removed with or by an archaeologist. Underlying surfaces or any other features of interest should be recorded prior to the new floors being laid. Recording of the underlying floor surfaces would give an ideal opportunity for community involvement.

3.3.4 It has been requested by the Llangwm Local History Society that at an early stage in the project, following the removal and storage of existing church furniture (pews etc), that a Ground Penetrating Radar survey is undertaken of the entire

footprint of the church. The aim of this survey is determine the presence of any voids (such as tombs etc) which could be hidden beneath the floors and possibly indications of earlier phases of the church. It is proposed that the work is undertaken by Terradat Ltd.

3.4 Removal of 19th century plasterwork inside the church

3.4.1 It is understood that plasterwork will be removed from the north transept of the church, which dates from the 19th century renovations. Records held by the Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW) suggest that a red wall paint was noted in the area around the moulded stonework recesses that house the two tomb effigies. There is therefore seen to be a potential for earlier wall colourings or paintings to be present.

3.4.2 It is understood that the plaster surface will be removed carefully and an archaeologist will observe the underlying surface for any decoration. Ideally this should be done in small test areas around the transept first under constant archaeological observation.

3.4.3 In the event that any wall paintings are revealed DAT Archaeological Services will contact all parties and make an initial assessment of the remains. A specialist wall painting expert would need to be employed at this stage to undertake further exposure of the remains and record/conserve them to an appropriate level. The full details of such work and the specialist to be employed would be determined at a later date (dependent upon the finding of any such remains).

3.4.4 In the event that no indications of painted plaster are found, then an intermittent watching brief will be undertaken during this work to determine if any other features are revealed by the works. Should wall paintings be revealed the same procedure as opbo9ve will be implemented.

3.4.5 In the event that no such remains are identified and all plasterwork is removed with no issues, then the exposed surfaces of the walls will be recorded through elevation drawing. This would enable details of former joints, features or repairs to be drawn. It would not be necessary to do a stone by stone drawing of all of the walls as they are mostly roughly coursed rubble stone, but stone by stone details of any features revealed would be necessary.

3.4.6 A rapid internal and external photographic survey of the building will be made at the start of the works to create a record of the structure in its present state. Further photos surveys will be made during the works, including as and when the plasterwork is removed but before a new surface added.

3.4.7 The Llangwm Local History Society are appointing a medieval carving specialist to record and analyse the existing moulded stone work and effigies located within the north transept. It is not proposed that DAT Archaeological Services undertake any detailed recording of moulded stone work, although a cursory record will be made. Consultation with the specialists will be undertaken to ensure that relevant details are shared.

3.5 General watching brief and recording procedures

3.5.1 Adequate time must be made available to the visiting archaeologist to ensure that appropriate recording can be undertaken of any archaeological features or deposits exposed during ground works.

3.5.2 Recording of all archaeological features or deposits will conform to best current professional practice and be carried out in accordance with the Recording Manual4 used by DAT Archaeological Services. Significant archaeological features or deposits will be drawn at a suitable scale (no less than 1:20) and photographed in an appropriate format.

3.5.3 All archaeologically significant finds will be retained and, where possible, related to the contexts from which they derived. Finds will be temporarily stored by DAT Archaeological Services in stable conditions. All finds, except those deemed to be Treasure, will remain the property of the landowner.

3.5.4 All archaeologically significant finds will be retained and, where possible, related to the contexts from which they derived. Finds will be temporarily stored by DAT Archaeological Services in stable conditions. All finds, except those deemed to be Treasure, will remain the property of the landowner.

3.5.5 Under the 1996 Treasure Act, "treasure" can be summarised as:

- Any object other than a coin containing at least 10% gold or silver and at least 300 years old;
- Any prehistoric assemblage of base metal;
- Coins found together which contain 10% gold or silver (but no single coins) and groups of at least 10 coins of other metals, provided they are at least 300 years old;
- Any object found associated with treasure except unworked natural objects; and
- Any object which would have been Treasure Trove before the 1996 Act but not covered above.

3.5.6 In the event that unforeseen archaeological discoveries are made during the development, or that archaeological remains of high significance are exposed, DAT Archaeological Services shall have the power to halt any ground works and shall inform the site agent/project manager and the archaeological advisor to the planning authority/DAC, and prepare a written statement with plan detailing the archaeological evidence. Following assessment of the archaeological remains by the curatorial officer, DAT Archaeological Services shall, if required, implement on behalf of the Client a contingency scheme for salvage excavation of affected archaeological features. In these instances it would be necessary to employ extra resources to record such features to an appropriate standard. Again this scenario is possible within the area of the former aircraft hangar.

3.5.7 As human remains will be encountered within the churchyard, confirmation will be required from the DAC that it will be acceptable for these to be recorded and removed from the ground prior to being reinterred elsewhere within the churchyard. The remains will be stored at the church and will not be removed from the churchyard prior to reinternment. As St Jerome's Church is a Church In Wales working church it will be necessary to apply for an exhumation licence from the Ministry of Justice.

[4] DAT Archaeological Services have adopted the Recording Manual developed by English Heritage Centre for Archaeology. A copy will be available on-site for inspection if required.

4. ARCHAEOLOGICAL RECORDING METHODOLOGIES

4.1 For all areas of watching brief, areas of ground reduction, floor removal and any necessary excavation: All deposits will be recorded by archaeological context record sheet, scale drawing, photography and site notebooks. All individual deposits will be numbered using the open-ended numbering system in accordance with Dyfed Archaeological Trust Field Services' Recording ManualTP5PT. Significant deposits will be recorded by scale drawing (no less than 1:20); drawn plans will be related to Ordnance Datum and, where possible, known boundaries. A photographic record will be maintained using digital and monochrome print formats.

4.2 All archaeologically significant artefacts, ecofacts and samples will be retained and, where possible, related to the contexts from which they derived. Sensitive material will be stored in appropriately stable conditions. Finds will be temporarily stored by DAT Archaeological Services in stable conditions. All finds, except those deemed to be Treasure, will remain the property of the landowner, but it is assumed that permission has been given by the landowner for these to be stored as part of the archive in a suitable repository (ownership will still be with the landowner).

4.3 The photographic survey of the church will include a rapid internal and external record of the appearance of the present state of the building, works undertaken within and outside the church and general shots of the progress of the development.

4.4 A report will be prepared (to the standards as laid out below).

5. Post-fieldwork reporting and archiving

5.1 All data recovered during the fieldwork will be collated into a site archive structured in accordance with the specifications in Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation (Brown 2011), and the procedures recommended by the National Monuments Record, Aberystwyth. The National Standards for Wales for Collecting and Depositing Archaeological Archives produced by the Federation of Museums and Art Galleries of Wales will also be adhered to.

5.2 The results of all stages of fieldwork will be assessed in local, regional and wider contexts.

5.3 Any proposed mitigation measures will need to be approved by the Diocesan Advisory Committee prior to the works progressing.

5.4 The report will include a desk-based assessment element.

5.5 The project archive, including all significant artefacts and ecofacts (excepting those which may be deemed to be Treasure) will be deposited with an appropriate body following agreement with the landowner.

5.6 DAT Archaeological Services will arrange for the deposition of finds, and ascertain the costs of storage and deposition, with an approved body before the project commences and inform the curator of the arrangement which has been made (it is anticipated that the archive will be deposited with Pembrokeshire Museum, but it is very likely that any finds may well be displayed by the Llangwm Local History Society within the church following conversion of the north transept).

TP[5]PT Dyfed Archaeological Trust Field Services use the Recording Manual developed by English Heritage Centre for Archaeology. A copy will be available for inspection if required.

5.7 A summary of the project results, excluding any confidential information, may be prepared for wider dissemination (e.g. Archaeology in Wales and special interest and period-specific journals).

5.8 The report will be prepared to follow the relevant Institute for Archaeologists Standards and Guidance (CIfA 2014).

5.9 Information from any specialists involved on the project (medieval stone carving and wall painting specialists if required) should be incorporated into a final report on the works. This may include the need for a more detailed publication the scope of which would be determined by the results of the on-site works.

5.9 Four bound copies of the reports will produced for the client on all stages of work. Digital copies in pdf format will also be supplied if required. Bound copies of the reports will also be produced for Dyfed Archaeological Trust Heritage Management and the regional Historic Environment Record.

6. Staff

6.1 The project will be managed by J Meek MIFA, Head of DAT Archaeological Services.

6.2 The on-site management and supervision will be undertaken by members of DAT Archaeological Services staff.

7. MONITORING

7.1 The works will need to be monitored by the archaeological advisor to the DAC and local planning authority. Time tables of meetings should be discussed and agreed prior to the works commencing.

8. HEALTH AND SAFETY

8.1 All permanent members of DAT Archaeological Services staff are CSCS6 registered.

8.2 DAT Archaeological Services will carry out a health and safety risk assessment to ensure that all potential risks are minimised.

8.3 All relevant health and safety regulations must be followed.

8.4 All site inductions, H&S procedures, H&S constraints and site rules of the client or any on-site contractor will be made known to DAT Archaeological Services staff at the start of the works.

8.5 Safety helmets, high visibility vests and boots are to be used by all site personnel as necessary. The developer will make all site staff aware of any other PPE7 that may be required.

8.6 DAT Archaeological Services staff must ensure that their presence on site is communicated to all relevant site staff, especially any machine or plant operators.

[6] *Construction Skills Certification Scheme (Health and Safety Tested)*
[7] *Personal Protection Equipment*

APPENDIX II:

GEOPHYSICAL SURVEY REPORT

Project

Geophysical survey to locate subsurface features in St. Jerome's Church

Location

Llangwm, Pembrokeshire

Client

Dyfed Archaeological Trust

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TERRA DAT
geophysical **innovation**

Job reference: 5065
Date: March 2016
Version: 1

GEOPHYSICAL SURVEY REPORT

Project

Geophysical survey to locate subsurface features in St. Jerome's Church

Location

Llangwm, Pembrokeshire

Client

Dyfed Archaeological Trust

Report Author:	Mag. Kathrin Zorn MSc	_____
Reviewer:	Alex Lewis	_____
Job Reference:	5065	
Date:	April 2016	

CONTENTS

Figures

Appendices

1 INTRODUCTION

This report describes a geophysical survey to map subsurface features within the ground of St. Jerome's Church, Llangwm, Pembrokeshire. Due to the progress of the building works carried out in the areas to be investigated, two separate surveys (1st and 15th of March) were necessary to get an integral cover of the church's underground.
The work was undertaken on behalf of Dyfed Archaeological Trust and the aim of the survey was to map buried structures or a vault, graves or voids.

