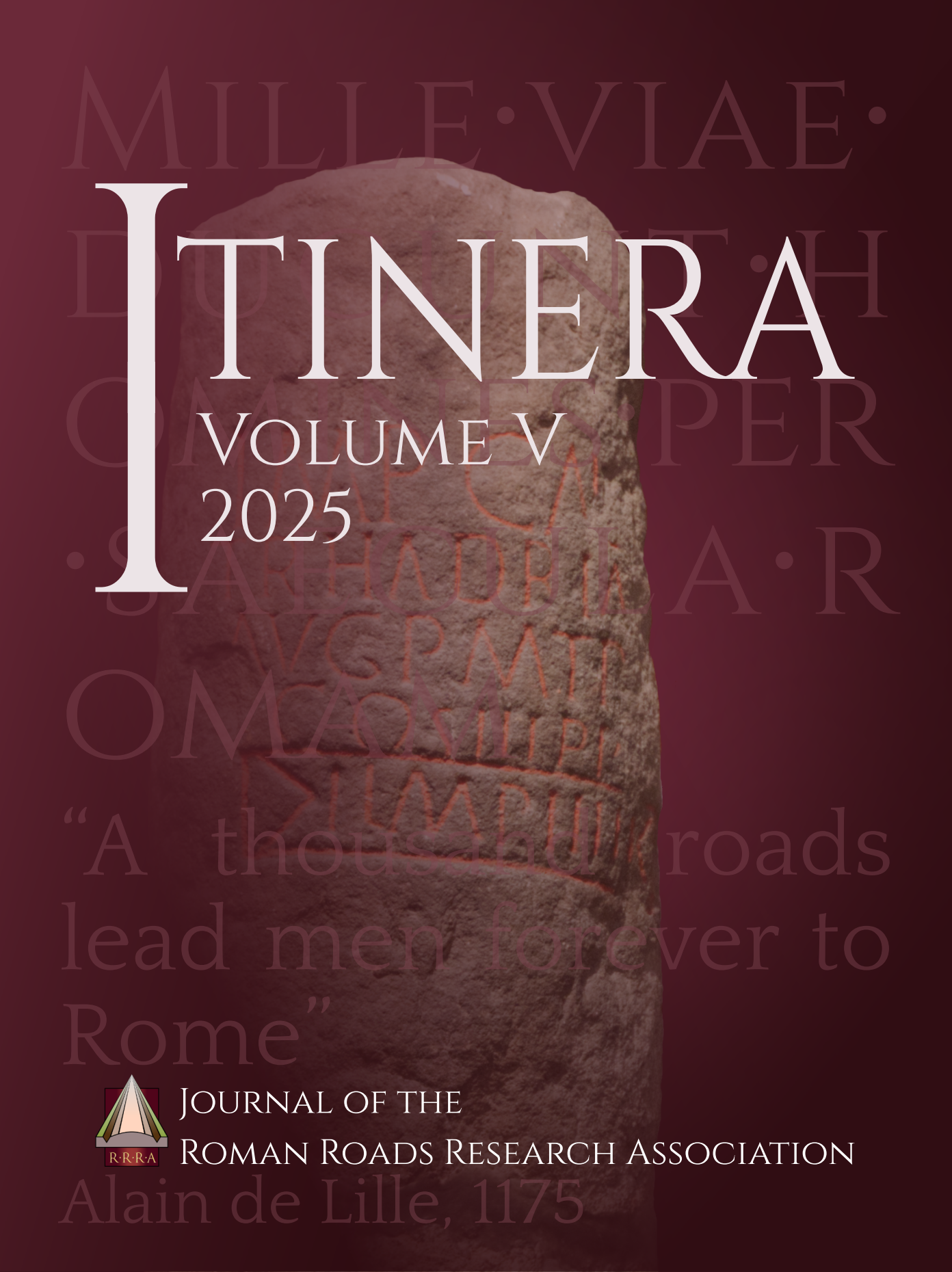


ITINERA

Volume V

2025

"A thousand roads lead men forever to Rome"

Alain de Lille, 1175

Journal of the
Roman Roads Research Association

ITINERA

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Editorial

Robert Entwistle



Welcome to the 2025 edition of *Itinera*, Volume V. *Itinera* continues to hold a unique position among academic journals of Roman studies, with roots in both the academic and grassroots communities. We focus upon the study of Roman roads, transport technology and systems of surveying. We welcome reports and contributions from all researchers able to extend knowledge in these areas to professionals and the public alike, through the format of a formal academic paper.

Volume V, if slenderer than the bumper 2024 edition, is typical in its range of papers. Thus, Wayne Kirk extends our knowledge of Roman Northamptonshire in the light of modern findings, through a wide-reaching paper appraising its road network. Mike Luke, well respected for his excavations and publications on Roman Bedfordshire, shows how a developed understanding of the 'small town' of Sandy leads to an improved appreciation of the local roads. The same theme of road networks is explored in a different way by Keith Abbott, who argues that minor roads and trackways are seriously under-represented in our present appreciation of Roman roads.

Neil Godfrey, by contrast, addresses a wholly different issue: the relationship between roads and Romano-Celtic temples, with roads providing not only transport and passing clients, but also planned landscapes within which temples stood. My own paper is different again, examining ancient surveying methods through the features of extant surveyed works, classical literary sources, and modern surveying techniques. This methodological paper ends my series of papers on Long-distance Alignments. We are also pleased to have a paper from an independent researcher, Paul Smith – one of our own members – presenting his thesis of a road formed over time, from the Iron-Age into the Roman period and beyond.

In this volume we further welcome two authoritative papers from leading academics in Romania, demonstrating the growing understanding of Roman roads in a part of the empire that has received limited attention in the UK. In understanding the growth of road networks in a territory newly brought within the empire we see the link between conquest and road construction, and reflect on the impact of recent political change upon research.

As always, I warmly celebrate the work of our academic advisors and our willing team of volunteers who carry out many critical functions: proofreading, creating the Index, reporting updates from across the country, and managing distribution of printed copy. *Itinera* would not be possible without the willing labours of these individuals, and above all without the editorial team who manage the life of our journal across the year. The process moves from gathering papers and archaeological updates, through review, selection, editing and typesetting, through to final publication. Dr Mike Bishop – writer, publisher and archaeologist – was a founder member of our editorial team, guiding us through the formative first four years of our existence. His expert advice on publishing and all matters Roman helped steer us through a period when everything was new. His international contacts extended knowledge of our journal to contributors as far away as Spain (and most recently) Romania. *Itinera* owes him a great debt as he moves on to other things this year.

With Mike leaving, we are delighted to have welcomed to our team Professor James Gerrard of the University of Newcastle. James Gerrard brings great academic distinction, strengthening us with his experience and calm judgements. Already he has inspired the initiative of an annual Prize for the best Dissertation reflecting Roman Transport studies. Details of the prize (readily available on request)

have been distributed through SALON and the RRRA Newsletter and will shortly be available on the RRRA website. We hope to see this prize awarded for the first time in 2025.

I take this opportunity of warmly welcoming submissions, projected or actual, for Volume VI of Itinera, from all corners of Britannia and the wider empire. You will find '*Notes for Contributors*' on the RRRA website.

In the meantime, I invite you to enjoy everything within Volume V.

Robert Entwistle

(Hon Editor, *Itinera)*

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Trails of Breadcrumbs: Predictive Methodologies used to Enhance Analysis and Discovery of Past Movement across Roman Britain

by Keith Abbott
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Abstract

The Roman conquest marks a well-documented horizon of prolific road construction across Britain, with the transformative societal effects of this road network extending well beyond the Roman period. lidar analysis and geophysical surveys undertaken by researchers continue to reveal previously unknown Roman (and pre-Roman) roads suggesting that the full extent of Roman Britain's network of thoroughfares is far from complete – particularly minor roads and trackways which are notoriously difficult to both identify and date. This paper explores the potential for using the distribution of dateable material culture and soil types together with GIS analysis as an integrated methodology for predicting likely corridors of movement across the Romano-British landscape and locating extant remains.

