Continuity in British Landscapes - 700 BC to AD 200: a geospatial analysis of landscapes and routeways in the Midlands and Northern England

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Statement of Originality:

I hereby declare that the intellectual content of this thesis and its attached appendices is the product of my own work, and that any and all information derived from the work of others to be utilised in the preparation of this thesis, be it from published or unpublished sources, has been acknowledged. This thesis has not been submitted for any degree at either The University of Sydney or any other institution of higher learning, nor has it been published under any other circumstances.

Abstract

This thesis analyses the nature and distribution of archaeological sites, dated to the pre-Roman and Roman periods c. 700 BC to AD 200, in a study area encompassing the regions of the Midlands and northern England, in the United Kingdom. Historical and archaeological evidence from a variety of scholars was combined with the results of a geospatial analysis utilising Geographic Information Systems methods, to analyse change and continuity within the cultural landscape across both temporal and cultural divisions.

Particular emphasis was placed on analysing macrospatial trends of settlement, land-use and land division both before and following the Roman conquest of Britain c. AD 43, factoring such trends into a 'locational preferences' methodological approach based on archaeological studies of pre-Roman and Roman change and continuity conducted in Italy. Settlements were analysed in their regional distribution, as well as their geospatial relationships with the topographic landscape factors of elevation, aspect and slope, connectivity to navigable waterways, Roman roads and the intersections of roads and rivers, and proximity to six nodal site categories: pre-Roman hillforts, C1st and C2nd Roman villas, C1st and C2nd Roman military sites, and C2nd Roman towns.

From this analysis, trends of settlement were found to conform towards a small-scale, localised and agricultural pattern, significantly influenced in its locational preferences by topographic conditions and connectivity within maritime, riverine and terrestrial networks of transportation, contact and exchange. Strong continuity was also apparent in the geospatial record, with significant stability of the settlement pattern across both the pre-Roman and Roman periods indicating a commonality of practice in settlement patterns, land-use and land division. This study further indicated the viability of geospatial analysis in providing a substantial body of supporting evidence for patterns of activity in the archaeological record across large geographic areas, timescales and in cases where inter-cultural variability between archaeological samples is likely.

Acknowledgements

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Last, and certainly not least, I would like to thank my family for supporting me throughout the production of this thesis, and especially my mother, Susanne, for encouraging my work ethic and assisting me with final proofreading. I would also like to make a special acknowledgement to my late grandfather, Thomas Taylor, for his enthusiasm for Roman history and literature that inspired me to pursue a career path in archaeology and classical history.

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Pre-Roman and Roman Cultural Landscapes in the Midlands and Northern England: The Archaeological Record and Geospatial Methods of Analysis

The study of change and continuity within the British cultural landscape has been a topic of academic interest for over a century, with numerous analyses seeking to quantify the impact of incoming groups such as the Romans, Anglo-Saxons and Normans, on the character of the land and its people. This study details a geospatial analysis of the relationships between archaeological sites located in a study area encompassing the regions of the Midlands and northern England, in the United Kingdom, dated to the pre-Roman 'Iron Age' Period (c. 700 BC – AD 43) and the first two centuries of the Roman Period (c. AD 43 – 200), exploring macrospatial trends of settlement, land-use and land division both before and following the Roman conquest of the island under the Emperor Claudius c. AD 43.

1.1 Introduction

Despite a number of comprehensive studies seeking to quantify the distribution of settlements across the pre-Roman and early Roman periods (Cunliffe. 2005; Harding. 2004; Taylor. 2007), geospatial analyses of the comparative characteristics of pre-Roman and Roman patterns of settlement, land-use and land division are relatively scarce. A substantial body of potential evidence remains largely unexplored and underutilised in either supporting or refuting positions in academic debate on the impacts of the Roman conquest on Britain. Changes in the number, size and internal occupational density of archaeological sites between the pre-Roman and Roman periods has often been seen to indicate a significant increase in activity within the cultural landscapes of Britain, with the Roman conquest and subsequent colonisation opening more substantial land units to the development of agricultural and domestic activities. However, at a cursory glance, the character of British settlement appears remarkably stable over time, with small settlements of little more than a few clustered roundhouses being the norm across both the later pre-Roman and Roman periods. In this sense, questions arise as to the nature and impact of Roman conquest and colonisation, and whether or not such events drastically changed the settlement framework of Britain, or simply adopted and expanded upon it.

In order to assess the similarities and differences between the cultural landscapes across the period from c. 700 BC to AD 200, three distinct periods were defined: the pre-Roman Period, First Century AD (hereafter C1st) and the Second Century AD (hereafter C2nd), with archaeological material classified into distinct periodised

samples. Analysis was conducted following an established Geographic Information Systems (hereafter GIS) methodology, seeking to examine the nature of change and continuity in the archaeological record across both temporal and cultural divisions and furthermore to provide evidence supporting or refuting key questions raised in the scholarship as to how the impacts of Roman conquest and colonisation in Britain may be interpreted through material evidence and patterns of settlement. An evaluation of the potential interactions between settlement and the natural and cultural landscapes was also an integral element of analysis, with attention paid to the expression of systems of land-use and land division, as well as maritime, riverine and terrestrial networking, within the archaeological record.

1.2 The Study Area and the Preparation of the Settlement Record

A study area of approximately 32,754 square kilometres across the width of Britain from the Welsh Marches to the North Sea coast (Fig. 1.1) was selected for analysis due to its inclusion of key pre-Roman and Roman routeways running from Chester, Cheshire, northeast to York, Yorkshire, as well as from London north to the Scottish border. This encompasses the modern administrative regions, as defined by the Esri map of UK regional boundaries (2022), of: the Northwest, Yorkshire and the Humber, the East Midlands, the West Midlands and Wales. Importantly, all regions were not sampled in their entire geographic extent, with the study area placed without regard for modern regional divisions. Such a sampling strategy afforded the best compromise between the production of a valid study area capturing a significant portion of the landscape, whilst also not expanding the scope of analysis such that it would become impossible to complete in a concise manner.

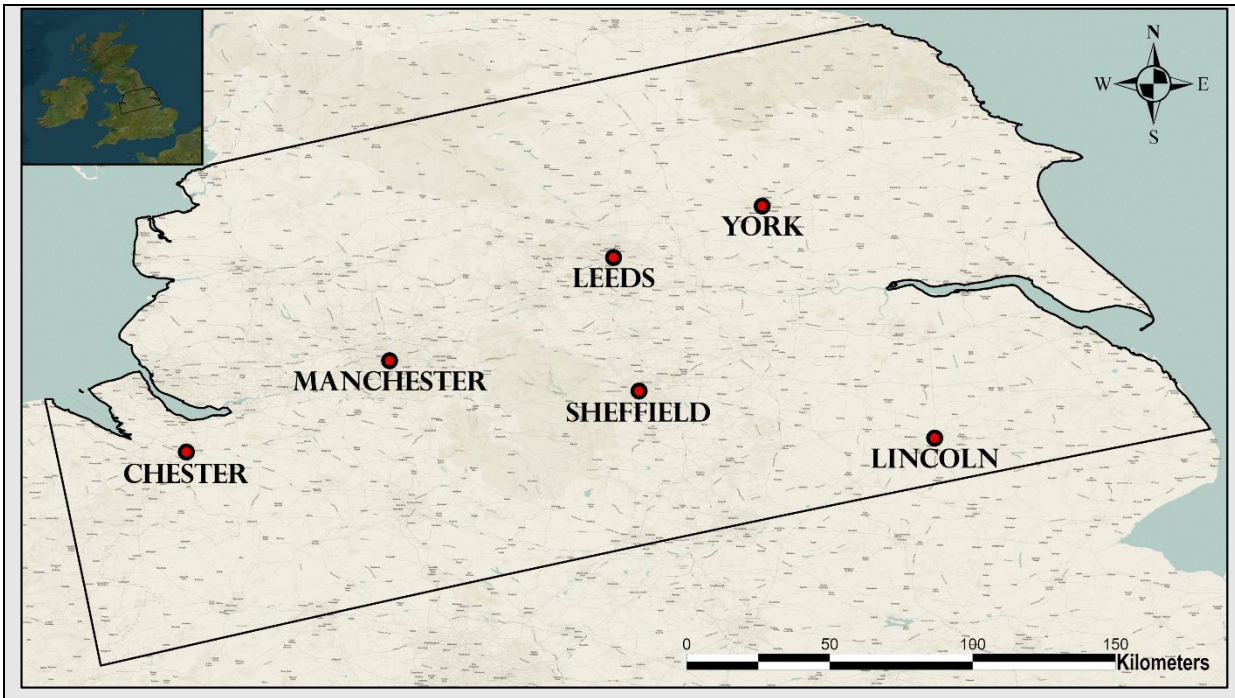

Figure 1.1: Map of study area, showing key modern population centres.

Within the study area, a number of important geographical features merit discussion. The presence of both the Irish and North seas on either side of the study area form a significantly maritime landscape, with the furthest location 99km from the nearest coastline. As such, it is reasonable to expect settlement patterns in the study area were in some manner reflective of connections to the sea. Following a north to south axis across the approximate middle of the study area, the Pennines constitute a significant natural boundary in dividing the Midlands and northern England into two distinct lowland regions on the east and west respectively. The Pennines are further differentiated from the remainder of the study area in their environmental conditions, with areas such as the Peak District, Yorkshire Dales and Lakes District being notably different from their neighbouring lowland regions. The Pennines primarily consist of open moorland and grassland, with average precipitation, temperature and windspeed values being generally higher than the eastern and western coastal regions (Met Office. 2022). Those lowland regions, in turn, are largely open agricultural landscapes, with areas of sparse woodland. Whilst the expansion in human settlement over the past two millennia, particularly following the Industrial Revolution, has undoubtedly changed the character of this landscape, a significant body of paleoenvironmental evidence indicates the overall constitution of the landscape was dominated by agricultural and woodland environs during the pre-Roman and Roman periods (Brayshay. 1999: 82; Dark. 1999; Harding. 2004: 64-65; Nevell. 1999). This suggests modern topographic and climatic data may be applicable as a proxy for the ancient conditions of the study area.

A settlement record was produced comprising a total of 428 archaeologically identified sites, dated to the pre-Roman, C1st and C2nd periods (Fig. 1.2) (App. 5.1), being drawn from for all subsequent models of analysis. This was achieved through the combination of several different datasets, with subsequent cross-examination against the literary record to ensure the best representation of the archaeological material currently possible (Fig. 1.3). A number of sites were discounted from inclusion in the settlement record due to the paucity of their investigation, with all sites requiring secure dating to either the pre-Roman, C1st or C2nd periods, as well as evidence of structures, structured deposits or earthworks indicating the function and/or extent of the site. As such, sites comprised solely of scattered material culture, or sites in which dating, function or extent were uncertain, were excluded from analysis, as they would make comparative analysis with more completely investigated sites problematic. The settlement record was categorised by both size and function, to ascertain if these factors had any impact on locational preferences. Sites were categorised by size into four primary groups: small (<4 ha), medium (4-8 ha), large (8-12ha) and very large (>12ha). This categorisation was selected as it offered the best discrimination of available site size data, whilst also allowing for samples of a meaningful size for comparative statistical analysis.

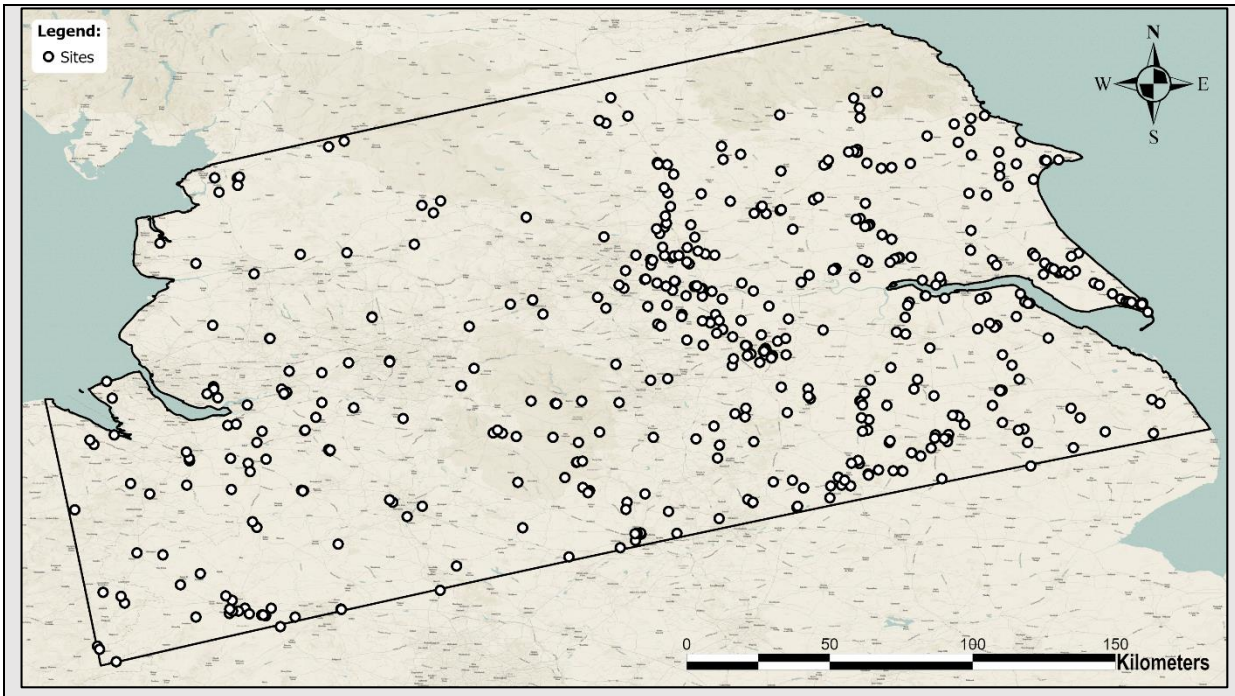

Figure 1.2: Map of study area, showing the positions of the 428 archaeological sites comprising the settlement record.

Data Description:	***Data Type:***	***Data Source:***
The Rural Settlement of Roman Britain: an online resource.	Comma-separated values (.csv) format table: site geolocational data, archaeological evidence, and descriptions.	Allen, *et. al*. 2018.
Geodatabase of Ancient Ports and Harbors.	Microsoft Excel table: site geolocational data, archaeological evidence, and descriptions.	de Graauw. 2014.
Pleiades: A Gazetteer of Past Places. Pleiades Data for GIS.	Comma-separated values (.csv) format table: site geolocational data, archaeological evidence, and descriptions.	Bagnall, R. *et. al*. 2021.
Atlas of Hillforts of Britain and Ireland.	HyperText Markup Language (.html) format online database: site geolocational data, archaeological evidence, and descriptions.	Lock & Ralston. 2017.
Heritage Gateway.	Online repository: site geolocational data, archaeological evidence, and descriptions.	Historic England. 2023a.

Figure 1.3: Table detailing the geo-spatial datasets utilised in this study, including information on dataset descriptions, types and sources.

Categorisation of site function was subsequently delineated based on the predominant mode of activity present in the archaeological record, such as agricultural, industrial or domestic activity, with variability in function over time leading to a distinct periodised categorisation of function.

1.3 Analytical Methodology

Four key geospatial analytical models were selected for use in this study: regionality, topography, connectivity and proximity (Fig. 1.4), based on the methodology established by Casarotto in studying change and continuity from the pre-Roman to Roman periods in the Italian region of Venusia (Casarotto. 2017; Casarotto, *et. al.* 2019), as well as drawing significantly from the works of Attwell and Fletcher (1987), and Fulford and Holbrook (2018) to bring geospatial analysis into the archaeological discipline and study of British cultural landscapes. This multi-objective approach utilised a comparative geospatial modelling method to ascertain the relative importance of several indices on the locational preferences of archaeological sites. For the purposes of this study, the distribution of sites was first analysed within the five noted regions of the Northwest, Yorkshire and the Humber, the East Midlands, the West Midlands and Wales, to ascertain if any region-specific patterns could be discerned within the data.

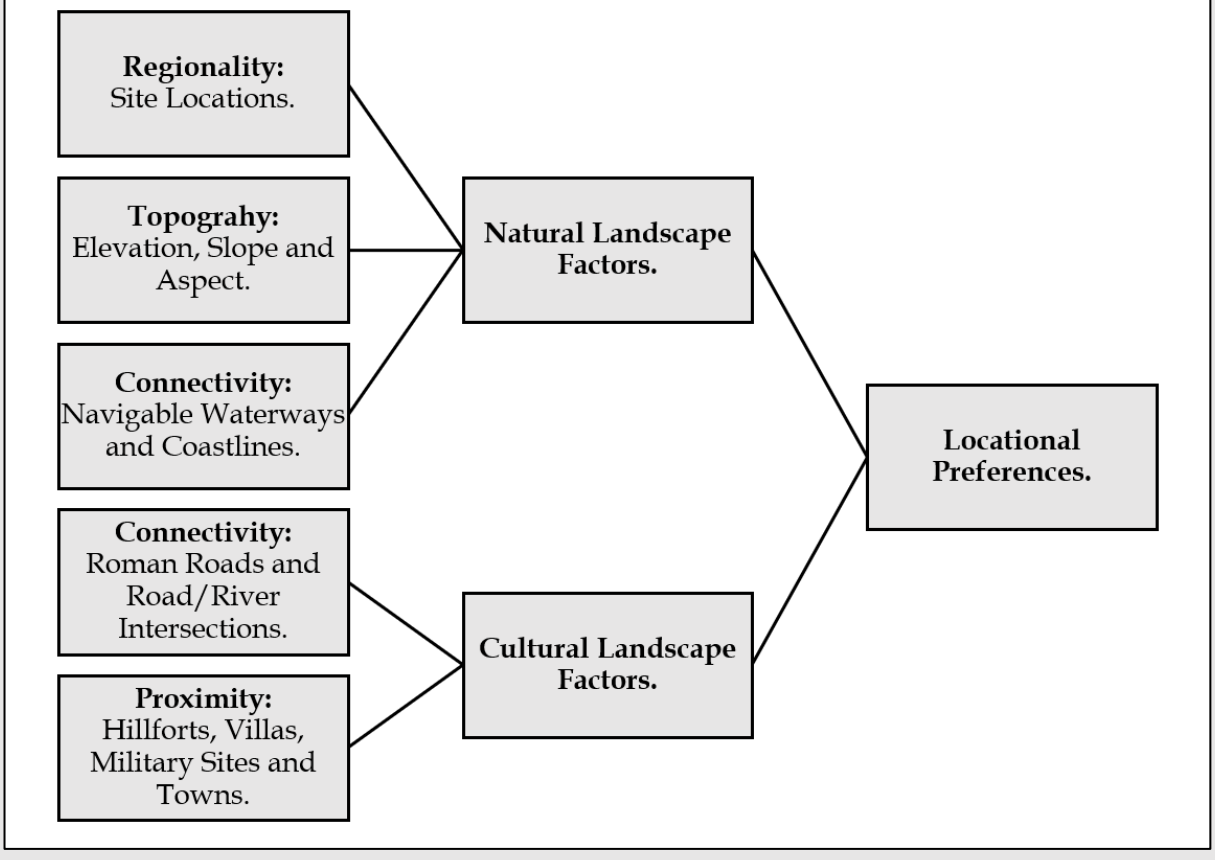

Figure 1.4: Flow diagram detailing the overarching methodological structure of this study.

Next, an analysis of the distribution of sites relative to the topographic landscape factors of elevation, slope and aspect was conducted, followed by the proximity of sites to navigable waterways, the Roman road network, and the intersections of waterways and roads (hereafter referred to as road/river intersections). Lastly, an analysis was conducted of the proximity of sites relative to a selected sample of potentially 'nodal' sites: pre-Roman hillforts, Roman villas of the C1st and C2nd, Roman military sites of the C1st and C2nd, and Roman towns of the C2nd. These analyses were then compared to explore if sites placed a particular emphasis on one landscape factor over another, and thus if they may have ordered their locational preferences. Across all models, a common approach was taken to ensure valid comparative analysis between the disparate datasets, with GIS analysis of all data utilising the Esri ARCGIS Pro software package. Data was also projected to a common standard, utilising the ETRS 1989 geographic coordinate system to maintain consistent geolocation of both topographical and archaeological data indices. Following the modelling of locational preferences for each landscape factor, sites were quantified in their locations relative to each factor and further categorised based on their respective period, size-category and function. Results were then tabulated and processed through both Shapiro-Wilk normality tests and Wilcoxon rank sum tests, to ascertain the relative distribution of data points and the statistical relationships between different groups. Particularly, the latter was utilised to ascertain any potential correlations between settlement patterns of different periods, functions and size-categories, and if change or continuity was present in the settlement record.

Topographic Modelling: All topographic models were created based on the 25m resolution European Digital Elevation Model (hereafter EU-DEM), version 1.1 (2016). Elevation was derived from a classification of the EU-DEM into contour bands in increments of 20m above mean sea level. Similarly, slope was derived from a classification of the EU-DEM into gradient classes following a template set out by the UN Food and Agriculture Organisation (Fig. 1.5) (Jahn, *et. al*. 2006: 12). Lastly, aspect was derived from a classification of the EU-DEM into nine distinct classes for the cardinal and intermediate directions, in increments of 45° from north, as well as flat land (Fig. 1.6). These classifications were selected as the primary means of analysis as they afforded the best compromise between the valid statistical discrimination of data, computational processing power requirements and the legibility of data outputs for further analysis, as well as their use in the methodology established by Casarotto (2017; Casarotto, *et. al*. 2019).

Slope Class:	*Slope Gradient (Degrees):*	*Slope Description:*
1	0-0.5°	Level
2	0.5-2°	Very Gently Sloping
3	2-5°	Gently Sloping
4	5-10°	Sloping
5	10-15°	Strongly Sloping
6	15-30°	Moderately Steep
7	30-60°	Steep
8	60->65°	Very Steep

Figure 1.5: Table detailing the classification of slope, with associated gradient values and description.

Aspect Class:	*Aspect Direction (Degrees):*	*Aspect Description:*
1	0	Flat
2	337.5-22.5	North
3	22.5-67.5	Northeast
4	67.5-112.5	East
5	112.5-157.5	Southeast
6	157.5-202.5	South
7	202.5-247.5	Southwest
8	247.5-292.5	West
9	292.5-337.5	Northwest

Figure 1.6: Table detailing the classification of aspect, with associated directional values and description.

Network Proximity Modelling: A common methodology was developed for all three models of the proximity of sites to navigable waterways, the Roman road network, and road/river intersections (Fig. 1.7).

The presence of waterways and coastlines in the study area that were potentially navigable by watercraft during the pre-Roman and Roman periods was derived from the EU-DEM. The D8 hydrology algorithm was used to transform elevation data into water flow accumulation, which provided an approximation of locations in the landscape in which waterways were likely to form. Flow accumulation was subsequently factored by stream order, then separated into primary streams based on a classification of waterways capable of navigation by Roman river boats whose draughts could have been as little as 0.6-1.0m, such as those excavated in London and the Netherlands (de Weerd. 1978: 20; Marsden. 1994: 89) Studies in Italy have suggested that such vessels were likely driven either by oars, or teams of men or traction animals on the riverbank, affording access to a greater range of rivers than deeper-draught, sail-driven vessels (Casson. 1965: 31-39). This classification was compared against modern data for the relative depths of waterways (DEFRA. 2022), to ascertain if all selected waterways would indeed have been able to support Roman shallow-draught watercraft. A map of coastlines was then derived from the

extent of the EU-DEM and combined with the navigable waterways to form a complete map of areas accessible to waterborne transportation.

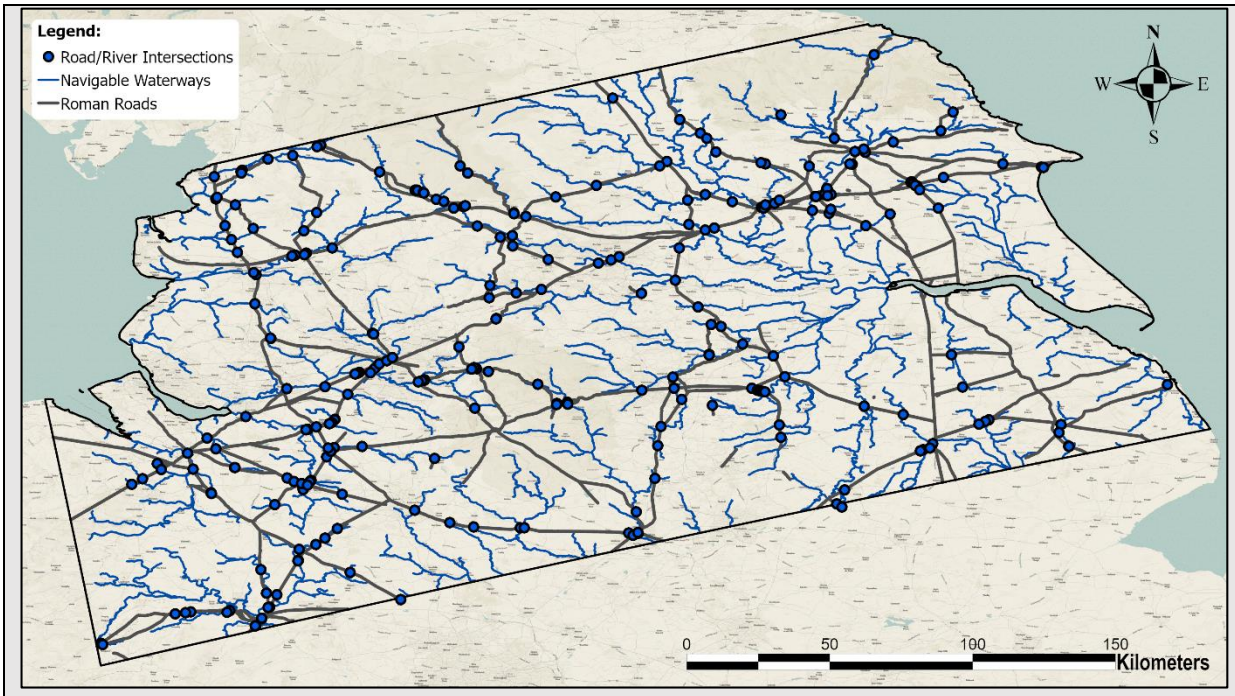

Figure 1.7: Map of study area, showing the positions of navigable waterways, Roman roads, and road/river intersections.

Roman Road proximity was derived from a GIS shapefile dataset of Roman roads in England provided by the Historic England Archive (2021). This dataset included a total of 1803 entries for excavations, geophysical and field surveys in which Roman roads were found to be present. Despite what may seem to be a substantial survey of Roman roads in England, significant gaps and discontinuities were present in the road network, leaving large areas of the study area with only partial information as to the location of Roman roads. In order to reduce methodological issues of underestimation, extrapolations were made to the road network dataset based on the works of the Roman Roads Research Association (2018a) and Orengo and Livarda (2016), as well as inferences drawn from prominent interpretations of how the road network was originally surveyed during the Roman Period (Collingwood. 1930: 4; Poulter. 2009: 5-10, 22; Poulter. 2014: 17-18). Whilst a limiting factor on the accuracy and precision of road network modelling, this was necessary to provide a more comprehensive indicative map of the distribution of Roman roads within the landscape of the study area.

The intersections between navigable waterways and the Roman road network were then derived from the two previous models, with a total of 225 road/river intersections found to be present in the study area. These accounted for the locations of potential fords, bridges and/or ferry points, though the exact nature of such crossings, or if they demonstrated any evidence for use during the pre-Roman or

Roman periods, were not quantified due to a lack of intensive archaeological study on the topic. From these datasets, a function of Euclidean distance was projected around the features, categorised into incremental planar contour bands of 500m, and sites counted within these bands to be statistically analysed as previously discussed.

Nodal Site Proximity Modelling: A total of six site categories were selected for their potential centrality within the cultural landscape as nodal sites around which the settlement pattern and socio-cultural and economic activities may have been organised: pre-Roman hillforts, Roman villas of the C1st and C2nd, Roman military sites of the C1st and C2nd, and Roman towns of the C2nd (Fig. 1.8). These sites were separated from the overall settlement record, with proximity values calculated using similar 500m contour bands to the modelling of proximity to waterways, Roman roads and road/river intersections. Sites were then quantified based on their respective locations within each band, tabulated and processed through the established statistical methods. As with the geospatial models discussed previously, this commonality of approach allowed for direct comparison across different models, as well as greater legibility in data, without sacrificing precision.

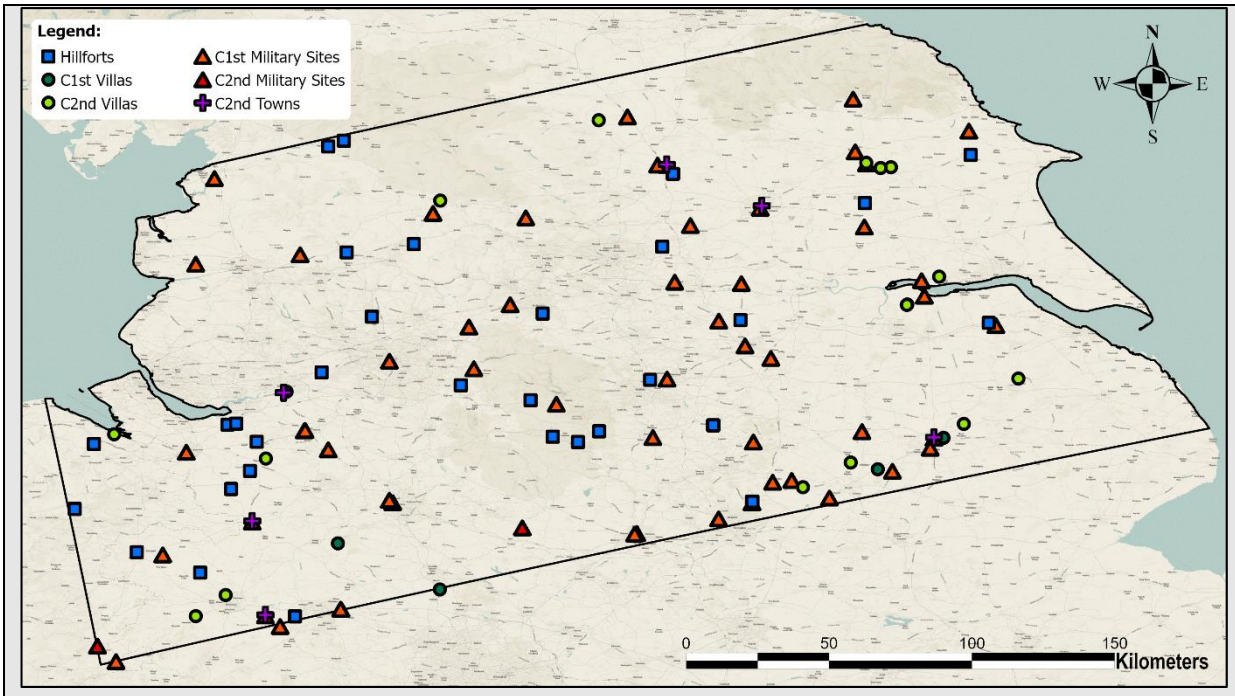

Figure 1.8: Map of study area, showing the positions of the nodal site categories of pre-Roman hillforts, C1st and C2nd Roman villas, C1st and C2nd Roman military sites, and C2nd Roman towns.

1.4 Methodological Limitations and Potential Sources of Error

Despite the scientific rigour of the methodology employed in this analysis, it should be noted that there is a high likelihood of significant topographic changes having occurred in the landscape of Britain over the past two millennia, problematising the accuracy of modern elevation models, such as the EU-DEM, in acting as a proxy for

the ancient landscape. The processes of erosion and alluviation, as well as topographic manipulation by humans, have likely played a role in defining the topography of the British landscape as it is seen in the 21st Century, meaning that any interpretation of ancient locational preferences for specific topographic conditions based on modern digital elevation models should be viewed as purely indicative, and not an exact science. Such issues of interpretation of pre-Roman and Roman landscapes utilising modern data have been explored in greater detail in geospatial studies of Roman landscapes in Italy (Casarotto. 2017: 167; Goodchild. 2007: 126), though the applicability of their methodologies across any analyses of pre-Roman and Roman landscapes in Europe remains valid in the absence of more complete geospatial surveying of ancient landscapes. Importantly, despite most sites spanning several hectares in area, site location was necessarily ascertained based on a single GPS point in all available geospatial datasets. As a result, the resolution of elevation data cannot be seen as a wholly accurate analytical device, as most sites have the potential to have existed across multiple elevation, slope or aspect classes, rather than a singular point within said classes. Therefore, all spatial data should be considered as indicative, though not definitive, of the location of sites relative to topography, further problematising statistical analyses. In the absence of more thorough sampling of the topographic conditions of ancient Britain, however, as well as the perceived validity of this methodology in current scholarship, this should be seen as the best available approach to analysing the relationships between ancient settlements and their locational preferences for topographic landscape factors.