1.1 Site description

The survey was carried out within St. Jerome's Church in Llangwm, Pembrokeshire. The Nave and the De La Roche chapel were of particular interest to determine if any subsurface vaults, structures or other features were present. Within the church grounds, during excavations as part of renovation works, human remains were found. Furthermore, between the survey visits, a Victorian underfloor heating system has been recovered.
On the 1st March, accessible areas for investigation were limited to the two former seating pits (North and South) and the De La Roche Chapel, where the church's flooring had been removed. Raised wooden flooring made a survey in those remaining areas impossible. On the second visit, 15th March, the entire floor of the Nave and the De La Roche Chapel (Plate 1) had been removed, covered in a rubble-gravel mix, levelled and topped with a polystyrene sheet in preparation for laying concrete. The depths and variations of the filling material are not known.

Plate 1: *GPR survey on the second visit in the De La Roche Chapel*

1.2 Survey objectives

The objective of the survey was to map historic building structures, graves or other underground features.

1.3 Survey design

Given the nature and scope of the survey, it was decided to investigate the site using ground penetrating radar which reveals ground character change, depths and features underground, making it an extremely useful tool to determine structures or ground disturbance

- **Ground Penetrating Radar (*Mala Ramac 250MHz and 500MHz antennae, UTSI combined 250, 500MHz and 1GHZ antennae*)** – to help characterise the ground composition and provide depth interpretation.

1.4 Quality control

The geophysical data are collected in line with normal operating procedures as outlined by the instrument manufacturer and TerraDat company policy. On completion of the survey, the data are downloaded from the survey instrument on to a computer and backed-up appropriately. The acquired dataset is initially checked for errors that may be caused by instrument noise; low batteries, positional discrepancies, etc. and any field notes are either written up or incorporated in the initial data processing stage. The dataset is processed using the standard processing routines and once completed, the resulting plots are subject to peer review to ensure the integrity of the interpretation. Our quality control standards are BS EN ISO 9001: 2008 certified.

2 SURVEY DESCRIPTION

2.1 Geophysical survey

The survey was carried out using the following geophysical methods over the accessible areas:

- Ground Penetrating Radar (*Mala Ramac 250* and *500MHz* antennae, *UTSI Groundvue 3:* 1GHz, 500MHz and 250MHz antennae)

Background information on these survey methods is provided in the Appendices, and a summary of the techniques with a brief description of the on-site activity is described below.

2.2 Survey layout and topographic survey

Upon arrival, a local survey grid has been measured and set out, which was preferentially aligned according to the seating pit and outer church walls to optimise data coverage.

2.3 Ground penetrating radar survey (GPR)

A Ground Penetrating Radar (GPR) survey involves the transmission of a pulsed electromagnetic (radio) wave and the recording of any returning reflection events. Readings are taken as the radar unit is towed at closely spaced intervals along the selected traverse line. The transmitted waves are focused into the ground and can penetrate thin soils, rock, concrete, and many other natural and man-made materials. Given a sufficient contrast, reflection events from geological or hydrological boundaries can be observed together with 'point' sources such as buried services, rebar, voids and large boulders.

2.3.1 GPR survey - field activity

In Survey 1, a *MALA RAMAC* radar system with shielded 250MHz and 500MHz antennae was used to acquire the radar data continuously along a series of 0.25 metre spaced parallel profile lines in selected accessible areas of the church, including the North and South seating pit and the De La Roche Chapel. In Survey 2 a *UTSI Groundvue 3* radar system with shielded 1GHz, 500MHz and 250MHz antennae was used to acquire the radar data along a series of 0.25 spaced lines within the entire Nave and De La Roche Chapel (Plate 2). Positioning of lines was completed in the processing stage.

Plate 2: *MALA RAMAC (left) and UTSI Ground Vue 3 (right) Ground Penetrating Radar systems (library pictures)*

2.3.2 GPR survey – data processing

The data processing was carried out using *GPR-SLICE* and *REFLEX* software. The first stage involves the correct positioning of the GPR data set and additional processing routines (*e.g.* background removal, deconvolution, FK filtering, migration, *etc.*) are applied. 2D radargrams are produced and exported to *CorelDraw* for final annotation.

3 RESULTS AND INTERPRETATION

The results of the GPR investigations have been shown separately in Figures 1 to 5. A summary table (Table 1) has been compiled with explanations of the most significant anomalies.

Although the two surveys overlap in some regions, results are not homogeneous as the subsurface was disturbed in between the two visits and objects removed. Further, the ground surface was different on both visits, with Survey 1 taking place directly on the excavated church ground and Survey 2 on infill material of which depth and level are unknown.

Even though some buried features and anomalies in the subsurface have been indicated, the additional use of other geophysical survey techniques could have improved interpretation in the context of the historical structures, infills or voids.

The GPR Slice results are used to provide information on the location of anomalies and general ground character changes. Further, GPR radargrams aid the interpretation concerning depth, extend and character of anomalies detected. Some exemplary results collected on the site are presented as black and white radargrams with areas of interest highlighted in blue (signal reverberation) or green (change in ground character) boxes and yellow lines (diffraction events). A brief description of typical radar features is given below.

- **Reflection event**: A laterally continuous interface between materials of contrasting electrical properties (controlled largely by composition and moisture content of the material). Examples of reflecting surfaces are soil horizons, soil-rock or air-rock interfaces, water tables, and solid metallic or non- metallic objects.
- **Diffraction**: A diffraction hyperbolae curve usually indicates a 'point' source, such as a void, buried service or an edge-feature (e.g. wall). A zone of small diffractions can indicate rebar or granular/blocky material.
- **Signal character**: A number of general comments may be made based on the observed changes in the character of the radar signal such as attenuation, loss of penetration and reverberation.

Regarding mapping buried structures in section, these are typically identified either by a large single diffraction event, cluster of diffractions or changes in the signal character/penetration. Depending on ground conditions and the nature of the specific buried structure, the radar can either directly map the target structure or identify in-direct attributes associated with the target structure, *i.e.* disturbed ground, fill material, *etc.* Concerning target detectability, the main

issues include the depth of target structure, size, nature of host material (*i.e.* homogeneous/heterogeneous), moisture content and the contrast between target/host materials.

Although a 1GHz antenna was employed in the investigation, results and penetration are not detailed enough to be discussed further. The 250Mhz antennae showed good penetration with satisfactory resolution to a level of 2m depth. The 500MHz antennae show detailed results to 1.5meters bgl. There are some localised variations in penetration, which are likely to reflect relative changes in the clay content as particularly seen in the SE, where higher clay content prevents penetration into deeper levels.

Broad defined areas of high responses were mostly found towards the outer sides of the nave walls, which could indicate relations to the foundations of the church. Further, in the De La Roche Chapel a well-defined anomaly towards the western wall has been located in 30-50 cm bgl. A further area of special interest is the northern side of the nave showing strong diffraction events with disturbed ground and high GPR responses to 1m bgl. The south-east of the nave similarly stands out with a defined feature of high GPR response. Several linear features within the grounds of the nave become visible in the plan views. Those could indicate services. It needs to be considered that the alignment of the former seating pits had been in the same direction as some of those anomalies and, therefore,, could represent these original locations mapping ground change.

Small, isolated and amorphous anomalies have a high presence especially towards the western middle of the nave. Here, a number of defined diffraction events and signal reverberation could be an indication for possible voids in the subsurface. Two isolated anomalies in the De La Roche Chapel indicate features with large reflectors in deep surface.

Anomaly	Description
NP1	Curved reflector with underlying reflections is indicative for possible voiding
NP2	Linear high response indicative of buried service
NP3	Zone of high GPR response indicating area of very disturbed ground to >1m bgl with multiple reverberation
NP4	Broad area of disturbed ground with different horizons and dipping reflectors
NP5	Curved reflector with underlying reflections is indicative for possible voiding
SP1	Broad area of response indicating change in ground character with dipping horizons and multiple reflection boundaries, possibly indicating backfilled excavations
SP2	Linear feature deriving from an area of high GPR response with multiple reverberations. Increased GPR response with multiple reverberations may indicate voiding
SP3	Distinct short linear feature showing high GPR response around 1m bgl which could indicate voiding
R1	Dipping reflectors with underlying reflectors linked with high GPR response could indicate infilled excavations in shallow depths
R2	Shallow anomaly close to the walls of the church, possibly related to building structure
R3	Anomaly at shallow depth around 30cm bgl, extending into deeper levels showing elevated GPR response
C500 1	Homogenous ground conditions with little variation and penetration, possibly caused through clay-rich soil
C500 2	Disturbed ground conditions with dipping reflectors and underlying reverberations linked with high GPR response could indicate voids at shallow depths or points source
C500 3	Broad rectangular area of elevated GPR response next to an exit with archway in the church, to which it is possibly related
C500 4	Elevated GPR response with multiple hyperbolae, reflectors with underlying reverberations possibly indicating backfilled excavations and/or voids close to outer church wall
C500 5	Isolated anomalies of higher GPR response with large reflectors indicating point source or feature in the subsurface at deeper levels
C250 1	Rectangular shaped shallow GPR anomaly in the De La Roche Chapel
C250 2	Broad rectangular area of elevated GPR response bordering an exit with archway in the church to which it is possibly related
C250 3	Isolated elevated GPR responses showing reflectors with underlying reverberations in disturbed ground, possibly indicating excavations backfilled and/or voids
C250 4	Linear features within disturbed ground conditions possibly indicating service

***Table 1**: Selected anomalies highlighted in the Figures 1-5 with their individual descriptions*

4 CONCLUSIONS

- The geophysical surveys have produced plan views and radargrams showing the distribution of different anomalies at different depths.

- The survey has shown changes in ground character and material composition that may be associated with structures, objects or disturbed ground. Some GPR anomalies are likely to show voids in the subsurface.

- The survey has distinguished areas of which appear to show definite outlines to the south-east wall, and in the north close to the church walls. Scattered responses with some linear features have been distinguished which could relate to underground structures.

Disclaimer

This report represents an opinionated interpretation of the geophysical data. It is intended for guidance with follow-up invasive investigation. Features that do not produce measurable geophysical anomalies or are hidden by other features may remain undetected. Geophysical surveys compliment invasive/destructive methods and provide a tool for investigating the subsurface; they do not produce data that can be taken to represent all of the ground conditions found within the surveyed area. Areas that have not been surveyed due to obstructed access or any other reason are excluded from the interpretation.