Introduction

Archaeological research traditionally focuses on monumental remains which present a 'static' view of past occupation. The Roman Rural Settlement (RRS) study extends this 'static' perspective of Roman Britain by analysis of 3,562 grey literature site reports. Whilst the RRS study characterises the Romano-British rural settlement landscape as having an extensive network of major-roads, minor-roads, trackways and rivers used for travel and transportation (Smith *et al.*,2016, 176), it does not attempt "*dynamic*" analysis of the past movement of people and objects between these nodal settlement locations. Similarly, research exploring mobility and migration during the Roman period focuses on the analysis of DNA and isotopes from human burials (Eckardt *et al.* 2014; Eckardt and Müldner, 2016, 203-233) to identify the diverse ethnicity of individuals present within urban settlements of Roman Britain when they died. However, the "*dynamic*" patterns of movement and the narratives that created these urban diasporas remain largely unexplored. Modern West Berkshire is a mostly rural county within only 7% of its area classified as urban, and presents a fragmented and relatively sparse record of Romano-British occupation. The known Roman roads of West Berkshire mostly emanate from the *civitas* capital *of Calleva Atrebatum* (Silchester), and are thought to mostly date to the Late 1st century AD. The distribution of Romano-British monuments

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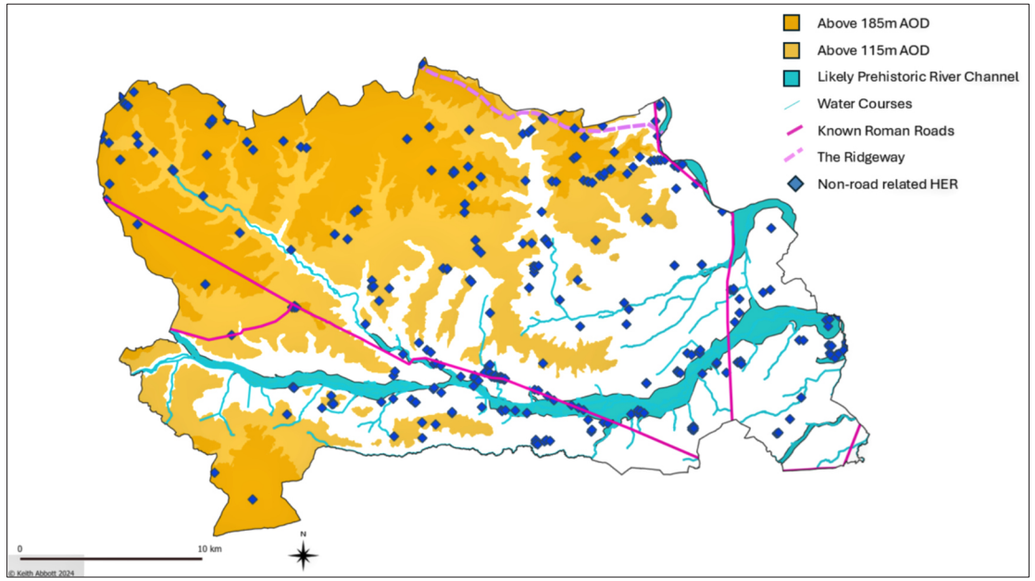


Fig. 1 - West Berkshire in relation to known Roman roads and settlements. Contains public sector information licensed under the Open Government Licence v3.0.

recorded across West Berkshire Historic Environment Record (HER) shown in Fig. 1 appears largely disassociated from the known major-roads, and Fig. 2 highlights the low number of minor roads/

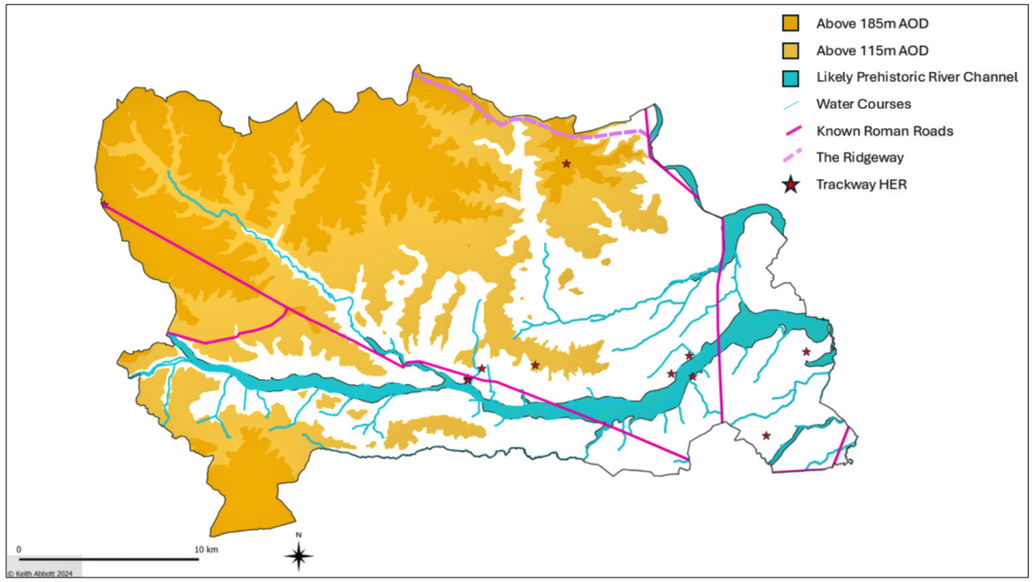


Fig. 2 - Non-road related HERs relative to known major-roads and predicted minor-roads/trackways of Roman West Berkshire. Contains public sector information licensed under the Open Government Licence v3.0.

trackways recorded as monuments on the HER database. Together this suggests that the minor roads and trackways of the Roman period are significantly underrepresented within the archaeological record.

Analysis of Material Culture Distribution across West Berkshire

Of the 1.6 million artefacts recorded on the Portable Antiquities Scheme (PAS) database, more than 90% are metal, 44% date to the Roman period with 74% of Roman period PAS artefacts being coins. Roman period artefacts are also recorded on the HER database and the catalogues of local museums, but these three datasets are rarely consolidated due to PAS data being so extensive and easily accessible compared to other datasets, and the lack of a scalable IT solution to integrate them. However, PAS data is subject to significant collection biases resulting from its reliance on metal detectorists who search almost exclusively in rural areas. Conversely, HER and museum data exhibits urban collection biases driven by commercial development, populations density and museums themselves being mostly situated in developed areas.

Distribution analyses of Roman material culture have long been used to identify the likely location of previously unknown Romano-British settlements. Other research correlates chronological patterns of Roman coin loss within site assemblages to predict settlement function (Reece 1991; Reece 1993). To utilise these methods to their fullest extent, the number of data points (i.e. find spots) needs to be maximised and inherent biases mitigated. Biases, particularly collection biases, can significantly distort distributions of find spots within each of the datasets as can be seen in Fig. 3. Consolidation of

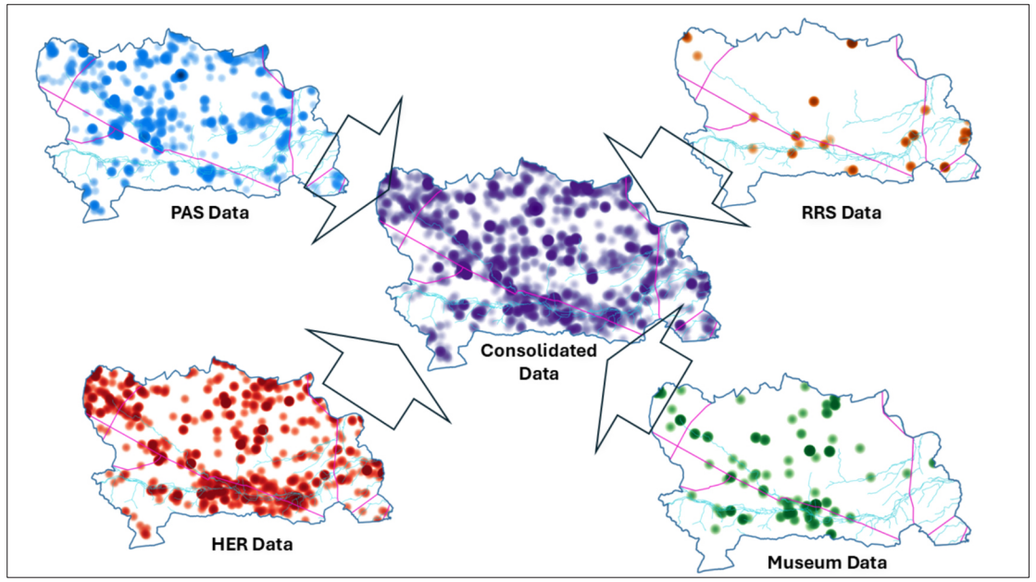


Fig. 3 - Illustration of the degree of bias inherent with West Berkshires PAS, HER, RRS and Museum data sets. Contains public sector information licensed under the Open Government Licence v3.0.