Issues of completeness and changes in the landscape over the past two millennia also problematise the interpretation of models of proximity to navigable waterways, Roman roads and road/river intersections. Processes of marine transgression and regression, as well as extensive processes of river meandering and sedimentation, have caused drastic changes in the character of waterways from the pre-Roman Period to the present, with potentially significant changes in navigability, as well as the physical location of rivers and coastlines within the landscape (Neumann. 1998; Van De Noort & Ellis. 2000: 421). In some cases, such as the site of a Roman military fort at Ribchester, Lancashire, riverine encroachment onto the site has caused the erosion of a substantial portion of the structural evidence and other associated archaeological material, with the River Ribble changing course since the Roman Period (Edwards. 2000: 3-5). The modelling of waterborne travel and its relationship with the cultural landscape of the pre-Roman and Roman periods in the Midlands and northern England should thus be seen as largely indicative, and not as exact scientific data, highlighting a need for further comprehensive surveying of ancient British waterways and the change in landscapes over time. The Roman roads dataset provided by Historic England further presents a number of methodological challenges and shortcomings. It is important to note that little work has been done to

date changes in the Roman road network over time. As the dataset is monolithic in its chronology, there is no presentation of potential changes, additions, or deletions in the network. Indeed, it is likely that a portion of the roads present in the dataset were constructed after the sampled time period, making their place in an analysis of the C1st and C2nd a source of error and the modelling of the proximity of the settlement record to Roman roads should be considered as wholly indicative, based on the best available data as of the writing of this study. Such incompleteness of survey data highlights an important gap in British scholarship requiring more comprehensive geomorphic investigation in the future.

1.5 The Structure of this Thesis

This study will follow a structured analysis following the order of methodologies detailed above. Chapter two will discuss the interpretations of literary sources in delineating patterns of activity within the cultural landscapes of the pre-Roman and Roman periods in the Midlands and northern England, and how trends of inter-period and inter-cultural change and continuity have been noted by scholars from ancient times until the present. Chapter three will detail the settlement record and its divisions by period, size, and function, establishing how trends within the settlement pattern and practices of land-use and land division may indicate change and continuity in the locational preferences of the pre-Roman and Roman records. This chapter will also detail the analysis of regionality within the settlement record, attempting to quantify if the relative geographic locations of sites may illuminate trends within their locational preferences. Chapter four will subsequently analyse the relationships between sites and the topographic landscape factors of elevation, slope, and aspect, to ascertain their relative importance within the locational preferences of sites of the pre-Roman and Roman periods. Chapter five will analyse the proximity of sites to the three landscape factors of navigable waterways, Roman roads, and road/river intersections, evaluating the relative connectivity of sites within networks of maritime, riverine, and terrestrial transportation, contact and exchange to see if such connectivity may have played a significant role in their locational preferences. Following this, chapter six will detail the analysis of site proximity to the six site categories of pre-Roman hillforts, Roman villas of the C1st and C2nd, Roman military sites of the C1st and C2nd, and Roman towns of the C2nd, to test the potential nodality of such sites within the landscape, as well as potential interactions between the rural and urban settlement patterns during the pre-Roman and Roman periods. Chapter seven will then conclude this study, drawing the preceding analyses into an overall locational preferences framework to establish how the nature and distribution of the settlement record may have changed or continued between the pre-Roman and Roman periods.

Chapter Two:

Literary Records of Land-Use, Land Division, and the Pre-Roman and Roman Settlement Patterns in Britain

An analysis of current scholarly literature for the nature of the settlement pattern in the Midlands and northern England during the pre-Roman and Roman periods reveals several significant patterns of inter-period and inter-cultural continuity of occupation and activity within the study area, as well as the variability in practices between regions east and west of the Pennines. It is prudent to examine issues about the nature of the pre-Roman cultural landscape of the northern half of England, its division into socio-cultural groups and their exposure in the historical record. Traditionally, the pre-Roman landscape from the Midlands to the Scottish border has been divided into a number of substantial 'tribal' territories, though the exact territorial extent of such groups remains a source of debate. Indeed, for the purpose of this study, a substantial lack of evidence in both the archaeological record and historical primary sources renders a detailed analysis of socio-cultural and political divisions of territory largely fruitless. Nonetheless, as it has served as a framing element for the majority of research conducted into the pre-Roman cultural landscape of Britain as a whole, it does merit a brief exploration.

2.1 Pre-Roman Cultural Traditions and Landscape Division

The earliest surviving record of the pre-Roman division of northern England comes from Tacitus, writing c. AD 98, who attributed control of the entirety of the region to the *Brigantes* tribe (Tac. *Agr.* 17), whilst the geographer Ptolemy, c. AD 150, described the *Brigantes* occupying an area south of the Scottish *Selgovae* and *Otalini* tribes "extending to both seas" across northern England (Ptol. *Geog*. 2.3.10). Ptolemy's account also names nine 'towns' attributed to the *Brigantes*: *Epiacum*, *Vinovium*, *Caturactonium*, *Calatum*, *Isurium*, *Rigodunum*, *Olicana*, *Eboracum* and *Camulodunum* (Ptol. *Geog*. 2.3.10), which have remained a constant source of interest to archaeological and historical investigations attempting to attach names to known pre-Roman sites (Hanson & Campbell. 1986: 74-77). Only *Eboracum* can be attributed to modern York, though lacking archaeological evidence of pre-Roman occupation within the city itself (Palliser. 2014: 12-14) calls into question whether such a listing was related more to the names of Roman provincial towns of Ptolemy's own time, rather than any division of tribal territory pre-dating the Roman conquest. Aside from the *Brigantes*, the *Parisi* tribe were located by Ptolemy in the area north of the Humber. Only the town of *Petuaria* was described to be within their territory (Ptol. *Geog*. 2.3.10), thought to be located at modern Brough-on-Humber, East Riding (Wacher. 1995: 394-401). This would delineate the territory of the *Parisi* to be from

the eastern Vale of York, through much of the Yorkshire Wolds, to the Humber Estuary. However, as with York, *Petuaria* has presented another problem to the validity of Ptolemy as a source for pre-Roman occupation, with the only excavated remains at Brough-on-Humber approximating a 'town' being from a period contemporary with Ptolemy himself, whilst pre-Roman remains were far less substantial (Wacher. 1995: 394-401). To the south, Ptolemy associated the *Coritani*, or *Corieltauvi*, tribe, with major 'town' centres at *Lindum* and *Ratae* (Ptol. *Geog*. 2.3.11). Unlike their northern neighbours, these may more easily be identified with Lincoln, Lincolnshire, and Leicester, Leicestershire, respectively, due to the reuse of their names to describe the later Roman towns (Wacher. 1995: 132-150, 343-362). The *Cornovii* tribe were likewise attributed by Ptolemy to a territory encompassing much of Shropshire, Staffordshire and Cheshire, with their 'towns' located at *Deva* and *Viroconium* – both of which can be positively identified as Chester and Wroxeter, Shropshire, respectively (Historic England. 2023a; Wacher. 1995: 362-377). Whilst some attempt has been made to draw pre-Roman territorial borders somewhere equidistant between Chester and Lincoln, and at the rivers Mersey and Ouse respectively (Fig. 2.1) (Hanson & Campbell. 1986: 82-84), such divisions should be considered problematic due to a lack of data for pre-Roman territorial boundaries.

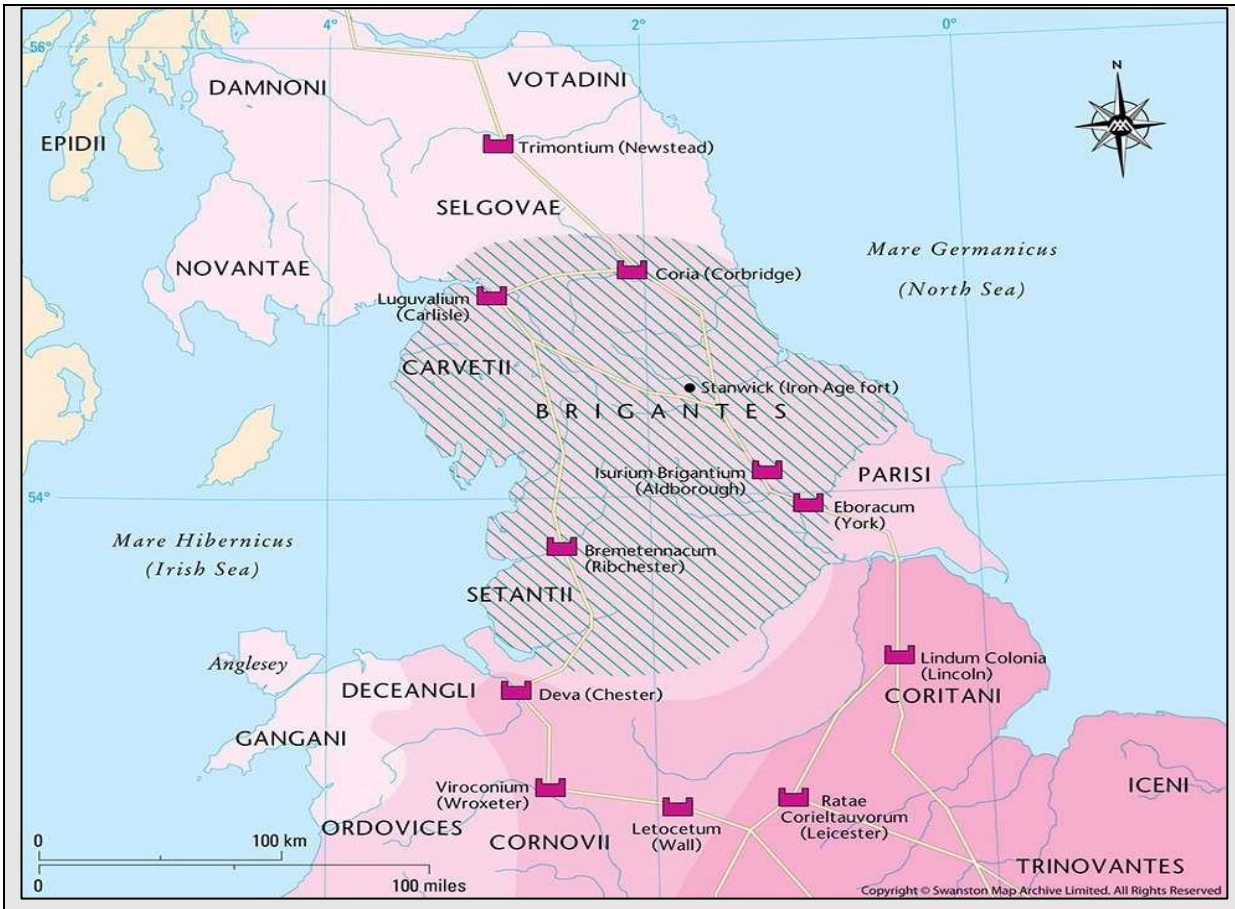

Figure 2.1: Map of potential pre-Roman land divisions in the Midlands and northern England, with particular emphasis on the territory of the *Brigantes* (Historic England. 2021).

Two groups from Wales are also of note, as their territories potentially extended into north-western England. The *Ordovices* were described as occupying a territory including central and northern Wales, as well as western Shropshire and Cheshire, with two towns of *Mediolanum* and *Brannogenium* (Ptol. *Geog*. 2.3.11), whilst attributed to the *Ordovices*, remaining largely unexamined and lacking correlation with any modern location. Lastly, the *Deceangli* tribe was attributed to a loosely defined area of north-eastern Wales and western Cheshire. This group was mentioned only in passing by Tacitus, describing a brief Roman campaign into their territory "within a little distance of the sea, facing the island Hibernia" (Tac. *Ann*. 12.32). Whilst an argument has been made about potential variations in earthwork morphology indicating a '*Deceanglian* identity' (Gardner & Savory. 1964; Harding. 2020: 83), it is impossible to specify where their territory lay, or even if the existence of such a group may be ascertained through archaeological means.

The process of identifying distinct cultural groups in northern England is complicated further by the inherent variation in the settlement pattern. Work in the last 20 years has increasingly called into question the monolithic identity of the Brigantes as a socio-cultural group, with suggestions they constituted either a super-cultural polity encompassing multiple distinctive cultural subgroups, or a hegemon of a monocultural group encompassing multiple distinct social groups. Mattingly describes inter-regional variation between the Northwest and Yorkshire, stating "material culture, stock-raising and economy … [add] further weight to the argument that the pre-Roman confederation was at best somewhat artificial" (Mattingly. 2007: 419-420). Furthermore, Cunliffe cites the meaning of the name *Brigantes* as 'high ones' to suggest their role as a hegemon over neighbouring groups (Cunliffe. 2005: 211). This ties in with an interpretation of the *Brigantes* situating themselves as a 'core' to a peripheral radius of distinct rural landscapes, with their potential territories centred on the Pennines and Yorkshire uplands affording them control over the movement of people, resources and goods leading to the claim "In [the *Brigantes*'] geographical position probably lay the basis of their power" (Cunliffe. 2005: 211). The long tradition of viewing the Pennines as central to the *Brigantes* is important to this claim, with the sizeable hillfort near Stanwick, North Yorkshire, often cited as the most likely location for a *Brigantes* capital based on its size, commanding position and wealth of pre-Roman material culture (Hanson & Campbell. 1986: 74-77). If Stanwick is taken to be a important *Brigantian* centre, or even capital, it is significant that their centre of power was geographically distanced from the other 'towns' located in Lancashire, Cheshire and the Yorkshire Dales. This also places the notional centre of pre-Roman activity north of the Vale of York, with importance being shifted towards York itself only after the Roman conquest. Conversely, the *Parisi* demonstrated a greater trend towards southern influences, with Cunliffe noting shifts from the first century BC until the Roman conquest in

ceramic typology towards *Corieltauvian* styles prevalent across the Humber, further positing this may indicate socio-cultural shifts in the region towards an increasing focus on stable cultivation-based agriculturalism (Cunliffe. 2005: 215).

The archaeological record of northern England notably contains few continental cultural influences. Whilst the increasing presence of Gallo-Roman material culture, particularly amphorae associated with wine and olive oil transportation, has been viewed in southern Britain as an indicator of heightening contact and exchange with Europe (Williams. 1989: 151), and particularly the possibility of direct Roman involvement in southern Britain following the Caesarean invasions c. 55-54 BC (Champion. 2016: 167; Harding. 2004: 197), scant material has been identified in the Midlands or northern England (Champion. 2016: 167; Williams. 1989: 151). A significant exception is presented by limited evidence of importation of exotic goods from the continent in the Irish Sea port site at Meols, Merseyside. It is, however, considered that such finds demonstrated a specific phase of local elite activity and were not indicative of wider trends across northern England (Harding. 2004: 65). This issue in material culture distribution has led to theories of divisions within the cultural landscape, with a number of scholars positing the proximity of southern and eastern England to the Channel and North Sea coasts afforded greater access to continental contact and exchange networks, whilst the relatively insular characteristics of the Atlantic and Irish Sea coasts proved a limiting factor to northern and western England accessing said networks (Cunliffe. 2005: 70; Harding. 2004: 28; Sargent. 2002: 225-226). This interpretation consequently suggests that varying degrees of access to maritime transportation networking formed "a significant cultural fault line" across pre-Roman and Roman Britain (Cunliffe. 2005: 70). This once again calls into question the monolithic identity of the *Brigantes*, further suggesting their territory may have been a socio-political or economic construct unifying multiple distinct cultural groups, rather than a monocultural polity. It is possible to characterise the pre-Roman cultural landscape of the Midlands and northern England as one of significant variation, with distinct groups maintaining control over territories of diverse extents and landscapes, with a relative disconnect from outside influences allowing an environment in which the development of localised cultural practices and group identities would be possible.

2.2 Pre-Roman Land-Use and Subsistence Strategies

Key issues relating to the division of the pre-Roman and Roman landscapes of the Midlands and northern England merit discussion, particularly climatic impacts on human habitation strategies and the nature and extent of pre-Roman agricultural and pastoralist practices. For some time, climate has been cited as an important influence on the variance in human activity in the Midlands and northern England, with the Pennines acting as a border between two contrasting climatic, and in turn

cultural, zones (Cunliffe. 2005: 70, 73-74). Modern climatic data presents stark differences in patterns between the east and west of England, with a notable increase in rainfall and decrease in mean temperatures in the Northwest region, when compared to the Northeast and Midlands (Fig. 2.2) (Met Office. 2022).

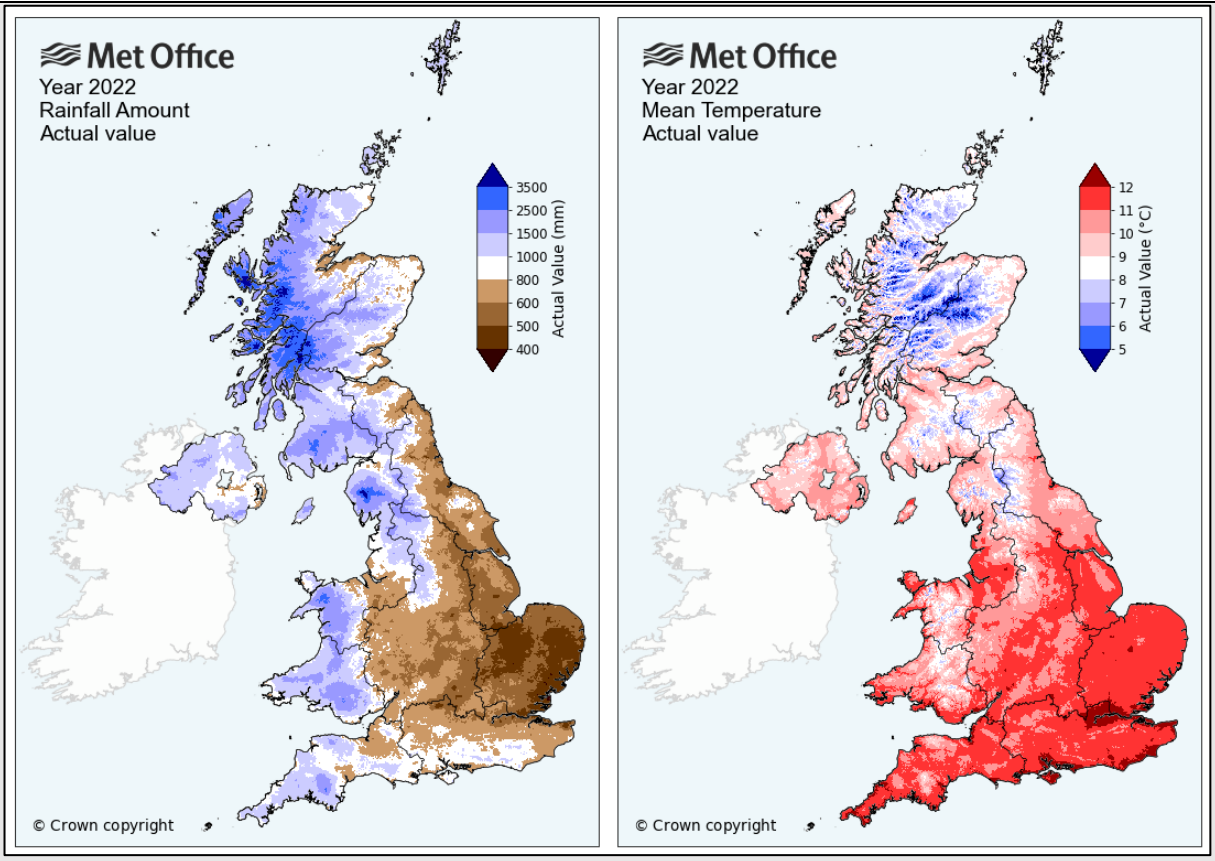

Figure 2.2: Maps of current mean rainfall and temperature values across Britain, indicating the division of two distinct climatic 'zones' across the Midlands and northern England (Met Office. 2022).

However, as a lack of paleoenvironmental sampling means a reliable proxy for paleoclimatic conditions in Britain remains absent, it proves difficult to accurately measure if modern climatic data acts as a suitable analogue for the ancient climate. Much has been made of palynological analysis as providing a general indicator for climate, though debate exists as to the viability of palynological analysis in paleoclimate observations in areas of intense human activity, as anthropogenic factors such as land clearance or agriculture may have a significant impact on sampling (Brayshay. 1999: 82; Middleton. 2011: 32). Despite such methodological issues, climate retains a constant presence in any scholarship regarding variability in the structuring of the pre-Roman cultural landscape. Whilst environmental determinism was perceived for much of the later 20th century as an unsatisfactory explanation for human activity in northern Britain, mirroring trends of scholarship globally, Cunliffe (2005: 70) notes the resurgence of three "immutable factors": geology, climate and communication routes, as the forces behind pre-Roman settlement variance in Britain. In the Pennine uplands and their fringe, a colder,

wetter climate during the pre-Roman Period is often cited as the most significant factor in the lack of intensive settlement, particularly of a large-scale agricultural nature (Cunliffe. 2005: 70; Middleton. 2011: 32; Nevell. 1999: 15-17). This has led to the interpretation that the Pennine uplands and western coastal lowlands were effectively precluded from a mixed agricultural framework of cereal cultivation and pastoralism, as found in the east, and were instead limited to a largely pastoralist economy (Cunliffe. 2005: 73-74, 212; Harding. 2004: 28). However, recent studies suggest a warming and drying trend towards the end of the pre-Roman Period correlated with an increase in agricultural sites located in the Pennines and northwest, leading to an interpretation of a broadening of mixed agricultural practices into these regions (Brayshay. 1999; Dark. 1999: 257-259; Middleton. 2011: 32). Climatic conditions should therefore not be seen as the determining factor in pre-Roman settlement and land-use practices in the Midlands and northern England, opening further avenues for research.

The nature and extent of agricultural and pastoralist practices has similarly seen substantial shifts in interpretation over time, with the two systems viewed as incompatible and competing to be the primary pre-Roman subsistence strategy. Recent analyses have complicated this dichotomy, suggesting a greater level of coexistence between the two practices. Cattle-based pastoralism was traditionally seen as the primary subsistence practice of pre-Roman northern England (Cunliffe. 2005: 211; Piggott. 1958; Wheeler. 1954: 26-28, 57), with a mixture of cereal cultivation and pastoralism more prevalent in the Midlands. The pervasive image of the 'Celtic cowboy', as proposed by Piggott (1958), combined the limited pre-Roman settlement pattern with the overabundance of bovine remains in pre-Roman assemblages to suggest a wide-ranging reliance on transhumance pastoralism as the primary subsistence factor for groups such as the *Brigantes*. However, the settlement and palynological records have challenged this interpretation, suggesting that whilst not entirely invalid, the 'Celtic cowboy' interpretation should be recontextualised as part of a broader subsistence framework (Harding. 2004: 27). Differences in the morphologies of fields used for cereal cultivation have been recognised across lowland environs in the Midlands and northern England, with networks of dykes and other linear earthworks dividing large agricultural units as early as the Bronze Age, with drove ways and enclosures seemingly for the corralling of animals interspersed within areas of cleared land more suitable for cereal agriculture (Taylor. 2007: 60-62). The combination of fields for cultivation and pastures for livestock demonstrated a diversity of subsistence practices, with a potentially significant sector of the population engaged in settled agriculturalism, whilst another engaged in the more mobile activity of cattle droving. In southern and western Yorkshire, the scale of enclosed agricultural land differed, with smaller enclosures for domestic settlement surrounded by radiating field boundaries forming a nuclear field system

(Millett. 2016: 704; Taylor. 2007: 63). This suggests a greater reliance on cereal agriculture, with less utilisation of the wider landscape and a lower allowance for drove ways and livestock pastures proximate to settlements. The picture becomes even less clear in the upland areas of the Yorkshire Dales and Pennines, where a paucity of archaeological investigation has led to interpretations of a dichotomy in land use between agricultural settlements in valleys and transhumance pastoralism on higher slopes (Taylor. 2007: 62). Investigation of settlement in the Peak District and Yorkshire Dales has found little evidence of field systems above 400m in elevation (Taylor. 2007: 59), whilst isolated pre-Roman structures and evidence of cave occupation on higher elevations, in addition to the lack of excavated field systems, provided indicators of transhumance (Cunliffe. 2005: 212). Similarly, study of the isotopic composition of faunal remains at two prominent pre-Roman sites in Hampshire suggest a higher level of mobility in pre-Roman cattle populations than previously assumed, instead indicating elements of pre-Roman society may have led highly mobile lives involved with droving activity, rather than settled pastoralism (Hamilton, *et. al*. 2019: 190-194). Whilst this evidence was from southern England, it does call into question interpretations of sedentism in other areas, inviting further research into mobility within pre-Roman subsistence systems. Overall, the application of a modern interdisciplinary approach has allowed for the development of a new predominant interpretation, as articulated by Taylor, of a highly mixed agricultural system in the pre-Roman Midlands and northern England, with "droves running from moor to dale bottom, probably allowing optimal seasonal grazing alongside localised cultivation" (Taylor. 2007: 59).

Further evidence complicating interpretations of the landscape in the Midlands and northern England appear in the palynological record, indicating widespread exploitation of cereal cultivation as a subsistence strategy. The palynological record is dominated by spelt and barley, though emmer may have gained predominance over spelt further north, particularly in Scotland (Van der Veen. 2016: 809, 815). Comprehensive evidence for agricultural activity in the pollen record was found at the Roman military site of Castleshaw, Greater Manchester, whose position on the western Pennine fringe presented unique insights into potential east-west divisions in the landscape, allowing for further recontextualisation of the pre-Roman agricultural landscape in the northwest. Radiocarbon dating of pollen samples indicated the first changes to the vegetation profile of the area occurred during the Mesolithic and later intensified from c. 750-590 BC onwards, with woodlands being replaced by open grassland, heath and peatbog environments, as a likely result of climatic change and increasing human practices of landscape management (Brayshay. 1999: 82). A corresponding increase in micro-charcoal accumulation demonstrated regular fire events in the landscape, suggested to be the deliberate clearing of dense scrubland vegetation in promotion of pastures suitable for seasonal

grazing (Brayshay. 1999: 87). By the end of the pre-Roman Period, pollen samples indicated woodland was not immediate to Castleshaw's location, with the presence of spelt pollen suggesting the landscape was cleared for cereal cultivation by the arrival of the Romans (Brayshay. 1999: 87-88). When combined, this pattern suggests a long sequence of human landscape manipulation for the purpose of subsistence, with agricultural activity present from the early pre-Roman Iron Age Period into the Roman Period. Whilst extensive landscape clearance and the promotion of grassland development appears primarily for the purpose of animal husbandry, particularly cattle grazing, the presence of spelt in later pre-Roman strata indicated the development of a mixed agrarian economy, suggesting this was not exclusive to lowland eastern England. Similar evidence was present in the Mersey Basin region, with decreasing woodland pollen counts correlating with increasing cereal pollen to demonstrate land clearance and cereal cultivation (Harding. 2004: 64-65; Nevell. 1999). Therefore, the dichotomy of a cereal agriculturalist east and a pastoralist west should be questioned, with evidence instead suggesting greater diversity in the subsistence strategies of the pre-Roman Period.

The pre-Roman archaeological record of the Midlands and northern England further indicated a significant trend towards dispersed agricultural settlement, with the landscape dominated by both enclosed or unenclosed farmsteads and small hamlets (Wallace. 2016: 131). Such sites appeared to be geographically limited, with increasing numbers of small-scale nucleated settlements located in valleys and low-lying areas to the east and south contrasted against the north and west, where the settlement pattern was dominated by a smaller number of large-scale nucleated sites with a peripheral landscape of isolated farmsteads (Mattingly. 2007: 418). As with agricultural land-use, significant regional variability in morphology and size appears in the record of settlements. In the eastern Midlands, the landscape was dominated by larger open settlements, with the noted systems of dykes and earthworks running from the Nene River to the Humber delineating areas for domestic and agricultural activity (Cunliffe. 2005: 73; Taylor. 2007: 63). Whilst enclosure settlements were also present in these areas, they were noticeably larger than their northern counterparts, leading to Cunliffe's interpretation that such sites formed an enclosed village housing "several family units" (Cunliffe. 2005: 73). This settlement pattern appears to be more akin to southern Britain, forming an extensive model of subsistence and occupation whereby the majority of settlements constituted dispersed hamlets set amongst large tracts of agricultural land, whilst a small number of larger nucleated settlements acted as nodes within the rural landscape.

Conversely, the West Midlands more closely followed northern areas, particularly the Yorkshire Wolds, with an intensive pattern of small, highly nucleated settlements set amongst smaller agricultural land units (Derych. 2012; Taylor. 2007:

62). Differentiation of settlement practices may thus allow for a limited re-establishment of the east-west divide to explain macro-spatial patterns in the Midlands. Settlements in southern and western Yorkshire trended towards dispersed small enclosure farmstead sites, with a continuity of occupation from the early pre-Roman Iron Age Period until the Fourth Century AD (Millett. 2016: 704). As noted, the Yorkshire Wolds were similar to the West Midlands, with a pattern of small, nucleated enclosure settlements clustering along predominantly north-south oriented trackways, supporting Taylor's suggestion that connectivity was a significant factor in the locational preferences of settlements (Derych. 2012; Taylor. 2007: 60-63). The proximity of settlements to linear earthworks such as trackways and dykes suggest the region was structured to include the mobility of herds in a transhumance economy, alongside cultivation agriculture (Taylor. 2007: 60-62). An important exception can be found in the Humber and Holderness regions, in which coastal processes had a significant effect on the settlement pattern. This low-lying area was subjected to repeated marine transgression from the late Bronze Age onwards, limiting pre-Roman activity to small 'islands' in the tidal marshlands (Neumann. 1998; Van De Noort & Ellis. 2000: 421). Whilst marine regression during the pre-Roman Iron Age and early Roman periods later enabled more stable patterns of human occupation, the paucity of archaeological material for settlement may be ascribed to natural processes (Taylor. 2007: 44; Van De Noort & Ellis. 2000: 421). Greater sparsity of settlements was found in upland areas of the Yorkshire Dales and Pennines, with fewer earthwork enclosures and an associated reduction in the numbers of structures within settlements indicating a lower density of occupation, whilst increasing numbers of single-structure farmsteads and cave occupation sites on upland slopes, both set amongst larger agricultural land units, suggested a more extensive exploitation of the landscape (Cunliffe. 2005: 212; Taylor. 2007: 59). The seeming abandonment of dispersed sites on higher elevations in the later pre-Roman Period indicated a transition of the upland settlement pattern, with the movement of people into growing nuclear settlements in valley systems (Taylor. 2007: 62). Whilst this trend has been identified, and continues into the Roman Period, more research is required to adequately account for its cause. West of the Pennines, an over-representation of small, univallate enclosure sites should be seen as significant evidence for an intensive localism in the settlement pattern and practices of land-use and land division (Middleton. 2011: 32; Nevell. 1999: 15). When compared to enclosure settlements in the east, the internal occupation of settlements in the west appeared far less dense, with only one or two roundhouses being the norm (Middleton. 2011: 32). Specialisation of activity also appeared prominently in the settlement pattern of the west, with salt driers and kilns for 'very coarse pottery' being interpreted by recent scholarship as indicative of an organised salt production and distribution economy, possibly related to elite exchange of continental goods

through sites such as Meols (Harding. 2004: 65; Matthews. 1999; Morris. 1985). The settlement pattern of the northwest therefore appeared to be dominated by intensive, small-scale occupation with a notable emphasis on craft specialisation.

The place of hillforts within the pre-Roman rural landscape has led to their perception as foci of cultural activity (Cunliffe. 2005: 310). Whilst this interpretation is largely uncontested, especially in southern England where large, complex hillforts acted as 'central places' for control of resources and groups of people, there remains a lack of such sites in the Midlands and northern England (Harding. 2004: 41). Apart from Stanwick, hillforts there appeared to be smaller and less densely occupied than their southern counterparts (Harding. 2004: 41). With the notable exception of Ingleborough Hillfort, North Yorkshire (Fig. 2.3), hillforts were also found no higher than 300m in elevation, indicating a lack of sites in the upland regions of the Pennines (Cunliffe. 2005: 310; Harding. 2004: 60). The relatively sparse distribution of hillforts throughout the landscape, their skew towards lowland locales, as well as the localism inherent in the settlement record, has led to interpretations of a lack of social complexity in the cultural landscape of the Midlands and northern England, though the possibility remains that 'central places' within the cultural landscape were found in another category of settlements, rather than hillforts (Cunliffe. 2005: 310; Harding. 2004: 41, 60).

Figure 2.3: Aerial photograph of Ingleborough Hillfort, North Yorkshire. Note the significantly elevated position of the site within the landscape, as well as the clearly visible stone and earthwork enclosure with a number of interior roundhouse circles (Historic England. 2023b).

There is a noticeable trend in the abandonment of hillforts in the area around the southern Pennines, with the majority of sites seemingly ceasing year-round occupation in the Fourth Century BC and being replaced by more archaeologically ephemeral activities such as seasonal transhumance (Harding. 2004: 62). In this sense, Applebaum (1963: 11) claims that many hillforts were perhaps not nodal centres of activity, but rather dependants on the agricultural landscape. This would suggest most activity occurred in the lowlands, whilst hillforts were potentially utilised only in specific activities such as seasonal pastoralism, or in specific cases such as conflict, where the earthworks could have proved useful. However, as neither interpretation can be seen as definitive, a significant question remains as to the nature and distribution of hillforts within the pre-Roman and early Roman landscapes of the Midlands and northern England, opening the potential for further research in this area.

The overall pattern of pre-Roman settlement in the Midlands and northern England emerges as one blending intensive localism with limited structuring provided by larger socio-political, cultural, and economic groupings. Whilst the traditionally cited monolithic groups, such as the *Brigantes*, offer some value for discussing the organisation of the pre-Roman cultural landscape, their problematic interpretation nonetheless requires a level of scepticism in their use to explain macro-spatial trends in human behaviour, or in their attribution to any constructs of group identity. Similarly, the tension between cultivation and pastoral subsistence models in ascertaining the predominant pre-Roman economic structure should be re-evaluated, with interpretive challenges presented by the archaeological record. The traditional east-west divide hypothesis should largely be discounted as a generalised explanation for the structure of the cultural landscape, with growing evidence for cereal cultivation in the west, and widespread pastoralism in the east calling into question the interpretation of two distinct economic zones. Regional patterns of settlement can likewise be noted, with variation between the northeast and northwest in terms of site morphology and their relationships within the agricultural landscape. Significantly, distinctive bands of activity can be noted across the region, with greater correlation in activity between the eastern Midlands and southern England, southern and eastern Yorkshire and the West Midlands, and northern Yorkshire and the northwest. These patterns have been quantified in terms of the extent and morphology of settlements, with a general trend towards larger, unenclosed sites in the southern and eastern areas of the Midlands and northern England. Therefore, greater attention should be paid to local variances within the overall framework of a mixed agrarian economy, with the ability for groups within the population to be engaged in distinct subsistence activities, and the likelihood of seasonality as a primary factor in this differentiation (Millett. 2016: 702).