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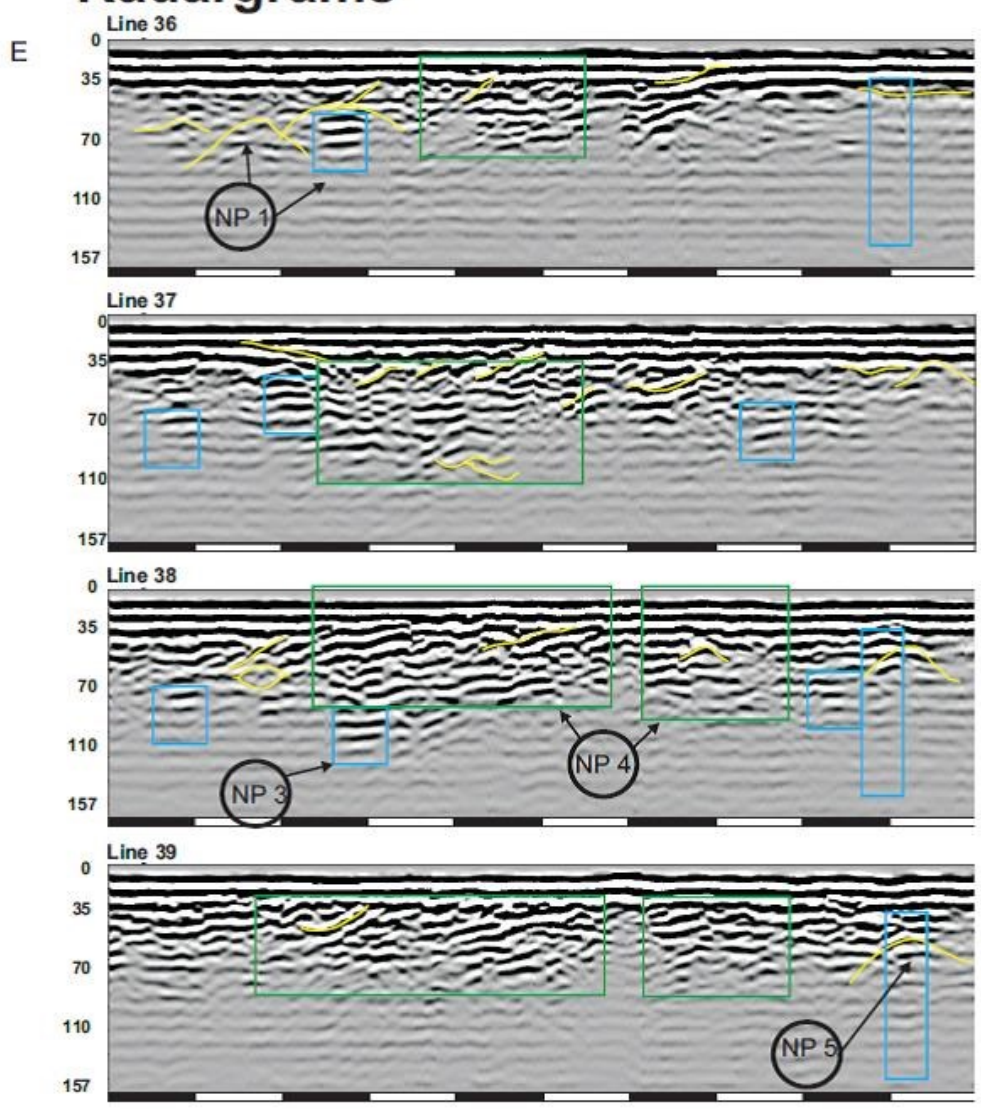
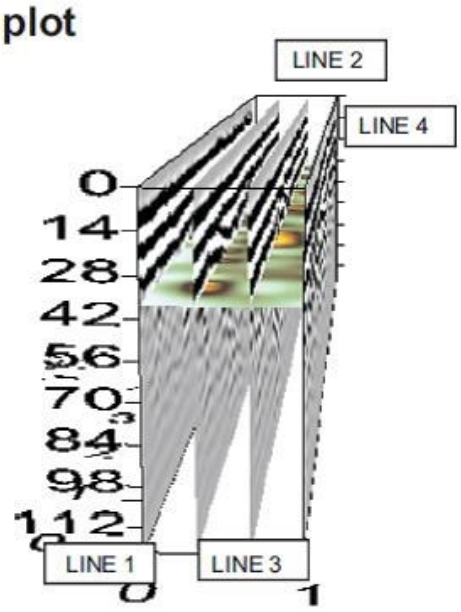
FIGURES

Radargrams

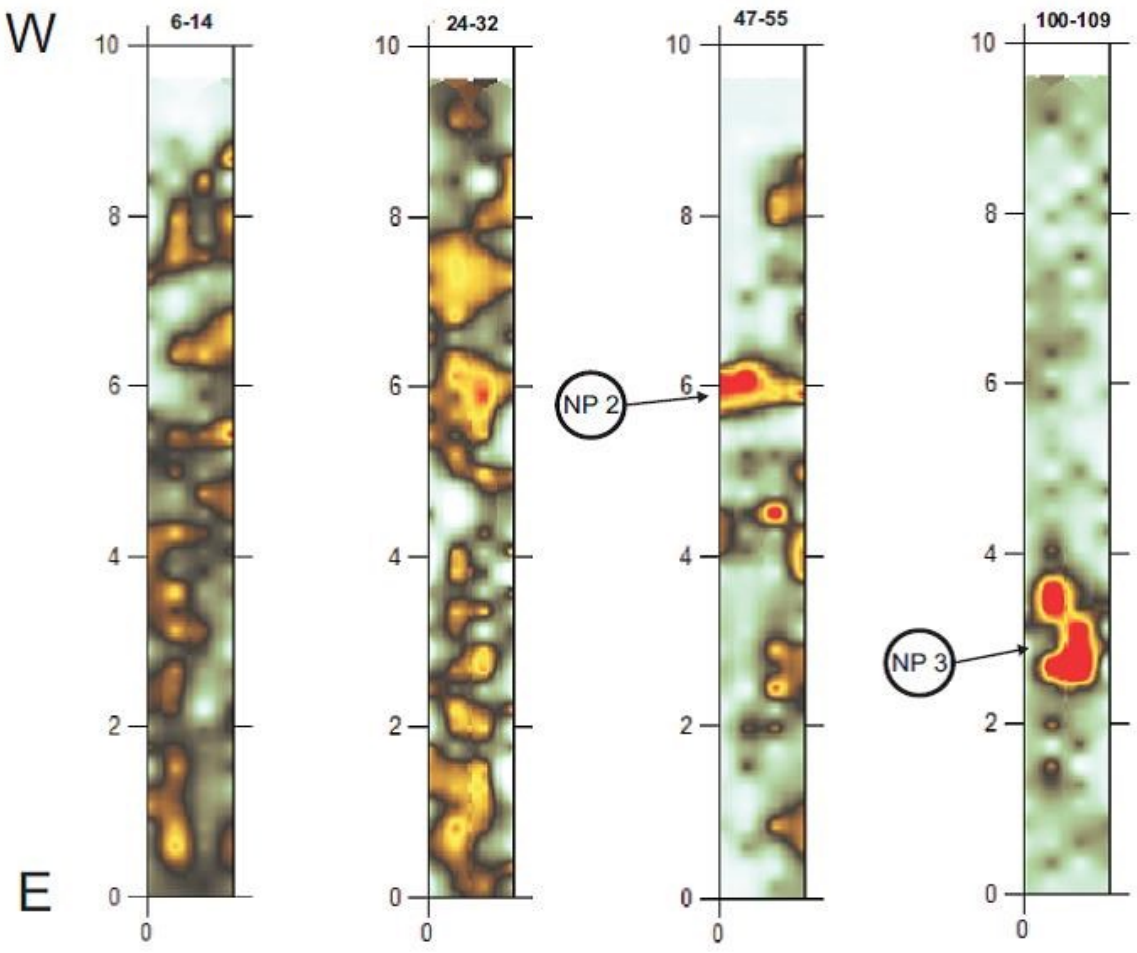


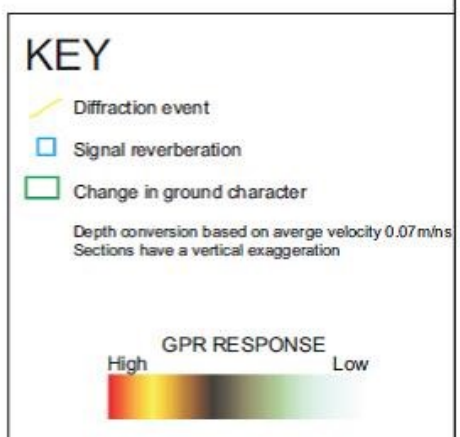
Location plot



Anomaly	Description
NP1	Curved reflector with underlying reflections is indicative for possible voiding
NP2	Linear high response indicative of buried service
NP3	Zone of high GPR response indicating area of very disturbed ground to >1m bgl with multiple reverberation
NP4	Broad area of disturbed ground with different horizons and dipping reflectors
NP5	Curved reflector with underlying reflections is indicative for possible voiding