the West Berkshire Romano-British artefact assemblage results in a dataset of unique findspots that is 1.9x larger than the 'PAS only' dataset and largely neutralises inherent collection biases (Abbott 2024) as also illustrated in Fig. 3. However, analysis of bias was also extended to identify potential "*blind spots*" within the archaeological record (e.g. private estates that don't permit access to metal detectorists) and potential "*false positives*" (e.g. where metal detecting rallies or archaeological excavations have recorded isolated concentrations of finds) that require closer inspection.

Pottery finds recorded on the HER and PAS are generally not identified or dated to the same high level of provenance seen within specialist reports for site excavations, making PAS/HER records of pottery finds difficult to analyse meaningfully. Whilst site excavation reports contain detailed records of their pottery assemblages, the distribution of sites excavated is itself subject to a significant urban bias as seen for RRS data as shown in Fig. 3. Consequently, the methods used by past researchers to correlate material culture distribution to likely settlement locations tend to exclusively use metal artefacts (cf Brindle 2014, 7). Clusters of metal material culture are ranked using interpretation schema presuming cluster size to be directly proportional to settlement size as the cumulative outcome of frequent past human visits resulting in greater artefact deposition over a prolonged period. For this study, following Brindle (2014, 23), clusters are defined as the number of metal artefacts found within 200m proximity to each other with a notional central point (using GIS) ranked into "*small*" (2-4 artefacts), 'medium' (5-10 artefacts) and "*large*" (11 or more artefacts) cluster sizes. Hoards represent a significant distortion to cluster analysis as they comprise a large number of finds associated with a single act of deposition, so were excluded from this cluster analysis to be assessed separately.

RRS data for the wider Berkshire area (i.e. Central Belt Region) concludes that 77% of farmsteads and 89% of villas were located within 5km from major-roads (Smith *et al.* 2016, 177-179). The distribution of medium/large material culture clusters across West Berkshire shown in Fig. 4 suggests the probable locations of additional settlements where monumental remains have yet to be discovered (and recorded on the HER) due to lower rates of rural discovery. The likelihood of the existence of a higher number of settlement nodes than previously thought adds further weight to the argument that the roads, minor roads and trackways interconnecting these settlements are under-represented within the archaeological record.

Using predictive methods to identify 'invisible' minor roads and trackways

As well as highlighting the possibility of a "*missing*" network of roads, minor roads and trackways, analyses of material culture deposition offer the potential to identify these past corridors of movement. Walton (2011, 31) argues that as well as locating settlement *foci*, coin distribution can indicate the routes of past thoroughfares particularly in under-researched rural areas. Objects are inherently portable - but don't move themselves, rather it is people that move them (Aldred 2020). This theoretical distinction supports the use of artefact distribution as a proxy for the past movement of the humans who carried objects prior to deposition. Having a significantly larger and unbiased dataset further increases the viability of this approach.

However, care must also be taken as different object types of have different "*usage-biographies*" (Dannehl 2017, 171-186) resulting from "*human-object*" interactions being influenced by factors such

as size, shape, value and material. These factors need to be taken into account when selecting proxy for past movement. Coins account for 74% of Romano-British artefacts on the PAS database, most of which are low denomination copper alloy coins. The inherent portability of such coins, their small size (i.e. high propensity for casual loss) and low value (i.e. low propensity for recovery) make them well suited for use as a proxy for past human movement. However, care is still required due the inevitable conflation of usage biographies of artefacts deposited as the result of monetary exchange (e.g. markets), taxation collection and/or religious activities. Conflation is also inevitable in the case of coin deposition occurring as a function of movement within settlements, and between settlements over various distances . Whilst coins are not a definitive indicator of the past movement of all people within a population, their distribution offers insights into the cumulative movement of those segments of the population using coin as part of their daily lives. Hence coins work best as proxy for past movement during the Late Roman period when use of coin by the rural population is thought to have peaked (Walton 2011, 31).

Other types of portable material culture can also be used as proxies to suggest the shared identity of the individuals who wore/used/deposited them. For example, the distribution of diagnostic brooch types may indicate the extent of movement of the groups of people who wore types of brooch, and the distribution of writing implements can be used to assess the past movement of literate persons. However, the much lower numbers of finds dilutes interpretations made across the wider area needed to ensure statistical significance.

Predictive archaeological modelling is routinely used in USA, Canada and Netherlands to identify areas under threat of development that are "*most likely to contain*" extant archaeology. Predictive methods have been used to analyse likely Roman settlement patterns across southern Britain by using HER data, topological factors (e.g. height AOD, water supply and soil character) and environmental archaeological data to model the likely distribution of farmsteads, field systems, trackways, villages and villas (Chadwick 2023). Middle-range theory argues that the "*static record*" of archaeological data gathered in the present is linked to the "*dynamics*" of past societies by assumptions made in the "*middle-range*" between the two (Johnson 2020). Thus, predictions of areas with high archaeological potential are justified so as long as three conditions are met:

- biases inherent within input data have been thoroughly assessed and mitigated;
- diagnostic assumptions made are explicitly listed;
- predictions made are tested against hard archaeological evidence.

Academic theorists have debated the merits of predictive archaeology since the 1980s, however improving information technology has seen the emergence of powerful tools such as Geographical Information Systems (GIS), Artificial Intelligence and Virtual Reality that are increasingly capable of processing large datasets. GIS "*least cost travel*" analysis has successfully been used to identify pathways taking account of topographical/environmental factors that require effort (i.e. "*cost*") to overcome such as gradient, wetness of soil or ruggedness of terrain. GIS "*least cost travel*" analysis of southwest Britain has predicted corridors of movement that have been subsequently correlated with the sections of "*lost*" Roman roads discovered by analysis of lidar data to identify landscape features with characteristic linear morphologies, such as parallel ditches and multiple quarry pits along their length (Parcero-Oubiña *et al.* 2023, 62-78). This does not imply that Roman engineers calculated "*least cost travel*" routes when surveying roads - indeed many major Roman major roads follow highly linear courses with limited accommodation of local terrain contours. However, study

of prehistoric trackways such as The Ridgeway demonstrates that many past corridors of movement do follow routes closely aligned with the "*least cost travel*" ideal (Bell 2020, 193). This is the likely result of an organic process of iterative convergence towards routes requiring least effort to overcome, rather than a single act of central planning. This raises the question of the degree that the minor roads and trackways of Roman Britain appropriated pre-existing thoroughfares connecting Iron Age settlements where occupation continued into the Roman period, compared to the "*planned*" network of major roads constructed after the Roman conquest. Little is known of the network of pre-Roman roads (Bishop 2014, 1-15) which is likely to have connected *oppida* settlements. Many *oppida,* such as that at Silchester, functioned as foci of pre-Roman trade suggesting they were nodal points for movement of people and goods. Silchester, like other *oppida* later designated as *civitas* capitals, continued to function as nodal settlements within the road network of Roman Britain (Fulford 2020, 7).