2.3 Change and Continuity Across the Pre-Roman to Roman Periods

An examination of the impact of the Roman conquest on the composition of the settlement pattern of the Midlands and northern England reveals significant continuity. Separated from the initial conquest c. AD 43 by between two and four decades, the Roman arrival in the study area appeared to be one of distinct phases, often dominated in the historical record by the military campaigns of successive Roman governors. However, for nearly a century the enduring position of early Roman archaeology in northern Britain has been that:

> "There are great numbers of so-called 'British settlements' which, when excavated, betray their Roman date by one or two chance finds … Apart from a potsherd or two, and perhaps a far-away reminiscence of Roman lay-out, these sites might be altogether pre-Roman" (Collingwood. 1930: 156).

This interpretation of limited 'Romanisation', despite some challenges, has remained pervasive throughout modern scholarship, creating a strong sense of continuity from the pre-Roman Period into the first two centuries of the Roman Period (Harding. 2004: 195; Mattingly. 2007: 357; Wallace. 2016: 131). Such an argument does not avoid the concept of conflict as part of the Roman conquest, with a substantial military presence demonstrated by an abundance of early Roman fortifications. Indeed, much of the 'new' settlement in northern England was in the form of military sites, with Mattingly noting a contrast between a singular focus of Roman military activity, and indigenous settlement patterns which "followed a variety of trajectories" (Mattingly. 2007: 357). Tacitus noted immediately after the first phase of conquest in northern Britain the occurrence of "many battles, some by no means bloodless, and his [Agricola's] conquests … embraced a large part of the territory of the *Brigantes*" (Tac. *Agr*. 17). This, in addition to mentions of 'terror' inflicted upon the local groups, indicated widespread conflict during the C1st, with clear efforts by the Roman military to subjugate northern England (Mattingly. 2007: 91). Supporting evidence can be found for conflict at those pre-Roman hillforts which retained occupation up to the Roman conquest. Whilst many hillforts had been abandoned prior to the arrival of the Romans (Harding. 2004: 62), evidence of conflict at Stanwick, as well as the discontinuity of its occupation and destruction of a part of its earthworks, indicated conflict caused the depopulation of the site (Wheeler. 1954: 13-18). The nature of hillfort depopulation suggests military activity targeted specific elements within the pre-Roman settlement pattern, whilst allowing continuity in the rural landscape, leading to Mattingly's claim that scholarship minimising the impact of the Roman conquest on the pre-Roman population constitutes "a naïve reading of the evidence available" (Mattingly. 2007: 91). Similarly, evidence of conflict and depopulation was present at the large pre-Roman settlement of Dragonby, Lincolnshire, supporting the notion of targeted military activity at key site locations

(May. 1970: 243). Furthermore, evidence of the redivision of the cultural landscape during the Roman Period has led to the interpretation that "in extreme cases native Britons might find their lands definitively alienated" (Mattingly. 2007: 354). This is not wholly unreasonable, given the correlating evidence of Roman military activity and site depopulation, however there are also notable interpretations that such highly disruptive military activities may have been limited:

> "Was there a deliberate policy not to cause too much destruction in Britain … in order to mitigate any concerns that the Roman army could be isolated from supplies from across the Channel and depend wholly on provision from within Britain?" (Fulford. 2020: 298).

> "Rome demonstrated no immediate desire to drastically alter the dynamic of the upland landscape. Imperial priorities were concerned primarily with the fiscal gain that accompanied order and control" (Derych. 2012: 41).

It is possible to present the interpretations of modern scholars of the impacts of Roman conquest on pre-Roman populations and their settlement in northern Britain as a singular position without much conflict. There is little disagreement that the Roman state forcefully gained dominance over the pre-existing population through overt shows of military force, such as the besieging and subsequent depopulation of prominent sites such as hillforts. On the other hand, the Romans preserved much of the rural settlement pattern for utilisation in subsistence, explaining its continuity in the archaeological record. It is this model that Harding proposes, stating the process utilised by the Romans in northern Britain "though undoubtedly socially disruptive, was qualified in terms of acculturation" (Harding. 2004: 195).

The rural settlement record demonstrated important examples of continuity, with much of the pre-Roman settlement pattern remaining intact into the Roman Period. The noted networking of linear earthworks in the West Midlands and Yorkshire Wolds also continued throughout the Roman Period, suggesting a long continuity of land division and occupation in those regions (Derych. 2012; Taylor. 2007: 60-63). Likewise, the relatively sparse settlement pattern of the Northwest remained apparent throughout the Roman Period, with a general lack of intensive rural settlement found between the River Mersey and River Ribble (Harding. 2004: 65). The West Midlands and Northwest skewed towards a relatively even distribution of roadside settlements, towns and military fortifications throughout the landscape, whilst the rural settlement pattern continued with little relation to the developing Roman pattern (Taylor. 2007: 48). Both change and continuity were present in the East Midlands, with the largely agrarian settlement pattern remaining consistent from the pre-Roman Period, whilst Taylor noted a "significant minority" of unenclosed rural sites in Lincolnshire and Northamptonshire increased in both size

and occupational density across the later pre-Roman, C1st and C2nd Roman periods (Taylor. 2007: 47). Farmsteads and agrarian hamlets continued to dominate the rural settlement record (Taylor. 2007: 111), with the use of roundhouses indistinguishable from the pre-Roman Period further supporting assertions of continuity. Whilst some increase in the presence of rectilinear structures within rural settlements was found, these should not be considered the usual, nor could definitive typologies, such as the aisled halls of the late Roman and sub-Roman periods, be distinguished (Millett. 2016: 707). Indeed, whilst continuity from the pre-Roman Period dominated the early Roman rural record, Roman influences were seen in the general variability of structural morphologies and the increasing density of landscape occupation, rather than the wholesale adoption of new architectural styles or settlement forms (Taylor. 2007: 43, 109-110). In southern and western Yorkshire, for example, the cultural landscape remained largely unchanged from the pre-Roman Period. Whilst new settlements emerged, these constituted either enclosures or open roundhouse clusters, being largely indistinguishable from their pre-Roman counterparts. Villas appeared only in limited numbers during the C1st and C2nd, with the majority of villa activity occurring later in the Roman Period, and therefore outside the scope of this study (Millett. 2016: 704). Similarly, significant changes in the rural settlement record were found in the development of civilian *vici* adjacent to military fortifications, with *vici* exceeding most rural settlements in extent, internal structural density, and the variety of structural morphologies present (Taylor. 2007: 47). Where change can be observed from the pre-Roman rural settlement pattern, such as the contraction of upland settlement in the Peak District, a broad continuity of land-use practices was ascertained, particularly in land clearance and the character of the agricultural regime (Taylor. 2007: 62). Perhaps the clearest example of change in the early Roman settlement pattern was observed in the Humber and Holderness region, where marine regression from pre-Roman levels allowed for the development of a dispersed agricultural landscape akin to much of Yorkshire following the Roman conquest (Neumann. 1998; Taylor. 2007: 60; Van De Noort & Ellis. 2000: 421). The pattern of settlement during the early Roman Period appears to share close similarities with the pre-Roman record, with an overall diversity of practice across regions suggesting strong localisation of activity. The lack of change in the rural settlement pattern is striking, indicating a general paucity of 'Romanised' development when compared to southern England or continental Europe. Positing a singular framework of provincial development should therefore be viewed as an inadequate explanation for the nature of the Roman colonisation of the Midlands and northern England, with the possibility for a far greater emphasis on continuity from the pre-Roman Period (Millett. 2016: 701; Taylor. 2007: 109).

2.4 'Romanisation' and the Changing Landscape of the Roman Period

The landscape of the Midlands and northern England during the first two centuries of the Roman Period demonstrated both continuity and change in landscape management, with key trends in the cultivation and pastoralist agricultural regimes carrying over from the pre-Roman record. The widespread cultivation of spelt, emmer and barley continued largely unaffected from the later pre-Roman Period, retaining a substantial footprint in the palynological record (Van der Veen. 2016: 809, 815). Studies in the Peak District demonstrated an increase in cereal pollen and corresponding decrease in woodland pollen, suggesting a continuity of trends of land clearance for cultivation (Long, *et. al*. 1998; Nevell & Redhead. 2005: 88-89). The appearance of introduced walnut pollen also indicated a change in crop selection, landscape organisation and the diversification of agricultural practices (Nevell & Redhead. 2005: 88-89). A recent isotopic analysis study also presented unique insights into potential changes in the early Roman landscape of the Midlands and northern England. Samples of spelt and barley from the site at Stanwick, Northamptonshire, were isotopically analysed for their relative nitrogen content, as an indicator for manuring practices in the cultivation process. Significantly, a nearly 2% decrease was noted in nitrogen isotopic values between the pre-Roman and Roman samples, with a 3% decrease also noted from early pre-Roman (c. 900-400 BC) to later pre-Roman samples (Lodwick, *et. al*. 2021: 22). When combined, these results demonstrated a clear decrease in the quantity of nitrogen crops were receiving across the pre-Roman and Roman periods, being interpreted as an indicator of a change in manuring practices towards a generally less intensive model of cereal cultivation. Whilst this was from the southern Midlands, and so outside the study area, it was concluded that the primary change in cultivation practices from the pre-Roman to Roman periods across Britain was a move towards a more extensive agricultural model, with a greater proportion of the landscape under constant cultivation with a lower labour input, rather than a more intensive practice of crop-rotation within smaller plots (Lodwick, *et. al*. 2021: 22). This tied closely with the interpretation that "The real change in arable farming noticeable in this period concerns not so much crop choice, but the scale of production" (Van der Veen. 2016: 810). Changes in storage practices were also apparent in the archaeological record, highlighting a greater focus on the storage and distribution of cereals when compared to the pre-Roman Period that mirrored changes in cultivation practices. Sites across the Midlands and northern England, particularly military sites, produced widespread evidence for 'corn drying' practices and the subsequent storage of substantial quantities of cereals in granaries (Fulford. 2020: 301). The presence of introduced grain pests in cereal samples from early Roman archaeological deposits at both London and York has been seen to further indicate an increase in the bulk storage of cereals in open granary structures, which would

provide the ideal habitat for such introduced pests when compared to smaller, pre-Roman cereal storage structures (Van der Veen. 2016: 811). A pattern thus appears in the early Roman agricultural landscape of the Midlands and northern England wherein the pre-existing model of agricultural land-use was merely adapted by the Romans to suit a generally more extensive regime, with a focus on increasing land clearance to create larger agricultural land units, the utilisation of less-intensive cultivation practices, and a greater focus on crop storage and preservation.

Whilst continuity is observable in the cultivation agricultural regime of the Midlands and northern England, the pastoral record demonstrated greater evidence of change, particularly in the species of animals utilised in husbandry. Again, the palynological record provides useful insights into the changes in pastoralist practices. Analysis of pollen samples at Castleshaw noted a sharp decrease in woodland pollen and corresponding increase in grassland pollen during the Roman Period, indicating the rate and extent of land clearance was increasing (Brayshay. 1999). This change in land management has been directly linked to Roman military activity in the area, as changes in the palynological record correlated with the construction and occupation of the Roman military fortifications at Castleshaw (Nash, Roberts & Redhead. 2016: 132-133). Nevell and Redhead posit this as a significant trend, suggesting deliberate efforts were made by the Roman military to improve grazing conditions in their immediate environs, though such efforts were highly localised, and grazing conditions declined immediately following the fortification's abandonment later in the Roman Period (Nevell & Redhead. 2005: 111-112). Whilst this evidence is limited to one site, and is therefore only locally applicable, it does provide a useful lens to view the potential for varying land-use objectives between different elements of Roman society, with an allowance for state-directed and controlled approaches to shaping the physical and cultural landscape. The recent application of inter-disciplinary approaches highlights a number of changes in the faunal record of the first two centuries of the Roman Period. Sheep constituted the majority of the pre-Roman faunal assemblage across Britain, though a preference for cattle was found in upland areas of northern England (Maltby. 2016: 797). However, the early Roman Period saw cattle overtake sheep as the primary component of the faunal assemblage (Maltby. 2016: 793-797), whilst metrical analysis of cattle remains demonstrated the introduction of much larger breeds into Britain during the early Roman Period (Maltby. 2016: 796). This correlated with the increase in land clearance (Nevell & Redhead. 2005: 111-112), indicating a significant transition in pastoralist practices. Another major change present in the faunal record is the sizeable increase in the number of pigs during the Roman Period, correlating with early Roman military and urban sites, whilst little evidence of pork consumption was found in rural settlements (Maltby. 2016: 798). At a number of urban sites, including Wroxeter, evidence of pig raising was found within the urban limits (Maltby. 2010: 264–265;

Maltby. 2016: 799). This is highly significant, as it demonstrates a clear specialisation of practice within the agricultural economy, with urban sites producing pork products wholly for their own domestic consumption, rather than relying on the surrounding rural landscape. When combined, the evidence for agricultural land-use in the early Roman Period indicated striking changes from the pre-Roman record, with a general diversification of food sources and the expansion of the agricultural landscape to cater towards a more extensive regime of low-input, large-field cultivation and the preferential raising of larger herds of cattle. Compared to the more localised and intensive agricultural regime of the pre-Roman Period, the agricultural regime of the early Roman Period supports interpretations of a general increase in population in the Midlands and northern England (Ottaway. 2016: 155-156), likely as a phase of post-conquest colonisation.

The nature and distribution of villas, towns and military sites within the Roman cultural landscape has often been seen as the most significant factor in defining the overall character of Roman provincial development, representing deliberate attempts of local elites, provincial administrators and the Roman state to gain control over specific regions and population groups. The relative paucity of evidence, and indeed sparse distribution where evidence exists, of villas and towns in the Midlands and northern England has led to interpretations that cultural sophistication was lacking in the northern regions of the province, such as the pervasive interpretation of a civilian/military divide (Lloyd. 2008: 27; Sargent. 2002). Very few villas were present north of the Humber, with only a few examples in Yorkshire, whilst the landscape north of the Mersey was completely devoid of villas (Harding. 2004: 65). Villa distribution is somewhat contentious in modern scholarship, with two conflicting schools of thought related to the validity of the villa pattern as an analytical framework. Some, such as Taylor, argue the villa pattern is entirely artificial and attributable to a general lack of widespread developer-funded archaeology in the area, particularly in the Northwest region, where a sparse distribution of archaeological sites trends more closely towards modern population centres (Taylor. 2007: 109). Conversely, both Harding and Sargent argue the trend in sparse occupation can be readily demonstrated in the pre-Roman settlement pattern, with a correlation between occupation in the pre-Roman Period and a lack of villas indicating a valid archaeological pattern (Harding. 2004: 65, 214; Sargent. 2002: 224). It has been argued that the pattern of villa distribution in the Midlands and northern England may follow similar trends to those in western Germany, with Fulford noting correlations between villa development in Cheshire and southern Yorkshire, and the region bordering the River Rhine from Xanten to Cologne, with this similarity between the two not challenged by the last “25 years of developer-funded archaeology” in northern England (Fulford. 2020: 303).

The function of villas within the early Roman cultural landscape, similar to their distribution, is also a matter of contention, with competing visions for villas as either primary productive units in the agricultural economy, or as high status 'show-sites' intended to further the agendas of an elite class within Roman provincial society (Fig. 2.4). The relationships between villas and rural settlements have proved emblematic of the argument for an agricultural function for villas within the overall cultural landscape, noting the location of such sites often appeared to create a 'core and periphery' relationship with the agrarian settlement pattern. In this regard, it has been suggested that villas assumed the role of the 'central place' ascribed to hillforts in the pre-Roman rural settlement pattern (Applebaum. 1963: 6). This interpretation has proved remarkably resilient, with recent analysis indicating villas were selectively situated based on the agricultural viability of the soil, at least in southeastern England, with little relationship to the urban settlement pattern (Bird. 2000: 157). Such a notion was presented in direct contrast with Millett's suggestion that villas were an 'elite settlement' on the periphery of towns, allowing local elites control over the urban socio-political activities (Bird. 2000: 157; Millett. 1996: 34-35).

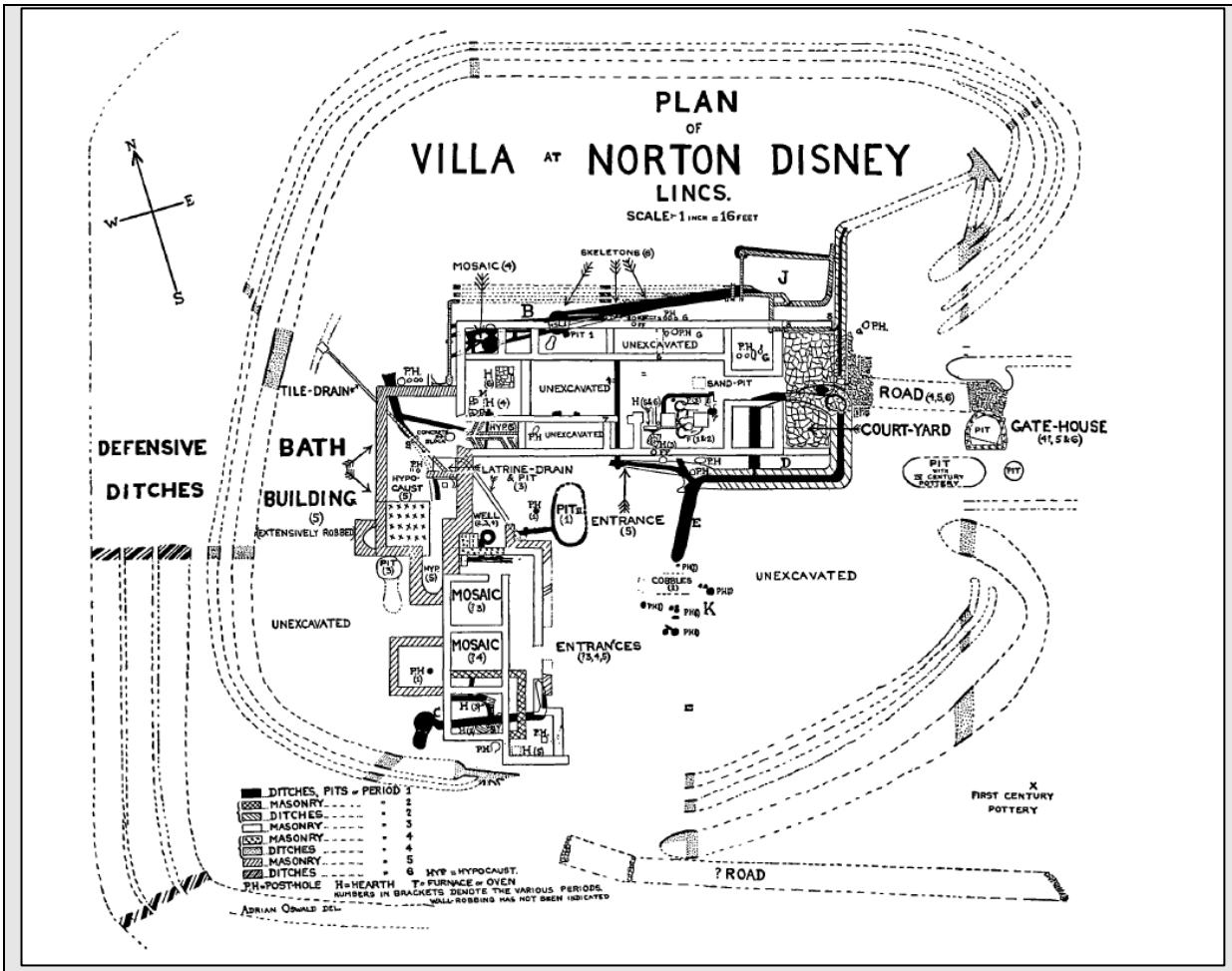

Figure 2.4: Plan of the 'defended' Roman villa located at Norton Disney, Lincolnshire. Note the site evolved substantially across the Roman Period from a single villa structure into a range with bathhouses and outbuildings, though much of this occurred after the C2nd (Oswald. 1937: 159)

These indicators form an interpretation of villas as a central node in the rural landscape, allowing social elites to control from a single location the production and distribution of outputs from a surrounding periphery of agricultural settlements. Contrasting against this interpretation is one of villas as an expression of social status by the Roman elite, and as a tool for local pre-Roman elites to express their *Romanitas* and thus their loyalty to the new regime. Citing examples of exceptional monumental villas, such as Fishbourne Palace, West Sussex, Mattingly argued the development of villas during the C1st appeared to be "exceptional commissions", constructed for the purpose of 'indulging' imperial officials, or provincial elites (Mattingly. 2007: 373). Similarly, Millett notes the majority of villa development progressed slowly during the early Roman Period, whilst a small number of complex villa estates, such as Fishbourne Palace, developed in direct contradiction of a model of gradual economic development as a 'central place' to control the agricultural landscape (Millett. 1996: 34-35; Millett. 2016: 705). As such, Millett proposes villas developed as "the spread of a fashion for a particular type of elite display, not the development of a particular economic mode" (Millett. 2016: 705). It is important to note that despite the strength of this interpretation in explaining villa patterns in southern England, no evidence of complex villa estates on the scale of Fishbourne Palace is present in northern England (Allen, *et. al*. 2018), limiting the applicability of such interpretations. There is, therefore, no overarching consensus about the role of villas within British cultural landscapes, instead requiring further analysis to build upon the record of such sites and their place within the landscape, as well as their potential role within the prevalent socio-cultural and economic systems of the early Roman Period.

The role of towns within the early Roman cultural landscape of the Midlands and northern England appears calcified in the scholarship, with a strong emphasis on the social, cultural and economic connectivity between apparently disparate rural and urban settlement patterns. The assertion that towns had a 'parasitic' relationship with the cultural landscape (Collingwood & Myres. 1937: 198-199) has not seen significant challenge, with a generally accepted notion that such sites acted as primary consumers within the provincial economic framework – their own produced goods seeing little exchange and movement outside of the towns' immediate environs (Collingwood & Myres. 1937; Pitts. 2016: 720-721; White & Dalwood. 1996: 20). The town has traditionally been seen as instrumental in developing systems of provincial inequality, with urban centres seeing "the blessings of romanization at the expense of the country-folk" (Collingwood & Myres. 1937: 198-199). In the Midlands and northern England, comprehensive survey of the environs of the town of Wroxeter conducted by Gaffney and White supports this notion, claiming that "the town appears rich, dynamic, and 'Romanized'; the countryside appears impoverished, static and conservative"

(Gaffney & White. 2007: 282-283; Pitts. 2016: 726) (Fig. 2.5). For the purpose of this study, the morphologies of towns have been defined as widely as possible to allow for a relatively concise exploration of urban and rural patterns of settlement.

Figure 2.5: Artistic impression of the Roman town of Wroxeter, Shropshire. Note the substantial earthworks and complex division of internal occupation, contrasted against the relative sparsity of occupation in the immediate hinterland of the town (Historic England. 2023c)

Given trends to delineate forms of towns in Britain by their nomenclature as, for example *civitates*, *coloniae*, or *municipia* (Wacher. 1995: 15-16), to adequately account for the relationship between towns and the remainder of the cultural landscape, it is necessary to posit their function in the simplest terms as administratively and economically 'central places' within the landscape. This centrality is reinforced in the scholarship, with various noted correlations between extant centres of pre-Roman and early post-conquest activity, and the eventual sites of Roman towns (Ellis Jones. 2009: 23; Mattingly. 2007: 255; Rogers. 2016: 745-753). Furthermore, there is an apparent connection between sites of Roman military activity, and the eventual formation of Roman towns across England. Rogers (2016: 753.) notes the conversion of a number of Roman military sites, including Lincoln, into Roman towns, as well as the construction of towns in accompaniment to military sites, such as at York. The location of towns should be viewed as highly artificial in nature, favouring specific objectives of the Roman provincial and state administration, and not arising solely through local processes. Consequently, the 'parasitic' nature of Roman towns within the rural landscape can be seen as a product of independent, yet related, systems of land-use and land division, as well as different socio-cultural mechanisms.

Study of the place of the Roman military within the archaeological record has often sought to link specific sites or phases of military activity with historical events, and thus reveal an overarching Roman provincial strategy in Britain during the C1st and C2nd (Breeze & Dobson. 1985). On a macroscopic scale, the movement of Roman military units within Britain can be readily observed and dated. For example, inscriptions attest to the presence of the *Legio IX Hispana* at Lincoln, or at least a *vexillation* of said legion, as early as AD 50 (Hanson & Campbell. 1986: 80), suggesting the movement of major military units into the Midlands and northern England prior to the Flavian Period. Conversely, it has been noted that a number of supposedly 'Agricolan' fortifications, dated c. AD 77-85, do not provide sufficient garrisoning space to match the strength of the Roman army in Britain described in the literary record. As such, either the literature is incorrect, or fewer forts can be attributed to Agricola's governorship (Hanson & Campbell. 1986: 88-89). Such cases illustrate the complications in reconstructing Roman military strategy from historical accounts in archaeological terms. Whilst specific units or periods of time may be identified, to readily quantify this into geospatial trends in the landscape remains problematic. By contrast, greater value in interpreting the geospatial priorities of the Roman state in the Midlands and northern England can be seen in the trends of site placement and occupation, revealing specific points of interest for the Roman state. For example, it has been suggested that the placement of the fortifications at Brough-on-Humber and Hayton, Yorkshire, were based on a strategy to delineate borders of the territories of the *Brigantes* and *Parisii* (Hanson & Campbell. 1986: 84). If such an interpretation is taken, then it would be prudent to examine the location of Roman military sites in the context of their pre-Roman environs.

Interactions between the Roman military and settlement patterns remain a contested issue, with contrasting views on the nature of military connectivity with inter-provincial systems of transportation, contact and exchange. The Roman military's reliance on the extant British landscape for the purpose of logistics and provisioning has proved a significant point of contrast, with disagreement on the extent to which the pre-Roman agricultural landscape could have sustained such a large influx of consumers. The presence of riverine port facilities at the fortresses of Chester and York, as well as Caerleon, Wales, has led to suggestions that the Roman military was likely supplied with foodstuffs, raw materials and processed goods from continental sources (Evers. 2011: 43-44; Harding. 2004: 215). Evidence for the storage and use of imported cereal at the Roman military 'supply base' at South Shields, Tyne and Wear, demonstrated that the Roman military in northern England was significantly dependent on imported agricultural produce for sustainment from the Third Century AD onwards (Bidwell. 1995: 395), though a limited phase during the C1st and C2nd existed where local foodstuffs may have constituted a majority of military supply (Ellis Jones. 2009: 24). Though this interpretation relies largely on a lack of

C1st and C2nd evidence, it is not without support, with proposals that the Roman military in Britain could have been supplied largely from local sources during the immediate post-conquest period, due to the extant agricultural landscape maintaining sufficient carrying capacity to sustain the additional consumers (Anderson. 1992; Breeze & Dobson. 1985: 18; Ellis Jones. 2009: 24). This relates to the noted suggestions that the Roman military deliberately avoided inflicting destruction on the agricultural settlement pattern to maximise its potential use in logistics and developing provincial economic systems (Derych. 2012: 41; Fulford 2020: 298), further complicating the picture. Particularly, Harding notes the division of the Northeast into land units suitable for extensive cereal cultivation would have afforded local military garrisons with the potential for subsistence off local sources, whereas the sparser agricultural landscape of the Northwest would have posed significant challenges for logistics (Harding. 2004: 215). Whilst neither position is conclusive, this debate does open the potential for a significant body of analysis into the interactions between Roman military installations, maritime, riverine and terrestrial systems of transportation, contact and exchange, and with the social, cultural and economic landscape of the Midlands and northern England.

The role of the Roman military in the surveillance and control of terrestrial networks of transportation, contact and exchange is also readily evident, with a large number of Roman fortifications found along Roman roads. As early as the 1930s, Collingwood identified the role of military fortifications as both facilitators and controllers of mobility within the Roman road network of the Midlands and northern England, replacing the role of the *mansio* - present in southern England and continental Europe - as nodal sites within the Roman road network (Collingwood. 1930: 5; Mattingly. 2007: 259). In this regard, it is important to consider the growing body of scholarship describing the dynamic use of landscapes by the Roman military in order to facilitate objectives of socio-political control and internal sustainment. As Okamura (2001: 468) notes, whilst the traditional focus on the identification and archaeological excavation of static defensive installations has created an academic discourse of Roman military fortifications and frontiers as part of a static and inflexible policy of "preclusive defence", there is a growing body of evidence to indicate a far more mobile and dynamic approach towards landscape surveillance and control. In Britain, this discourse has been adopted widely across the scholarship, with significant insights provided into Roman military integration within the cultural landscape, especially connectivity with its maritime, riverine and terrestrial networks of transportation, contact and exchange (Bidwell. 2007: 30; Hanson & Campbell. 1986; Symonds. 2018: 35-54, 55-92). In the study area, this pattern has been noted in two primary locations, with the forts of the Stainmore Pass, Yorkshire, indicating a possible passage of Roman military forces from York towards Carlisle, Cumbria, (Hanson & Campbell. 1986: 86-87), as well as the series of

fortifications lining the major trans-Pennine thoroughfares from the legionary fortress of Chester and the coastal fort of Kirkham, Lancashire, via the crossroads fort at Manchester, Greater Manchester, and on to York (Symonds. 2018: 70-76). Manchester is of particular interest as it falls within the study area and was located at the nexus of Roman roads aligned both north-south and east-west, as well as the navigable rivers Irwell, Medlock and Irk, being viewed as a clear example of the Roman military exploiting strategic locations within riverine and terrestrial networks of transportation, contact and exchange (Breeze & Dobson. 1985: 18; Ellis Jones. 2009: 128). If this macro-spatial pattern of landscape control is taken as a valid interpretive framework, it is therefore likely that connections between the Roman military and the road network could readily be found in analysis of their spatial interactions, opening further research potential.

2.5 Conclusions

A review of extant scholarship regarding the nature of the pre-Roman and Roman cultural landscapes of the Midlands and northern England reveals significant diversity in terms of the socio-cultural and economic practices of the respective periods, but also strong inter-period continuity transcending cultural and temporal divisions. Variation was found to be significant in both the nature of the settlement pattern and agricultural landscape, with a mixed economy comprising practices of cultivation and pastoralism occurring concurrently within the majority of regions. The nature and distribution of rural settlements likewise indicate the diversity of practices in the agricultural landscape, with a greater presence of large, nucleated settlements among a landscape of dispersed farmsteads on the eastern side of the Pennines, whilst the west favoured a larger number of small, nucleated settlements that likely served the function of both domestic and agricultural sites. Such patterns were found to be strongly continuous over time, suggesting that the pre-Roman rural landscape was significantly robust that it proved resistant to any changes brought about by the arrival of the Romans. Indeed, it is apparent that the changes to the landscape during the Roman Period came primarily in the form of key nodal site categories, with villas, military sites and towns joining with maritime, riverine and terrestrial networks of transportation, contact and exchange to create distinct systems for the production and movement of foodstuffs, raw materials and finished goods, as well as the surveillance and control of the landscape. From this system, it is possible to posit the role of the Roman state, military and elite elements within provincial society of the Midlands and northern England constituted perhaps the most decisive changes within the settlement pattern and cultural landscape, contrasting against the relative stability of the rural landscape that remained largely unchanged by the conquest.

Chapter Three:

Pre-Roman and Roman Settlement of the Midlands and Northern England in its Regional Context

The settlement record of the Midlands and northern England, categorised by period, size and function, as well as patterns of regional site distribution across the landscape, demonstrated significant continuity between pre-Roman and Roman settlement patterns. Periodisation of the 483 sites identified in the study area indicated the number of sites increased significantly over time, from 206 pre-Roman sites to 317 sites in the C1st and 428 sites present by the end of the C2nd (Fig. 3.1-3.3). This increase in site numbers was exactly equal between the three periods, with the addition of 111 sites from the pre-Roman to C1st periods, and C1st to C2nd respectively. Such an even rate of change should be seen as highly artificial though not intentional, likely resulting from a paucity of archaeological research, as well as methodological issues in the sampling strategy of the datasets comprising the settlement record. Despite this, the settlement record constructed for the purposes of this study maintains an illustrative value for overall trends in the settlement pattern, land-use and land division practices, constituting a valid sample of currently available archaeological data. The increase in sites from the pre-Roman to Roman periods is of particular interest, as it would indicate an immediate post-conquest phase of consolidation and development within the cultural landscape.