Depth slices





Title: North seating pit, 500MHz GPR antenna

Project: St. Jerome's Church, Llangwm

Drawn by/Ref: KZ/5065/1

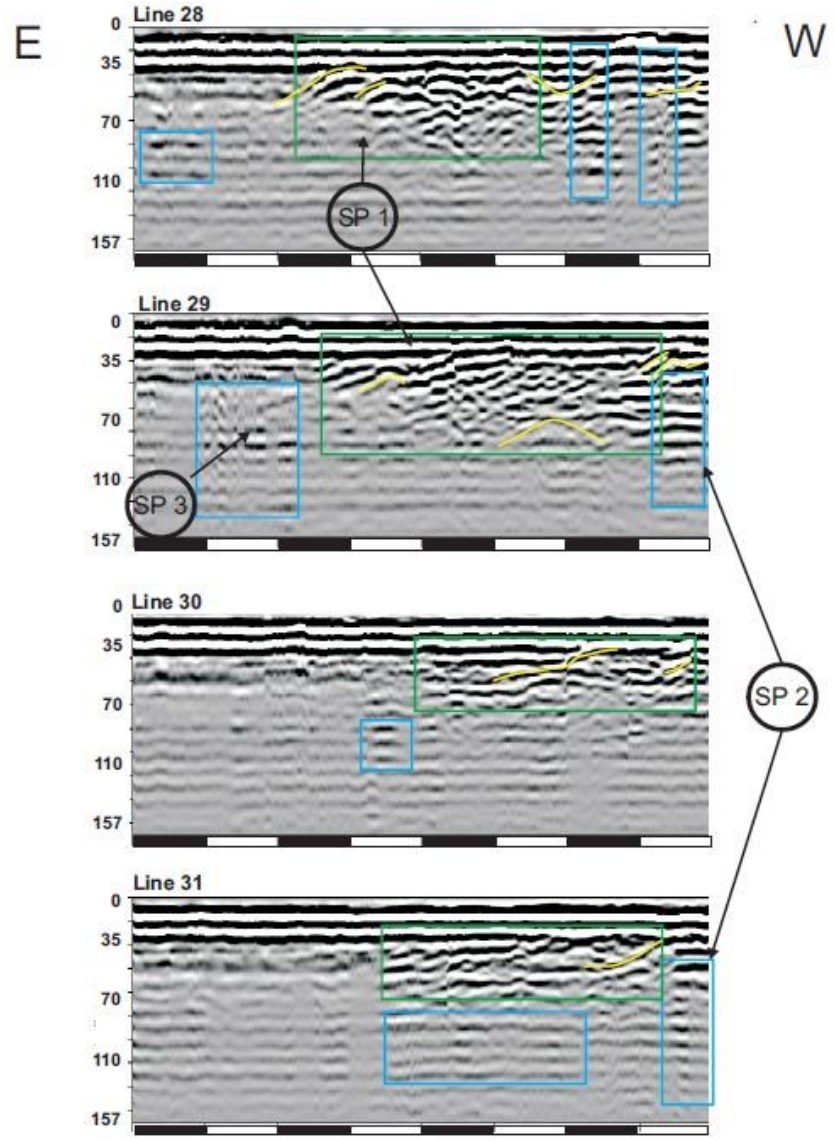
Date: April 2016

TERRA DAT geophysical innovation

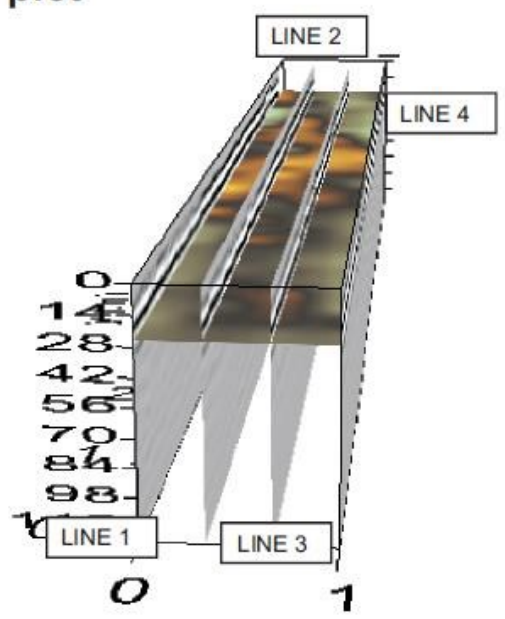
Tel: +44 (0) 8707 303050

FIGURE 1

Radargrams

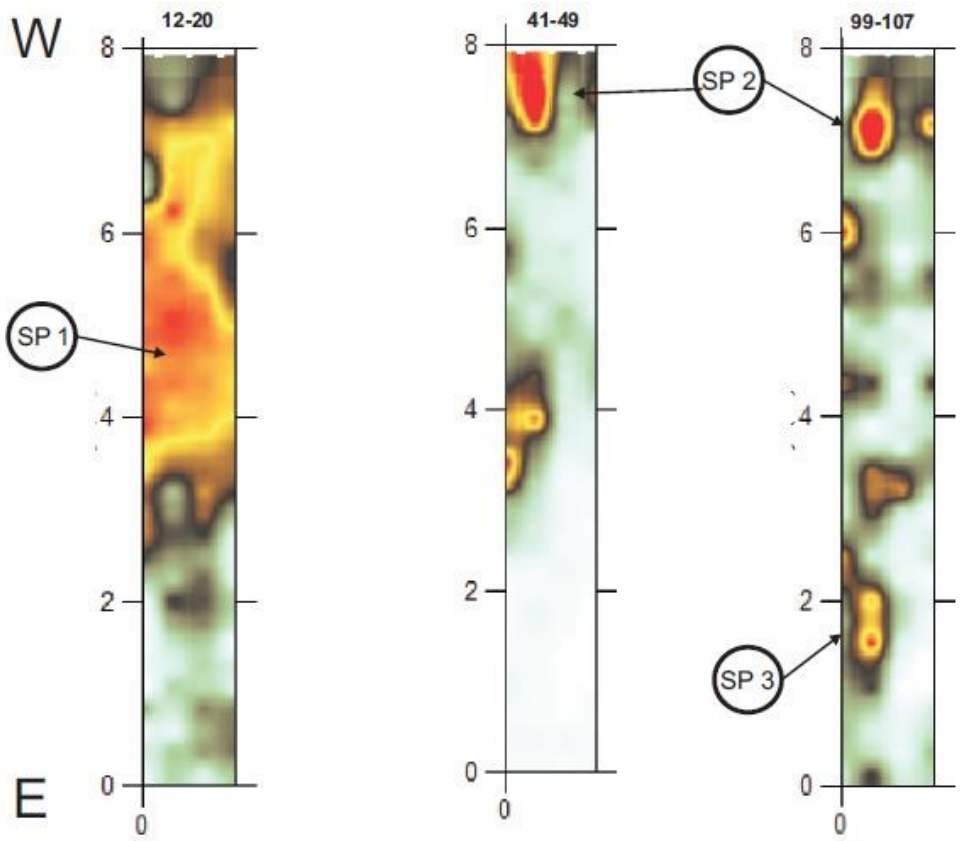


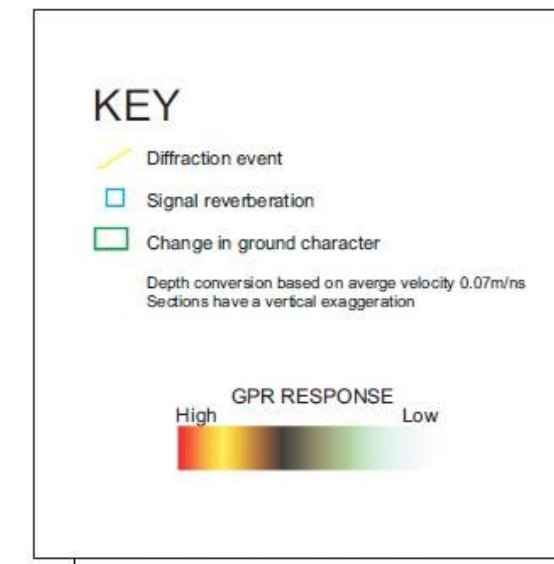
Location plot



Anomaly	Description
SP1	Broad area of response indicating change in ground character with dipping horizons and multiple reflection boundaries, possibly indicating backfilled excavations
SP2	Linear feature deriving from an area of high GPR response with multiple reverberations. Increased GPR response with multiple reverberations may indicate voiding
SP3	Distinct short linear feature showing high GPR response around 1m bgl which could indicate voiding