Initial lidar analysis across West Berkshire fails to identify any of the "*missing*" minor roads or trackways. However, whilst the extant remains of major roads such as Ermin Street (RR41) are visible from cropmarks, the modern road routes and field boundaries, sections of other major roads such as the road to Bath (RR53) also cannot be seen. This may be due to roads being overlain by modern thoroughfares, or because less robust construction methods were used for minor roads and trackways which resulted in them being more susceptible to agricultural damage. Deep ploughing was widely used across the clay on chalk geology of the Berkshire Downs, and is cited as being a major factor in the high degree of variability observed for survival of archaeological remains on agricultural land (Trow and Holyoak 2008).

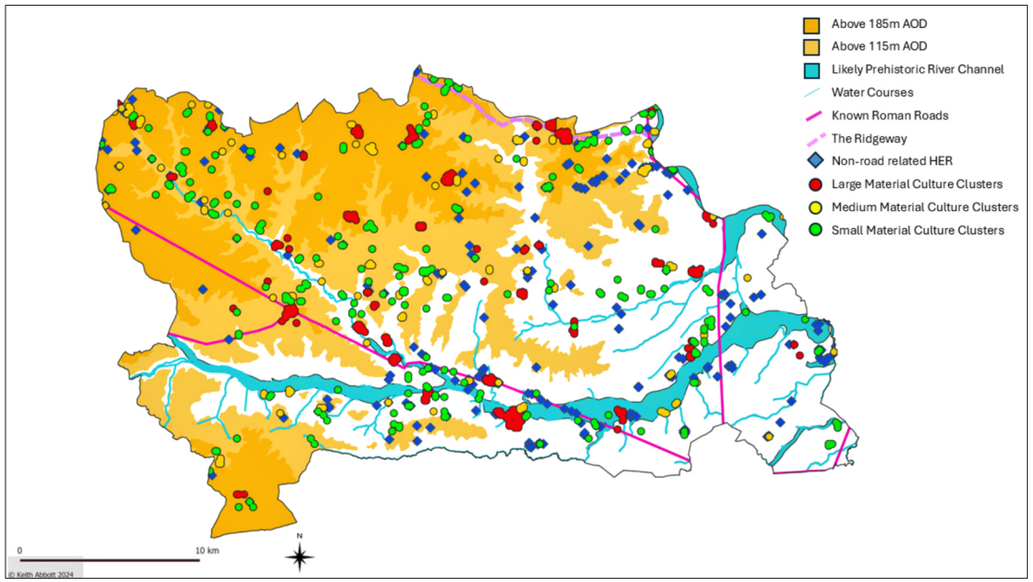


Fig. 4 - Locations of Romano-British material culture clusters and known (non-road) HER Monuments across West Berkshire. Contains public sector information licensed under the Open Government Licence v3.0.

Case study #1: Predicting corridors of movement across West Berkshire

Most of the evidence of the mobility of the population of Roman Britain comes from isotopic analysis of human remains found in context. This suggests that some rural populations of Roman Britain (and the food they consumed) may have originated <30km from the settlements where they were finally interred (Chenery *et al.* 2010, 156). But other research has shown that large Romano-British settlements contained individuals of varying status, professions and genders from across the Roman Empire. (Eckardt and Müldner 2016; Eckardt *et al.* 2014). We know from the historical record that military and government officials travelled widely across Roman Britain using the centrally planned network of major Roman roads described within the *Antonine Itineraries* (Black 1995), many of which survive within the archaeological record. However, the routes used by other segments of the population to move between settlements are largely invisible in the archaeological and historical records. Analysis of West Berkshire's collated PAS/HER/RRS/Museum material culture datasets identifies 'large' clusters of material culture deposits shown in Fig. 4 which are interpreted as probable nodes of Romano-British occupation. The RRS project suggests that these settlement nodes are likely to have been interconnected by a network of roads, minor roads and trackways extending across southeast Roman Britain (Smith *et al.* 2016, 176) used for both long and short distance travel.

The Ridgeway, shown in Fig. 5 running across the Downs in the north of West Berkshire, is one of several prehistoric trackways across upland southern Britain (Bell 2020, 193-195). Excavations along The Ridgeway suggests that minor-roads and trackways continuously evolved throughout the Late-Roman/Early-Medieval period, and may have featured metalling limited to a thin spread of gravel. This contrasts with the robustly engineered major roads constructed by the Roman military capable of sustained usage by wheeled vehicles bearing heavy loads (Margary 1973, 18; Davies 2012, 53). Analysis of lidar across West Berkshire has to date failed to reveal alignments of linear features,

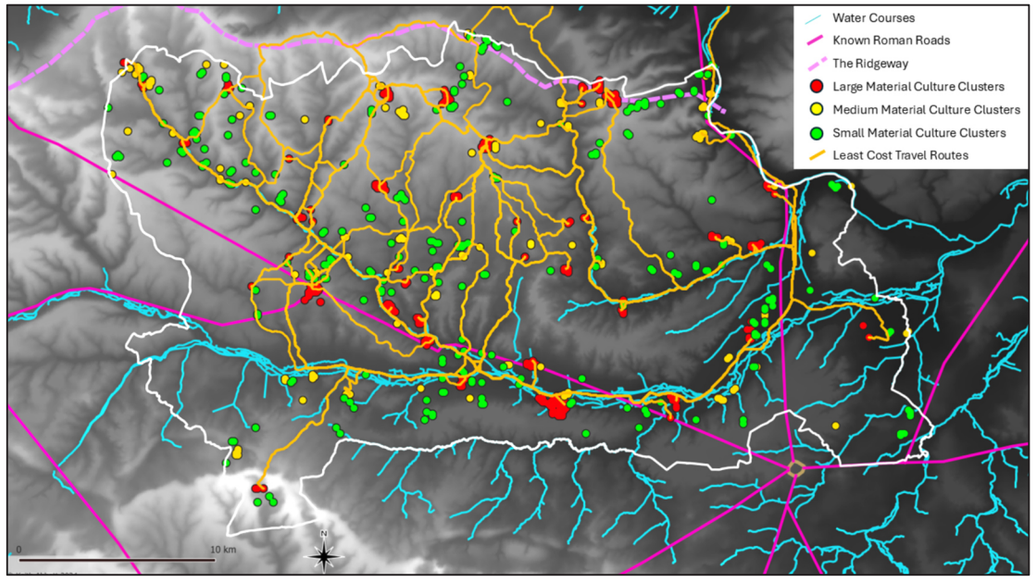


Fig. 5 - GIS derived 'least cost paths' between material culture cluster locations. Contains public sector information licensed under the Open Government Licence v3.0.

parallel ditches and quarry pits indicative of major roads (Parcero-Oubiña *et al.* 2023, 62-78). This suggests that the "*missing*" thoroughfares of Roman West Berkshire may have been mostly minor roads or trackways. Such less robustly constructed thoroughfares are more likely to have sustained agricultural damage, and their propensity for continued evolution/re-use may have resulted in many being overlain by later medieval/modern roads.

GIS terrain modelling identifies the "*least cost travel*" routes between each of these likely settlement nodes based on minimum ascent/descent gradient calculations. It is observed that some sections of the conflated "*least cost travel*" routes between clusters shown in Fig. 5 are utilised multiple times. These dominant sections of 'least cost travel' routes are frequently associated with landscape features such as river valleys, ridgeways, gaps and passes such as The Ridgeway across the Berkshire Downs, the Goring Gap and the valleys of the Rivers Pang, Lambourn and Kennet. Research of prehistoric movement and trackways concurs with the observed frequent utilisation of such landscape features by prehistoric thoroughfares (Bell 2020, 193), whereas the routes of known Roman major Roads shown in Fig. 2 (e.g. Ermin Street) appear to be influenced by these landscape features to a lesser extent. This suggests that there are likely to have been two generic types of thoroughfare connecting settlements across Roman West Berkshire: routes that developed organically over a long period that heavily utilised dominant landscape features; and centrally planned routes constructed over a relatively short period (e.g. Roman military roads) maintaining where possible assigned medium/long distance alignments.

Propensity for movement is driven by a myriad of socio-economic human factors resulting in decisions to travel between particular locations (and not others) being taken many times by many individuals over many years. Whilst 'large' material culture clusters correlate well with locations (e.g.