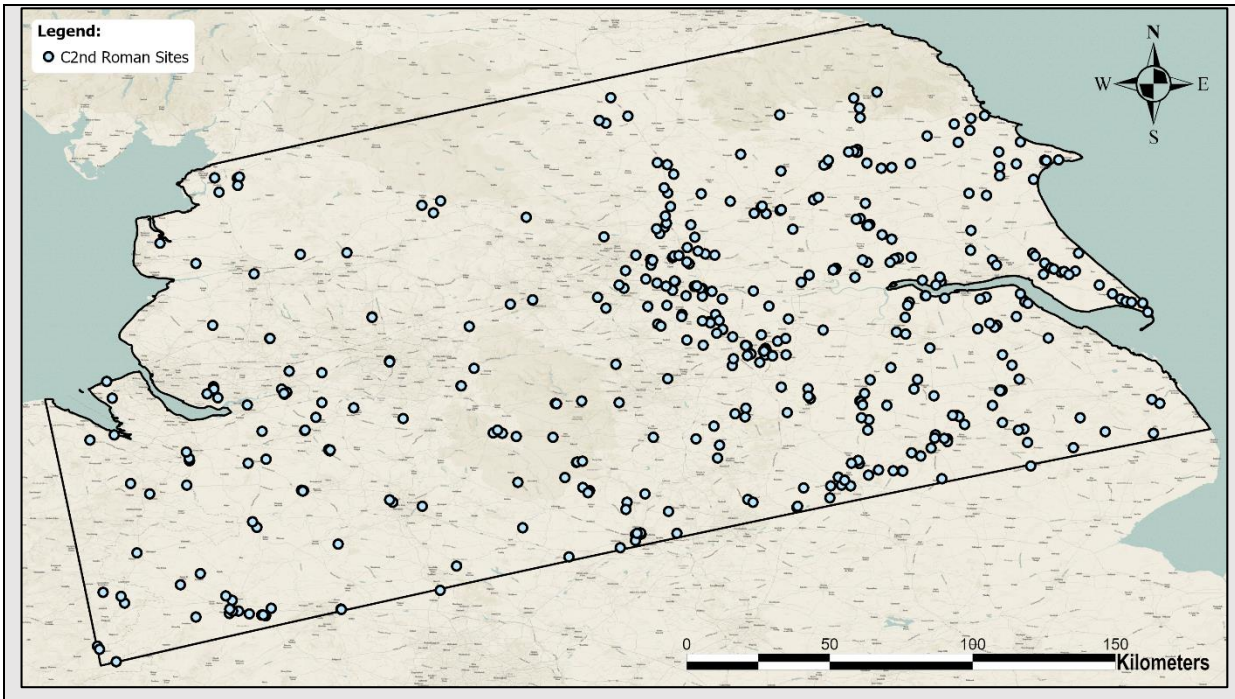

Figure 3.1: Map of sites present in the study area during the C2nd Roman Period.

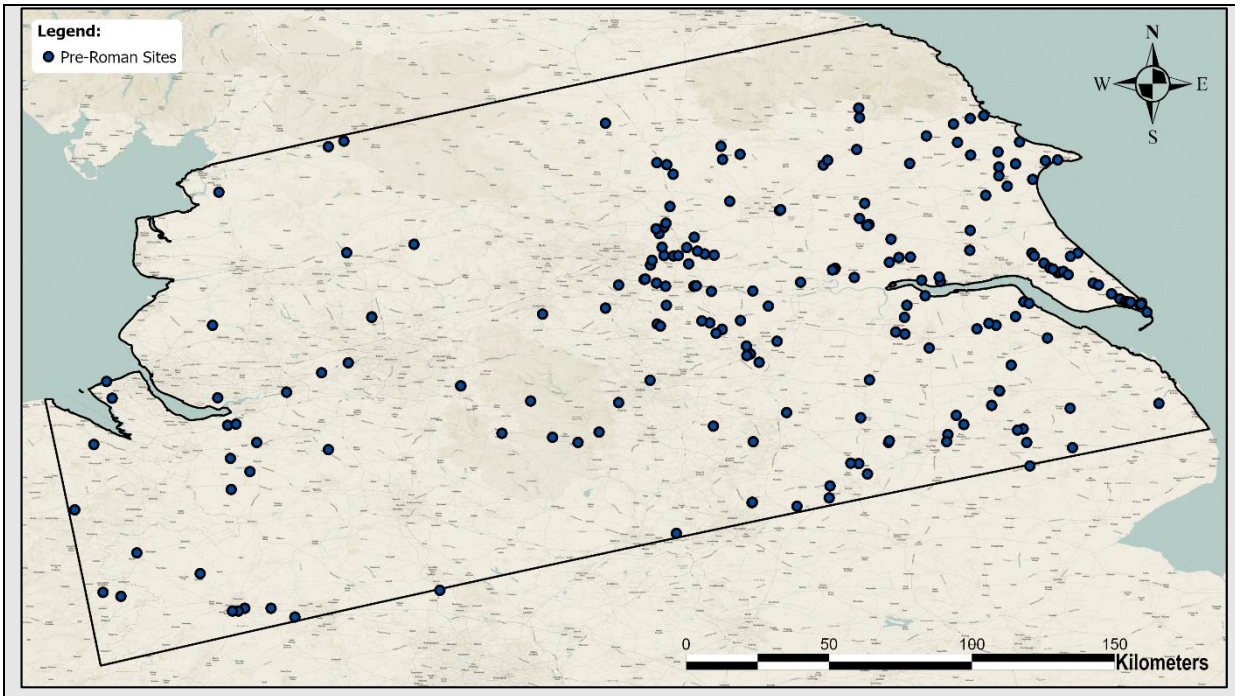

Figure 3.2: Map of sites present in the study area during the pre-Roman Period.

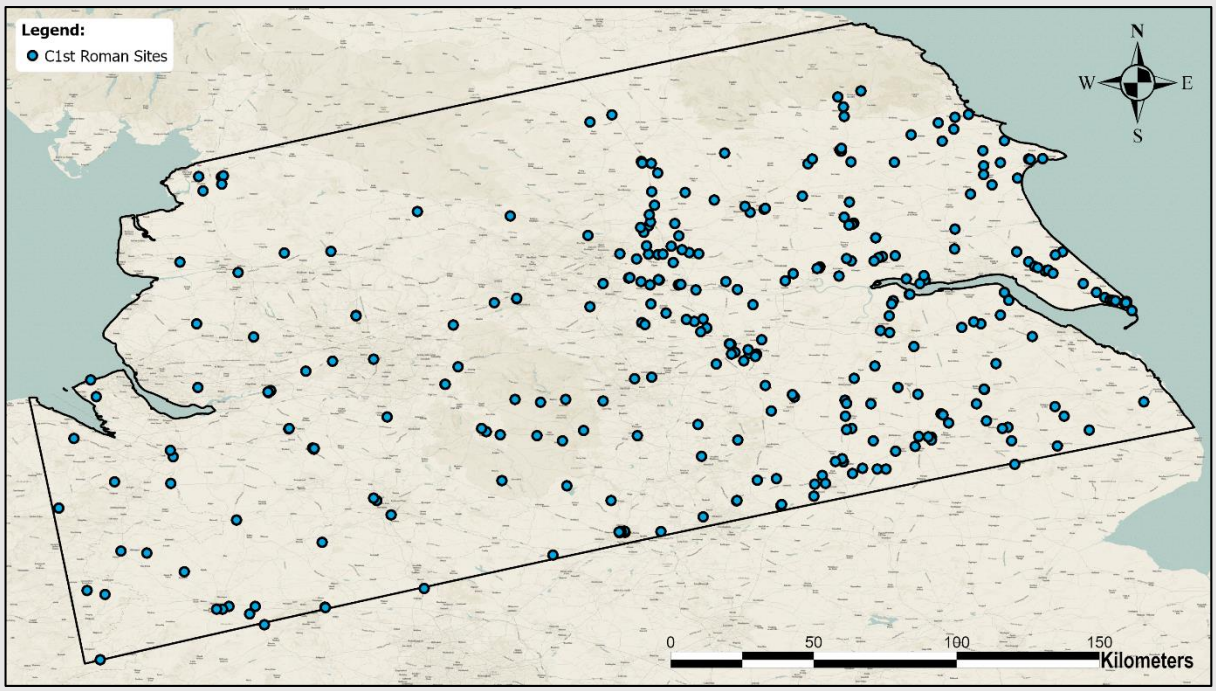

Figure 3.3: Map of sites present in the study area during the C1st Roman Period.

However, significant continuity was also found between the pre- and post-conquest settlement records, with 86.89% of pre-Roman sites containing excavated or surveyed archaeological material dated to the Roman Period (App. 5.1). This lends credence to the interpretations that many early Roman sites were indistinguishable from those in the pre-Roman record (Collingwood. 1930: 156; Harding. 2004: 195; Mattingly. 2007: 357; Wallace. 2016: 131), allowing for a suggestion of broad inter-period and inter-cultural continuity. Furthermore, three pre-Roman sites

demonstrated no evidence of occupational continuity into the C1st, but evidence of reoccupation during the C2nd. This suggests some level of continuity in the use of their locale, or that the position within the landscape was viewed as equally important in the locational preferences of both pre-Roman and C2nd Roman groups, despite the apparent discontinuity in occupation. Pre-Roman and Roman locational preferences therefore appear to have been broadly continuous over time and between groups, with the intensification of occupation after the Roman conquest notionally following extant practices in the selection of site locations.

3.1 Regionality and Settlements by Period

When categorised by period, the settlement record displayed a significant east-west division in occupation, with a greater number of sites located in regions east of the Pennines, than in the west (Fig. 3.4). Site numbers skewed markedly towards the East Midlands and Yorkshire and the Humber, with the two regions accounting for 83.49% of pre-Roman sites, 79.81% of C1st and 77.80% of C2nd Roman sites - the slight decrease over time explained by the intensification of occupation in other regions. Particular attention should be paid to Yorkshire and the Humber, with a settlement density nearly twice that of the next region: the East Midlands, and nearly five times greater than the region with the lowest density: the West Midlands. In this regard, Yorkshire should be viewed as the centre of activity in the Midlands and northern England, with an anomalously high degree of complexity in its cultural landscape unseen in the remainder of the study area. Based on site density, this would also make Yorkshire the most densely populated of any region in the study area (App. 1.1-1.4), furthering the likelihood of more complex social, cultural and economic activities having occurred there, which shall be tested further in later analyses.

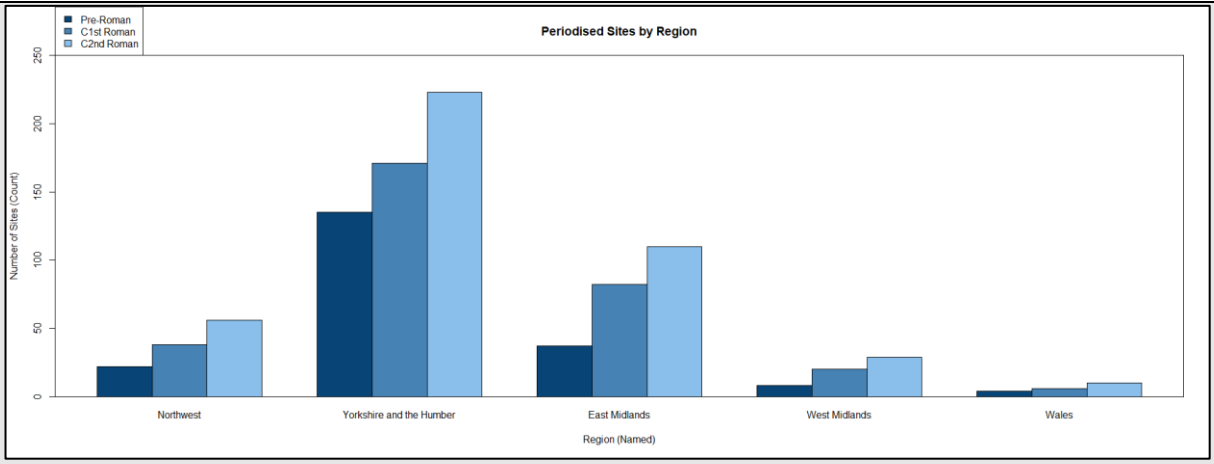

Figure 3.4: Graph showing the distribution of periodised sites within each of the five primary regions in the study area.

3.2 Regionality and Settlements by Size-Category

Categorisation by size also revealed significant continuity over time, with the proportion of sites in each size-category relative to the overall sample correlating across time periods (Fig. 3.5). The rate of growth in the number of sites was also found to be consistent over time in the small size-category, whilst growth in the numbers of medium, large and very large sites appeared to have been greater between the pre-Roman and C1st record, than between the C1st and C2nd.

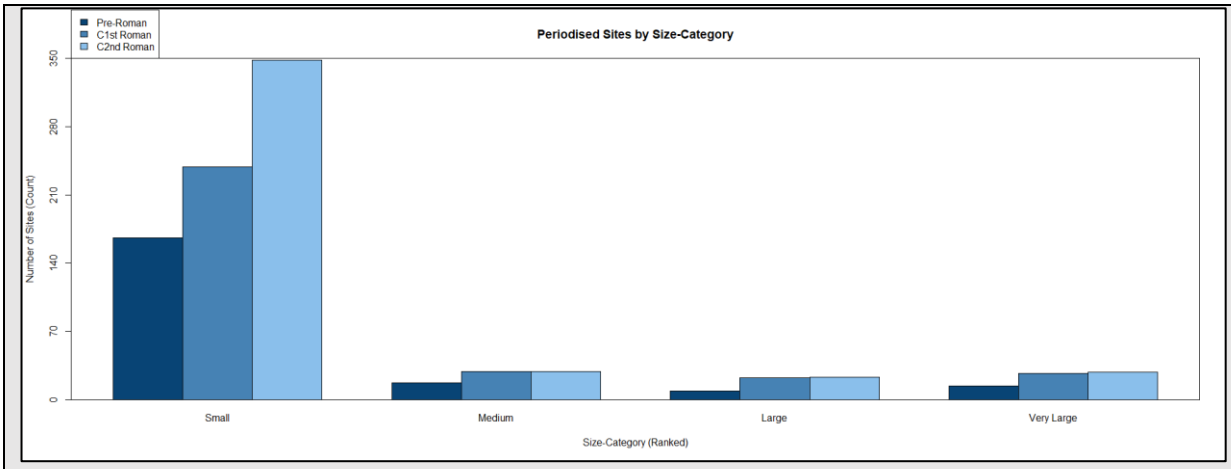

Figure 3.5: Graph showing the categorisation of periodised sites by size-category, indicating the relative number of sites in each category.

All periods skewed significantly towards the small size-category, with other size-categories demonstrating remarkable inter-period and inter-categorical correlation in the number of sites. The settlement record consequently trended towards a small-scale, localised pattern, with sites larger than four hectares being uncommon and markedly even in number across the medium, large and very large size-categories, suggesting such categories were outliers. The regionality of sites, when categorised by size-category, demonstrated strong correlation with the overall pattern in a significant east-west divide. As with the overall record, the majority of small sites were found to be distributed in the two regions of the East Midlands and Yorkshire and the Humber, with the remaining regions accounting for between a quarter and a third of small-scale settlement across all three periods (App. 1.6; 1.8; 1.10). Medium, large and very large sites were found to follow this distribution, with the majority of all three size-categories located east of the Pennines suggesting the increase in site numbers was largely limited to the small size-category in the two regions east of the Pennines and that settlement growth during the Roman Period was intensely localised in nature and limited in scale.

3.3 Regionality and Pre-Roman Settlements by Function

The pre-Roman settlement record contained five distinct categories of activity: agricultural sites, domestic settlements, hillforts, industrial sites and ports (Fig 3.6).

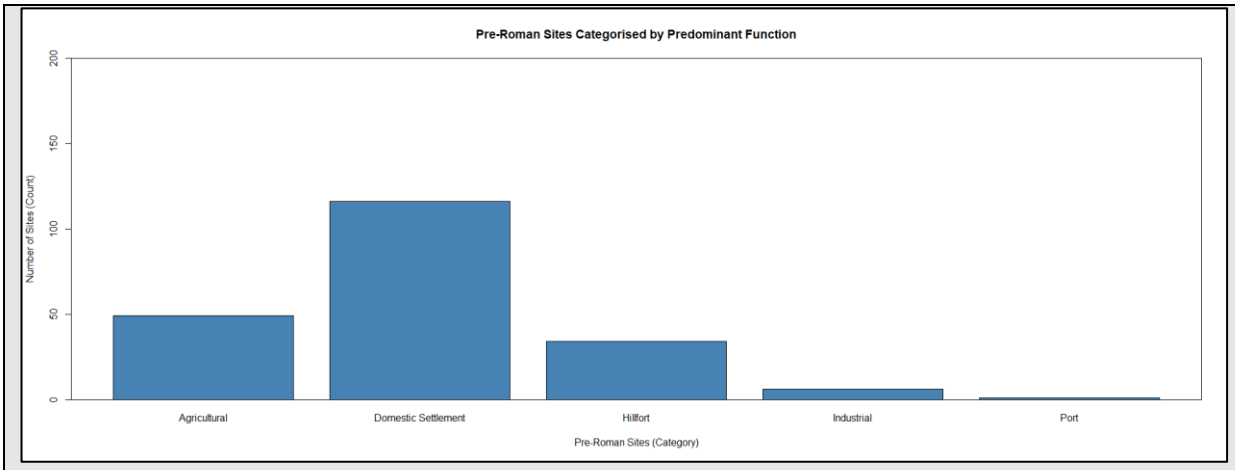

Figure 3.6: Graph showing the categorisation of pre-Roman sites by function, indicating the relative number of sites in each category.

Agricultural sites: Comprising farmsteads and earthwork enclosures in which agricultural activity was noted, agricultural sites accounted for 23.79% of the pre-Roman record. Of these, 85.71% were smaller than four hectares (App. 1.11), primarily constituting isolated farmhouses indicative of low intensity agricultural activity performed by groups as small as an individual family unit (Cunliffe. 2005: 212). Larger agricultural sites comprised complex farmsteads and enclosures which appeared to have been used in seasonal grazing, based on sparse assemblages of material culture and postholes for structures too small and ephemeral in nature to have been occupied permanently. Pre-Roman agricultural sites also showed significant similarities with the overall record in terms of their regional distribution, with 85.71% of sites located in the East Midlands and Yorkshire and the Humber indicating a clear trend in agricultural activity towards the east (App. 1.5).

Domestic Settlements: Accounting for 56.31% of the periodised settlement record, domestic settlements were the most numerous pre-Roman site category. They also demonstrated the greatest diversity of structural morphologies and size-categories of any contemporary category, ranging from small hamlets to large multi-enclosure site complexes with delineated areas for specialised activities. The morphologies of pre-Roman domestic settlements were not quantified, nor any sub-categories created. This was due to the significant degree of inconsistency in archaeological recording, with numerous sites being interpreted as domestic settlements based on scant evidence provided in watching briefs or interventions recorded only in grey literature (Allen, *et. al.* 2018). Whilst some settlements provided precise evidence of excavated material, such as roundhouse numbers or the exact extent of settlement

activity found in either excavation or survey, comparison of such sites with others lacking in detail would result in issues of estimation due to the inconsistency of the data. Domestic settlements trended towards small-scale occupation, with 83.62% of the total sample being less than four hectares in area (App. 1.11). Settlements also showed a significant skew within the overall pattern towards regions east of the Pennines, with 92.24% located in the East Midlands and Yorkshire and the Humber. As this exceeds the mean distribution of pre-Roman sites by over 15%, it is possible to posit a far greater intensity of domestic occupation occurring in the east, particularly in Yorkshire and the Humber, where domestic settlements comprise 67.41% of the total record of pre-Roman sites (App. 1.5), highlighting a significant trend towards this category as a primary form of occupation and activity.

Hillforts: A total of 34 hillforts were present in the study area, being the third most common category of site in the pre-Roman settlement record. Hillforts trended towards the small size-category, with a 61.77% majority being smaller than four hectares in area and 26.47% between four and eight hectares (App. 1.11). Sparse material assemblages and a lack of structural evidence indicates smaller hillforts had a relatively low population density, opening the possibility for the interpretation of seasonal occupation, as noted by Harding (2004: 62). Conversely, four hillforts were found to have an area of over twelve hectares, with significant variability in morphology and the nature of internal occupation. Despite their large areas, both the univallate hillfort at Dorket Head, Nottinghamshire, and bivallate hillfort at Mellor, Greater Manchester, demonstrated evidence of intensive but low-density occupation, with a relatively small number of roundhouses found clustered within limited intramural areas of both sites (Lock & Ralston. 2017; Nevell & Redhead. 2005: 28-33). It is unlikely that either site would have sustained a sufficiently high population density to be considered a pre-Roman 'central place' within the broader cultural landscape similar to hillforts in southern England (Cunliffe. 2005: 310; Harding. 2004: 41), though the imposing upland positions of both sites may have afforded them some significance within the local rural settlement pattern. However, the large multivallate sites of the Wrekin Hillfort, Shropshire, and Old Oswestry, Shropshire, provided strong evidence for densely distributed occupation and mixed agricultural and industrial activities conducive to an interpretation as permanently occupied sites (Fig. 3.7). These sites were found to have distinct divisions of activity, with clusters of roundhouses, storage pits and enclosures for livestock (Allen, *et. al.* 2018). In this regard, very large hillforts in Shropshire conformed more closely to those in southern and eastern England, possibly serving as 'central places' within the pre-Roman landscape, however such large and complex hillforts remained absent in all other regions of the study area. Hillforts differed from other pre-Roman site categories in their regional distribution, with exactly half located on either side of the Pennines. The greatest concentration of hillforts was found in the Northwest region,

presenting the only case in which a western region held the largest count of sites. This over-representation is significant (App. 1.5) and should not be seen as an artificial product of sampling methodologies. Importantly, no hillforts showed evidence of continuity in their original occupation form into the Roman Period, with 38.24% of hillforts suggested to have been abandoned before the conquest, whilst the remainder transitioned to sites of far lower occupational density or entirely different forms of activity either before or just after contact with the Romans (Allen, *et. al.* 2018). It is possible that such sites may have continued use as areas for ephemeral settlement activity, such as a camp or corral for transhumance pastoralists. However, the post-conquest material assemblages were not substantial enough to indicate permanent occupation, suggesting hillfort populations had declined significantly.

Figure 3.7: Aerial photograph of the Old Oswestry hillfort, Shropshire. Note the elaborate earthworks and large central area delineated for occupation (Shropshire Live. 2014).

Industrial sites: Just six sites with demonstrated industrial-scale metalworking, pottery and mixed production activities were present in the pre-Roman record, with the majority being small sites of less than four hectares (App. 1.11). A notable exception is the site of at Gunhills, Armthorpe, South Yorkshire, which at over 12 hectares in area represents an anomaly. However, in all cases, the spread of industrial activity was found to be limited to single clusters of kilns or furnaces, with none demonstrating industrial activity distributed across the entirety of the site. A number of domestic settlements also demonstrated evidence of small-scale, mixed industrial activity, with kilns, furnaces and salt-driers a common occurrence (Allen, *et. al.* 2018). Such 'cottage industries' should be considered the norm in the pre-

Roman economy, with dedicated industrial sites the rarity. Whilst the sample of industrial sites was not large enough to draw specific conclusions, when divided into their three respective subcategories, they were largely utilitarian in output, with assemblages comprising simple ironworking and ceramic coarse wares (Allen, *et. al.* 2018). This indicates their primary function was in producing similar basic goods to the cottage industries found in domestic settlements, albeit on a more intensive scale. Interestingly, all pre-Roman industrial sites were located in the two eastern regions (App. 1.5), though this interpretation is problematic due to the small sample size.

Ports: Only the single port of Meols was confirmed to have been present during the pre-Roman Period. At less than four hectares in total area, it is interpreted as a port due to the presence of continental artefacts and non-local coins, including a quantity of exotic finds pre-dating the Claudian invasion. As this site was discovered due to coastal erosion, it is likely that other ports may have already been lost due to the same erosive processes. Indeed, it is reasonable to assume that a further number of port sites existed during the pre-Roman Period, particularly on the east coast and the Humber, where ports are attested in the early Roman record. Furthermore, it is reasonable that sites located within close proximity to water may have conducted low-intensity maritime activities resulting in little or no archaeological signature.

3.4 Regionality and C1st Roman Settlements by Function

The C1st settlement record was categorised by function into six primary groups: agricultural sites, domestic settlements, industrial sites, military sites, ports and villas, with each showing evidence of both change and continuity from the pre-Roman record (Fig. 3.8). Notably, the pre-Roman hillfort site category is completely absent, with a lack of evidence of their continuity into the early Roman Period.

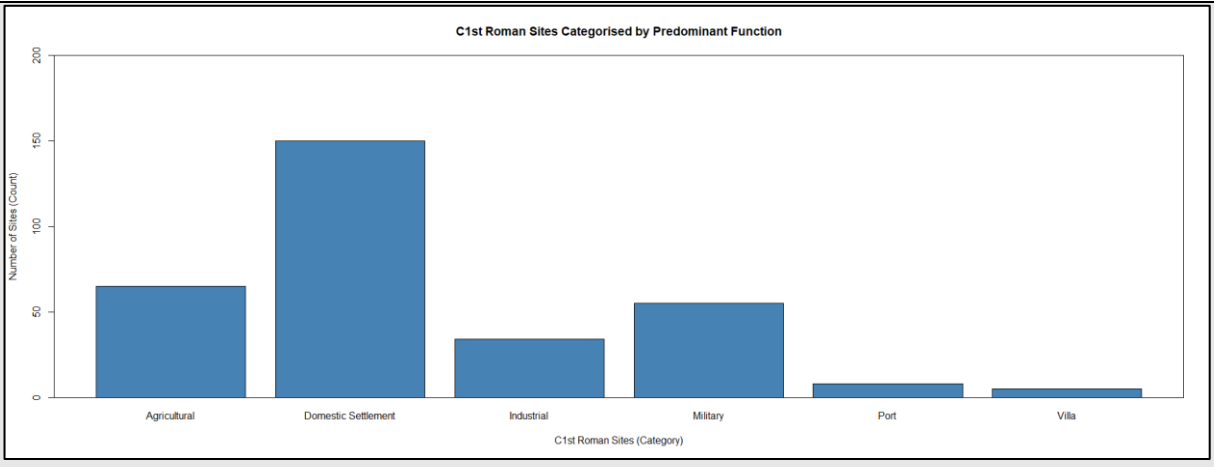

Figure 3.8: Graph showing the categorisation of C1st Roman sites by function, indicating the relative number of sites in each category.

Agricultural Sites: 20.51% of the C1st record was comprised of agricultural sites, such as farmsteads and agricultural enclosures similar to those of the preceding

period. Significant continuity can be seen with the pre-Roman record, with 70.77% of C1st agricultural sites showing evidence of pre-Roman occupation, and 92.31% being fewer than four hectares in total area (App. 1.12). The disappearance during the C1st of pre-Roman agricultural sites exceeding 12 hectares in area is notable, as these two sites were not abandoned, but rather transitioned into other settlement categories during the C1st, with both being superseded by Roman military forts and attendant *vici*. Indeed, the pre-Roman farmstead at Brough, Nottinghamshire, is the only example in the study area of the abandonment of a pre-Roman agricultural site, with all other sites showing evidence of a continuation of activities in some form. In this regard, marked continuity may be discerned in the agricultural site record between the pre-Roman and C1st Roman periods, with the only notable exceptions resulting from activities associated with the Roman military. Agricultural sites also demonstrated significant continuity in their regional distribution, with 87.69% being located to the east of the Pennines, and 56.92% within the region of Yorkshire and the Humber alone (App. 1.7). This reinforces the robust nature of the agricultural landscape in the east of the study area, suggesting it remained undiminished and in fact expanded somewhat following the Roman conquest.

Domestic Settlements: As with the pre-Roman Period, C1st Roman domestic settlements followed a variety of land-use objectives, and likewise conformed to a number of different morphologies and size-categories. Significantly, 89.56% of pre-Roman settlements showed evidence of continuity into the C1st, indicating the remaining sites were likely abandoned sometime before or immediately during the Roman conquest. There is also evidence which may indicate the forced depopulation of at least one pre-Roman domestic settlement, Dragonby, through military action (May. 1970: 243), suggesting some Roman military intervention in shaping the early post-conquest settlement pattern. When broken down by size, C1st domestic settlement showed remarkable continuity from the pre-Roman Period, with 80% of the sample being less than four hectares in area and the remaining size-categories demonstrating no significant change in their proportion of the record (App. 1.12). Strong continuity was again indicated in the domestic settlement record, suggesting early Roman conquest and settlement had little impact on the extant pre-Roman settlement pattern. When factored by regional distribution, C1st domestic settlements followed similar trends to the agricultural site pattern, with 86.67% of the sample located in regions east of the Pennines. This represents a slight decrease from the pre-Roman Period, albeit to such a negligible degree that strong continuity remained present in the settlement pattern across the pre-Roman and C1st Roman periods (App. 1.5; 1.7).

Industrial Sites: C1st industrial sites demonstrated the clearest change in practices from the pre-Roman Period, with the development of new and distinct craft

specialisations, as well as a significant 466.67% increase in the number of industrial sites from the pre-Roman record. Four additional industrial site subcategories were also present in the C1st, with mining, quarrying, salt and tile production appearing alongside pottery production, metalworking and mixed industrial activities (Fig 3.9).

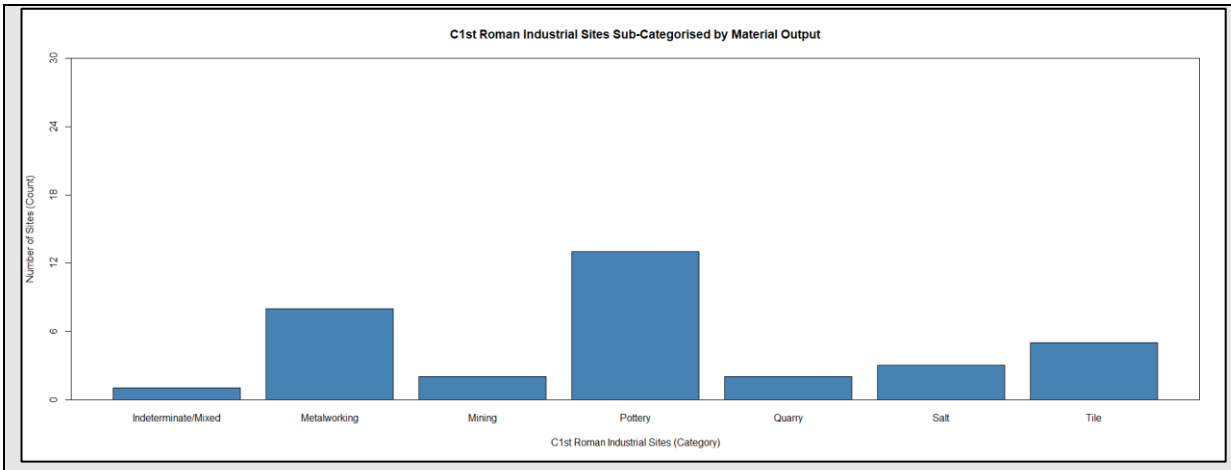

Figure 3.9: Graph showing the sub-categorisation of C1st Roman industrial sites by predominant material output, with the number of sites in each category.

Evidence of both change and continuity from the pre-Roman industrial record can be seen. The pre-Roman metalworking site of Harby Iron Age Gully, Nottinghamshire, showed no evidence of activity in the C1st, suggesting its abandonment before the Roman conquest, whilst the two pre-Roman pottery production sites continued use into the Roman Period, with a progressive intensification of activity noted at both sites (Allen, *et. al*. 2018). As with the pre-Roman Period, industrial sites trended towards small-scale activity, with 91.18% being less than four hectares in area. The remainder of sites were equally divided among the medium, large and very large size-categories (App. 1.12), though it is notable that in all cases, only a portion of the total site area was utilised in industrial activity, with much of the remaining area given over to enclosures of unknown purpose or scatters of finds not attributable to either industrial or domestic activity. Interpretation of many early Roman industrial sites should be seen as largely dubious, requiring a greater robustness of archaeological investigation to adequately explain the function of each site.

Unlike the pre-Roman Period, C1st industrial sites were far more widespread, being present in every region of the study area. Most sites were located east of the Pennines, with industrial activity in the East Midlands and Yorkshire and the Humber accounting for 38.24% and 29.41% of the overall record respectively (App. 1.7). Arranged by sub-category, pottery production sites appeared to be the most widespread, with examples in four out of the five regions, whilst the small sampled area of Wales did not present any sites of this sub-category. Both metalworking and tile sites were found in three regions, with metalworking sites located in the East Midlands, Yorkshire and the Humber, and the Northwest, whilst tile sites were

found in Yorkshire and the Humber, the Northwest and Wales. The latter should be seen as significant, as tileries are often associated with military activity (Darvill & McWhirr. 1984: 247-249, 257), though again issues of sample-size arise. Furthermore, both quarry sites were found in the East Midlands, within close proximity of Derby, Derbyshire, whilst mining sites were found in the Northwest and Wales, being located on an axis to both the east and west of Chester. This suggests the potential for regional specialisation in industrial activity, though far more work would be needed to produce an adequate sample size to analyse the validity this pattern.

Military Sites: Unlike other contemporary site categories, the development of Roman military sites during the C1st demonstrated the creation of an entirely new pattern of settlement and land-use, with 55 new military sites present in the C1st settlement record. These were divided into six primary sub-categories: camps, forts, forts with attendant *vici*, fortlets, fortresses with attendant *vici*, and workshops (Fig. 3.10). Importantly, just 12.72% provided any evidence of pre-Roman activity, supporting Bidwell's (2007: 32) claim the majority of Roman military site development in the Midlands and northern England was conducted on locations devoid of pre-existing activity or settlement.