Depth slices





Title: South seating pit 500MHz GPR antenna

Project: St. Jerome's Church, Llangwm

Drawn by/Ref: KZ/5065/2

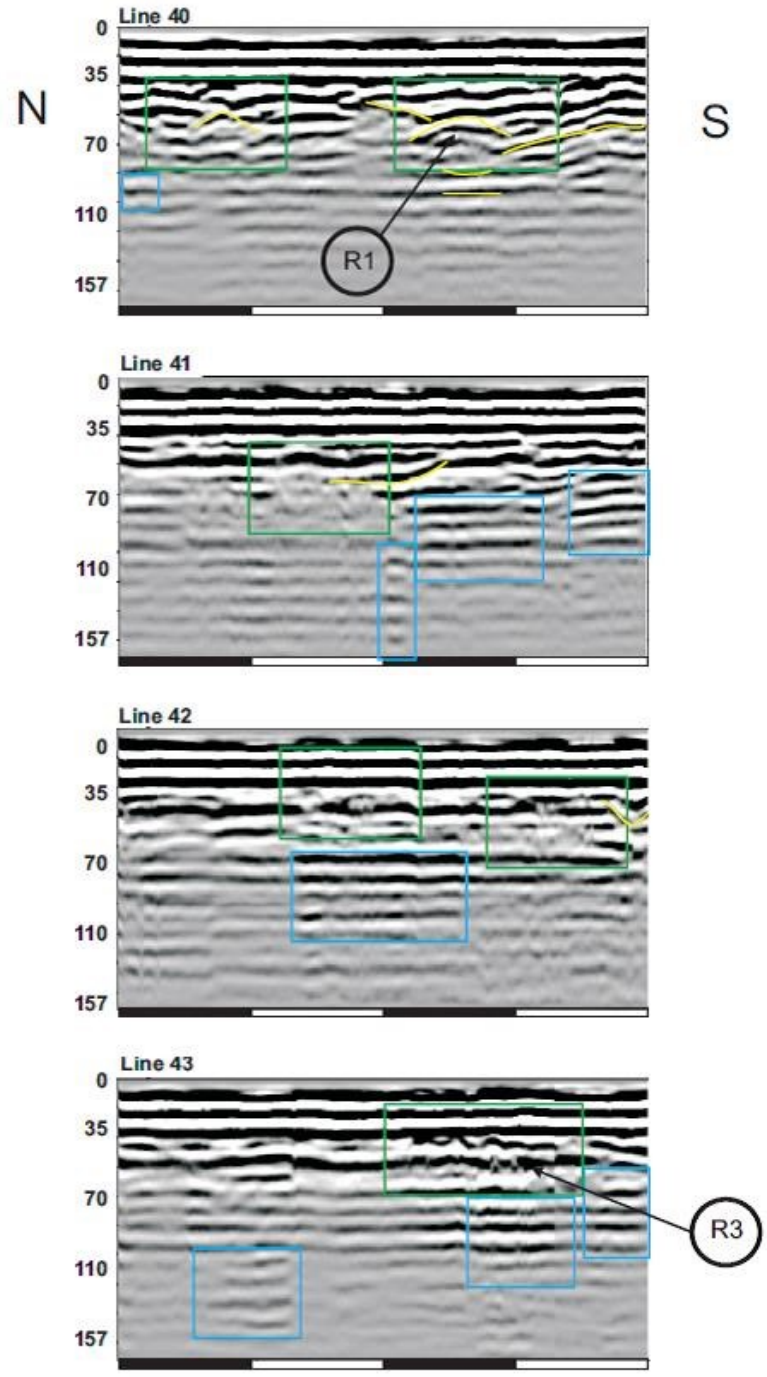
Date: April 2016

TERRA DAT geophysical innovation

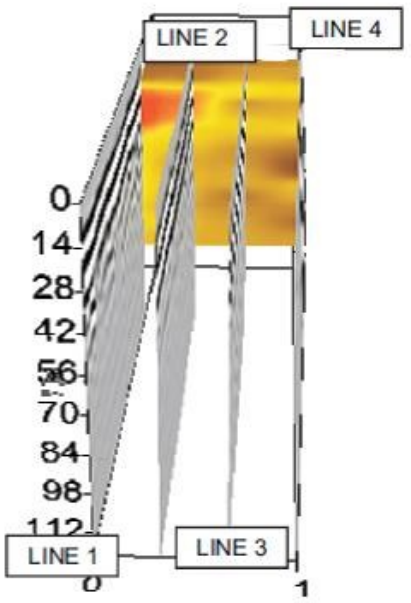
Tel: +44 (0) 8707 303050

FIGURE 2

Radargrams

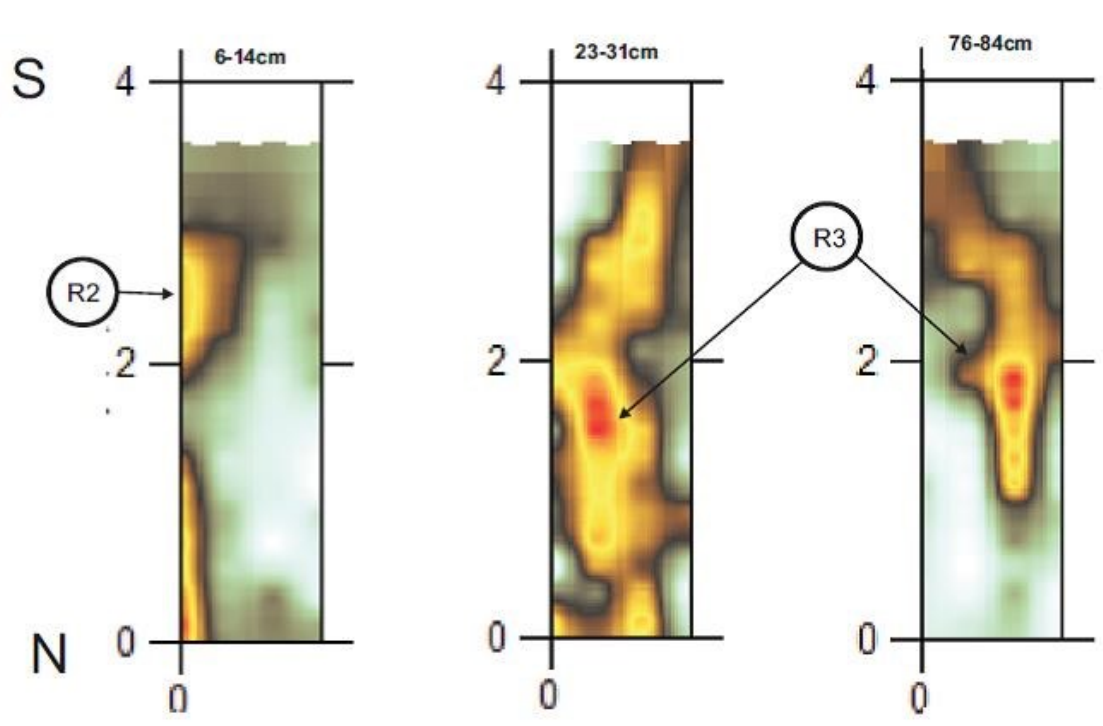


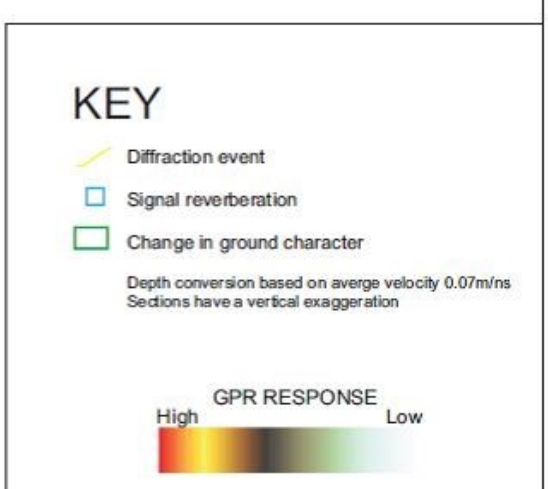
Location plot



Anomaly	Description
R1	Dipping reflectors with underlying reflectors linked with high GPR response could indicate infilled excavations in shallow depths
R2	Shallow anomaly close to the walls of the church, possibly related to building structure
R3	Anomaly at shallow depth around 30cm bgl, extending into deeper levels showing elevated GPR response