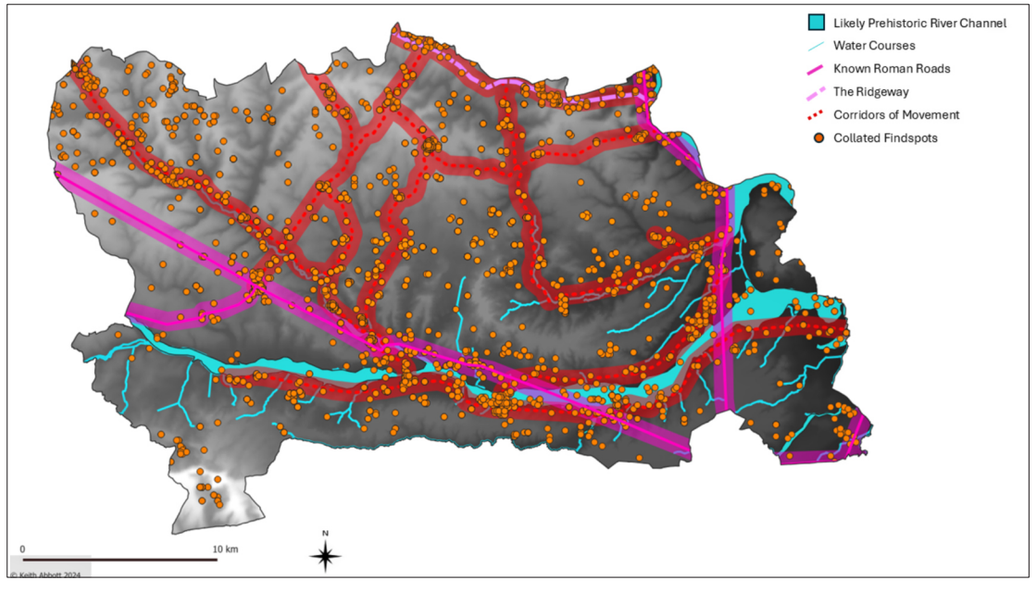


Fig. 6 - Romano-British material culture findspots within 500m/1000m of known Roman Roads, The Ridgeway and likely corridors of movement. Contains public sector information licensed under the Open Government Licence v3.0.

settlements) that people travelled between, it remains unclear which settlements people moved between most frequently and the routes taken when doing so. Assuming that travellers carried portable objects, as well as coins to purchase goods/services en route, over time the actions of travellers would result in higher levels of cumulative material culture deposition along frequently used corridors of movement compared to areas not visited less frequently. Coins in particular have complex "*usage biographies*" used by researchers as indicators of wealth, economic activity and/or religious devotion. However, as past human movement is intimately entangled with material culture deposition, cumulative dateable material culture deposits can be used as a proxy to identify likely corridors of past movement.

Likely corridors of movement were defined using GIS as the areas 500m either side of each "*least cost travel*" route and known Roman roads representing the zones most likely to have been influenced by travellers and exposed to increased rates of deposition. Finds/km of objects dating to the Roman period was used as a normalised indicator of the frequency of usage of the predicted corridors of movement across West Berkshire as shown in Fig. 6. However, ranking deposition rates along the identified corridors of movement was not straightforward as consideration needs also to be made of biases such as "*blind spots*" (e.g. large private estates where metal detecting has not taken place) as well as routes associated with natural landscape features with a high propensity for use as thoroughfares (e.g. river valleys, ridgeways, gaps and passes). The resulting empirical analysis identified the thoroughfares shown in Fig. 7 as being the corridors most likely to have been used for travel between the probable settlement nodes of West Berkshire. GIS highlights that 71.4% of all Roman period artefacts are found <500m from these (known and predicted) routes showing that Romano-British activity was concentrated within these corridors. Material culture deposition suggests that river valleys, in particular the valleys of the Rivers Kennet and Lambourn, were both

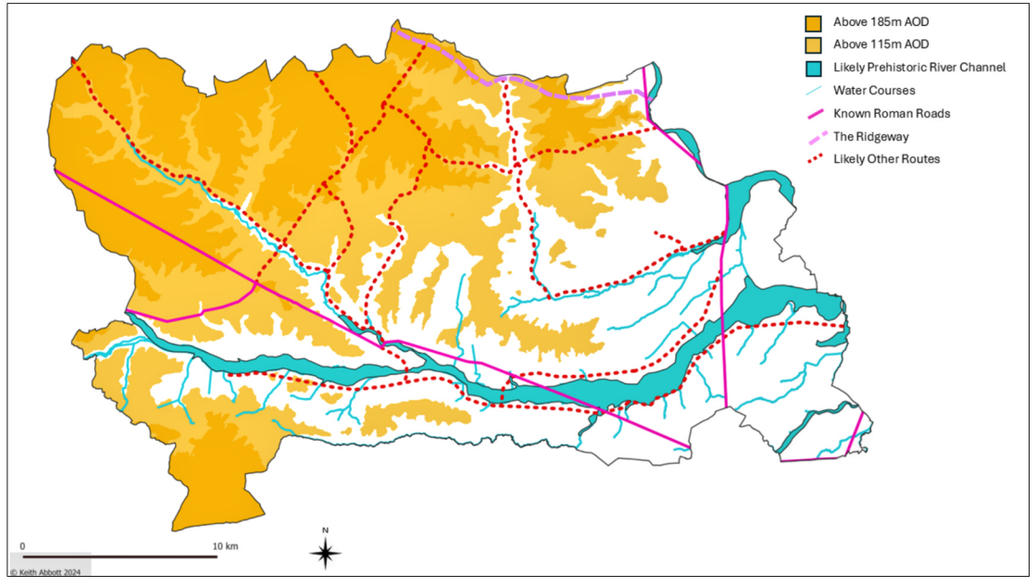


Fig. 7 - The likely routes of West Berkshire's minor-roads/trackways (also known as 'corridors of movement') relative to The Ridgeway and known Roman Roads. Contains public sector information licensed under the Open Government Licence v3.0.

densely occupied and heavily utilised as corridors of movement between settlements. This suggests that riverine thoroughfares are likely to have been closely integrated with the network of roads, minor roads and trackways connecting Roman West Berkshire shown in Fig. 8.

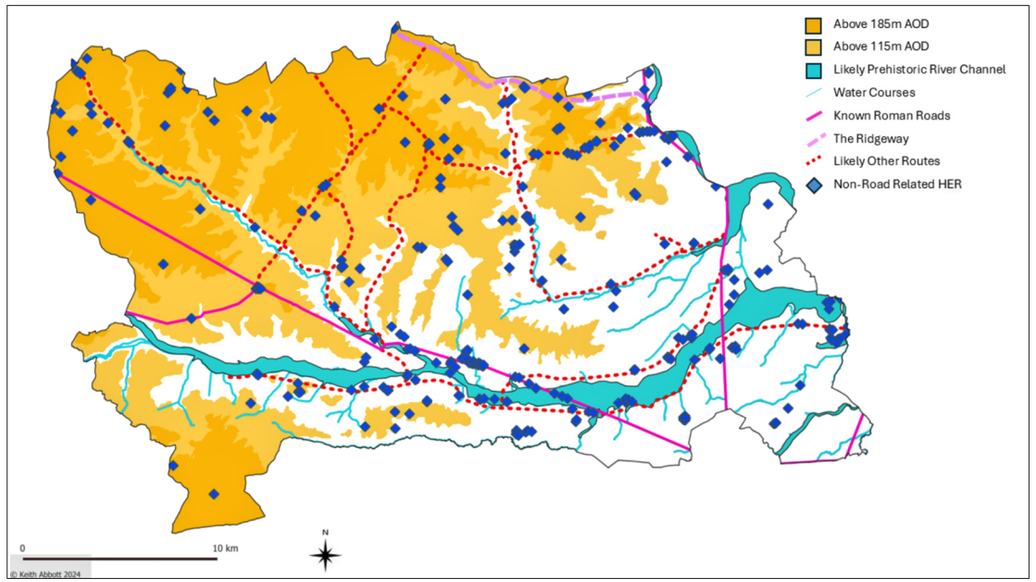


Fig. 8 – Comparison of Non-Road HER monuments with predicted corridors of movement. Contains public sector information licensed under the Open Government Licence v3.0.