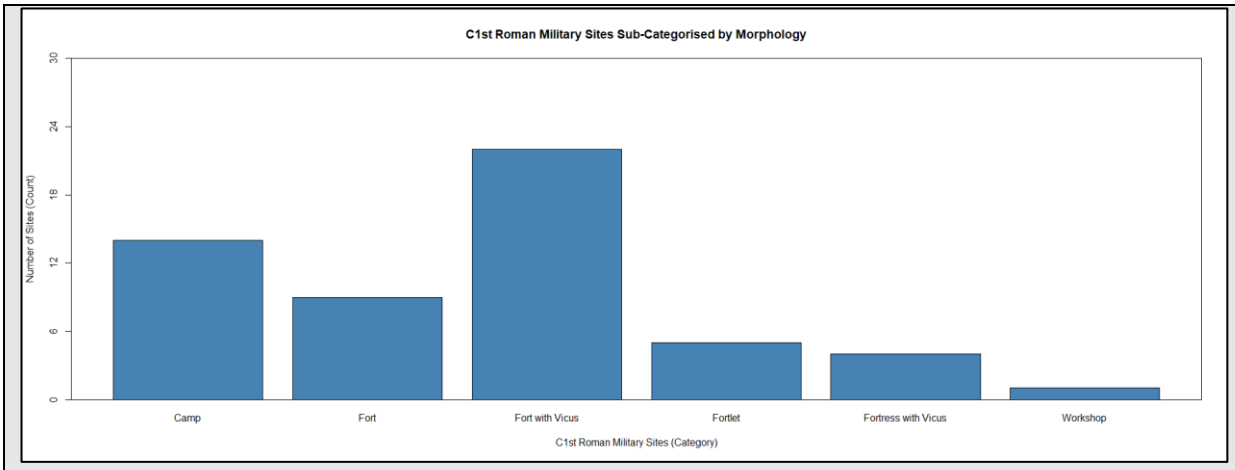

Figure 3.10: Graph showing the sub-categorisation of C1st Roman military sites by morphology, with the number of sites in each category.

Camps constituted 25.46% of the military site category, accounting for temporarily occupied enclosures of military nature. It should be noted that this sub-category has been deliberately underestimated in this study, with only sites confirmed through excavation, geophysics or field survey being included in the settlement record. Many other examples known only by cropmarks were discounted, as there is an unfortunate tendency in archaeological records to present any rectilinear earthwork as either a Roman fort or camp, regardless of a lack of material evidence confirming either dating or function (Allen, *et. al*. 2018; Historic England. 2023a). Of these, two camps have evidence of pre-Roman occupation, with the camps in Nottinghamshire located at Warsop and Dorket Head superseding an extant farmstead and hillfort

respectively. Dorket Head should be viewed as highly significant, as the end of occupation of the hillfort and the construction of the camp appeared to have coincided, suggesting the hillfort was depopulated by military activity. Forts - particularly those without attendant civilian *vici* - followed a similar trajectory, with many forts and camps deemed largely indistinguishable except for the extent of the assemblage of material culture. Forts were delineated based on the robustness of such assemblages, as well as the site interpretation in excavation notes provided as part of the settlement record datasets. At 16.36% of the overall record, this category constituted rectilinear earthwork enclosures in which structures for the purpose of long-term military activity were found. These sites were further delineated from forts with *vici*, as the absence of attendant civilian activity should be viewed as a significant indicator of the role of the fort within the cultural landscape. Forts with *vici* made up the largest component of the military site category, being 40% of the sample. The development of *vici* around forts immediately following their construction was not an uncommon occurrence, with 71% of C1st forts having *vici*, representing over twice the number of forts without civilian occupation. The development of *vici* coinciding with the development of forts should therefore be considered the norm. Importantly, only four forts, or 12.49% of the total sample, demonstrated any evidence of pre-Roman occupation, being entirely agricultural sites or domestic settlements. All four of these forts had attendant *vici*, raising questions as to whether the *vici* developed out of the pre-Roman settlement, or was a wholesale replacement of the pre-Roman settlement and population. Camps and forts demonstrated significant variability in size, though those forts without *vici* trended towards the smaller size, with 66.67% of the sub-category being under four hectares in area. In this regard, it is possible to observe two distinct military patterns, with camps and forts without *vici* on the one hand, and forts with *vici* on the other.

Contrasted against the relatively large samples of camps and forts, the three categories of Roman military fortlets, fortresses and workshops demonstrated greater variability in activity, with both fortlets and workshops demonstrating highly localised, small scale military activities with strong integrations within the rural settlement pattern. Conversely, fortresses demonstrated the most direct interaction between the Roman state and the cultural landscape, likely acting as core nodal sites and centres of activity unseen in the other categories present in the C1st record, and unparalleled until the development of the Roman town during the C2nd. Five fortlets were present in the C1st record, with only one site, Ad Pontem, Nottinghamshire, showing any evidence of pre-Roman occupation (Wilson & Wright. 1964: 159). Fortlets were of smaller size, with the earthworks of all sites enclosing less than four hectares in area. This was closer to forts without *vici* than other military site sub-categories, suggesting a commonality of function. Despite the small area enclosed by earthworks, two fortlets, located at Langton, North Yorkshire,

and Kirkham were both greater than four hectares in total area, with evidence of activity in a large extramural area. However, this may also be attributed to their later occupation confusing the archaeological record of their extent as of the C1st. Conversely, the fortlets at Staxton, North Yorkshire, and Uxacona, Shropshire, as well as Ad Pontem, showed no evidence of extramural activity and little evidence of internal structures, suggesting that occupation at such sites was ephemeral and possibly short-lived. The four C1st legionary fortresses of Lincoln, Chester, Wroxeter, and York presented evidence for the development of civilian *vici* during the decades immediately following the Roman conquest, though no fortress demonstrated evidence of pre-Roman occupation. This suggests they did not evolve from extant population centres and were instead a wholly Roman development. All conformed to a largely similar plan and exceeded twelve hectares in area, indicating common standards of construction (Fig. 3.11).

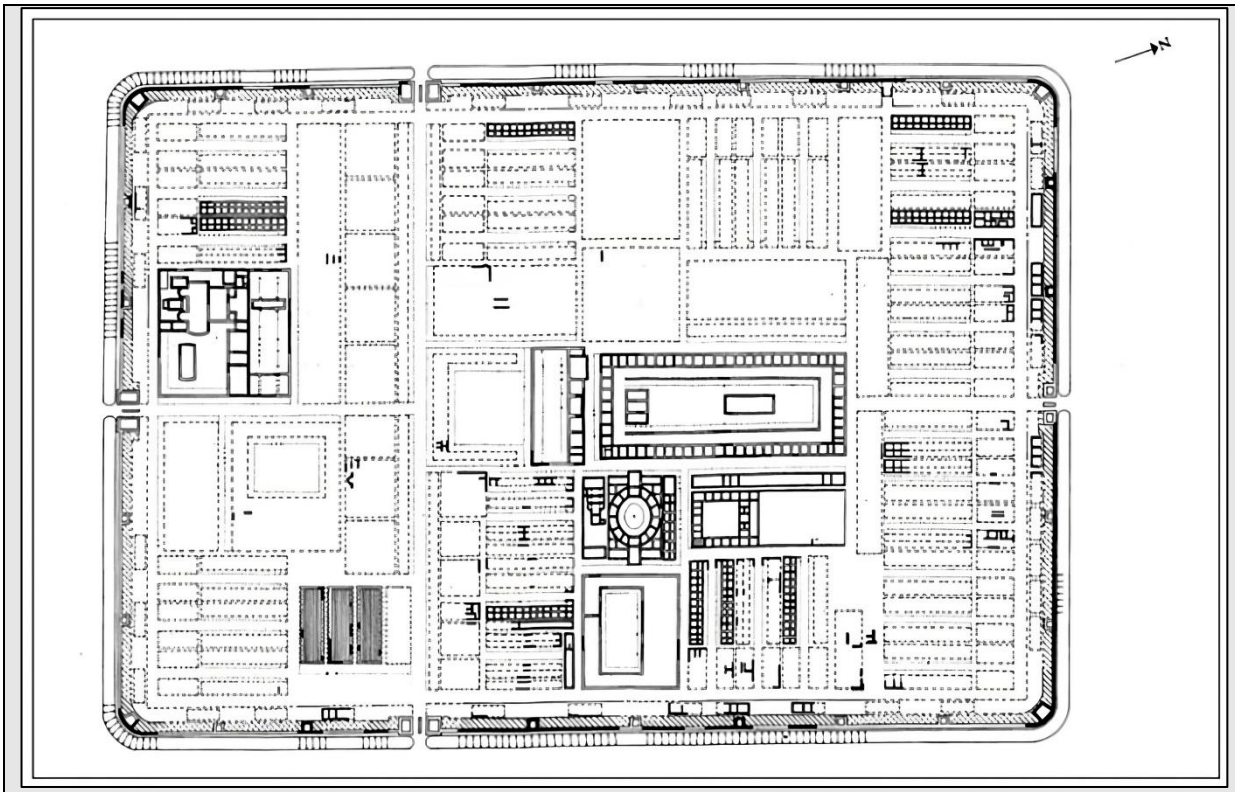

Figure 3.11: Plan of the legionary fortress of *Deva Victrix*, located at modern-day Chester, Cheshire (Not to scale). Note the significant complexity of internal structural layout, as well as the highly ordered nature of the overall structural morphology (After: Historic England. 2018: 2; with edits).

The scale and complexity of these sites should be seen as significantly anomalous from the overall pattern of settlement in the Midlands and northern England during the C1st, as well as anomalous from the other military site subcategories. Simply housing a population of over 5000 people in a clearly ordered, fortified settlement presents a significant point of variation from the overall settlement record, with the site morphology and population density of fortresses making them unlike any contemporary site category. As such sites accommodated the regular Roman legions,

unlike the auxiliary units housed in camps, forts and fortlets, the role of the Roman state and provincial administration should be viewed as central to the role of fortresses within the landscape, with their locations likely strategically placed to maximise their control over the extant and developing settlement patterns. This has led to the interpretation of fortresses as having the same 'parasitic' relationship with the settlement record and rural landscape as Roman towns during the C2nd and later periods (White & Dalwood. 1996: 20), raising significant questions as to the nature of their role within the Roman patterns of settlement in the Midlands and northern England. Another notable anomaly in the military site record is the workshop complex located at Holditch, Staffordshire. The site was small, being less than four hectares in area, with occupation starting in the later C1st as a ceramics workshop within a rectilinear enclosure, interpreted as military in nature. As a singular site, its comparative value is limited, though it appears to have been closer in morphology and activity to contemporary industrial sites than other military sites.

A total of 67.27% of C1st Roman military sites were located east of the Pennines, indicating a notable skew in military activity towards eastern regions. Camps were conspicuously absent from the Northwest, with a 57.14% majority located in the East Midlands and the remainder evenly divided between the West Midlands and Yorkshire and the Humber (App. 1.7). This suggests temporary camps were either completely unused in the northern campaigns of Cerialis and Agricola or were instead rapidly replaced by the more permanent forts comprising much of the remaining record. Indeed, 74.19% of forts appeared in the regions of Yorkshire and the Humber, and the Northwest. A number of these sites provided evidence for earlier Roman military activity, which was temporary in nature (Allen, *et. al*. 2018). Though unquantified, this potentially indicates that occupational permanence and relatively static military activities were predominant in the northern regions, whereas the Midlands was a transitory landscape in which mobile campaigning took place during the early C1st and was then not followed by widespread military settlement. It is also possible the inhabitants of the Midlands were more passive than their northern neighbours, with the distribution of military sites drawing a clear north-south axis associated with a division of the longevity of military activity.

Ports: Moderate growth was shown in the Roman port sample, from just one identifiable site in the pre-Roman Period to a total of eight in the C1st and C2nd, with no changes noted in the category between the two centuries. Due to similar issues of coastal erosion and the paucity of archaeological investigation of pre-Roman ports, the distribution of Roman ports should be seen as largely artificial, constructed from an incomplete archaeological record and in some cases based largely upon the speculation of modern scholars. Such speculation posits the presence of port facilities at most riverine towns and legionary fortresses, with such

large sites unlikely to have existed without some mechanism for accessing and utilising maritime commerce and transportation (Cleere. 1978: 36-40). However, it is equally likely that many smaller sites located along riverbanks or the coast may have had small-scale facilities for docking ships and boats. The sampling of Roman ports should thus be considered incomplete and requires further investigation. As with other categories, ports trended strongly towards the small size-category. Two notable, very large port sites were present, located at Wilderspool, Cheshire, and Old Winteringham, Lincolnshire. Both sites were primarily of domestic function, though evidence of activity along their river frontages on the River Mersey and Humber respectively suggests they played a role in maritime commerce. Old Winteringham is especially significant, as it lies opposite another potential port site at Brough-on-Humber, with suggestions a ferry operated between the two sites to facilitate the movement of people and goods across the estuary (Moon, *et. al*. 2020: 49) (Fig. 3.12). In cases such as York and Chester, port facilities were considered to be a functionally separate site from the legionary fortresses and towns, and so their area was limited to the extent of their respective river frontage.

Figure 3.12: Map of the potential Roman ferry between Old Winteringham, Lincolnshire, and *Petuaria*, located at modern Brough-on-Humber, East Riding (Roman Roads Research Association. 2018b).

Importantly, the distribution of ports was even between regions east and west of the Pennines, with 50% located in the Northwest region alone (App. 1.7), though this should be viewed as a product of limited sampling. Overall, due to the poor archaeological record of ports, this site category should be considered of relatively low validity in providing an indicative sample to effectively discern patterns of settlement and land-use during the Roman Period.

Villas: Only five villas were found to be present during the C1st Roman Period, with two sites: Loushers Lane, Cheshire, and Acton Trussell, Staffordshire, providing evidence of pre-Roman occupation (Allen, *et. al*. 2018) In both cases, the villas were set amongst a series of pre-Roman agricultural structures, covering an area no more than four hectares, with potential continuity of site occupation and agricultural activity concurrent with the construction of the main villa structures. The pattern of early villa construction is also shared with the remaining three sites, with the villas at Norton Disney, Lincolnshire, Greetwell, Lincolnshire, and Hales, Staffordshire, all originating as single rectangular structures set amongst a scatter of non-structured activity, likely of agricultural or industrial nature. All C1st villas were found to be of the small or medium size-categories (App. 1.12), with a lack of sites exceeding eight hectares in area indicating a generally humble beginning for the category during the decades immediately following the conquest. Such a pattern may be attributed to the relatively short timeframe from the conquest to the end of the C1st, with three to five decades being perhaps too brief to adequately establish sufficiently complex socio-cultural and economic activities in which substantial villa development may have occurred. C1st villas skewed significantly towards southern occupation, with 80% located in the East and West Midlands and a single exception, Loushers Lane villa, in the Northwest (App. 1.7). However, given the small sample size of C1st villas, few further conclusions may be drawn as to the nature of villa development in the Midlands and northern England during this period.

3.5 Regionality and C2nd Roman Settlements by Function

The C2nd settlement record, when categorised by function, demonstrated strong continuity from the C1st, with all site categories remaining present and the addition of a single category: the Roman town. Indeed, the major change from the C1st is in the number of sites present, with a strong trend towards growing site numbers and occupational densities in many site categories (Fig 3.13).

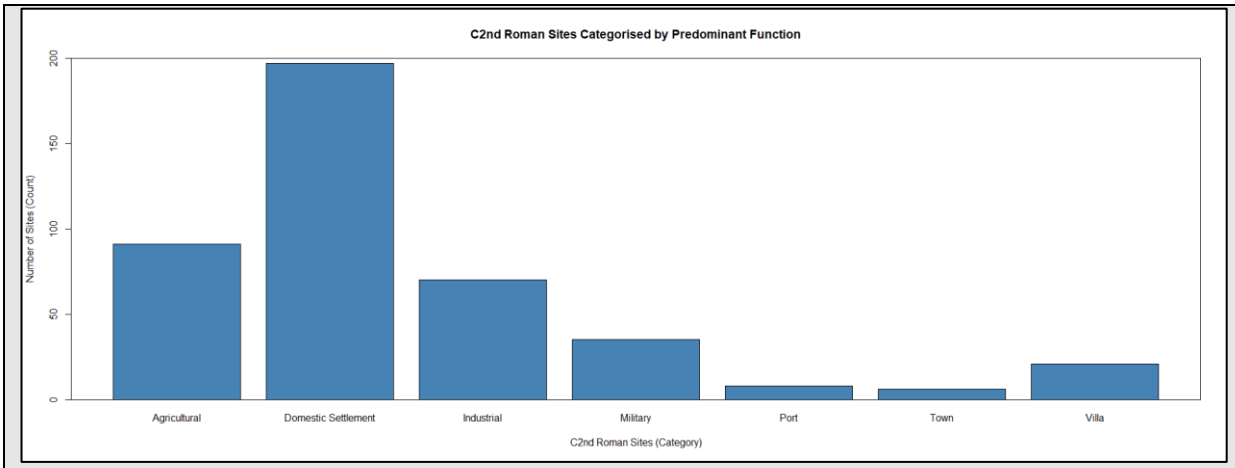

Figure 3.13: Graph showing the categorisation of C2nd Roman sites by function, indicating the relative number of sites in each category.

Agricultural sites: Substantial inter-period growth was noted in the agricultural site category, increasing 32.31% in number to comprise 21.26% of the total C2nd settlement record. As with the preceding period, C2nd agricultural sites conformed strongly to the small size-category, with 94.51% being less than four hectares in area (App. 1.13). Agricultural sites were continuous from the C1st in regionality, with 84.62% of sites located east of the Pennines (App. 1.9). This suggests the agricultural landscape during the C1st and C2nd was characterised by a continuity of small-scale, localised activity, with a more extensive agricultural regime in the East Midlands and Yorkshire and the Humber resulting in a greater density of agricultural activity, and a likely greater degree of complexity in the rural landscape.

Domestic settlements: Closely conforming to the pattern of the C1st, domestic settlements of the C2nd remained the most prevalent category in the study area, accounting for 46.03% of the overall record. Settlements again followed a variety of different structural morphologies, size-categories and forms of activity, and so cannot be adequately discussed on individual merit. When categorised by size, domestic settlements also showed a similarly close consistency with the C1st, with 83.25% being less than four hectares in total area (App. 1.13). The proportion of domestic settlements in the medium, large and very large size-categories remained close to that of the C1st, indicating remarkable stability in the settlement pattern and a trend towards localised, small-scale practices of land division and land-use. Domestic settlements also demonstrated strong continuity in terms of regionality, with 82.74% located in the regions of Yorkshire and the Humber and the East Midlands (App. 1.9), indicating a profound east-west division of settlement distribution consistent across all three periods. As with the C1st record, this suggests a greater density of occupation and domestic activity in the east of the study area, compared to a far sparser landscape in the west.

Industrial sites: Growth was also found in industrial site numbers during the C2nd, increasing 105.88% from the C1st record and indicating an emphasis on developing the provincial economy to sustain the growth of other site categories. When sub-categorised, industrial sites were dominated by metalworking and pottery production, with other industries taking a lesser role in the record (Fig. 3.14). The C2nd industrial site category also showed strong similarity with the C1st in site size, with a 94.29% majority falling within the small size-category of fewer than four hectares in total area (App. 1.13). All three sites of larger size-categories from the C1st record were also present in the C2nd, with the only addition being the large enclosure site of Norton, North Yorkshire, where pottery production was found to be taking place.

Industrial sites showed strong continuity in terms of regionality, with 72.86% located east of the Pennines (App. 1.9). In Yorkshire and the Humber, a site cluster to the

southeast of Doncaster, South Yorkshire, contained an uncommonly high concentration of pottery and metalworking activity, with eight potteries and three metalworking sites located within a 115.05km^2 area producing a site density approximately nine-times the average in that region (App. 1.4).

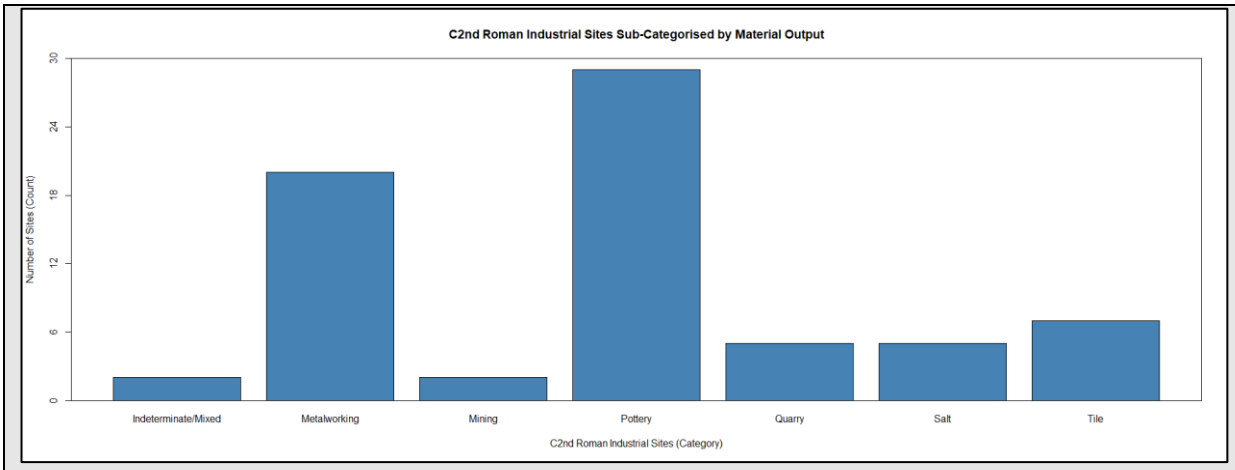

Figure 3.14: Graph showing the sub-categorisation of C2nd Roman industrial sites by predominant material output, with the number of sites in each category.

Even more strikingly, a site cluster located in the East Midlands at Market Rasen, Lincolnshire, contained seven potteries within an area of only 0.88km^2, indicating these sites should be considered a singular entity, rather than individual sites as listed in the sources comprising the settlement record (Allen, *et. al*. 2018). Together, both site clusters suggest a strong trend towards the concentration of industrial activity emerging in the C2nd, with particular emphasis on intensive pottery production and metalworking occurring in the regions of the East Midlands and Yorkshire and the Humber.

Military sites: C2nd military sites were the only category in which the number of sites decreased over time, with a 36.36% reduction from the C1st. This is significant, as it correlated with a phase of reconstruction of fortifications from earthen and timber enclosures to stonework indicating a general trend towards the permanence of an occupation force, rather than the campaigning armies seen in the C1st (Bidwell. 2007: 23-24). Furthermore, there is evidence of the redeployment of certain units, such as the *Ala II Asturum* at the fort of Ribchester, to a new fort at Chesters on Hadrian's Wall (Edwards. 2000: 48-50), indicating that a general reorganisation of the military landscape was occurring during the C2nd. When sub-categorised, some change can be noted in the record, with the disappearance of the military workshop sub-category, and the addition of a single fortlet with *vicus* (Fig. 3.15).

Only four military camps were tentatively interpreted to be present during the C2nd, constituting a 71.43% reduction in number from the C1st. However, all were of dubious interpretation and dating, based purely on morphological comparisons of

the earthworks and limited ceramic evidence, with three showing repeated occupation uncharacteristic of a Roman marching camp. Whilst defined as military camps of C1st to C2nd occupation for the purposes of this study, they represent a source of potential error and thus require further field investigation to securely define their chronology.

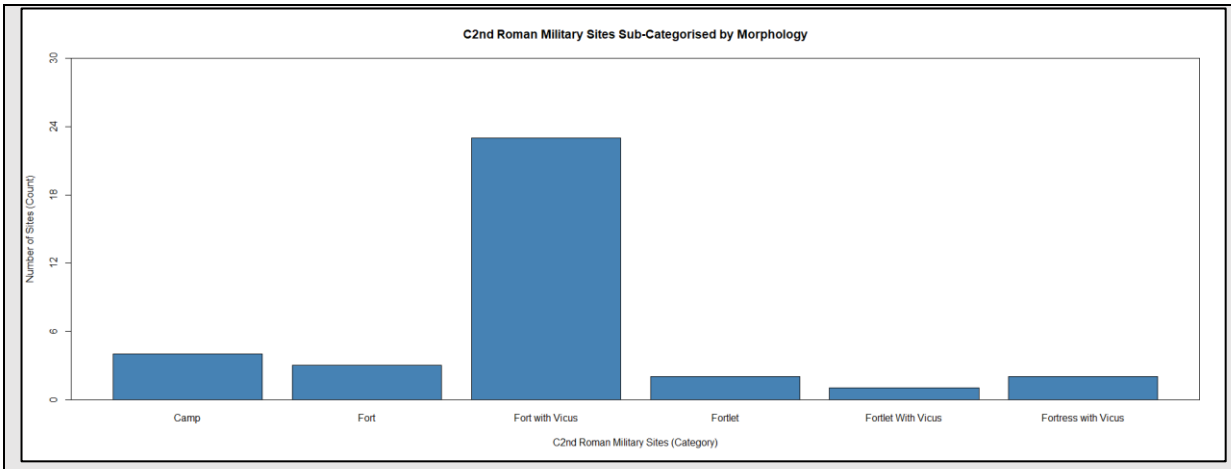

Figure 3.15: Graph showing the sub-categorisation of C2nd Roman military sites by morphology, with the number of sites in each category.

Unlike camps, 92.31% of C2nd Roman forts were found to be pre-dated by C1st military activity, with 69.23% also showing evidence of continuity in attendant civilian *vicus* occupation from the C1st. 11.54% displayed anomalous consistency across both centuries in lacking a *vicus*. It is possible that local conditions were not favourable for civilian occupation, though further investigation of this pattern is required. Notably, the development of *vici* appears to have played a critical role in the longevity of fort occupation. Only two C2nd forts, located at Forden Gaer, Clwyd-Powys and Rocester, Staffordshire, lacked evidence of occupation in either the pre-Roman or C1st Roman periods, being wholly new constructions. In all other cases, forts either continued occupation directly from the C1st, or in the case of Kirkham, developed from a C1st fortlet. This demonstrated a significant trend towards the development of permanent military garrisons within the landscape of the Midlands and northern England occurred during the C2nd, with a general standardisation of sites away from the diversity of the C1st record.

As with other military site sub-categories, fortlets saw a 40% decrease in numbers during the C2nd. The roadside fortlet at Castleshaw provides insight into a unique use of fortifications by the Roman state to manage transportation networks (Fig. 3.16). The small scale of the site, as well as sparse assemblages of excavated material, suggest that it would not have sustained a large or permanent garrison, necessitating a seasonal or rotational approach to occupation (Symonds. 2018: 9-11, 74-76). However, the presence of both an uncommonly large granary, as well as a structure variously interpreted as a being of administrative function, possibly a *principia*,

indicate the site was likely involved in the surveillance and control of the trans-Pennine road network (Redhead. 2012: 66-67; Symonds. 2018: 9-10, 74), as well as having a potential role as the posting of a *beneficiarius* – a Roman state official involved in local administration and taxation (Redhead. 2012: 67).

Figure 3.16: Aerial photograph of the Roman fortlet at Castleshaw, Greater Manchester. Note the complex layout of internal structures, uncommon for a site of this category. (AeroEngland. 2020).

The apparent centrality of Castleshaw in the road network is also demonstrated by the presence of a small extramural settlement around the fortlet – the only site of this category to feature attendant civilian occupation – which suggests a significant commonality of site activity with the larger fortifications in the Midlands and northern England (Symonds. 2018: 76-77). The two other fortlets present in the C2nd: Staxton and Uxacona, were both smaller than Castleshaw and provided no evidence of civilian activity. In terms of the use of such roadside fortifications, a body of research has developed to suggest the Roman military employed a flexible approach to occupation, with major legionary fortresses and auxiliary forts acting as the central locations from which rotational garrisons could be drawn (Mattingly. 2007: 153-154; Mattingly & Hitchner. 1995: 175-176; Redhead. 2012: 66-67; Symonds. 2018: 1-11, 16-17, 60-73). This interpretation has cited written and inscriptional evidence from across the Roman world, cross-examining garrison strength reports detailed in the Vindolanda Tablets against *ostraca* found at the Roman military outposts of *Krokodilo*, Egypt and *Bu Njem*, Libya (Cuvigny. 2018: 33-55; Mattingly. 2007: 153-154; Mattingly & Hitchner. 1995: 175-176; Symonds. 2018: 1-11, 16-17, 60-73), to suggest a commonality in practice across the Roman Empire.

Only the two legionary fortresses of York and Chester remained during the C2nd, representing a 50% reduction in number from the C1st. In both cases, substantial expansion of the attendant civilian *vici* was noted in the archaeological record, suggesting the significance of the sites as regional administrative centres for both civilian and military affairs. Conversely, at Lincoln and Wroxeter, the fortresses were abandoned in favour of developing towns, demonstrating a wholesale transition from military to civilian function. Finally, the military workshop noted in the C1st at Holditch showed evidence of a transition into a civil settlement during the C2nd, with no evidence of military activity by that time.

C2nd military sites were broadly similar with the C1st record in terms of size, with 42.86% falling within the small size-category of less than four hectares in area (App. 1.13). Both camps and forts without *vici* fell exclusively within this range, with the variety in sizes noted in the C1st completely disappearing, likely indicating such sites were of lesser importance in the C2nd, and possibly were not permanently occupied. All fortlets similarly conformed to the small size-category, whilst fortresses were within the very large size-category. In this regard, military fortifications were similar to other site categories, with the noted variance in site size of the C1st decreasing over time. Variance in C2nd military site size can only be seen in the fort with *vicus* sub-category, where stronger similarities with the C1st can be found. This was likely due to inherent variances in civilian occupation and the morphology of the *vici*, rather than changes in the military fortifications themselves.

Military sites also demonstrated substantial changes in regionality during the C2nd, with site numbers decreasing in most regions. Particularly, the number of military sites in the two Midlands regions decreased by 58.33% from the C1st (App. 1.9), suggesting the consolidation of the Hadrianic and Antonine frontiers likely moved the focus of the Roman military further northwards. Whilst a more modest decrease of 31.82% can be noted in the number of military sites in Yorkshire and the Humber (App. 1.9) - comprising mainly camps and forts without *vici* - the Northwest was notable in maintaining exact continuity in the number of fortifications across both centuries. Evidence for *vici* at all military sites in the Northwest was also significant, suggesting a trend towards the permanency of military occupation was directly related to the presence of attendant civilian *vici*. This further supports a strong pattern of military sites as fixtures in the cultural landscape to the west of the Pennines, and therefore that this region should be viewed as significantly influenced by military occupation and activity.

Ports: C2nd Roman ports were identical in character and distribution to their C1st counterparts, and so do not merit reiteration.

Towns: As a new construct within the cultural landscape of the Midlands and northern England during the C2nd, towns accounted for just 1.40% of the overall sample. This category was delineated from domestic settlements based on the density of occupation, presence of higher civic functions such as the construction of *fora* or *basilicae*, description as a town in the historical record, or in cases where the predominant interpretation of the archaeological and historical records presented the site as a town (Wacher. 1995). 83.33% of towns provided evidence of C1st occupation, with towns at Lincoln and Wroxeter, as well as Whitchurch, Shropshire, and Aldborough, North Yorkshire, being preceded by Roman military sites, and Wilderspool, Cheshire, being preceded by a domestic settlement. Only the town of York provided no evidence of earlier occupation, though the *vicus* of the C1st fortress at the site may have accounted for earlier civil settlement in the area. Notably, three of the four pre-town military sites featured a civilian *vicus*, suggesting a connection between the formation of towns in the Midlands and northern England during the C2nd, and the activities of the Roman military in the C1st, which should be considered a primary area of interest for further study.

When categorised by size, the majority of towns conformed to the very large size-category, with Lincoln, Wroxeter, York and Aldborough accounting for 66.67% of the sample, all being over twelve hectares in area (App. 1.13). The towns of Wilderspool and Whitchurch stood apart from their contemporaries, being noticeably smaller at a maximum area of four and eight hectares respectively. In both cases, connections to Roman military activity in the C1st were noted in the site interpretations, with subsequent repurposing comprehensively changing the structural morphology and spatial patterns of activity present (Allen, *et. al*. 2018). Such 'small towns' represented a distinct phase of settlement formation unseen in other site categories, suggesting highly localised processes of evolution in socio-cultural and economic activities, as well as land-use and land division (Wacher. 1995: 19-20). In terms of regional distribution, towns showed remarkable evenness, with 50% located both east and west of the Pennines (App. 1.9). This makes towns anomalous to the overall pattern, indicating they likely functioned within their own pattern distinct from the remainder of the settlement record.

Villas: Substantial growth was again found in the number, scale and complexity of villas, increasing 320% from the C1st to account for 4.91% of the C2nd record. Importantly, all C1st villas provided evidence of continuity into the C2nd, with new villas being constructed at extant agricultural sites or small domestic settlements not exceeding four hectares in area. Langton Roman Villa, North Yorkshire was found to be anomalous, as pre-villa activity was interpreted as military in function, though this interpretation is itself disputed (Allen, *et. al*. 2018). Despite this, C2nd villas were predominantly constructed in areas of established settlement, either as an expression

of the elite status of an individual or group from within the population of such sites, or as a means of an outside elite gaining control over that pre-existing division of the cultural landscape. When categorised by size, C2nd villas demonstrated a trend towards small-scale occupation, with 57.14% being less than four hectares in total area (App. 1.13). Unlike the C1st sample, C2nd villas demonstrated increasing complexity, with the development of a number of villas in the medium and large size-categories. Welton Villa, East Riding, showed a significant evolution from a pre-Roman farmstead into a corridor villa and accompanying large agricultural complex during the C2nd. Similarly, the villa at Kirk Sink, North Yorkshire, showed rapid development from an earlier settlement into a large villa, outbuildings, and agricultural complex. Both villas likely indicated an increasing complexity in agricultural practices and land division within the C2nd landscape, with little to no evidence of their role as a mode of expressing an elite identity, save to the immediate local population. Overall, villas showed significant change in terms of regionality during the C2nd, with a far greater distribution of sites throughout the landscape compared to the C1st. As with other categories, villas indicated a locational preference for regions east of the Pennines, with 66.67% located in the east Midlands and Yorkshire and the Humber (App. 1.9). Contrasted with the limited distribution of C1st villas, this suggests a significant change in the cultural landscape of the C2nd, with villa activity spreading more evenly across the landscape and into areas where it was previously absent.