Depth slices





Title: De la Roche Chapel 500MHz GPR antenna

Project: St. Jerome's Church, Llangwm

Drawn by/Ref: KZ/5065/3

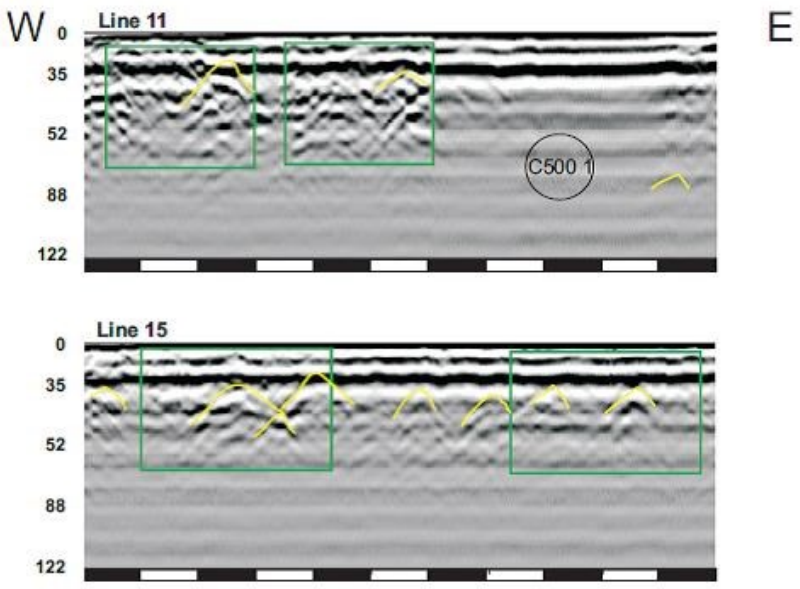
Date: April 2016

TERRA DAT geophysical innovation

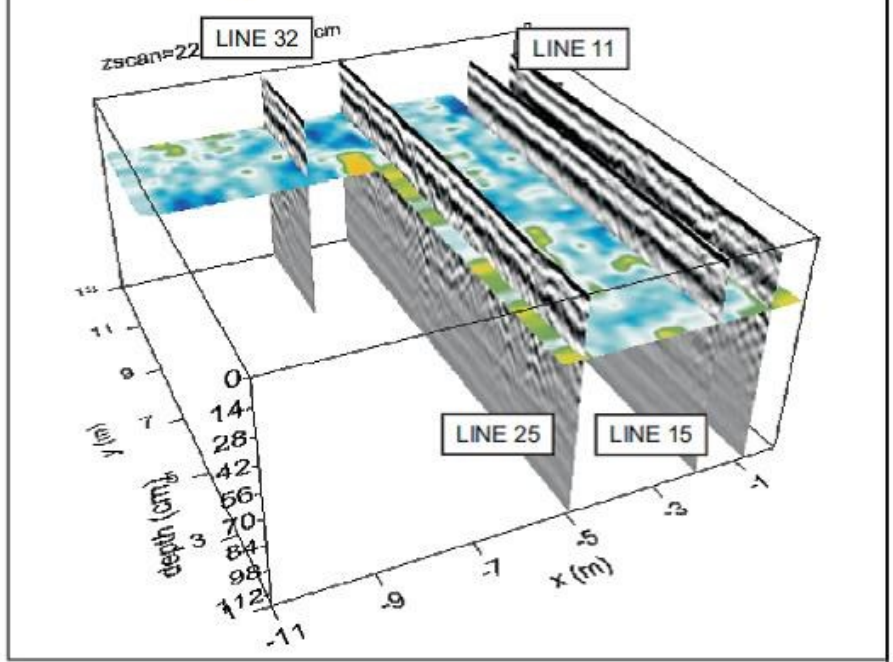
Tel: +44 (0) 8707 303050

FIGURE 3

Radargrams

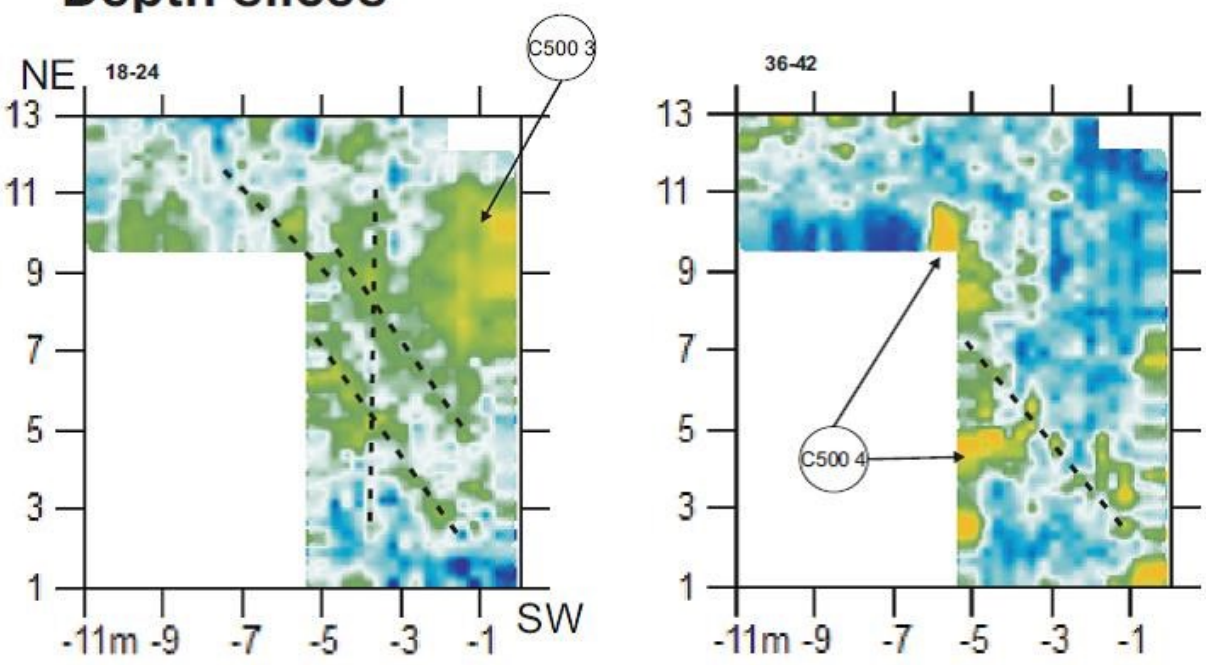


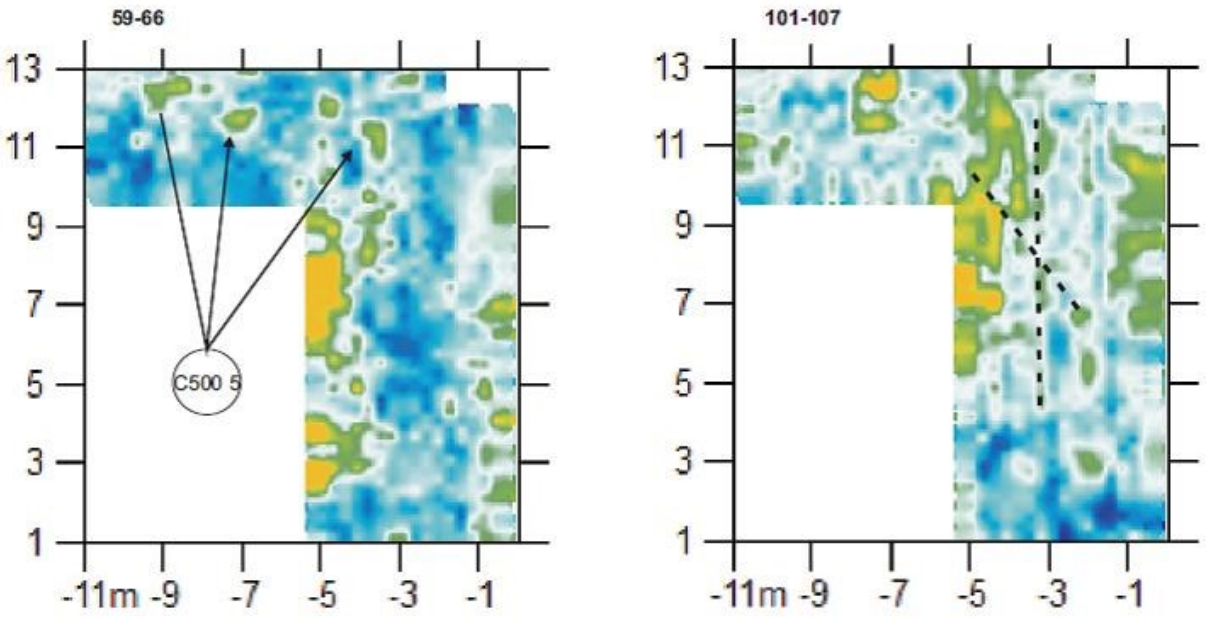
Location plot



Anomaly	Description
C500 1	Homogenous ground conditions with little variation and penetration, possibly caused through clay-rich soil
C500 2	Disturbed ground conditions with dipping reflectors and underlying reverberations linked with high GPR response could indicate voids at shallow depths or points source
C500 3	Broad rectangular area of elevated GPR response next to an exit with archway in the church, to which it is possibly related
C500 4	Elevated GPR response with multiple hyperbolae, reflectors with underlying reverberations possibly indicating backfilled excavations and/or voids close to outer church wall
C500 5	Isolated anomalies of higher GPR response with large reflectors indicating point source or feature in the subsurface at deeper levels

Depth slices





KEY

- Diffraction event
- Signal reverberation
- Change in ground character

Depth conversion based on averge velocity 0.07m/ns
Sections have a vertical exaggeration

GPR RESPONSE
High — Low

Title: **2nd visit 500MHz GPR antenna**

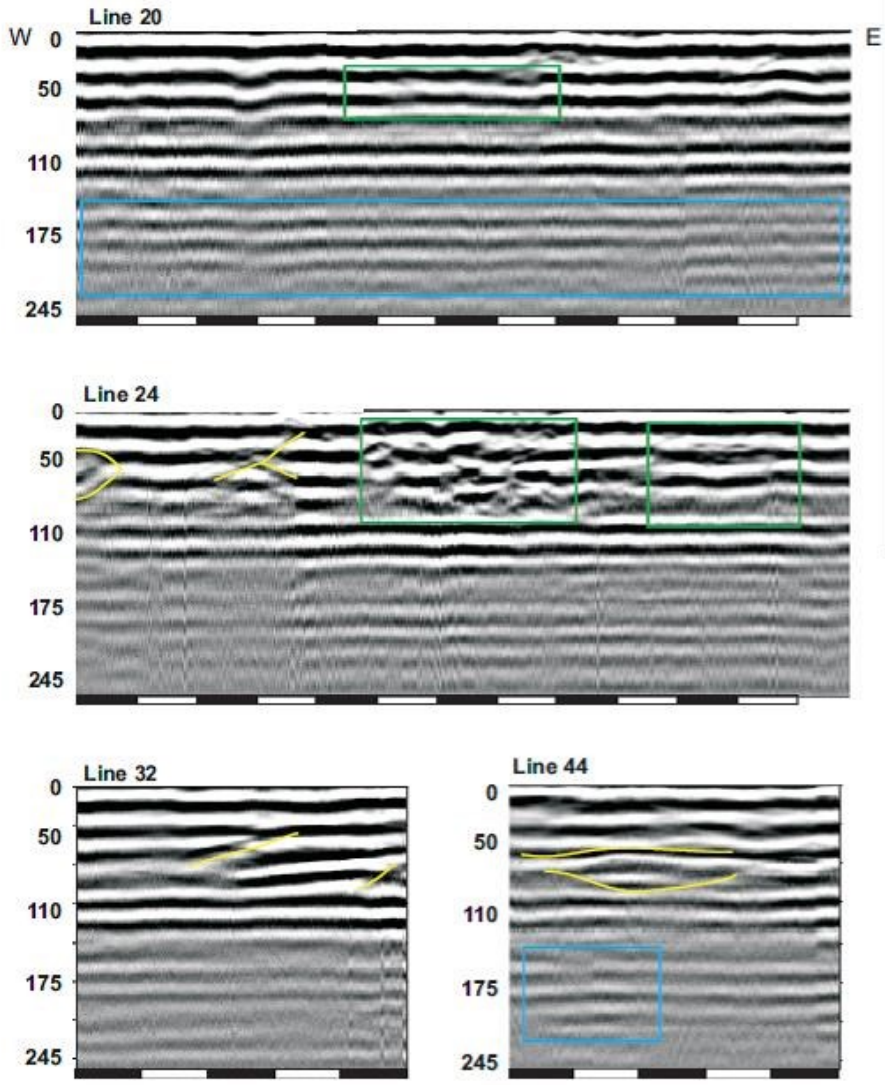
Project: **St. Jerome's Church, Llangwm**

TERRA DAT geophysical innovation
Tel: +44 (0) 8707 303050

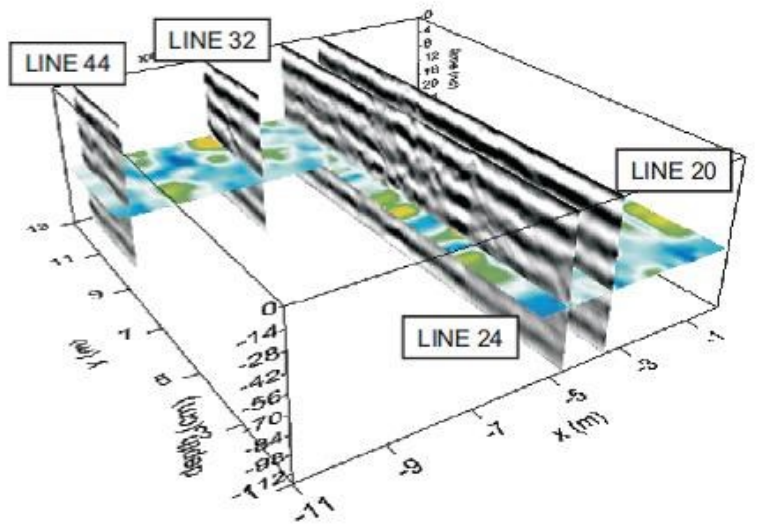
Drawn by/Ref: KZ/5065/4
Date: April 2016

FIGURE 4

Radargrams

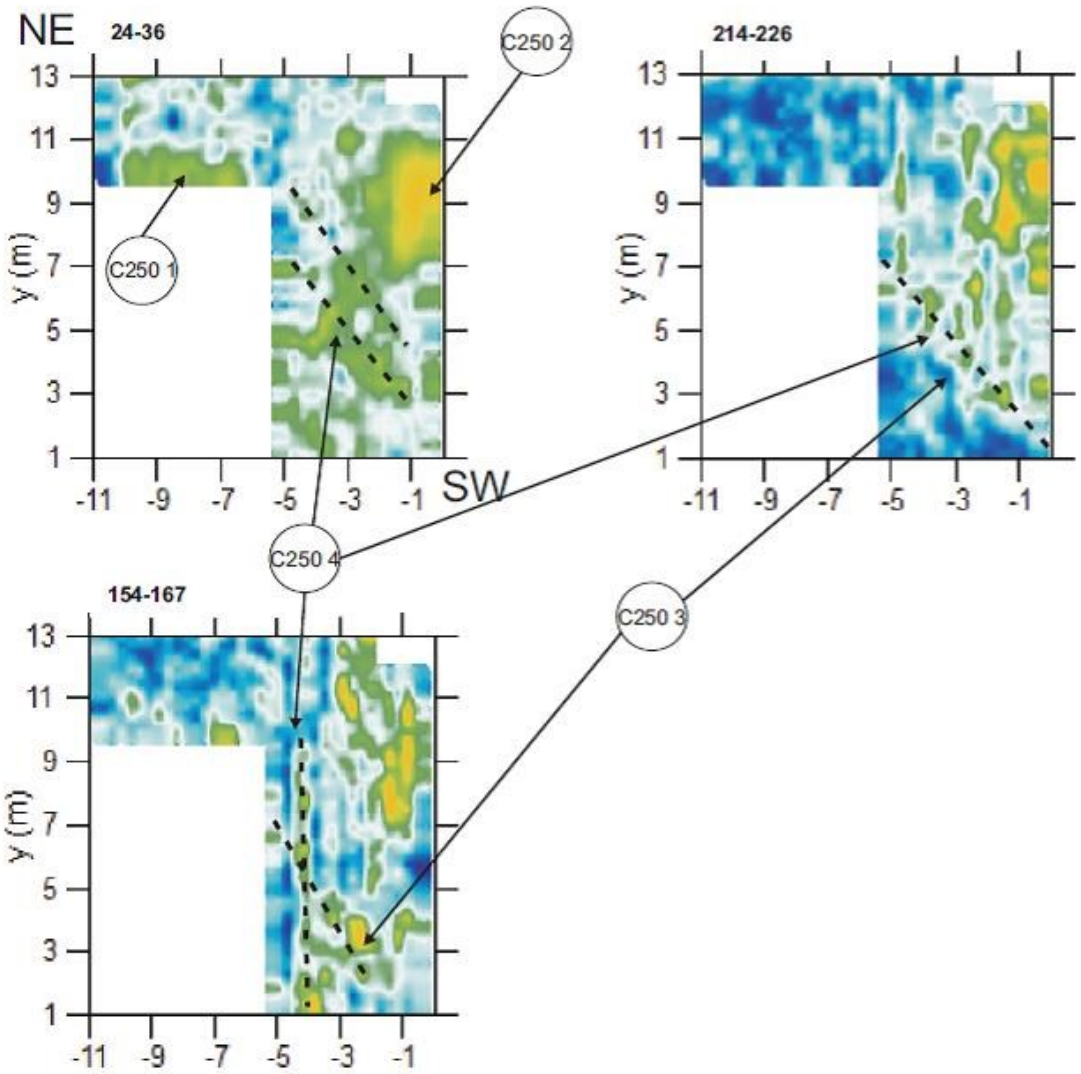


Location plot



Anomaly	Description
C250 1	Rectangular shaped shallow GPR anomaly in the De La Roche Chapel
C250 2	Broad rectangular area of elevated GPR response bordering an exit with archway in the church to which it is possibly related
C250 3	Isolated elevated GPR responses showing reflectors with underlying reverberations in disturbed ground, possibly indicating excavations backfilled and/or voids
C250 4	Linear features within disturbed ground conditions possibly indicating service