Identification of likely corridors of movement using Roman period material culture deposition cannot be taken as definitive proof of a road or trackway having existed. Ultimately archaeological excavation and/or geophysical analysis is required to prove the existence of settlements associated with large clusters of Romano-British material culture and the roads/trackways that interconnected them. However, this methodology offers a credible starting point for much needed research to identify corridors of movement to be further investigated to reveal the "*missing*" major roads, minor roads and trackways of rural Roman Britain.

Case study #2: Locating the route of the road to Bath

The route of the Roman road, RR53, to Bath was extensively researched by Toller (2013, 52-65) heading west from Bath, through Mildenhall, to its intersection with Ermin Street, RR41, in West Berkshire (SU 4042 7113). However the absence of both visible remains and lidar/aerial photography anomalies resulted in the easternmost 2km of the road to Bath (and the location of its intersection with Ermin Street) being highly conjectural. The lack of physical evidence is probably due to sustained agricultural damage from deep ploughing across the largely clay-on-chalk geology of the Berkshire Downs during the 19th and 20th centuries.

Analysis of West Berkshire's collated PAS/HER/RRS/Museum material culture dataset identified a 'large' cluster Romano-British material culture interpreted as a likely settlement located at Wickham,

West Berkshire some 1.5km northwest along Ermin Street of Toller's projected road intersection. The HER records Wickham as a probable Roman roadside settlement on the basis of material culture diagnostic of domestic occupation revealed during excavations (Mundin and Pine 2008, 47-55), but no definitive evidence of the Romano-British settlement itself was recorded. The collated PAS/HER/RRS/Museum material culture dataset identified no other "*large*" material culture clusters along Ermin Street between Wickham and Newbury (6.5km to the southeast) despite PAS finds from other eras showing this part of West Berkshire to have been heavily metal detected. *Itinera XIII/XIV* of the *Antonine Itineraries* describes the way-station of *Spinis* being located '*15 miles from Silchester*' which places it either at the intersection of Ermin Street/road to Bath or to the southeast of the intersection along Ermin Street. Antiquarian researchers identified Speen and Woodspeen as possible locations of *Spinis* (Peake 1931, 90-1, 229). However even allowing for the uncertainties associated with the likely distance of *Spinis* from Silchester, the HER contains little monumental evidence of Romano-British roadside settlement along Ermin Street between Wickham and Newbury.

Geophysical surveys at Radley Farm, shown in Fig. 9, some 3km west of Ermin Street, confirmed that earthworks visible within Stibbs Wood and Three Gate Copse were the remains of the Roman Road to Bath as proposed by Toller (2013, 52-65). A previously lost transcript of excavations of the Roman road to Bath within Three Gate Copse (SU 3770 7050) described the road's morphology in section in detail (Preshous and Bamister 1968, 1-2). However, east of Three Gate Copse the remains of the road to Bath heading towards Ermin Street were neither visible on the ground, from lidar or from aerial photographs. This resulted in a straight line between the earthworks at Stibbs Wood (SU 3674 7029) and Three Gate Copse being adopted as the most likely projection of the road's route towards Ermin Street (Toller 2013, 53).



Fig. 9 - Vertical section at a chalk quarry close to RR53 within Stibbs Wood.

Toller's projection placed the intersection of the road to Bath and Ermin Street some 1.5km southeast of Wickham along the B4000, but geophysical surveys carried out along this projected route failed to find any evidence of the Roman road. Furthermore, a topographical survey along this projection

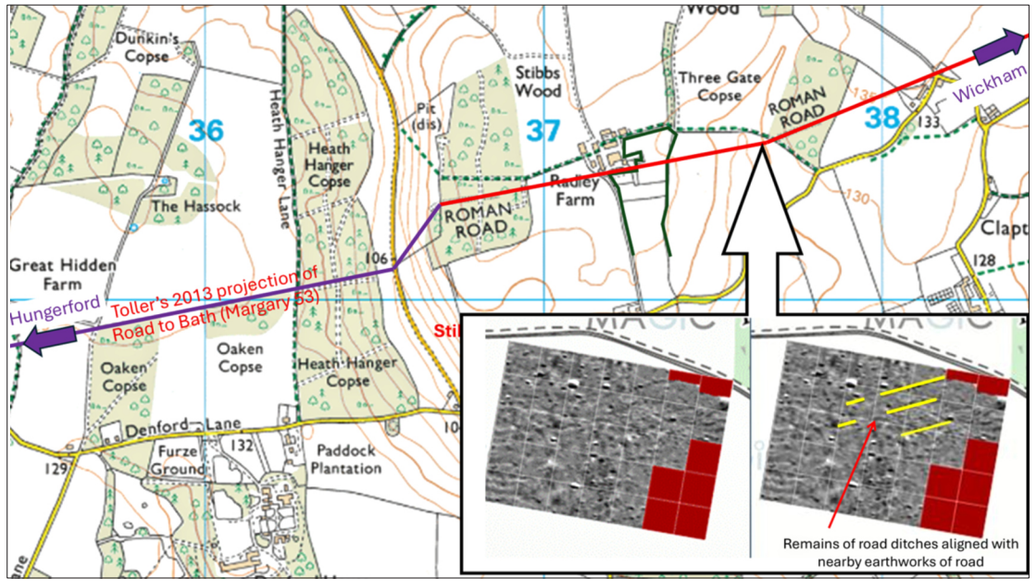


Fig. 10 – Remains of the parallel ditches of RR53 to the southwest of Three Gate Copse. Map © Crown Copyright and OS100022861.

identified a swathe of permanently boggy ground along the foot of a steep escarpment to the north of the Wormstall Estate which would have presented a challenge to construction of a road. The shallow depth of the clay-with-flint soil over much of this area was apparent within a nearby post-medieval quarry some 100m from the Roman road in Stibbs Wood, which showed that the depth of overburden ranged from 0.4m to 1.0m as seen in Fig. 9 Deep ploughing probably extended to a depth of >0.5m, necessary to release nutrients required to maximise the productivity and drainage, was therefore highly likely to have destroyed all traces of the Roman road

To assess why remains of the road to Bath were proving so difficult to locate, geophysical surveys were carried out between two surviving sections of the road's earthworks. The aim of this assessment was to analyse the extent to which negative results were due to the morphology of the road, local geology and/or the survey methods being used. Geophysical surveys along this 1.5km "*known route*" of the Roman road using a gradiometer and earth resistance meter proved comprehensively negative – apart from in one area where the bottom of the road's parallel ditches for some 40m were revealed by the 1.0m gradiometer close to Three Gate Copse as shown in Fig. 10. Closer inspection of this area revealed that whilst the surrounding area is mostly clay with flint soil, the locations where remains of road ditches were observed exhibited colluvial deposits of hill wash on top of the underlying clay. By contrast the two surviving earthworks in ancient woodland were well defined and in the section excavated across the road in Three Gate Copse robust construction of the road using '*hard packed flints, smaller at the surface and increasing in size nearer to the natural layer*' was noted (Preshous and Bamister 1968, 2). This stark contrast in the survival of the road within ancient woodland and agricultural land

confirms that sustained agricultural damage probably destroyed the road's remains. However, the assessment also suggests that damage of archaeological remains can be ameliorated by colluvial deposits of hill wash which is supported by other research (Bell 2020, 251; Trow and Holyoak 2008).

Whilst this assessment demonstrated that sections of the Roman road might have survived deep ploughing where protected by colluvial deposits, the 8,000m^2 surveyed revealed only 80m^2 of ephemeral remains of the Roman road. Not only does this represent a prospection productivity of just 1% along a known route, but also highlights that the ephemeral anomalies revealed may not have been recognised had they not been located along a known alignment.