3.6 Overview

Analysis of the settlement record of the Midlands and northern England through the transition from the pre-Roman Period to the first two centuries of the Roman Period reveals significant trends towards small-scale, localised occupation, with the majority of sites comprising agricultural farmsteads and small domestic settlements no larger than a village or hamlet. This bears strong similarity with the interpretations of settlement across the study area established by Taylor (2007: 44, 59, 60-62).

Specialisation of sites appeared to be uncommon in the pre-Roman settlement record, with few of industrial function and little evidence for organised control of production and distribution. In this regard, Cunliffe's assertion that hillforts played a central role in controlling the socio-economic fabric of the pre-Roman cultural landscape (Cunliffe. 2005: 310) appears tenuous when looking at the study area, with such a theory likely being limited in applicability to the pre-Roman south. Instead, the monopolising role of the agricultural site and small domestic settlement in the Midlands and northern England can be seen as strong evidence for a model of agricultural activity centred around intensive small-scale cultivation, as well as significant potential for the exploitation of a pastoralist economy in the regions west

of the Pennines, where agricultural settlement evidence is more sparsely distributed throughout the landscape. The 'Celtic cowboy' (Harding. 2004: 27; Piggott. 1958) should therefore be largely discounted as an overarching economic model for the eastern regions of the study area but cannot be discounted in the west. This east-west divide presents a significant framing device for settlement in the Midlands and northern England, with the topographic division of the landscape afforded by the Pennines dividing occupation, land-use and land division practices, and likely their related socio-cultural and economic patterns of activity.

Trends of both change and continuity in the settlement record may be noted following the Roman conquest of the region during the latter half of the C1st. The significant increase in site numbers from the pre-Roman Period indicated an intensification of activity in the cultural landscape, with a likely correlative expansion in population. However, similar to the pre-Roman record, the social and economic conditions of the C1st were largely agricultural in nature, demonstrated by the intensification of activity in both agricultural sites and small-scale domestic settlements. Indeed, the strong continuity in the occupation of agricultural sites and domestic settlements, at 71% and 92% respectively, should be seen as an indicator of significant continuity in the economic and cultural landscape, with such sites demonstrating little evidence of change from their pre-Roman origins supporting Collingwood's assertion that the majority of rural settlements were significantly continuous from the pre-Roman to Roman periods (Collingwood. 1930: 156). The greater density of agricultural and small-scale domestic activity also likely signified a change in land division, with the larger and more-sparse plots facilitated by the lower number of pre-Roman sites slowly giving way to a pattern of more numerous small-scale sites who would undoubtedly have required re-division of land and attendant changes in land-use.

The greatest change in the cultural landscape of the Midlands and northern England can be noted in the increasing specialisation of sites during the C1st, with both the industrial and military categories, as well as ports, showing significant variance in function and structural morphology. The four-times increase in C1st industrial sites over those present in the pre-Roman Period suggests a deliberate effort by the Roman state to shape the provincial economy, with the focus on large-scale potteries and metalworking sites likely connected to the expansion of population seen in the growing domestic settlement record. Whilst ports have noted issues with interpretation, likely being significantly underestimated due to a relatively poor sampling strategy in the construction of the archaeological record, their role in the development of the Roman provincial pattern during the C1st should not be minimised. Whereas only one site was noted in the pre-Roman Period, also likely as a result of underestimation, the growth of ports accompanying both military and

civil settlements during the C1st should be seen as indicators of growing connectivity with inter-provincial networks of transportation, contact and exchange, further linking the development of Roman Britain with a concerted effort of the Roman state. The development of military sites further suggests the crucial role of the Roman state in deliberately shaping the post-conquest cultural landscape of the Midlands and northern England, with a diverse range of structural morphologies and size-categories indicating a similarly large variance in military activity. Particularly, the dichotomy between camps, fortlets and forts without attendant civilian *vici*, and forts and fortresses with *vici* should be seen as significant, with the former representing a highly mobile form of military activity, likely linked to campaigns attested to in the historical record (Hanson & Campbell. 1986: 80-89), whilst the latter indicates longer trends of the calcification of military settlement and the stabilisation of the provincial landscape. The development of villas in the C1st should likewise be seen as more indicative of trends evolving in the C2nd, with the small sample of C1st villas being of relatively small area and simple structural morphology. Developmentally, it is notable that all villas present in the C1st appear to have had a largely agricultural function, with noted small-scale pre-Roman agricultural activity predating villa construction at two sites. This suggests C1st villas conformed more to the pattern of the rural agricultural landscape, rather than a distinct pattern unique to villas that may in turn be indicative of the sites as an expression of a developing Roman 'elite' social identity.

Moving to the C2nd, the overall pattern is broadly similar to the C1st, with an increase in density of occupation at an almost identical rate of change to the pre-Roman to C1st transition. Strong continuity can be seen in the records of both agricultural sites and domestic settlements, with a consistent rate of growth indicating similar trends in rural development to earlier periods. Industrial sites similarly trended towards the expansion of an extant pattern, with pottery production and metalworking remaining the dominant industrial activities during this time. The development of high-density industrial pottery production occurring in C2nd eastern Yorkshire merits discussion. As this region would produce the distinct Crambeck and Huntcliff ware ceramic industries during the latter half of the Roman Period (Historic England. 2023a; Wood. 2016: 280-282), the intensity of pottery production activity during the C2nd can perhaps be viewed as the precursor to an increasing trend of complexity of activity within the industrial record of the centuries after this study, with ceramic production a clearly dominant component of the regional economy during the Roman Period. When classified by site function and size, the C2nd showed a notable decrease in variability in many indices associated with the Roman state, such as military sites, non-agricultural villas and towns, suggesting a relatively organised development of the cultural landscape. The military site record exemplifies this, with evidence of variability associated with

campaigning activity almost entirely absent in the C2nd. The correlation between the development of civilian *vici* and the longevity of military sites is apparent, as camps and forts lacking extramural activity declined significantly over time. It is therefore likely that civil objectives were an important factor in developing the C2nd landscape, with military sites providing a framework of stability and economic opportunity in which such communities could grow. This pattern also appears in the development of the majority of Roman towns from earlier military fortifications, suggesting a movement of administrative functions from military to civilian sectors occurred during this period, with military focus moving northwards towards the Hadrianic and Antonine frontiers. Unlike the C1st, C2nd villas presented the most significant evidence for a transition of activity from military to civilian spheres, with the construction of larger and more complex sites indicative of a decoupling with the agricultural site pattern and developing social complexity through the division of distinct estates with differing land-use objectives. The overarching pattern of the C2nd settlement record consequently appears in the developing complexity of the rural and urban economic systems, with far less correlation with the pre-Roman pattern than the previous century suggesting the growth of a distinctly Roman pattern, whilst the transition from military to civilian patterns of occupation further suggests a drastic shift in priorities within the landscape.

3.7 Conclusions

Categorisation of the settlement record of the Midlands and northern England by period, function and size, as well as analysis of patterns of regional site distribution, reveals significant continuity in the composition of the cultural landscape between the pre-Roman and Roman periods, though areas of specific inter-categorical and inter-period discontinuity were also present. Overall, the two categories of agricultural sites and domestic settlements demonstrated the most significant evidence for continuity across time, indicating a strong focus on small scale, localised occupation and agricultural activity within the cultural landscape. Without evidence of change within these two categories, the impact of the Roman conquest on the majority of the landscape of the Midlands and northern England is therefore revealed to be minimal, though notable growth in both categories suggests a more extensive utilisation of the landscape during the Roman Period. Variance in settlement function and size was instead found in the categories of pre-Roman hillforts, Roman military sites and villas, as well as the industrial sites of all periods. Such categories can be seen as notable points of specialisation within their respective cultural landscapes, indicating culture-specific activities and approaches to occupation, land-use and land division.

Chapter Four:

Pre-Roman and Roman Patterns of Settlement and the Topography of the Midlands and Northern England

Analysis of the settlement record of the Midlands and northern England in its relationships with the topographic landscape factors of elevation, slope and aspect reveals significant inter-period patterns of continuity in the locational preference for gentle conditions suitable for an extensive mixed-output agricultural regime. Particularly, the settlement record appears to have focused on a locational preference for level or gently sloping terrain of low elevation and predominately south-facing aspects - slopes facing southeast, south, or southwest - as those would be favourable to solar orientation and milder climatic conditions suitable for cereal cultivation.

4.1 Topography and Settlements by Period

When factoring the periodised settlement record by elevation, a strong skew towards locales at or below 100m was found, with no statistically significant variance in the locational preferences of sites for lowland locales across all three sampled periods (Fig. 4.1) (App. 2.1; 3.1; 4.1). The proportion of sites located below 100m demonstrated an incredibly slim margin of inter-period variation, with values ranging from 83.00% in the pre-Roman sample, to 83.28% in the C1st and 83.65% in the C2nd respectively indicating a clear locational preference towards lower elevations common between cultural groups and time periods.

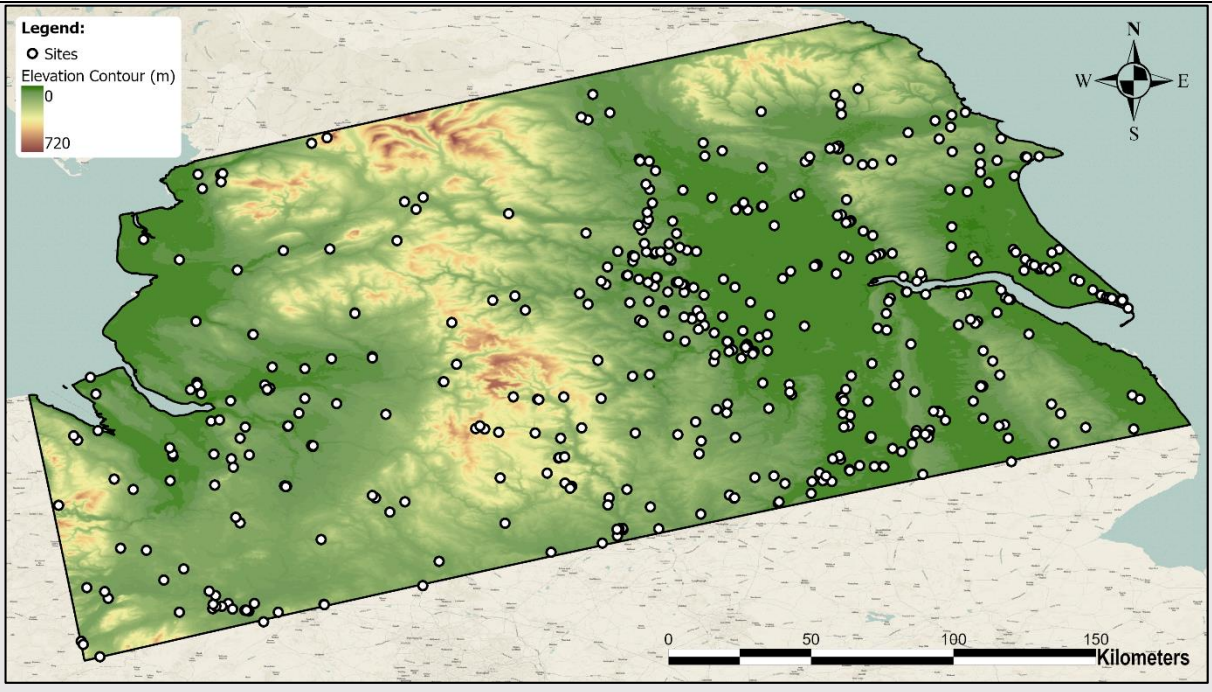

Figure 4.1: Map of terrain elevation in the study area, with sites overlain.

In terms of slope, strong inter-period skew was demonstrated in the location of sites on level to very gently sloping terrain, of less than 2° in gradient, with statistical correlation across all samples (Fig. 4.2) (App. 2.2; 3.2; 4.2). As with elevation, inter-period variance was slim, with 72.33% of pre-Roman sites located on slopes of less than two degrees, ranging to 70.03% and 70.33% during the C1st and C2nd respectively. Similar to elevation, this suggests a significant locational preference towards gently sloping topography that was continuous between periods.

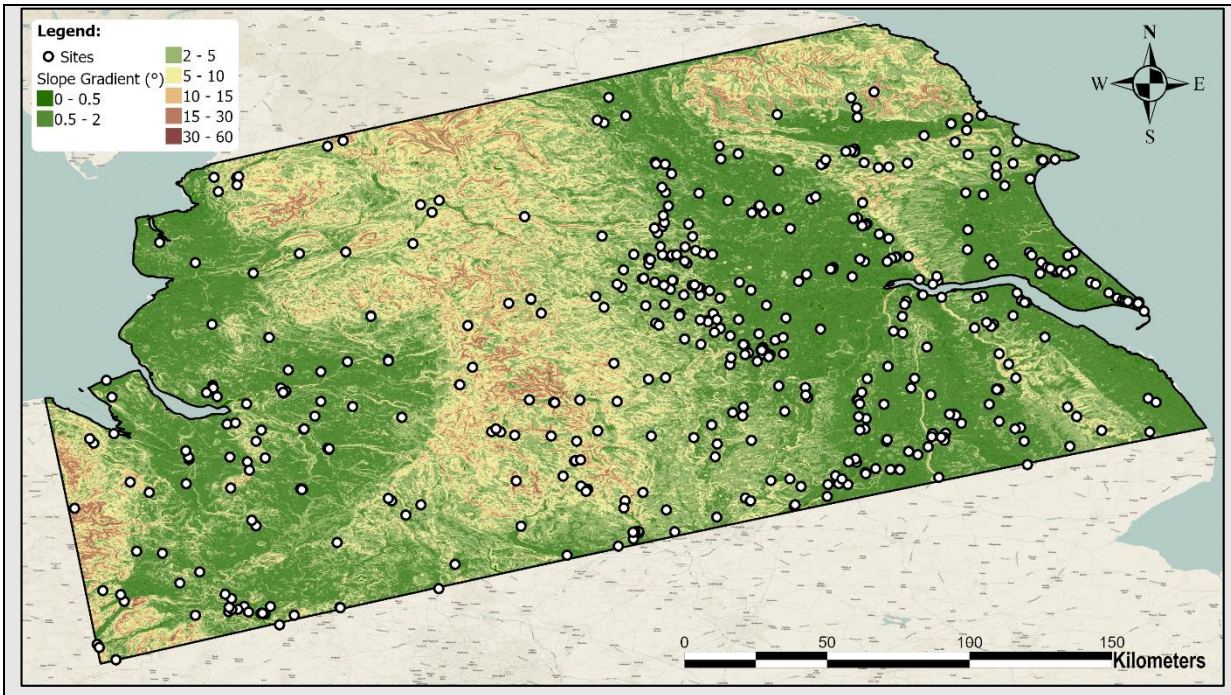

Figure 4.2: Map of terrain slope in the study area, with sites overlain.

The periodised settlement record skewed somewhat towards predominantly south-facing aspects (Fig. 4.3). However, a statistically significant normalised distribution in the data, indicating the majority of sites were located on south-facing slopes, was not found (App. 2.3; 3.3; 4.3). This suggests that whilst south-facing aspects may appear to have been favoured, the distribution of settlement across other aspects was significant enough to discount a trend towards positive solar orientation exclusively. When solar-neutral orientations – those sites located on slopes of due east-west aspects – were added, a statistically significant pattern could be ascertained in the distribution of settlement (App. 2.3; 3.3; 4.3). Therefore, whilst sites across all three periods may not have deliberately favoured positive solar orientation, a preference to avoid predominantly north-facing aspects of poor solar orientation was present. Aspect selection was found to be strongly continuous over time and between pre-Roman and Roman populations, with both favouring locations of solar-neutral-to-positive orientation. This would have provided the majority of sites across all periods with the best access to sunlight, as well as sheltered them from cold northerly winds, making such locales ideal for conducting agricultural activities.

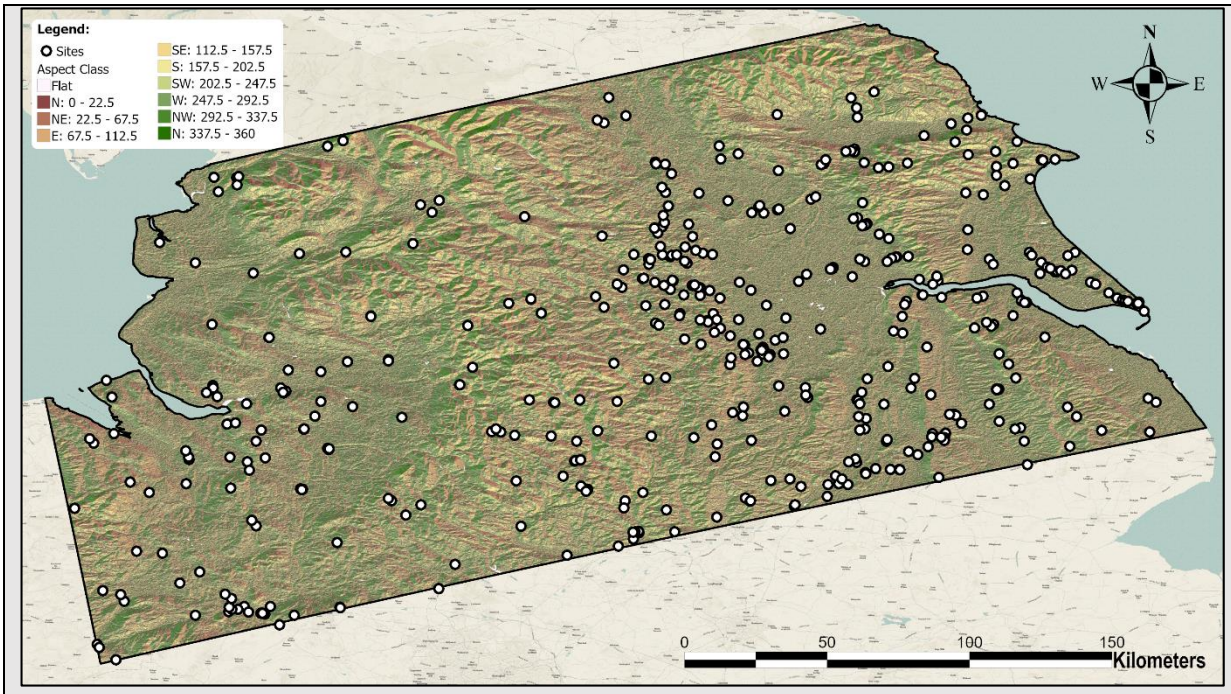

Figure 4.3: Map of terrain aspect in the study area, with sites overlain.

4.2 Topography and Settlements by Size-Category

Categorisation of settlements by size also demonstrated significant patterns of continuity within the pre-Roman and Roman cultural landscape of the Midlands and northern England, with site locations varying only slightly in elevation and aspect, whilst strong uniformity was noted in relation to slope (Fig. 4.4).

Small Size-category: Sites of the small size-category showed remarkable consistency over time, with no statistically significant inter-period variance in their distribution relative to elevation, slope or aspect (App. 2.1-2.3; 3.1-3.3; 4.1-4.3). Small sites skewed strongly towards locations below 100m, suggesting a significant preference for lowland locales. Whilst small sites demonstrated the greatest overall range of gradient values, their medians remained strongly consistent over time, with the majority of small sites located on slopes not exceeding 2-5° across all three periods. Sites located on 15-30° slopes were found to be statistical outliers, suggesting strong inter-period continuity in the locational preferences of small sites for level to gently sloping terrain. Small sites demonstrated the greatest inter-period variation in their location relative to aspect, when compared to other topographic landscape factors. However, the majority remained strongly consistent over time, focused predominantly on south-facing aspects conducive to solar orientation. Whilst a slight downward trend in solar orientation was noted in this size-category over the three periods, perhaps indicative of more extensive landscape utilisation, analysis found this to not be statistically significant (App. 2.3; 3.3; 4.3). The distribution of small sites relative to aspect was found to be slightly more varied than elevation and slope,

though statistical correlation was sufficiently significant to indicate strong continuity over time. Therefore, the small size-category demonstrated strong similarities with the overall record in their locational preferences for elevation, slope and aspect, suggesting their size was not a significant factor in defining their spatial priorities.

Figure 4.4: Graphs of pre-Roman, C1st and C2nd Roman sites, when categorised by the small, medium, large and very large size-categories, indicating their locations relative to (top) elevation, (middle) slope and (bottom) aspect.

Medium Size-category: Sites of the medium size-category varied from the overall pattern relative to elevation and aspect but correlated closely to other size-categories in slope (App. 2.1-2.3; 3.1-3.3; 4.1-4.3). A greater proportion of medium sites were located on elevations above 100m, with the highest site present in the study area falling within this size-category. Such patterns related to a categorisation of medium sites by function, with a significant number being hillforts. During the C1st and C2nd, medium sites appeared more frequently on the lower elevations, though a lack of statistical significance in this trend (App. 2.1; 3.1; 4.1) indicates broad continuity. Conversely, medium sites showed greater variance when compared to the overall pattern of settlement relative to slope. Both pre-Roman and C1st medium sites deviated from other size-categories, lacking correlation with small sites across the two periods (App. 2.2; 3.2; 4.2). C2nd medium sites correlated with all other size-categories, indicating medium sites trended towards the overall pattern over time, though this possibly resulted from limited sampling. In relation to aspect, medium sites demonstrated a weaker skew in distribution compared to the overall trend, as well as the other size-categories, in their preferences for aspects of solar-neutral-to-positive orientation, however, continuity of solar orientation remained statistically significant across medium sites of all three periods (App. 2.3; 3.3; 4.3).

Large Size-category: Large sites demonstrated the greatest skew towards lower elevations, gentler slopes and predominantly south-facing aspects (App. 2.1-2.3; 3.1-3.3; 4.1-4.3). With the exception of two outliers, all large sites were located below 100m in elevation. Large sites also demonstrated a strong preference for very gently sloping locations of less than 2° in gradient, with strong inter-period and inter-categorical statistical correlation present (App. 2.2; 3.2; 4.2). Sites of the large size-category similarly followed the pattern established by small and medium sites in terms of aspect, with a significant skew towards predominantly south-facing locations of solar-neutral-to-positive orientation. Similar to the small size-category, a slight trend away from predominantly south facing aspects was observed from the pre-Roman to Roman periods (App. 2.3; 3.3; 4.3). Whilst this potentially suggests a trend towards a more extensive regime of land-use during the Roman Period, the small sample size and lack of statistical variance makes such an interpretation problematic, again indicating a broad overarching continuity in locational preferences.

Very Large Size-category: Sites of the very large size-category varied more relative to elevation but were more consistent relative to slope and aspect. They were generally less skewed towards locations below 100m, instead being similar to the medium size-category in having a slight observed trend in concentration on lower elevations over time. Whilst not found to be statistically significant (App. 2.1; 3.1; 4.1), it appears the development of very large sites on lowland areas intensified

somewhat during the Roman Period. The development of very large domestic settlements and Roman military sites, as well as Roman towns during the C2nd appeared commonly in low-lying locales. The very large size-category also retained strong inter-period and inter-categorical consistency in its skew towards level to gently sloping terrain, with the majority of sites located on slopes below 5° in gradient (App. 2.2; 3.2; 4.2) indicating significant continuity in occupation. In the locational preference for aspect, very large sites again correlated with other size-categories in their skew towards solar-neutral-to-positive orientation (App. 2.3; 3.3; 4.3), though this varied generally more than other size-categories. A slight trend towards south-facing aspects was again noted between the pre-Roman and Roman periods, potentially hinting at a subtle change in the settlement pattern with regards to aspect. However, this variance was again not found to be statistically significant (App. 2.3; 3.3; 4.3), furthering the notion of strong continuity in occupation.

4.3 Topography and Pre-Roman Settlements by Function

Categorisation of the pre-Roman settlement record by function indicated close similarities with the overall trend for occupation of low-lying elevations, slopes of level to gently sloping gradients and aspects of solar-neutral-to-positive orientation. However, the pre-Roman Period also demonstrated the greatest inter-categorical variance in terms of topographic locational preferences, with hillforts and ports being particularly anomalous from other categories (Fig. 4.5).

Agricultural Sites: Pre-Roman agricultural sites favoured locations of low elevation, with 95.92% below 100m. This correlated closely with contemporary domestic settlements and ports, though not with any other category (App. 2.1; 3.1; 4.1), suggesting a commonality of locational preference between the three categories in terms of elevation. Agricultural sites demonstrated a similarly strong skew in terms of their preference for slope, with 75.51% of sites located on slopes below 2° in gradient. This was found to statistically correlate with industrial sites and ports, though not with other categories (App. 2.2; 3.2; 4.2), indicating a deviation in terms of locational preferences for slope. The preference of agricultural sites for aspect was again found to be significantly skewed, with 71.43% located on predominantly south facing aspects of solar-neutral-to-positive orientation. This correlated with all contemporary categories except for hillforts (App. 2.3; 3.3; 4.3), suggesting strong consistency with the overall record in locational preferences for aspect.

Domestic Settlements: A total of 95.69% of pre-Roman domestic settlements were found to be located below 100m, correlating only with agricultural sites and ports (App. 2.1; 3.1; 4.1). Settlements also stood apart in their locations relative to slope, with 87.07% on slopes below 2° in gradient and none on slopes above 5°, indicating a stronger skew towards level to very gently sloping terrain than other contemporary

categories. In this regard, domestic settlements only correlated with industrial sites and ports (App. 2.2; 3.2; 4.2), suggesting a significant point of deviation from the overall pre-Roman record. In a return to the overall pattern however, 77.59% of domestic settlements were located on aspects of solar-neutral-to-positive orientation, correlating with all other contemporary categories except hillforts (App. 2.3; 3.3; 4.3). As such, domestic settlements demonstrated significant variability in their locational preferences for topography.

Hillforts: The locational preferences of hillforts for topography were significantly anomalous from other pre-Roman and Roman categories. Contrasting against the overall trend towards low-lying locations, 82.35% of hillforts were located above 100m in elevation, correlating only with ports (App. 2.1; 3.1; 4.1). The majority of hillforts were located between 100m and 200m, with a notable outlier being the location of Ingleborough hillfort at 720m. The highest hillfort site in England, Ingleborough represents a significant deviation away from the lowlands in favour of a commanding position within the landscape. Hillforts also demonstrated the greatest range of slope values, with the majority located on slopes between 2° and 10° in gradient and a single outlier of Ball Cross hillfort, Derbyshire, located on a slope of between 10° and 15°. As with elevation, hillforts were found to have deviated significantly from the overall record in their locations relative to slope, correlating only with contemporary ports (App. 2.2; 3.2; 4.2). Hillforts were less anomalous in location relative to aspect, with 76.47% located on aspects of solar-neutral-to-positive orientation correlating with industrial sites and ports. However, statistical correlation was not found with contemporary agricultural sites and domestic settlements (App. 2.3; 3.3; 4.3) due to a large number of hillforts favouring solar-neutral west-facing orientations, with this sample being again anomalous from the overall pattern.

Industrial Sites: Of all pre-Roman categories, industrial sites demonstrated the greatest skew in location relative to topography, with all sites located under 100m in elevation, on slopes below 2° in gradient and on aspects of solar-neutral-to-positive orientation. Industrial sites correlated only with ports in terms of their locational preferences for elevation (App. 2.1; 3.1; 4.1), likely due to the incredibly small sample sizes of the two respective categories. Conversely, industrial sites demonstrated significant correlation with all other categories in terms of aspect, and all categories except hillforts relative to slope – the variance with hillforts likely due to the strong skew of industrial sites towards very gently sloping locations (App. 2.2-2.3; 3.2-3.3; 4.2-4.3).

Ports: The single pre-Roman port site of Meols was an anomaly from the overall pattern of settlement relative to topography. Its elevation was found to be the lowest of all categories, with a maximum value of 20m, though its location on a slope

between 2° and 5° in gradient, as well as a north-facing aspect, were found to diverge from other contemporary site categories. Statistical testing found a degree of correlation between Meols and all other pre-Roman site categories (App. 2.1-2.3; 3.1-3.3; 4.1-4.3), however the validity of this remains problematic due to the sample size of one being completely inadequate for reliable comparative analysis.

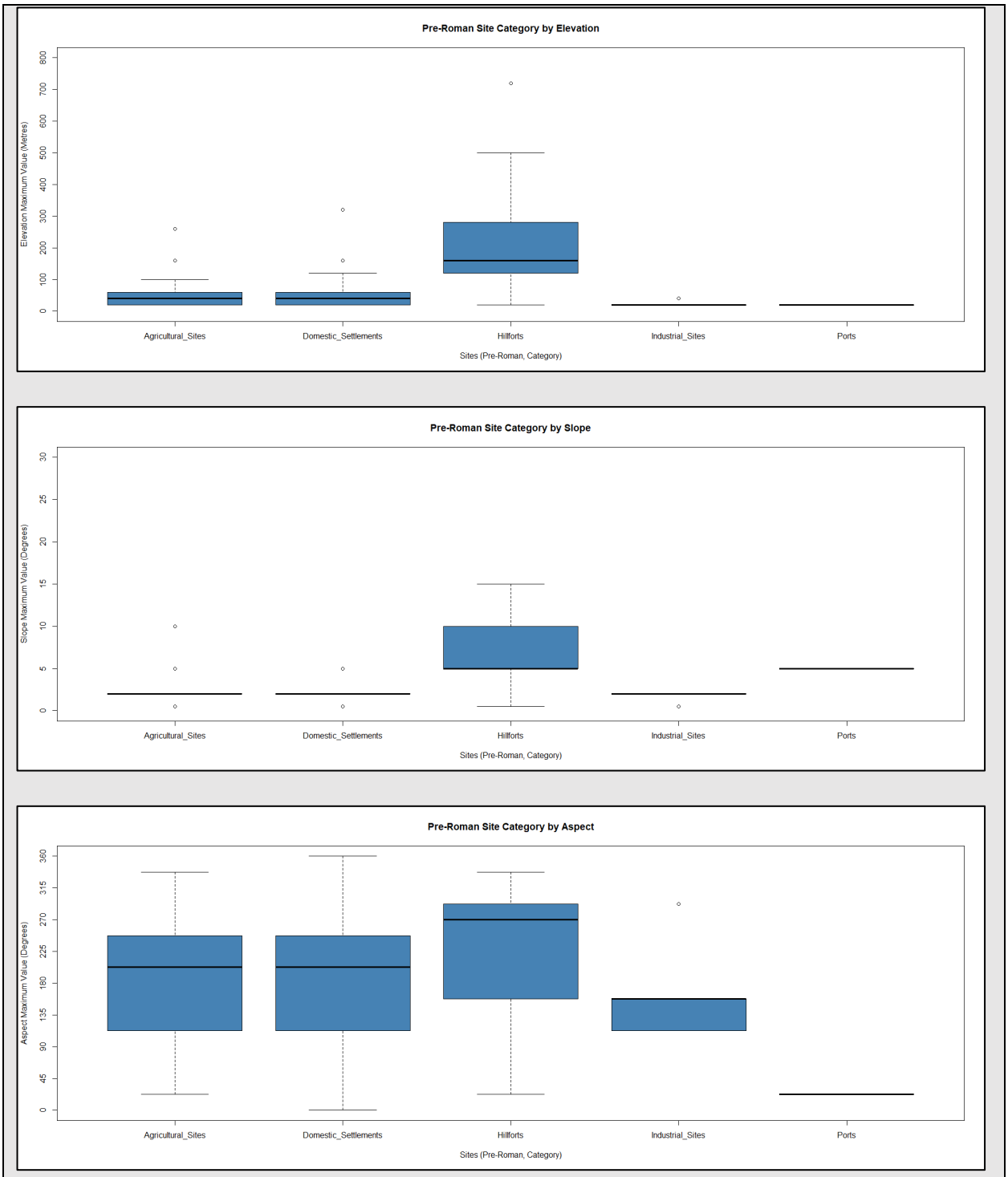

Figure 4.5: Graphs of pre-Roman sites, when categorised by function, indicating their locations relative to (top) elevation, (middle) slope and (bottom) aspect.

4.4 Topography and C1st Roman Settlements by Function

The locational preferences for topography of the C1st settlement record, when categorised by function, were found to demonstrate both change and continuity from the pre-Roman record, with generally greater skew in all categories towards low-lying, level to very gently sloping, and predominantly south-facing locations. A greater degree of inter-categorical consistency was also of particular note, with sites of the early Roman Period being generally more influenced by their locational preferences for mild topographic conditions than their pre-Roman counterparts, suggesting a point of deviation from the pre- to post-conquest periods (Fig. 4.6).

Agricultural Sites: C1st Roman agricultural sites showed significant continuity from the pre-Roman Period in elevation, with 93.85% located below 100m. They displayed notable statistical correlation with those of the preceding period, as well as all contemporary site categories apart from Roman military sites (App. 2.1; 3.1; 4.1), indicating significant continuity of practice across the C1st cultural landscape. Agricultural sites were also continuous in their preference for slope, with 72.31% located on slopes under 2° in gradient correlating strongly with all other categories (App. 2.2; 3.2; 4.2), reinforcing the strong consistency across the C1st landscape. Interestingly, 80% of agricultural sites were found to be located on aspects of solar-neutral-to-positive orientation, demonstrating an increase over the pre-Roman Period. However, the overall degree of skew in the distribution of agricultural sites relative to aspect was found to be lower than the pre-Roman Period, likely due to a lack of north-facing C1st agricultural sites and a larger number of predominantly west-facing sites. This correlated with all categories except for domestic settlements (App. 2.3; 3.3; 4.3), again indicating variation from the pre-Roman settlement record.