Depth slices



KEY

- Diffraction event
- Signal reverberation
- Change in ground character

Depth conversion based on averge velocity 0.07m/ns
Sections have a vertical exaggeration

GPR RESPONSE
High — Low

Title: 2nd visit
250MHz GPR antenna

Project: St. Jerome's Church, Llangwm

TERRA DAT
geophysical innovation
Tel: +44 (0) 8707 303050

Drawn by/Ref: KZ/5065/5
Date: April 2016

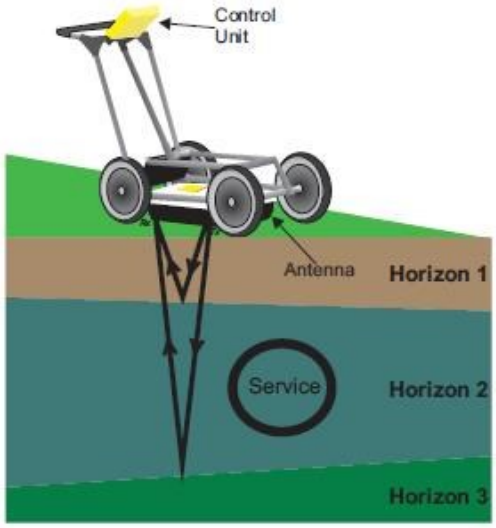
FIGURE 5

APPENDICES

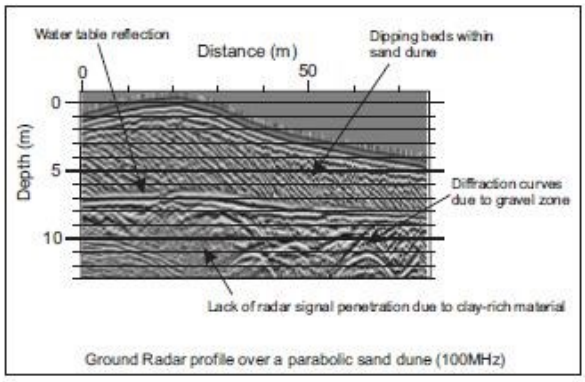
Appendix - Ground Penetrating Radar (GPR)

A Ground Penetrating Radar (GPR) survey involves one or two people either continuously towing a radar system or taking readings at very closely spaced intervals along selected traverse lines. GPR systems use a pulsed electromagnetic (radio wave) transmitted via a tuned frequency antenna that can penetrate soils, rock, concrete, and many other natural and man-made materials. Reflection events from geological or hydrological boundaries between sufficiently contrasting materials are recorded via a receiver antenna. A time-depth cross-section (radargram) of the shallow subsurface is constructed as the radar system is moved along a survey line. The radargram can be depth calibrated to enable detailed interpretation given known or measured velocities for the materials being investigated. While viewing relatively raw radar data can prove useful in the field there are numerous processing routines that can be employed to significantly improve the results. Final sections are presented showing annotated features of interest with apparent depth calibration.

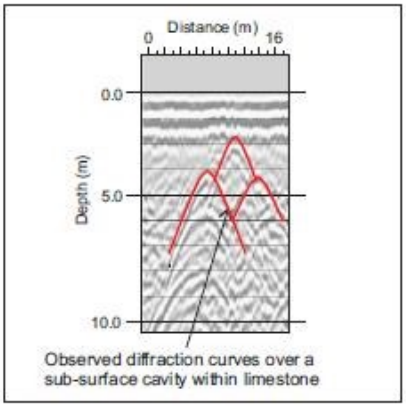
General principle of Ground Radar



GPR Survey in progress



Ground Radar profile over a parabolic sand dune (100MHz)



Observed diffraction curves over a sub-surface cavity within limestone

In order to improve the quality of the recorded radar data, a number of processing routines can be applied to the data using dedicated software (REFLEX). The final radar sections are converted to depth by applying a conversion velocity, which is usually based on an average velocity value for the local sediments. Without any additional calibration the measured depth to a particular feature is likely to be resolved within a 20% error margin depending on the local velocity structure.

Constraints:

The main limitations affecting radar surveys are the presence of conductive materials near surface (e.g., clay and water) which reduce penetration, and blocky material which scatters signal.

TERRA DAT

APPENDIX III: Description of St Jerome's from the Cadw Welsh Historic Churches Project (Ludlow 1998)

ST JEROME,
LLANGWM,
PEMBROKESHIRE (PRESELI)

Dyfed PRN 3196

RB No.

NGR SM 9903 0938

(No Listed Building information available)

SUMMARY

Medieval church; 75% medieval core fabric.

A 5-cell church, medium-sized, 'cruciform'. Consists of chancel, 2 bays; nave, 4 bays; transeptal north aisle, 2 bays; south transept, 1 bay; all medieval. South porch, 1880s. Boilerhouse (south of nave), 2 bays, earlier 20th century.

Construction is in limestone rubble. 90% of internal walls are rendered/plastered. Slated gable roofs; boilerhouse with an asbestos lean-to. Chancel arch; south transept arch, vault and blocked spiral stair; Decorated piscina, 2 tomb recesses (with effigies) and north aisle arcade; squint; rood-loft corbels; blocked and rebuilt windows; blocked doors; buttresses; all medieval. Blocked 17th century window. Most other windows, south door and porch, western bellcote, 1880s. West window, later 20th century.
(3 incised stones, medieval, not in situ?.)

Roofs and floors: 1880s. Finishes: 1880s, repointed 20th century.

Condition - good.

Archaeological potential - very good. Deep revetted cutting runs around 50% of church, primary, footings exposed in 10% of church; 100% of floors raised; floors suspended, with underfloor void; boilerhouse floor below-ground?; no internal crypt/vault evident; no evidence for former components beyond church; memorials lie significantly close to 20% of church.

Structural value (pre 19th century) - good. 75% medieval core fabric. Medieval arches and arcade, vault, blocked spiral stair, Decorated piscina and 2 tomb recesses (with effigies); squint; rood-loft corbels; blocked and rebuilt windows; blocked doors; buttresses; all medieval. Blocked 17th century window.

Phasing:
Phase 1 - Chancel and nave, 13th century?.
Phase 2 - South transept, earlier 14th century.
Phase 3 - North aisle, later 14th century.
(Phase 4 - Restored c.1850, low impact?; no new components.)
Phase 5 - Restored 1880s, medium-high impact; south porch built.
Phase 6 - Boilerhouse, earlier 20th century.

DESCRIPTION

St Jerome, Llangwm, is a 5-celled church, of medium size, 'cruciform'. It retains approximately 75% medieval core fabric.

The church now consists of a 2-bayed chancel, a wider 4-bayed nave, a 2-bayed north transeptal aisle, a small, single bayed south transept, and a south porch. There is also a 2-bayed boilerhouse between the nave and the south porch east wall. Construction is in predominantly in medium-large limestone rubble, with some Old Red Sandstone, unsquared and uncoursed. Pointing from the 1880s lies beneath extensive 20th century ribbon pointing; internal render/plaster, 1880s. Roofs are slated gables, the nave always roofed at a higher level; the boilerhouse is lean-to roofed in asbestos.

A deep, narrow revetted cutting runs around the east and north walls of the chancel, the north transept and the nave north and west walls; it is mainly primary but the nave north wall footings are exposed. The floors have been raised throughout. Floors are suspended throughout, with an underfloor void. The boilerhouse floor is probably below-ground. No internal crypt/vault is evident. There is no evidence for any former components beyond the present church walls. A railed tomb lies against the chancel east wall, and further memorials lie significantly close to the chancel south wall and north transept west wall.

The nave and chancel are probably contemporary and divided by a chancel arch of 13th-early 14th century date. The south transept may be an addition, but is broadly contemporary; the arch into the nave is similar to the chancel arch. The north aisle is from the later 14th century and exhibits fine, Decorated mouldings, but may have been rebuilt from an earlier component (see below). The church was formerly entered through opposing north and south doors, blocked before the 1880s when a doorway in the present position had already been inserted. The south porch is from the 1880s and the boilerhouse is from the earlier 20th century.

The present church

The upper sections of the chancel were substantially rebuilt, probably during the 1880s, in muddy limestone rubble. The rebuilt section includes the 3-light east window exhibiting geometric tracery in oolite, from the 1880s. There are 2 cusped single lancets in the north wall, and one in the south wall of the west bay; all are from the 1880s but the north wall windows occupy the rebuilt embrasures of medieval predecessors. The south widow was newly inserted in the 1880s; the window interrupts the ?2-centred head of a blocked doorway, visible externally and blocked before the 1880s, while to the east of the window the remains of the cusped surround of a single lancet from c.1500 are visible, associated with a corbel of unknown function at mid-height, in the angle with the south transept east wall. The plain, 2-centred chancel arch is from the 13th-early14th century, and there are 2 corbels on the west face below the arch apex, associated with the rood-loft beam. Externally, a square, yellow-brick chimney exits through the gable upstand, from the 1880s?, associated with a free-standing stove?, the flue below is blocked. The softwood chancel roof has princess-post trusses arch-braced from wall-corbels, and is from the 1880s. The east bay floor and passages are tiled, from the 1880s, with suspended board flooring in the west bay; the floors are raised from their medieval level throughout.

The nave fabric is substantially similar to that in the chancel, but the upper sections do not appear to have been rebuilt. There is a window in both the north and south wall, like the chancel east wall but -light, and inserted in the 1880s into pre-existing embrasures. Beneath both window sills is visible the blocking of a former doorway; the material blocking both the north and south doors is identical and both may have been blocked at the same time, when an entry was established at the south west corner of the nave. The embrasure and 2-centred surround in the latter are from the 1880s, but the entry itself is earlier. The west wall is slightly battered and has large, raking buttresses at either end, the southern medieval and the northern an addition of the 1880s. The gabled single bellcote has a 2-centred opening and was entirely rebuilt in the 1880s; there is a bell. The west wall window is of 2 cusped lights with a mouchette, all in

composite stone from the later 20th century but replacing a window of the 1880s, again inserted into a pre-existing opening. The nave is roofed like the chancel, and floored as the chancel west bay, from the 1880s.