The "*large*"cluster material culture deposits around Wickham suggested the presence of a significant roadside settlement along Ermin Street. Settlements are frequently located at Roman road intersections. The absence of significant material culture deposits and monumental remains along Ermin Street highlighted Wickham as a candidate for the location of its intersection with the road to Bath despite being 1.5km northwest of Toller's projection. However, the resulting extended search sector covered an area of >200ha across ground with a known low rate of survival of archaeological remains. This area would have required many months of effort to complete a comprehensive geophysical survey.

It was decided to prioritise the search sector by extending the conclusions reached in the assessment of the road to Bath's survival between two known points that highlighted the role of colluvial soil deposits in protecting extant archaeology from agricultural damage. The British Geological Society produces nationwide maps of superficial geological deposits using data gathered from borehole surveys. However, many rural areas exhibit a greater distance between borehole samples when compared to urban areas that have undergone successive phases of commercial development. To address this potential gap, field observations of the local terrain across the search area were made to

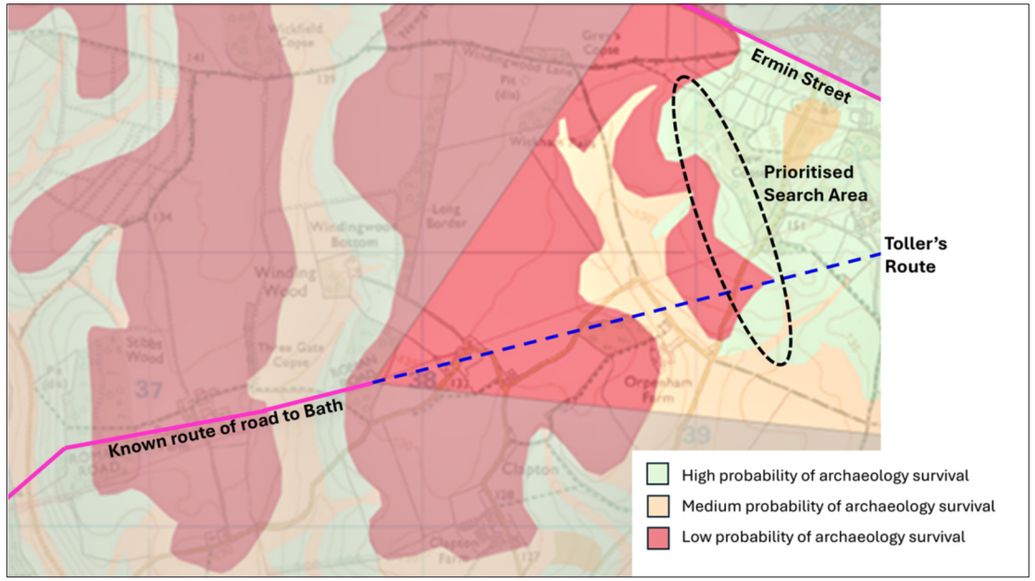


Fig.11 - Prioritisation of areas with an increased probability of archaeology survival based on soil type.

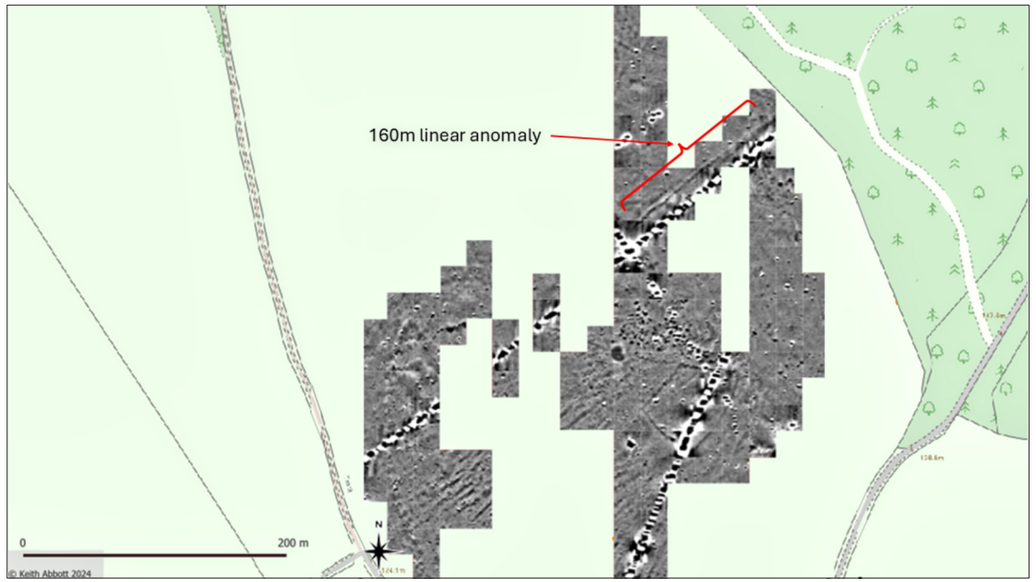


Fig. 12 – Gradiometer survey below New Copse revealing a 160m linear feature. © OpenStreetMap contributors.

produce an augmented map of where colluvial deposits were likely to occur. This map was then used to predict high/medium/low probability of extant archaeological remains having survived agricultural damage as shown in Fig. 11. This suggested that archaeological remains were most likely to have survived in the far east of the search sector at the foot of the scarp at New Copse near

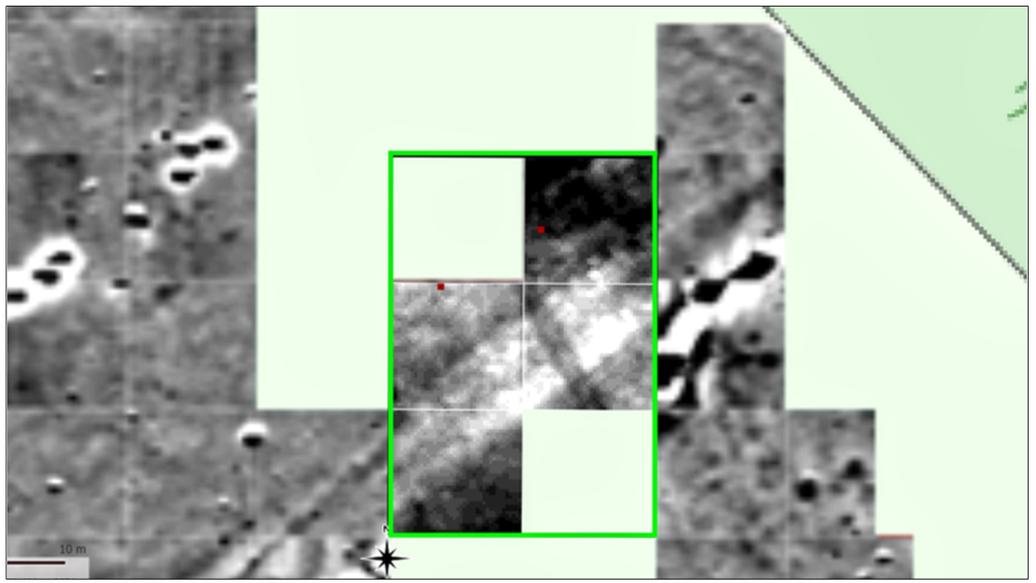


Fig. 13 – High earth resistance linear feature highlighted in green on top of the gradiometer survey image below New Copse.