Domestic Settlements: Change was present in the elevation of C1st domestic settlements, with 83.33% located below 100m indicating a slight increase in occupation of upland locales. However, domestic settlements correlated strongly with all contemporary site categories (App. 2.1; 3.1; 4.1), suggesting strong intra-period consistency in the landscape. Settlements demonstrated the strongest skew in slope values, with 75.33% located on slopes below 2° in gradient. This correlated with all contemporary categories, though was the strongest with agricultural sites (App. 2.2; 3.2; 4.2). 74% of settlements were also located on slopes of solar-neutral-to-positive orientation, correlating with all other categories except for agricultural sites (App. 2.3; 3.3; 4.3). This lacking correlation should be seen as a significant indication of changing spatial relationships within the C1st rural landscape, with both continuity and variability between settlements and agricultural sites. Overall, C1st domestic settlements should be viewed as one of the categories most influenced by topographic conditions, indicating a clear locational preference for low-lying, level to very gently sloping, and predominantly south-facing positions in the landscape.

Industrial Sites: C1st industrial sites were more consistent with the overall record relative to topography. 70.59% of industrial sites were located on elevations below 100m, correlating closely with all other categories (App. 2.1; 3.1; 4.1). Similarly, industrial sites correlated with all categories in their locational preference for slope, with 61.77% located on slopes under 2° in gradient (App. 2.2; 3.2; 4.2). Industrial sites were also consistent in their locational preference for aspect, with 70.59% on aspects of solar-neutral-to-positive orientation correlating with all categories (App. 2.3; 3.3; 4.3). In this regard, C1st industrial sites showed no notable differences in their locational preferences for topography than other contemporary categories.

Military Sites: Roman military sites of the C1st followed a similar trajectory to contemporary industrial sites in terms of their locational preferences for topography. 76.36% of military sites were found to be located below 100m, correlating with industrial sites, domestic settlements and villas, but not agricultural sites or ports (App. 2.1; 3.1; 4.1). Correlating with all other site categories, 63.64% of military sites were located on slopes under 2° in gradient, though again they were most similar to contemporary industrial sites (App. 2.2; 3.2; 4.2). C1st military sites also demonstrated the greatest range of values relative to aspect, with 60% located on slopes of solar-neutral-to-positive orientation correlating with all other categories (App. 2.3; 3.3; 4.3), albeit to a weaker degree than the correlation relative to slope.

Ports: The increase in the number of ports during the Roman Period brought their distribution relative to topography into correlation with other categories, allowing for a better understanding of their locational preferences. All eight Roman ports were located below 100m in elevation, correlating with all categories except for C1st military sites (App. 2.1; 3.1; 4.1). Ports were also located on a greater range of slopes, with four sites located on slopes below 2° in gradient, whilst three sites were on slopes under 10° and a single site was located on a slope of between 10° and 15°. This correlated with all other categories (App. 2.2; 3.2; 4.2), indicating no significant point of variance from the overall record. Ports also correlated closely with all other categories relative to aspect, with 87.50% located on predominantly south-facing aspects of solar-neutral-to-positive orientation (App. 2.3; 3.3; 4.3), suggesting they did not deviate meaningfully from the overall locational preferences for topography.

Villas: C1st Roman villas varied little from other categories in their locational preferences for topography. 80% of villas were located below 100m in elevation, correlating strongly with all contemporary site categories (App. 2.1; 3.1; 4.1). Whilst only 40% of villas were located on slopes below 2° in gradient, the remainder were on slopes between 2° and 5°, indicating a preference for level to gently sloping topography correlating with all contemporary categories (App. 2.2; 3.2; 4.2). Villas were also exclusively located on aspects of solar-neutral-to-positive orientation, with 80% of the sample located on predominantly south-facing aspects and the remainder

on east-west aspects, correlating again with all contemporary categories (App. 2.3; 3.3; 4.3). Whilst the validity of statistical analysis of C1st villas for correlation with other categories can be questioned due to their small sample size, the lack of any significant outliers suggests they did not deviate in any meaningful way from the overall locational preferences of C1st sites for topography.

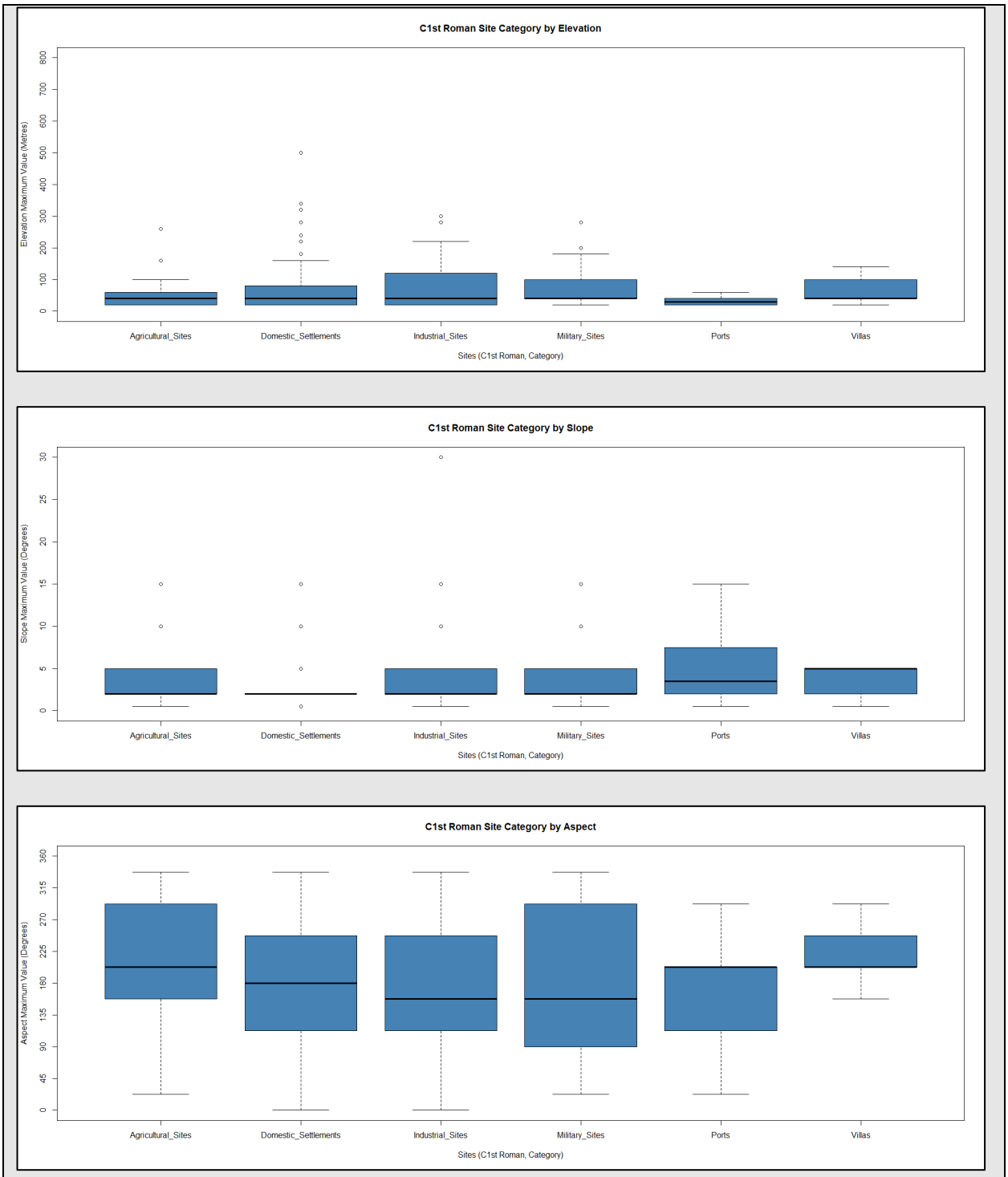

Figure 4.6: Graphs of C1st Roman sites, when categorised by function, indicating their locations relative to (top) elevation, (middle) slope and (bottom) aspect.

4.5 Topography and C2nd Roman Settlements by Function

Categorised by function, the C2nd settlement record demonstrated greater inter-categorical variability in the locational preferences for topography when compared to the C1st record, with marked differences between site categories comprising the rural settlement pattern, and military sites, ports and towns indicative of Roman state control (Fig. 4.7). This suggests the growth of the C2nd settlement record corresponded with increasing exploitation of a broader range of locations within the landscape, indicating less defined locational preferences compared with previous periods.

Agricultural Sites: C2nd agricultural sites showed substantial variability from the C1st in their relationship with topography. A total of 78.02% were located below 100m in elevation, indicating a decrease of 15.83% from the C1st record. Despite this, agricultural sites were found to correlate closely with all other C2nd site categories in terms of their locational preferences for elevation (App. 2.1; 3.1; 4.1), suggesting broad consistency across the C2nd landscape. Agricultural sites also varied more markedly in their relationship with slope, with 61.54% of sites located on slopes below 2° in gradient demonstrating a decrease from the C1st. As with elevation, this was shown to correlate with other C2nd categories except for domestic settlements (App. 2.2; 3.2; 4.2), again indicating consistency within the landscape. Whilst agricultural sites of the C2nd were shown to statistically correlate with their C1st counterparts in terms of their preferences for aspect, their degree of skew was far lower, with 69.23% located on aspects of solar-neutral-to-positive orientation. This again correlated with all contemporary categories (App. 2.3; 3.3; 4.3). Together, the changes in the agricultural record suggest a transition to a more extensive distribution of agricultural sites across the C2nd landscape.

Domestic Settlements: Stronger continuity in the locational preferences for topography was found between C2nd domestic settlements and the C1st record. 86.80% of settlements were located below 100m in elevation, correlating strongly with both the C1st record, as well as all other contemporary site categories (App. 2.1; 3.1; 4.1). Domestic settlements again demonstrated the strongest preference for level to gently sloping terrain of any contemporary category, with 78.68% located on slopes below 2° in gradient. This was found to correlate with C2nd industrial sites, ports and towns, but not with agricultural sites, military sites or villas (App. 2.2; 3.2; 4.2), suggesting greater variability in the locational preferences for slope. Domestic settlements also showed significant continuity in their preferences for aspect, with 71.57% on aspects of solar-neutral-to-positive orientation. This again correlated with all other categories (App. 2.3; 3.3; 4.3), demonstrating a commonality in the locational preferences for aspect across the C2nd settlement record.

Industrial Sites: Industrial sites of the C2nd showed substantial changes from the C1st sample in terms of their locational preferences for elevation, slope and aspect. A total of 81.43% of industrial sites were found to be located below 100m in elevation, demonstrating an increasing preference for low-lying locales over the C1st record, whilst correlating strongly with all other contemporary site categories (App. 2.1; 3.1; 4.1). Industrial sites demonstrated a further alignment with the overall record relative to slope, with 71.43% located on slopes below 2° in gradient indicating a change in trend from the preceding period. Despite this, industrial sites were also found to correlate with all other categories in terms of slope (App. 2.2; 3.2; 4.2). Unlike the C1st, industrial sites demonstrated a weaker locational preference for aspects of solar-neutral-to-positive orientation during the C2nd, with 57.14% of sites located within this range indicating a significant decrease over the C1st record. However, the median aspect value remained consistent with agricultural sites and domestic settlements, resulting in correlation between industrial sites and all contemporary categories in terms of their preferences for aspect (App. 2.3; 3.3; 4.3).

Military Sites: C2nd military sites most closely correlated with contemporary industrial sites in terms of their locational preferences for topography. 74.29% of military sites were found to be located below 100m in elevation, correlating with all C2nd site categories with the exception of ports (App. 2.1; 3.1; 4.1). A total of 60% of military sites were located on slopes below 2°, indicating a slight contraction in distribution relative to slope. This was found to correlate with all other categories except for domestic settlements (App. 2.2; 3.2; 4.2). Military sites also demonstrated significant continuity from the C1st in terms of their locational preferences for aspect, with 57.14% located on aspects of solar-neutral-to-positive orientation correlating with all contemporary site categories (App. 2.3; 3.3; 4.3). Overall, this suggests that despite the decrease in site numbers from the C1st to C2nd, Roman military sites retained significantly continuous locational preferences for topography over time.

Ports: Whilst ports of the Roman Period demonstrated no inter-period variance in terms of their distribution relative to elevation, slope and aspect, potential changes in their correlation with other contemporary site categories merit discussion as indicative of changing spatial relationships between the categories. In terms of elevation, ports correlated with all C2nd categories except for military sites and villas (App. 2.1; 3.1; 4.1), indicating notable commonalities with the C1st record. Both slope and aspect also proved significantly consistent, with ports correlating with all other categories in relation to both factors (App. 2.2-2.3; 3.2-3.3; 4.2-4.3). Therefore, little inter-categorical variability was present between Roman ports and the overall record in terms of their locational preferences for topography, furthering the

implications of broad continuity between the two centuries of the early Roman Period.

Towns: Roman towns showed a strong connection with the domestic settlement pattern in their distribution relative to elevation and slope but stood apart from other C2nd site categories in their locations relative to aspect. 83.33% of towns were located below both 100m in elevation and 2° in slope, demonstrating a statistically significant correlation to all other site categories in relation to each landscape factor (App. 2.1-2.2; 3.1-3.2; 4.1-4.2). This is highly significant, indicating towns almost exclusively preferred low-lying and level to very gently sloping locations conducive for the development of large-scale occupation. Though 66.67% of towns were located on aspects of solar-neutral-to-positive orientation, they were found to preference predominantly west-facing aspects to a greater degree than any other category, with half located on aspects facing northwest, west and southwest respectively. Towns significantly correlated with all other categories in their distribution relative to aspect, likely as a result of their small sample size, though the degree of correlation was lower than other contemporary categories (App. 2.3; 3.3; 4.3). As such, towns appeared to deviate little from the overall record in their locational preferences for elevation and slope but did provide some evidence of deviation relative to aspect.

Villas: C2nd Roman villas were found to be similar to contemporary towns in terms of their distribution relative to topography, with elevation and slope values generally conforming to those of other categories, whilst aspect provided some evidence of deviation. 76.19% of villas were located below 100m in elevation, correlating with all other C2nd site categories with the exception of ports (App. 2.1; 3.1; 4.1). Whilst only 47.62% of C2nd villas were located on slopes below 2° in gradient, the overall range of villa distribution relative to slope strongly correlated to the overall record, with an equal number of sites located on slopes between 2° and 5° and only one site on a 10° slope being considered as an outlier. This also correlated with all contemporary categories except for domestic settlements (App. 2.2; 3.2; 4.2). As with the C1st, C2nd villas also indicated an important trend towards solar alignment, with 80.85% located on aspects of solar-neutral-to-positive orientation. This was found to statistically correlate with the C1st record, as well as all C2nd categories (App. 2.3; 3.3; 4.3), showing little inter-categorical or inter-period variance in terms of the locational preference of villas with regard to aspect.

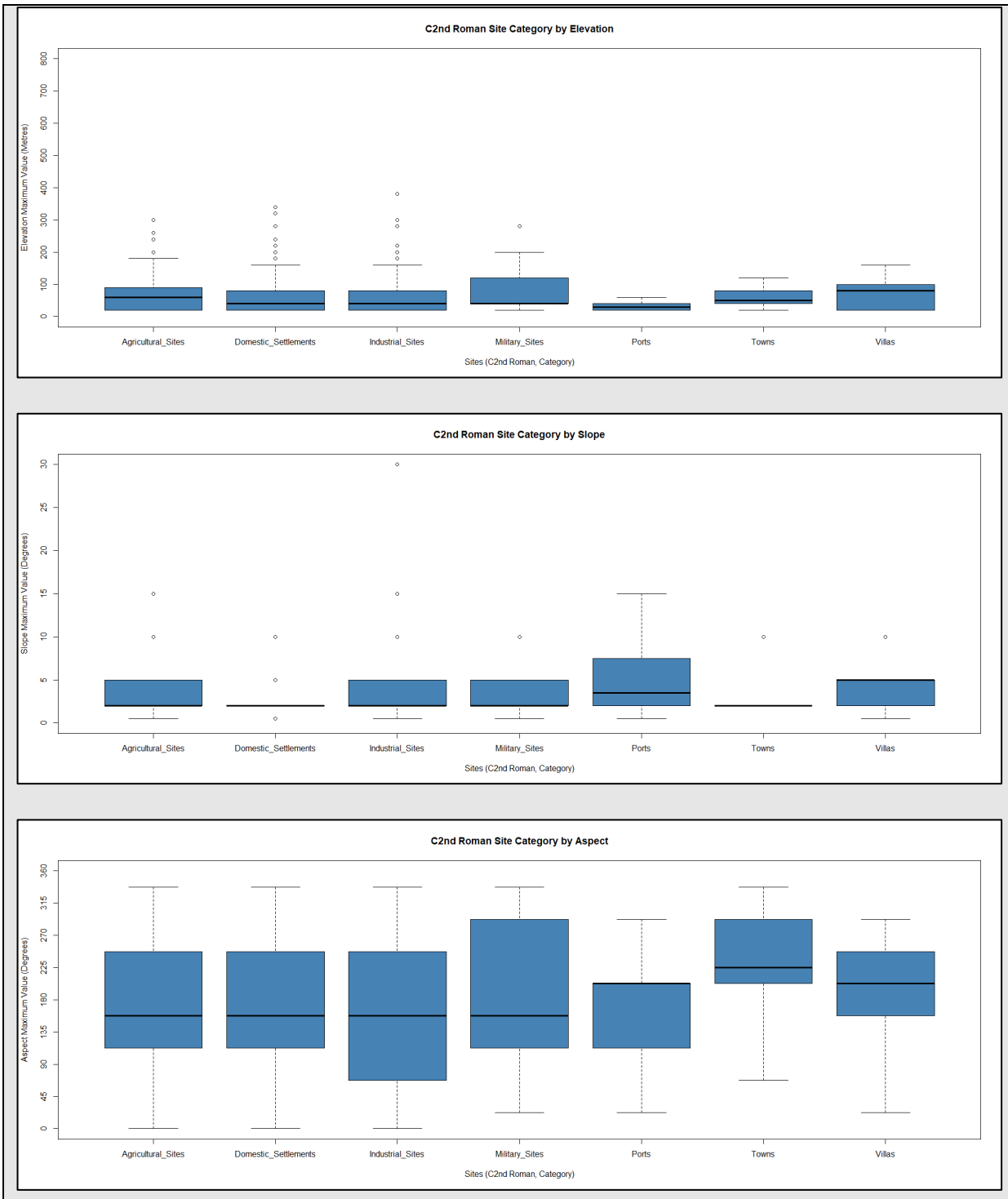

Figure 4.7: Graphs of C2nd Roman sites, when categorised by function, indicating their locations relative to (top) elevation, (middle) slope and (bottom) aspect.

4.6 Overview

The spatial relationships between the settlement record of the Midlands and northern England and the three topographic landscape factors of elevation, slope and aspect indicated significant continuity over time. Analysis of site distribution relative to elevation showed a significant trend towards lowland occupation, with the majority of sites located below 100m. Whilst variation between size-categories and functional categories was found, analysis showed this to not be statistically significant, and instead a product of the small sample sizes of certain site categories. Notably, statistically significant inter-period correlations were found between sites categorised by period, size or function, indicating site location was decided regardless of pre-Roman or Roman cultural indices, and instead overwhelmingly on the basis of a common preference for lowland areas within the landscape. This suggests that incoming Roman colonial groups likely followed extant pre-Roman practices in the situation of their sites, or that new sites were deliberately constructed in areas proximate to pre-Roman settlements in order to gain some degree of control over them or their associated environs. However, it is equally possible that the locational preference for lowland elevations was a product of Roman objectives within the cultural landscape, and any relationship with pre-Roman sites was coincidental. As with the gaps in the settlement record arising from inadequate archaeological sampling, more research shall be required in order to theorise motivations for these locational preferences.

Likewise, the location of sites relative to slope can be seen as strongly consistent across time periods, size-categories and functional categories, indicating a continuity of locational preferences between both pre-Roman and Roman groups. Statistical consistency was clearly demonstrated, with approximately 70% of sites across all three time periods located on slopes below 2° in gradient, falling within the categories of level to very-gently-sloping terrain. Indeed, only two sites during the C1st and C2nd can be found on slopes above 15°, but below 30°, thus falling within the moderately steep slope category. Both sites were of industrial function and were ascertained to be notable outliers from the overall pattern. The trend towards slopes below 15° in gradient should be viewed as highly significant to the nature of land-use in the pre-Roman and Roman cultural landscapes, particularly with regard to the nature of the agricultural regime, as utilisation of mildly sloping terrain would have minimised the required labour inputs for both traversal of the landscape and in manual cultivation activities.

As with elevation and slope, the locational preferences for aspect appeared to be consistent over time, with strong statistical correlation noted between sites categorised by period, size and function in terms of their location relative to aspect. The notable skew in the distribution of settlements towards those aspects trending

from east to west in a predominantly south-facing orientation should be seen as significant, offering neutral-to-favourable conditions in terms of both solar and wind orientation. Interestingly, the slight downward trend present in the overall distribution of sites away from those favourable aspects, from 76% of sites in the pre-Roman Period, to 73% and 68% in the C1st and C2nd respectively, can be seen as a minor movement towards an extensification of occupation and land-use practices. However, statistical testing did not indicate this change over time to be significant, with the pattern remaining largely within a similar range of variance. In a pre-industrial societal context with the absence of artificial lighting, the majority of activities reliant on light, such as agriculture, would have required orientation towards the sun, thus explaining this locational preference. South-facing aspects would additionally benefit from southerly winds bringing warmer air from lower latitudes, whist predominantly north-facing slopes would be more exposed to colder northerly winds. As such, the locational preference for aspect can be viewed as significantly impacted by climatic considerations, with further implications in the nature of the agricultural regime being a likely outcome.

4.7 Conclusions

Significant continuity therefore appears to be present in the locational preferences of the pre-Roman and Roman settlement record of the Midlands and northern England for locations with topographic conditions of low-lying elevations below 100m, level to very gently sloping terrain of below 2° in gradient, and predominantly south-facing aspects conducive to solar-neutral-to-positive orientation. Site distribution demonstrated a marked skew towards such locations, with no statistically significant variation across sites when categorised by period, size, or function. As such, it is possible to posit a clear locational preference of sites in the study area towards a specific set of gentle topographic conditions. An evaluation of the potential causes of this trend indicates a high probability of the settlement record being influenced in location by the nature of the agricultural regime, with sites requiring low labour inputs in manual cultivation being preferred over locations requiring more intensive activity. If this position is taken, then the character of the cultural landscape of the Midlands and northern England during the pre-Roman and Roman periods is revealed to have been one of a significantly agricultural nature, with patterns of settlement heavily influenced by subsistence strategies and the nature of the agricultural economic regime. This agriculturalist framework in the geospatial record supports previously discussed trends in the literature, thus constituting the most likely explanation for the locational preferences of the pre-Roman and Roman periods.

Chapter Five:

Pre-Roman and Roman Patterns of Settlement, Routeways and Landscape Networking in the Midlands and Northern England

The spatial relationships between the settlement record of the Midlands and northern England and the landscape factors of navigable waterways, Roman roads and road/river intersections demonstrated significant patterns in the concentration of settlement and activity around networks of maritime, riverine and terrestrial transportation, contact and exchange. The proximity of sites to navigable waterways was found to be significantly close. Indeed, there is no point in the landscape where one would be more than 20km away from navigable water and no site across the three sampled time periods was located further than 7km from a waterway. Roman roads were found to be far more sparsely distributed across the landscape, with sites located, at most, 47km from a Roman road. Whilst likely attributable to incompleteness in the dataset of Roman roads, this indicated a clear difference between terrestrial and waterborne networks, as at the greatest distance, a given site would be over six times closer to a navigable waterway or the coast than a Roman road. Road/river intersections were found to be similarly sparsely distributed throughout the landscape, with a maximum of 39km from a site to a waterway crossing. This reinforces the primacy of navigable waterways within the landscape, suggesting they had a potentially significant influence on patterns of settlement, land-use and land division.

5.1 Connectivity and Settlements by Period

Both inter-period change and continuity is apparent in the relationship between settlement and navigable waterways (Fig. 5.1), with sites of the Roman Period appearing to have a slightly closer relationship with waterways than those of the pre-Roman Period (App. 2.4; 3.4; 4.4). Whilst the distribution of all three periodised samples was skewed towards locations of close proximity to waterways, inter-period statistical correlation was only found between the C1st and C2nd, with the pre-Roman record indicating a significant point of variance (App. 2.4; 3.4; 4.4). 65.05% of pre-Roman sites were found within 2km, with the proportion of sites in this proximity range increasing to 69.09% and 67.76% in the C1st and C2nd respectively. This indicated a modest increase over time in the distribution of sites within close proximity of waterways, suggesting a slightly greater dependence on riverine and maritime transportation, contact and exchange during the Roman Period for access to inter-provincial trade and logistics. However, as the primary point of deviation

was within the range of 1-2km from a navigable waterway, the overarching implications on human mobility and the potential for transportation of material culture remain largely negligeable between the pre-Roman and Roman periods.

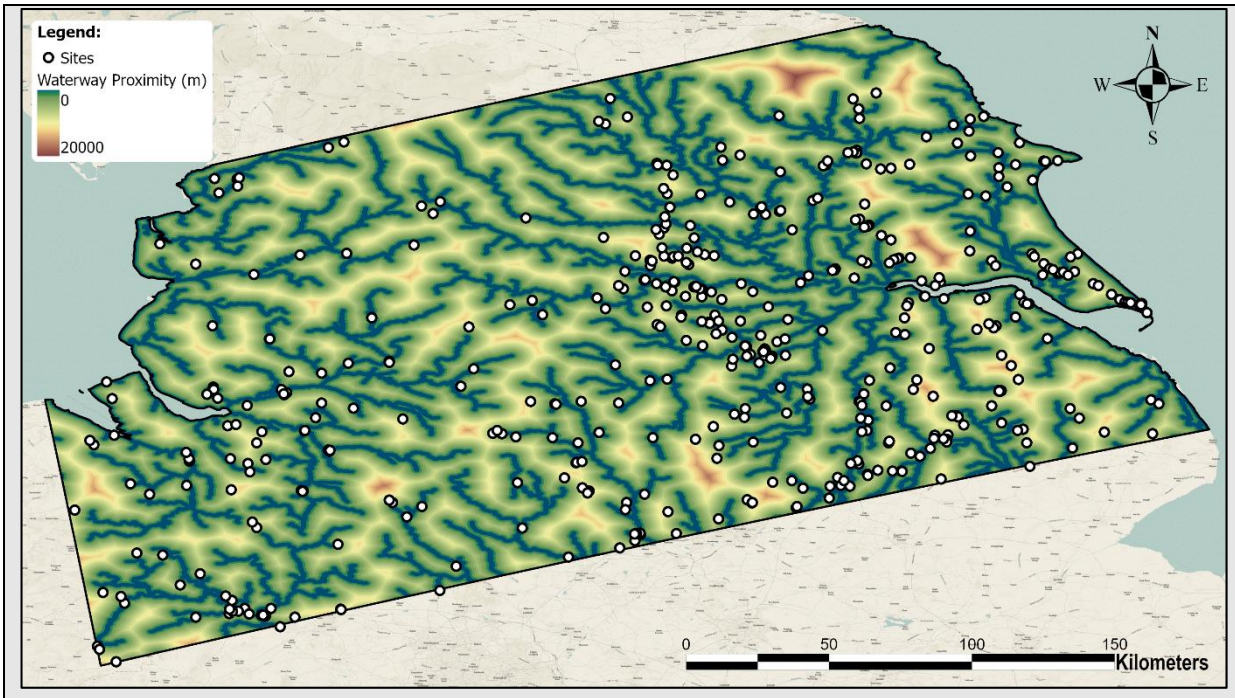

Figure 5.1: Map of site proximity in the study area to navigable waterways.

By contrast, the relationships between the periodised settlement record and Roman roads (Fig. 5.2) indicated notable change over time, with pre-Roman sites being sparser in distribution relative to the Roman road network than those of the C1st and C2nd (App. 2.5; 3.5; 4.5). This was particularly apparent in the close proximity range, with just 22.82% of pre-Roman sites located within 2km of a Roman road rising to 40.06% and 40.65% of C1st and C2nd sites respectively. The pre-Roman Period was also shown to be statistically anomalous to the C1st and C2nd Roman periods (App. 2.5; 3.5; 4.5), with a greater overall range of distance values and lower skew in distribution suggesting the Roman road network in the Midlands and northern England was not deliberately designed to service the extant pre-Roman cultural landscape. By contrast, the Roman road network and Roman settlement record had a statistically significant connection, suggesting sites were located to maximise their access to terrestrial networks of transportation, contact and exchange.

The spatial relationships between the periodised settlement record and road/river intersections closely followed their relationships with Roman roads (Fig. 5.3), with significant variation between the pre-Roman and Roman site samples (App. 2.6; 3.6; 4.6). The greatest sparsity of site distribution of any model was found in the close proximity range, as just 10.19% of the pre-Roman site sample was located within 2km of a road/river intersection, whilst 22.71% and 22.20% of C1st and C2nd sites respectively were within this range. This indicated a modest increase in settlement

close to waterway crossings, which was found to be a statistically significant point of variation between the pre-Roman and Roman periods, though strong continuity was found across the C1st and C2nd (App. 2.6; 3.6; 4.6). Such sites would have likely had visual oversight of road/river intersections and would have allowed constant movement to and from the crossing, suggesting a greater emphasis on management or exploitation of waterway crossings during the Roman Period as nodal locations through which transportation networking could be surveilled and controlled.

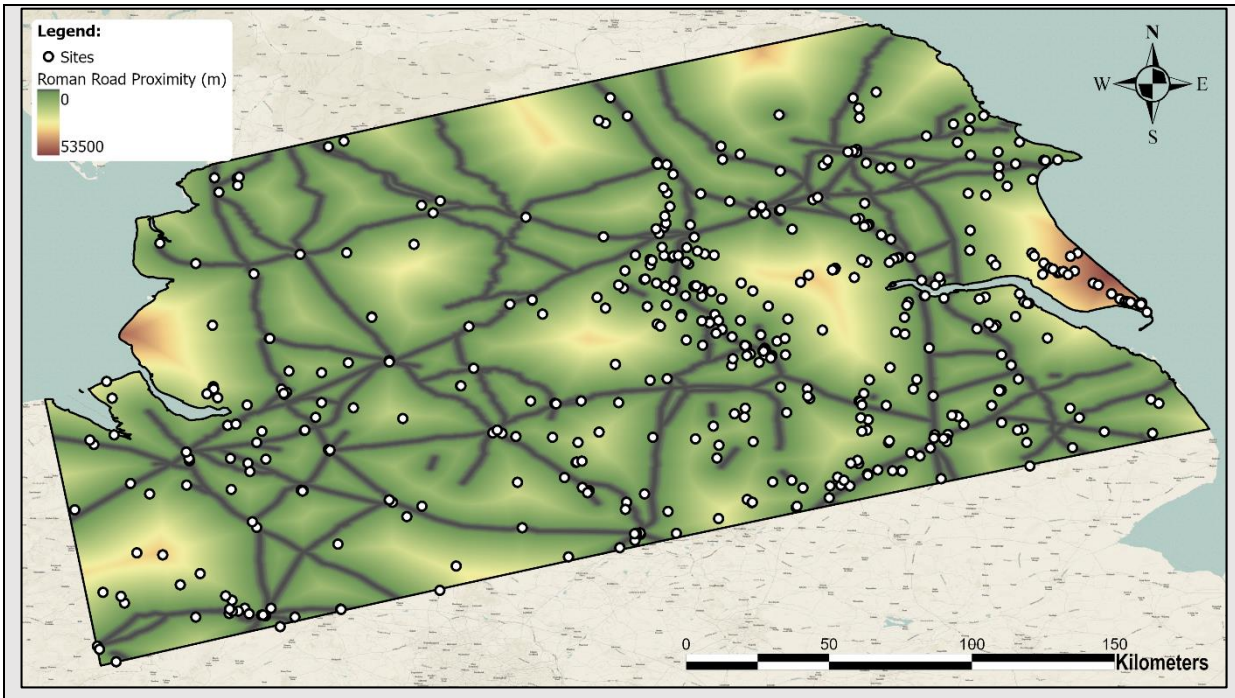

Figure 5.2: Map of site proximity in the study area to Roman roads.