The north aisle is of 2 bays but is transeptal in form; it might be described as either a transept or an aisle. It was (re)built c.1380 as a chapel of the Roche family and is rich with contemporary, Decorated mouldings; the upper sections were, however, rebuilt like the chancel in the 1880s. It communicates with the nave through a 2-bayed arcade beneath a 2-centred relieving arch; the individual arches have chamfer-moulded heads on an octagonal pier which has a simply-moulded capital and a base obscured by the later flooring. It is lit by windows in the east and north wall. The former is a fine, 2-light window with cusped ogee-heads and a quatrefoil-pierced spandrel, in a limestone surround, all from the late 14th century, but unblocked and restored in the 1880s. The north wall window is like the nave side wall windows, and though on the site of a pre-existing opening, was entirely rebuilt in the 1880s including infill. In the east wall is a fine Decorated piscina (Barnwell, 1884, 33-5) with a triangular-headed recess with armorial relief-work and a projecting square canopy which is cusped, and exhibits similar relief-work; a moulded pinnace rises from the top of the canopy and the cylindrical bowl, with similar relief-work, lies upon a cylindrical attached shaft. In the north wall are 2 tomb-recesses with similar mouldings; both have ogee-heads , cusped and pinnacled, and the tomb-chests are panelled. The eastern recess contains the effigy of a knight, from c.1380 and contemporary with the recess itself (Laws and Edwards, 1911, 214-9), while the western recess contains a female effigy of similar date (Laws and Edwards, 1909, 341-5). The aisle is a transeptal gable and is roofed like the nave, from the 1880s. The floor is probably like that in the nave and has been similarly raised, from the 1880s, but lies beneath a later floor-covering.

A small squint leading into the chancel was discovered in the south-west corner of the aisle in 1910. It is carried diagonally as an external squinch in the angle between the aisle east wall and the chancel north wall, and has a segmental head; its sill is interrupted by the chancel north-east window. The squint is lit by a single-light window with a square head and surround, 14th century. The eastern respond of the aisle south wall arcade is cut out around the squint as though the latter were a pre-existing feature, which would suggest that the aisle was a late 14th century rebuild of an earlier component. The rebuilt squint was given a surround including an armorial device.

The small south transept is lit by a window in the south wall like the nave windows, from the 1880s and enlarged from an earlier opening. A blocked window in the east wall is visible externally as a segmental arch and square surround, of a single-light window?, of the 17th century?; it had been blocked by the 1880s but its embrasure had survived as a recess. There is an internal corbel to the south of the same wall, medieval, function?. A spiral stair apparently exists in the thickness of one of the transept walls (Anon, 1910, 319) but was not observed 23/10/97; It may be represented by the squinching of the internal north-west corner, now with a square 'aumbry' opening, contracted from a former door?. the stair presumably led to the former rood-loft. The south transept is vaulted with a segmental barrel-vault from the earlier 14th century. There is a suspended board floor throughout, and is now used as a vestry.

Developmental history

Richard Fenton visited the church c.1811 (Fenton, 1903, 132-3) and noted the north aisle effigies, piscina (which was broken), and its moulded arcade. Samuel Lewis described the church in 1833 as 'a spacious and venerable structure, in the early style of English architecture' (Lewis, 1833).

By 1856 the church had been so 'entirely modernised, externally, as to discourage any examination of the interior' (Glynne, 1885, 212-3). The plan was as at present, but without the south porch and boilerhouse. The windows were all 'modern'. The north aisle, however, is described as it exists at present, and all its medieval features were visible. The exterior had been rough-cast, and the interior was 'fantastically painted red'. To this account can be added the information contained within the faculty bundle for the later restoration (NLW, SD/F/379). Two blocked windows are shown in the north wall of the chancel, which was lit by just one single-light window (19th century?), in the east wall. The south door was in its present location, and the present nave window openings are shown, but were single light and timber framed

(sashes?); a blocked window lay to the east of the south window. Similar single light windows occupied both transeptal end walls, and both their east wall windows were blocked. The floors were flagged. There was a west gallery, and the church was seated with a mixture of box-pews and benches.

The church was restored again to the specifications of the architect E. H. Lingen Barker, of London, Hereford and Tenby. The Faculty bundle for the restoration curated by the NLW (NLW, SD/F/379) is marked 'not granted', yet it is apparent from the plans and elevations that all the proposed work was carried out. The bundle is also undated, but Barker was chiefly active during the 1880s. It is, moreover, apparent that a heating apparatus had been installed by 1884 (Pembs. R. O., HPR/6/44). The west gallery, all fittings and floors were removed, the bellcote was taken down and the chancel, north aisle and south transept walls were partly taken down. The external cutting was (re)excavated and given its revetment walling. The upper portions of the chancel, aisle and transept walls were rebuilt. The church was refenestrated with the present windows which, with the exception of the chancel south window, occupy pre-existing openings, all of which were rebuilt to a greater or lesser degree; it had been intended to restore the medieval chancel south window. The interiors were replastered, all of the existing plaster having apparently been removed. The church was reroofed including tabling, and refloored, at a higher level than in the medieval church. New fittings included the present softwood stalls and desk, and the similar pews, the altar rail and vestry screen in the south transept. The font was moved to its present position, and restored. The oolite pulpit may be later.

The south porch was new built as part of the restoration, in squared and coursed rubble. The side walls are buttressed at the ends, and the doorway has a 2-centred oolite surround and drip-mould. The softwood roof comprises common rafters with collars and ashlar posts, from the 1880s, while the floor was retiled in 'marble' slabs in the later 20th century. The porch was 'rebuilt' in 1897 (Pembs. R. O., HPR/6/44) but the extent of this work is not known.

The organ was 'opened' in 1891 (Pembs. R. O., HPR/6/44), and presumably located in the chancel; it was moved to the aisle in 1917.

There has been a considerable amount of further work. The squint from the north aisle, which had been blocked, was revealed in 1910 (Anon, 1910, 319) and the piscina bowl, hitherto broken, was discovered during the unblocking. A blocked spiral stair was also apparently discovered in the south transept (ibid. - not observed 23/10/97). The church was repaired in 1915, together with roof and seats, for £21 13s 6d (Pembs. R. O., HPR/6/44).

The boilerhouse was erected south of the nave, and against the south porch east wall, during the first half of the 20th century. It is of brick, with an external roughcast render, and comprises 2 bays with an internal structural division beneath a lean-to roof of corrugated asbestos sheeting. There are 2 plain doorways in the south (side) wall. The interior was not seen 23/10/97; the floor may lie beneath yard level.

There were minor alterations through 1955-66 (Pembs. R. O., HPR/6/40). The nave west window was rebuilt, and the porch floor retiled. The altar table is from the 1980s.

The limestone font has a plain square bowl and a cylindrical base, probably 13th century. The base is from the 1880s.

There were 3 14th century incised wheel-crosses lying loose in the church in 1925 (RCAHM, 1925, 136); 2 had their heads complete, the third was represented by a broken portion of its shaft and calvary. One lies against the south transept arch west jamb.

No Listed Building information available.

(The south transept is traditionally known as the Roch Chapel).

SITE HISTORY

There is no firm evidence for any pre-conquest religious use of the site.

St Jerome, Llangwm, was a parish church during the post-conquest period, of the medieval Deanery of Roose (Rees, 1932). The living was a rectory, appendent to the Manor of Llangwm of the Lordship of Haverford (or 'Roose'), which from the 13th century was a possession of the Roches (Green, 1912, 222-3). The patronage later descended, through inheritance, to the Longueville and Ferrers/Devereux families. With the downfall of the Earl of Essex, his possessions, including the patronage of Llangwm, fell to the crown, and it was subsequently held by a succession of individuals. Llangwm is not mentioned in the 'Taxatio' of 1291, but in 1536 the church of 'Langome' had an annual value of £7 12s 11d, in tenths 15s 3½d (ibid.).

In 1786, the discharged rectory of Llangwm, of the Archdeaconry of St David's, had an annual value of £47, rated in the king's books at £7 12s 11d (ibid.), and by 1833 was endowed with £200 parliamentary grant (Lewis, 1833).

In 1998 St Jerome, Llangwm, was a parish church. The living was a rectory, held with Freystrop and Johnston (no Benefice No.) in the Archdeaconry of St Davids, Rural Deanery of Roose (St Davids, 1997-8).

(The dedication was traditionally rendered as St Heirom; the current accepted form is Jerome.)

SOURCES CONSULTED

Map Evidence

NLW, Parish of Llangwm, Tithe Map, 1840.

Rees, W., 1932, South Wales and the Border in the XIVth century.

Church in Wales Records

St Davids, 1997-8, Diocesan Year Book.

NLW, SD/F/379, Faculty - Restoration of church (not granted?), n.d.

Parish Records, Pembrokeshire Record Office, Haverfordwest

HPR/6 - Llangwm:-

HPR/6/1 - Parish Register, inc. Churchwardens' Accounts, 1741-2, 1755, 1761-3.

HPR/6/36 - Correspondence re: opening of new burial ground, 1881.

HPR/6/40 - Archdeacon's authorisation for minor alterations, 1955-66.

HPR/6/44 - Vestry Minute Book, 1883-1920.

ST JEROME'S CHURCH, LLANGWM, PEMBROKESHIRE: ARCHAEOLOGICAL WATCHING BRIEF

DYFED ARCHAEOLOGICAL TRUST

RHIF YR ADRODDIAD / REPORT NO. 2016/12
RHIF Y DIGWYLLIAD / EVENT RECORD NO. 109237

Medi 2016
September 2016

Paratowyd yr adroddiad hwn gan
/ This report has been prepared by:

Alice Day

Swydd / Position: **Archaeologist**

Llofnod / Signature Alice Day Date: 18/Jan/2017

Mae'r adroddiad hwn wedi ei gael yn gywir a derbyn sêl bendith
/ This report has been checked and approved by

Jim Meek

ar ran Ymddiriedolaeth Archaeolegol Dyfed Cyf.
/ on behalf of Dyfed Archaeological Trust Ltd.

Swydd / Position: **Head of DAT Archaeological Services**

Llofnod / Signature James Meek Date: 18/Jan/2017

Yn unol â'n nôd i roddi gwasanaeth o ansawdd uchel, croesawn unrhyw sylwadau sydd gennych ar gynnwys neu strwythur yr adroddiad hwn

As part of our desire to provide a quality service we would welcome any comments you may have on the content or presentation of this report

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