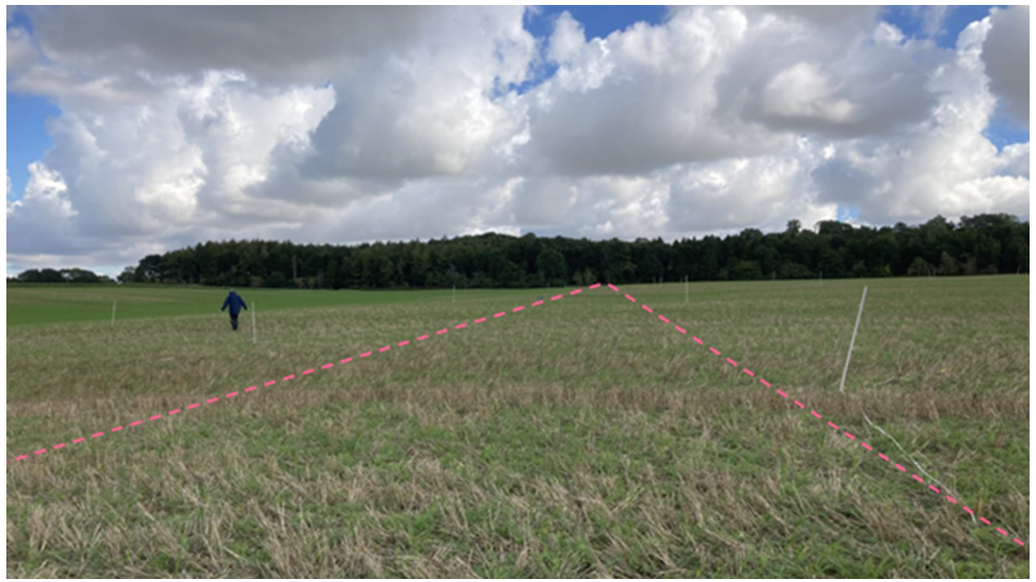


Fig. 14 -Modern day view along the likely route of the Road to Bath below New Copse.

Wickham. Being located in the east of the survey sector this still required a large north-south transect to be covered by the geophysical survey, but with an increased probably of finding any surviving remains of the Roman road.

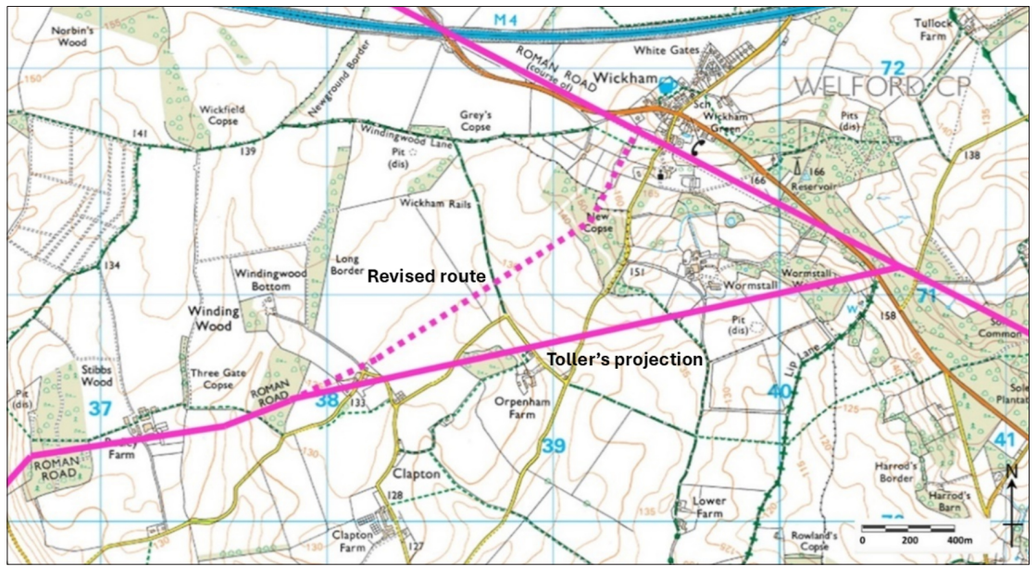


Fig. 15 – Revised route of the Road to Bath intersecting with Ermin Street at Wickham. Map provided by MAGIC on 14 Oct 2023. © Crown Copyright and database rights 2023. Ordnance Survey 100022861.

Gradiometer surveys revealed a 160m linear anomaly below New Copse located within the zone predicted to have a high rate of survival of extant archaeology as shown in Fig. 12. The feature was surveyed westward until it eventually disappeared as subsoil reverted to clay with flint. The linear feature was interpreted as being the northern road ditch of the road to Bath, the ditch to the south being obscured by dipolar interference from a modern utility pipeline. Earth resistance surveys across this gradiometer anomaly were undertaken as shown in Fig. 13 which revealed the characteristic high resistance linear response typical of a Roman road surface at SU 3910 7128 across the otherwise featureless pasture shown in Fig. 14. It should be noted that the linear high earth resistance feature is some 15m wide, whereas the excavated section of the road to Bath within Three Gate Copse showed the *agger* to be only 8m wide. This was interpreted as being due to lateral agricultural erosion of the road's *agger* before colluvial deposits had sufficiently accumulated. Further geophysical surveys were undertaken further to the west of this linear anomaly as far as the known location of the road at Three Gate Copse. This area is covered by clay with flint soil and no further evidence of the Roman road's remains were found, even as close as 50m to its surviving earthworks.

These road features identified require excavation to definitively confirm the presence of the Roman road, the state of its preservation and its morphology. The current projected route of the road is shown in Fig. 15. Whilst it is likely that the extended width of the high resistance road anomaly is due to agricultural erosion of the road's *agger*, this result could also be due to the presence of shoulders of compacted sand/clay either side of the road that could also exhibit high earth resistivity if present and dependent on materials used.

Extensive geophysical surveys of the likely Romano-British settlement at Wickham have revealed features suggesting roadside that the settlement extended along a 700m length of Ermin Street. Fig. 16 highlights features interpreted as a possible 'slip road' of the road to Bath's intersection with Ermin Steet at Wickham, and offers the potential for future excavations to reveal the morphology and phasing of this important road junction as well as the function of the Romano-British settlement that most likely developed around it.

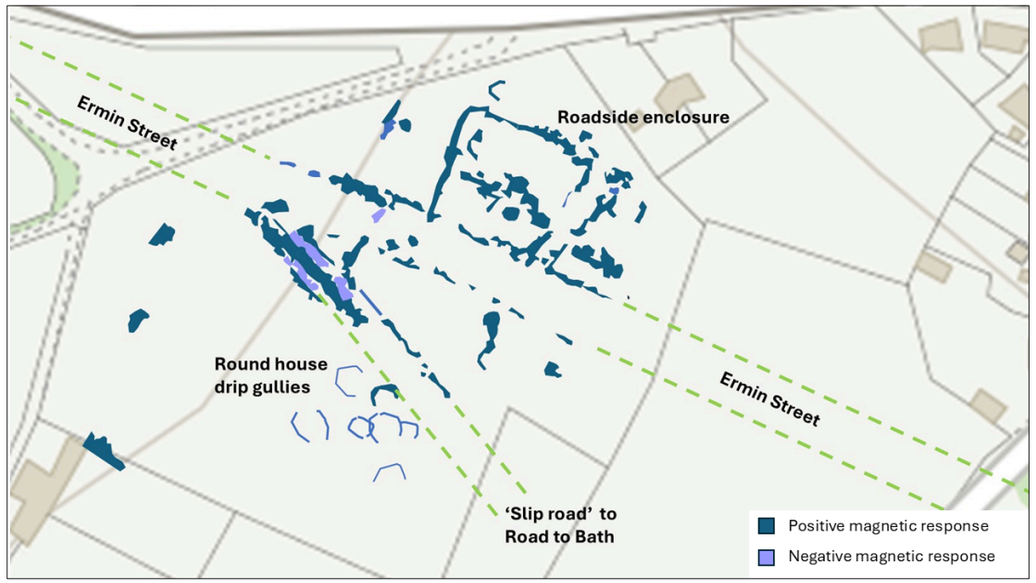


Fig. 16 – Results of geophysics survey of the Road to Bath/Ermin Street intersection. © OpenStreetMap contributors.

Conclusions

This study has demonstrated that the minor-roads and trackways interconnecting Romano-British settlements are significantly underrepresented within the archaeological record – particularly across modern day rural landscapes such as West Berkshire.

The predictive methods using material culture distribution and "*least cost travel*" analysis offer the potential for increased productivity for identifying the corridors of movement used by the past thoroughfares 'missing' from the archaeological record. Correlation of these likely corridors of movement with superficial geological deposits further increases productivity for geophysical surveys of areas geologically prone to agricultural damage of archaeological remains.

Further work is required to further validate these predictive methods, and to develop further methods to quantify past movement along Roman period thoroughfares to create new narratives of how thoroughfares were used and who used them.

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