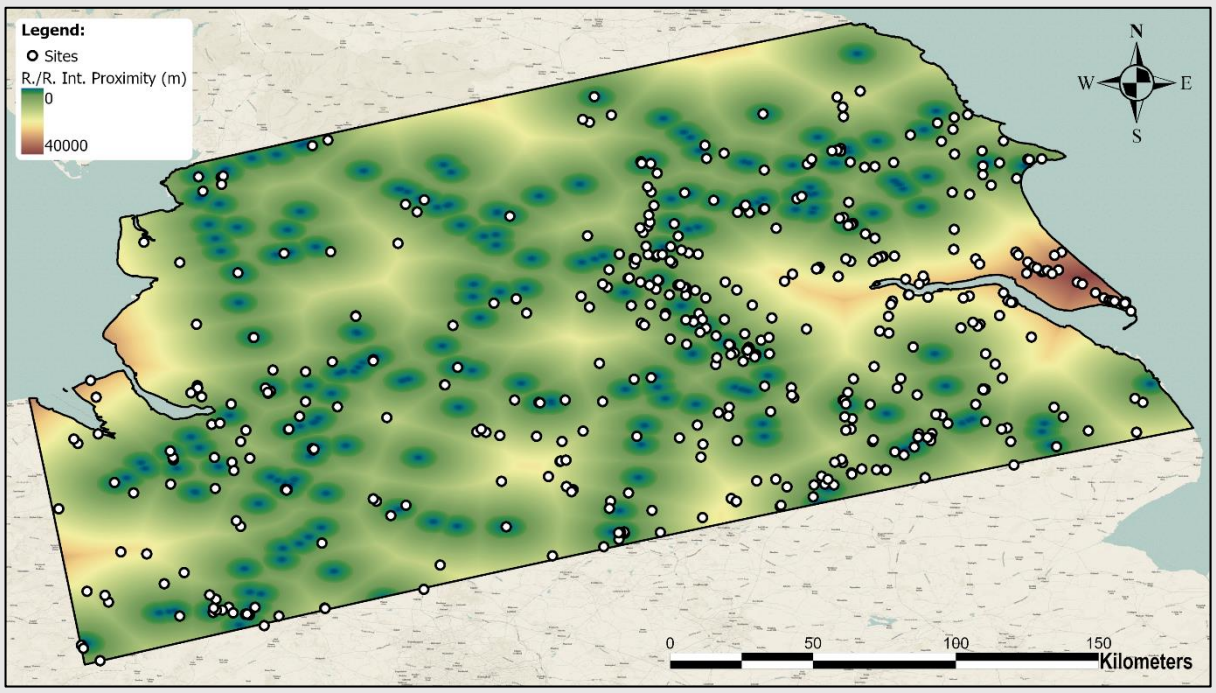

Figure 5.3: Map of site proximity in the study area to road/river intersections.

5.2 Connectivity and Settlements by Size-Category

When categorised by size, the relationships of the settlement record to navigable waterways, Roman roads and road/river intersections were shown to have closely followed the overall pattern. Whilst sites demonstrated significant continuity in their strongly skewed distribution relative to waterways, stronger inter-period variation was found between the pre-Roman and Roman records in their sparser distribution relative to Roman roads and road/river intersections (Fig. 5.4).

Small Size-category: Sites of the small size-category demonstrated a statistically significant correlation in distribution across the pre-Roman, C1st and C2nd periods (App. 2.4; 3.4; 4.4), with all three samples favouring locations of close proximity to navigable waterways and coastlines. By contrast, small sites changed substantially over time in their distribution relative to Roman roads, with statistical discontinuity noted between the pre-Roman and Roman samples (App. 2.5; 3.5; 4.5) due to small Roman sites being closer to the Roman road network than pre-Roman sites. Small sites similarly indicated substantial change in their locational preferences for proximity to road/river intersections between the pre-Roman and Roman periods, with statistical correlation found only between the C1st and C2nd samples (App. 2.6; 3.6; 4.6). As with Roman roads, this suggests a change in locational preferences from the pre-Roman to Roman periods of increasing closeness to road/river intersections. It is important to note that in all three models of proximity, significant variation from the periodised record was not found, indicating small sites did not deviate meaningfully from the overall record.

Medium Size-category: Medium sites were more sparsely distributed relative to navigable waterways, as well as somewhat more varied over time. A statistically significant point of variance was found between the medium and small size-categories in all three periods, as well as between medium and large sites of the C1st and C2nd (App. 2.4; 3.4; 4.4). Medium sites demonstrated some variance between periods and size-categories in their proximity to Roman roads, though inter-period variance was found to be lower than that of small sites. Skew toward roads increased modestly over time, though only the C2nd was found to vary statistically from the pre-Roman Period, with continuity between the pre-Roman and C1st periods suggesting a less drastic change in locational preferences (App. 2.5; 3.5; 4.5). Medium sites were more continuous in their distribution relative to road/river intersections, with a smaller proximity range indicating a stronger skew towards waterway crossings. Though inter-period statistical correlation was noted, the degree of correlation was lower between the pre-Roman and Roman periods (App. 2.6; 3.6; 4.6). However, the validity of statistical testing should be questioned due to the small sample size of medium sites, making the potential for positing a trend of changing locational preferences over time problematic.

Large Size-category: Sites of the large size-category more closely followed small sites in their relationship with navigable waterways, with strong statistical skew noted across all three periods, as well as significant inter-period correlation in location (App. 2.4; 3.4; 4.4). Large sites also demonstrated the greatest skew in their distribution relative to Roman roads, with the majority of sites located within 5km. As with waterways, this correlated across all three time periods, suggesting a commonality of locational preferences among large sites for close proximity to roads (App. 2.5; 3.5; 4.5). Conversely, the relationships between large sites and road/river intersections demonstrated the greatest inter-period change, with site distribution skewing somewhat towards waterway crossings over time. However, whilst the degree of correlation was shown to vary between periods somewhat, the differences were not found to be statistically significant (App. 2.6; 3.6; 4.6), instead indicating overarching continuity. In this regard, the relationships between large sites and navigable waterways, Roman roads and road/river intersections can be seen as strongly consistent, despite the noted minor variations within the record.

Very Large Size-category: Very large sites demonstrated a similar degree of skew towards navigable waterways to other size-categories. However, they also presented an anomaly in the relationships between sites of differing size-categories, with a lack of inter-period correlation. Very large pre-Roman and Roman sites were found to vary somewhat in distribution relative to waterways, with some degree of correlation between the pre-Roman and C1st, and C1st and C2nd records, but no correlation between the pre-Roman and C2nd records (App. 2.4; 3.4; 4.4). As very large sites of the Roman Period were significantly representative of the military and town categories, it is likely that the location of many very large sites closer to waterways can be seen as a deliberate strategy to gain greater control and surveillance over networks of riverine and coastal mobility, as well as greater logistical consistency in accessing goods and raw materials moving through the network. Likewise, very large sites correlated strongly across all three periods in their locations relative to the Roman road network (App. 2.5; 3.5; 4.5). Whilst a slight increase in skew towards the Roman road network over time was observed, the closeness of very large pre-Roman sites to roads constitutes an important indicator of the role of extant major sites within the pre-Roman cultural landscape on how the Roman road network was surveyed. Some evidence for change over time in terms of the relationship between very large sites and road/river intersections was found, with the degree of skew in the distribution of very large sites generally following their large counterparts in increasing slightly over time (App. 2.6; 3.6; 4.6). This suggests a greater locational preference of very large Roman sites for waterway crossings than their pre-Roman counterparts. Given the noted military and urban functions of many very large sites of the Roman Period, the close relationships between very large Roman sites and waterway crossings therefore reinforces the

perceived importance to the Roman state of surveilling, controlling and utilising waterway crossings as nodes in the maritime, riverine and terrestrial networks of transportation, contact and exchange.

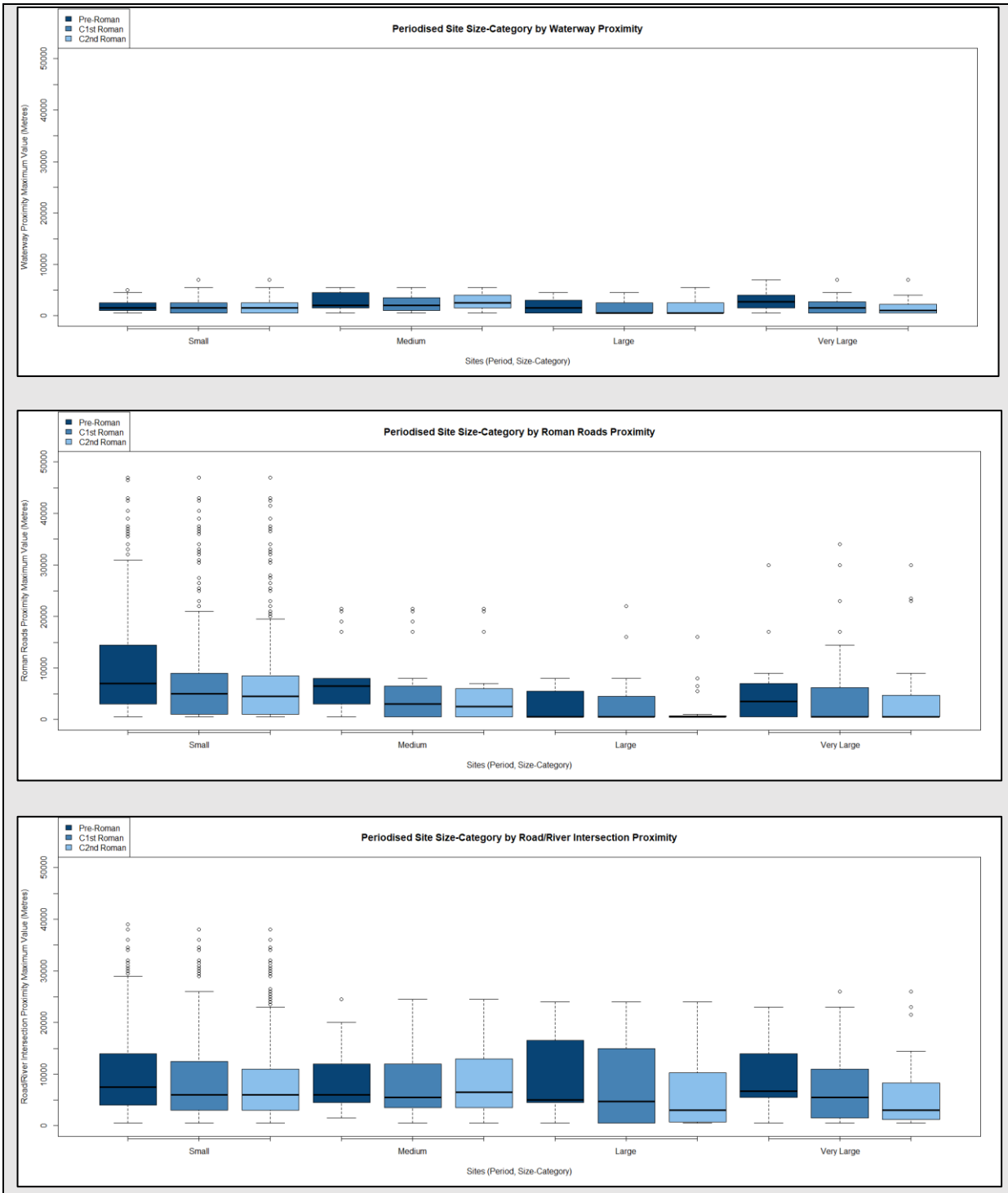

Figure 5.4: Graphs of pre-Roman, C1st and C2nd Roman sites, when categorised by the small, medium, large and very large size-categories, indicating their proximity to (top) navigable waterways, (middle) Roman roads and (bottom) road/river intersections.

5.3 Connectivity and Pre-Roman Settlements by Function

When categorised by function, the pre-Roman settlement record indicated strong consistency with the overall record in terms of their locational preferences for proximity to waterways, Roman roads and road/river intersections, with minor inter-categorical variance suggesting unique preferences specific to individual site categories, such as hillforts and ports. Similar to the overall record, spatial priorities were found to be clearly ordered, with significant inter-categorical consistency in the strong skew towards waterways, followed by Roman roads and then road/river intersections (Fig. 5.5) (App. 2.4-2.6; 3.4-3.6; 4.4-4.6).

Agricultural Sites: Pre-Roman agricultural sites demonstrated significant skew in distribution, with 67.34% located within 2km of a navigable waterway. This correlated with all other categories except for hillforts (App. 2.4; 3.4; 4.4), suggesting strong uniformity within the agricultural landscape with respect to waterway proximity. Similarly, agricultural sites were found to have the greatest skew of any pre-Roman category in their proximity to Roman roads, with 32.65% of the sample located within 2km of a road. However, the presence of significant outliers meant that agricultural sites correlated with all contemporary site categories (App. 2.5; 3.5; 4.5), again suggesting a commonality of locational preferences. The proximity of agricultural sites to road/river intersections reinforces this, with 16.33% located within 2km correlating strongly with all other categories (App. 2.6; 3.6; 4.6). As with the overall record, this suggests a significant order of spatial priorities, with proximity to waterways being the most important factor in agricultural site location.

Domestic Settlements: Broad similarities were found between domestic settlements and agricultural sites in their distribution relative to navigable waterways, with 68.10% located within 2km of a waterway. Domestic settlements also showed the greatest range of distribution relative to waterways, however their degree of skew was ascertained to align closely with agricultural sites, indicating the greater overall range of values was the product of outliers. Statistical correlation between domestic settlements and all other contemporary site categories, except for hillforts was ascertained, though correlation was also strongest with agricultural sites (App. 2.4; 3.4; 4.4), indicating a shared locational preference for waterway proximity. Settlements followed the overall record in their relationship with Roman roads, as 20.69% of the sample was located within 2km of a road. This correlated with all other contemporary categories (App. 2.5; 3.5; 4.5), reinforcing a common locational preference for road proximity. This trend was again demonstrated in the distribution of settlements relative to road/river intersections, with 10.35% located within 2km correlating strongly with all other categories (App. 2.6; 3.6; 4.6). The order of locational preferences thus closely follows the overall record, suggesting domestic

settlements of the pre-Roman Period did not deviate significantly in terms of their spatial relationships with waterways, Roman roads and road/river intersections.

Hillforts: Pre-Roman Hillforts were found to present the greatest variance in their spatial relationships with navigable waterways, Roman roads and road/river intersections, being anomalous to both the overall periodised record, as well as other contemporary site categories. Hillforts demonstrated the weakest skew relative to waterways, with 47.06% of sites located within 2km of a waterway correlating with industrial sites and ports, but not agricultural sites or domestic settlements (App. 2.4; 3.4; 4.4). By contrast, hillforts were more closely aligned with other categories in their distribution relative to Roman roads, with 20.59% of the sample located within 2km of a road. Correlation was found with all other contemporary categories (App. 2.5; 3.5; 4.5), suggesting that despite the deviation in relation to waterways, hillforts remained consistent with the overall record in their distribution relative to Roman roads. The proximity of hillforts to road/river intersections further complicates this, having a relatively small distribution range more akin to agricultural sites and domestic settlements. However, though correlation was found between hillforts and all contemporary site categories in their distribution relative to road/river intersections (App. 2.6; 3.6; 4.6), only one hillfort was found to be located within 2km of a waterway crossing, indicating a general preference away from close proximity. Hillforts therefore presented a complicated case within the pre-Roman landscape, being generally more isolated than other site categories from access to maritime, riverine and terrestrial networks of transportation, contact and exchange.

Industrial Sites: Pre-Roman industrial sites varied significantly in their locations relative to waterways, Roman roads and road/river intersections. Industrial sites were found to have the greatest skew of all contemporary categories, with 83.33% within 2km of a waterway. Despite the greater skew, correlation was also found with all contemporary categories (App. 2.4; 3.4; 4.4), indicating industrial sites did not deviate notably from the overall record. By contrast, industrial sites showed the second weakest skew in terms of their location relative to Roman roads, with no sites located within 2km of a road and the closest site at 5km. Despite this, statistical correlation was found with all other categories (App. 2.5; 3.5; 4.5). This pattern was followed with the distribution of industrial sites relative to road/river intersections, with no site within 2km and the closest located at 5.5km. Correlation was again found with all contemporary categories (App. 2.6; 3.6; 4.6), though across all statistical analyses of correlation, the small sample size of pre-Roman industrial sites should be viewed as problematic, likely resulting in issues of underestimation.

Ports: The pre-Roman port of Meols was found to be located within 500m of the coast, 23km from the nearest Roman road and 29km from a road/river intersection.

Such results placed Meols within the range of other site categories (App. 2.6; 3.6; 4.6). However, the sample size of one should be seen as wholly inadequate, and statistical analysis of correlation with other site categories could not be accurately processed. This once again highlights a need for further archaeological investigation of pre-Roman port sites, as it is unlikely that Meols is the only example of such a site in the Midlands and northern England.

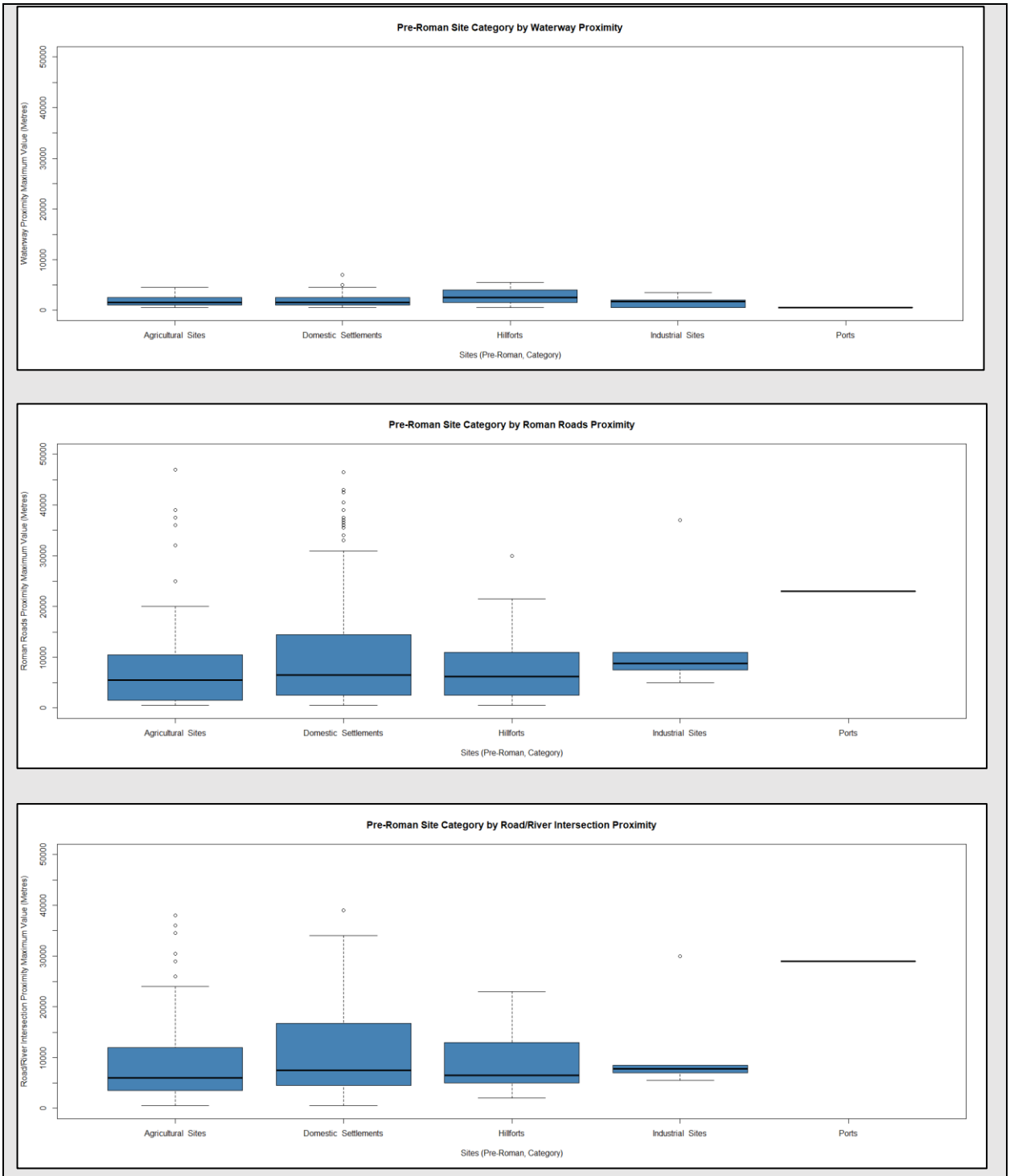

Figure 5.5: Graphs of pre-Roman sites, when categorised by function, indicating their proximity to (top) navigable waterways, (middle) Roman roads and (bottom) road/river intersections.

5.4 Connectivity and C1st Roman Settlements by Function

The C1st Roman settlement record, categorised by function, demonstrated increasing inter-categorical variability from the pre-Roman record in the proximity of sites to navigable waterways, Roman roads and road/river intersections. This corresponded with an increasing skew in proximity, suggesting Roman sites favoured closer access to maritime, riverine and terrestrial networks of transportation, contact and exchange than the preceding period (Fig. 5.6) (App. 2.4-2.6; 3.4-3.6; 4.4-4.6).

Agricultural Sites: Significant skew was demonstrated in the distribution of C1st agricultural sites towards navigable waterways, with a total of 69.23% located within 2km. This correlated with all contemporary site categories except for ports, as well as the pre-Roman agricultural site record (App. 2.4; 3.4; 4.4). By contrast, C1st agricultural sites were more sparsely distributed relative to Roman roads, as well as road/river intersections. 26.15% were located within 2km of a Roman road, correlating with domestic settlements and villas, but not with industrial sites, military sites and ports (App. 2.5; 3.5; 4.5). Similarly, just 12.31% were located within 2km of a road/river intersection, correlating with all contemporary site categories except for military sites (App. 2.6; 3.6; 4.6). This suggests a clear order of the spatial priorities of C1st agricultural sites, with a clearly stronger locational preference for proximity to waterways than Roman roads or road/river intersections.

Domestic Settlements: C1st domestic settlements were continuous with the pre-Roman record, as well as similar to C1st agricultural sites, in their distribution relative to waterways, Roman roads and road/river intersections. 64.67% of settlements were located within 2km of a waterway, demonstrating a slightly more distant proximity to waterways than both their pre-Roman predecessors, as well as other contemporary sites. However, this correlated strongly with all contemporary categories, with the exception of military sites and ports (App. 2.4; 3.4; 4.4). Similar to C1st agricultural sites, 28% of domestic settlements were found to be located within 2km of a Roman road, correlating again with all categories except for military sites and ports (App. 2.5; 3.5; 4.5), whilst 15.33% of the sample were located within 2km of a road/river intersection, correlating with all contemporary categories except for military sites (App. 2.6; 3.6; 4.6). The strong correlation between agricultural and domestic sites thus reveals notable consistency within the rural landscape of the C1st, as well as continuity from the pre-Roman settlement pattern.

Industrial Sites: The distribution of C1st industrial sites skewed strongly towards waterways, Roman roads and road/river intersections. In total, 73.53% were located within 2km of waterways, correlating with all categories except for ports (App. 2.4; 3.4; 4.4). The relationship between industrial sites and the Roman road network and road/river intersections also showed greater skew, with 47.06% located within 2km

of a road, and 35.29% within 2km of a road/river intersection. Statistical correlation was found between industrial sites and agricultural sites, domestic settlements and villas relative to Roman roads, but not with military sites or ports (App. 2.5; 3.5; 4.5). By contrast, the distribution of industrial sites relative to road/river intersections correlated with all contemporary site categories (App. 2.6; 3.6; 4.6). Greater variation was consequently demonstrated within the industrial site category, with a more significant locational preference for sites close to maritime, riverine and terrestrial networks of transportation, contact and exchange than other categories.

Military Sites: C1st military sites showed the second greatest skew of their contemporary site record in proximity to waterways, Roman roads and road/river intersections. 70.91% were located within 2km of a navigable waterway, correlating with all categories except for domestic settlements (App. 2.4; 3.4; 4.4) and indicating military sites did not meaningfully deviate from the overall pattern. The distribution of Roman military sites to the road network deviated significantly, with 76.36% of the sample located within 2km of a road indicating a strong skew in distribution that correlated only with ports and villas (App. 2.5; 3.5; 4.5). By contrast, the spatial relationship between military sites and road/river intersections was closer to the overall record, with 43.64% within 2km of a road/river intersection correlating with all contemporary site categories except agricultural sites and domestic settlements (App. 2.6; 3.6; 4.6). Across all three proximity models, C1st military sites shared a close relationship with maritime, riverine and terrestrial networks, suggesting they placed a greater importance on access to transportation, contact and exchange.

Ports: Roman ports demonstrated the greatest skew of any contemporary site category towards navigable waterways and Roman roads, but the weakest skew towards road/river intersections. All eight ports were within 2km of a waterway, correlating only with military sites and villas (App. 2.4; 3.4; 4.4). Similarly, 87.5% were located within just 500m of a Roman road, with Meols as the only outlier. As with their distribution relative to waterways, statistically significant correlation was found only with military sites and villas (App. 2.5; 3.5; 4.5). Conversely, Roman ports showed a greater range of distribution relative to road/river intersections, with 50% of the sample located within 2km of a waterway crossing, correlating with all other contemporary site categories (App. 2.6; 3.6; 4.6). Due to the small sample size of Roman ports, statistical correlation remains problematic.

Villas: Stronger similarities were found between C1st Roman villas, agricultural sites and domestic settlements in their distributions relative to waterways, Roman roads and road/river intersections, though slightly greater skew was noted in the distribution of villas toward all three factors. 80% of C1st villas were found to be located within 2km of a waterway, correlating closely with all contemporary site categories (App. 2.4; 3.4; 4.4). Similarly, villas skewed strongly towards Roman

roads, with 60% within 2km of a road correlating with all C1st site categories (App. 2.5; 3.5; 4.5). A weaker skew was found between villas and road/river intersections, with just 20% located within 2km of a waterway crossing. However, this again correlated strongly with all contemporary site categories (App. 2.6; 3.6; 4.6), indicating broad consistency across the sample. As with ports, interpreting the place of C1st villas within the landscape is limited by sample size.

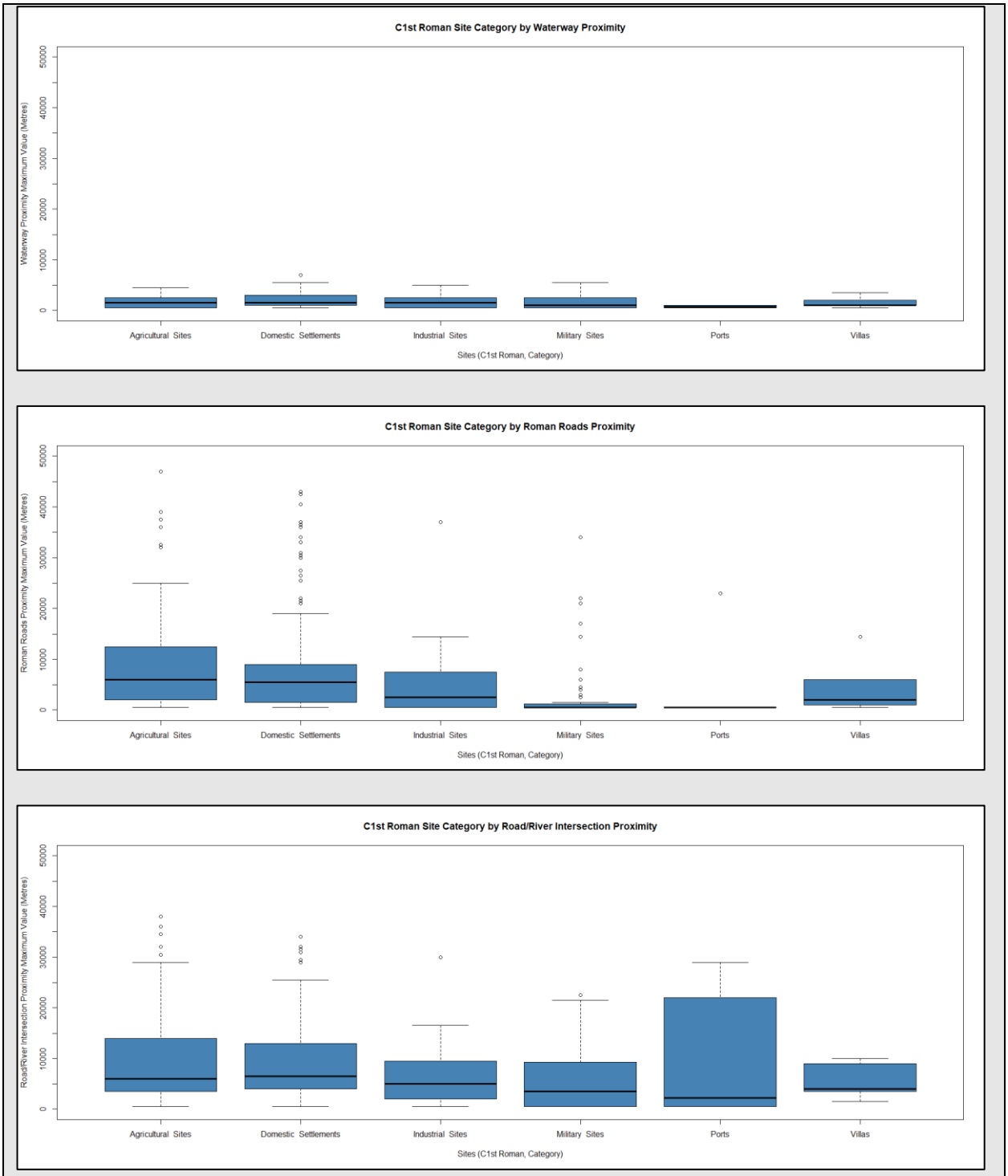

Figure 5.6: Graphs of C1st Roman sites, when categorised by function, indicating their proximity to (top) navigable waterways, (middle) Roman roads and (bottom) road/river intersections.

5.5 Connectivity and C2nd Roman Settlements by Function

Categorisation of the C2nd settlement record by function revealed markedly similar patterns of site distribution to the C1st record in relation to navigable waterways, the Roman road network and road/river intersections (Fig. 5.7). All categories demonstrated statistically significant skew in their proximity to the three landscape factors, however the degree of skew was shown to vary somewhat between categories (App. 2.4-2.6; 3.4-3.6; 4.4-4.6), indicating distinct patterns of occupation and activity within the landscape.

Agricultural Sites: C2nd agricultural sites showed considerable continuity from the C1st, indicating strong consistency in the rural landscape across the Roman Period. A modest increase in the skew of agricultural sites towards locations of close proximity to waterways was noted, with 71.43% located within 2km of a navigable waterway. This correlated with all contemporary site categories except ports (App. 2.4; 3.4; 4.4). The relationship between agricultural sites and Roman roads was significantly continuous with the C1st, as 23.08% were located within 2km of a Roman road and correlated only with contemporary domestic settlements and villas (App. 2.5; 3.5; 4.5). In this regard, the distribution of C2nd agricultural sites relative to the Roman road network should be viewed as a significant point of deviation from the overall record, indicating a distinct locational preference in the rural landscape for road proximity. Agricultural sites again demonstrated continuity in their distribution relative to road/river intersections, with 12.09% located within 2km of a waterway crossing. This correlated with domestic settlements, ports and villas, but not industrial sites, military sites or towns (App. 2.6; 3.6; 4.6). As with the relationship between C2nd agricultural sites and Roman roads, this suggests a distinct pattern of site distribution in the rural landscape, with agricultural sites generally demonstrating less interest in locations of close proximity to maritime, riverine and terrestrial networks of transportation, contact and exchange.

Domestic Settlements: Similar to agricultural sites, C2nd domestic settlements showed strong continuity with their C1st predecessors in their distribution relative to waterways, Roman roads and road/river intersections. A total of 63.96% of domestic settlements were found to be located within 2km of a navigable waterway, correlating with agricultural sites, industrial sites, towns and villas, but not with military sites and ports (App. 2.4; 3.4; 4.4). In a slight increase from the C1st, 32.99% of settlements were located within 2km of a Roman road, correlating only with contemporary agricultural sites and villas (App. 2.5; 3.5; 4.5). By contrast, strong continuity with the C1st was noted in the distribution of C2nd settlements relative to road/river intersections, with 16.75% within 2km of a waterway crossing correlating with contemporary agricultural sites, ports and villas, but not with industrial sites, military sites or towns (App. 2.6; 3.6; 4.6). In this regard, the domestic settlement

record of the C2nd can be seen to correlate more strongly with the agricultural record than other contemporary site categories, indicating a consistency of locational preferences across the rural landscape for proximity to all three landscape factors.

Industrial Sites: C2nd industrial sites demonstrated a slightly greater skew in distribution towards locations of close proximity to waterways, Roman roads and road/river intersections than their agricultural or domestic counterparts. A total of 68.57% were found within 2km of a navigable waterway, correlating with all contemporary site categories except for ports (App. 2.4; 3.4; 4.4). Demonstrating a significant increase in skew over agricultural and domestic sites, as well as a slight increase over the C1st record, 50% of industrial sites were found to be located within 2km of a Roman road. This correlated with all C2nd site categories with the exception of agricultural sites and ports, likely due to the presence of a number of outliers (App. 2.5; 3.5; 4.5). The relationship between industrial sites and road/river intersections followed this trend, showing a slight decrease in close proximity from the C1st with 30% of the sample located within 2km of a waterway crossing. This correlated with contemporary ports, towns and villas, but not with agricultural sites, domestic settlements or military sites (App. 2.6; 3.6; 4.6), suggesting a significant point of deviation in locational preferences. Overall, this indicates C2nd industrial sites had a generally closer spatial relationship with maritime, riverine and terrestrial networks of transportation, contact and exchange, likely facilitating the movement of raw materials and goods throughout the landscape.

Military Sites: Significant skew was noted in the record of C2nd military sites in their distribution relative to waterways, Roman roads and road/river intersections. Demonstrating a modest increase in close proximity over the C1st sample, 77.14% of C2nd military sites were found to be located within 2km of a waterway. This correlated with all contemporary site categories except domestic settlements and villas (App. 2.4; 3.4; 4.4). Similarly, C2nd military sites further emphasised the close connection with the Roman road network established during the C1st, with 91.43%, located within 2km of a road indicating an incredibly close relationship between the Roman military and terrestrial networks throughout the landscape. This was found to correlate only with ports and towns, with all other site categories demonstrating a significantly lower degree of skew suggestive of a distinct locational preference for road proximity (App. 2.5; 3.5; 4.5). The degree of skew in the distribution of military sites relative to road/river intersections was also found to have increased from the C1st, with 57.14% within 2km of a waterway crossing correlating only with contemporary ports and towns (App. 2.6; 3.6; 4.6). As with the relationship between C2nd military sites and roads, the relationship with waterway crossings was shown to be significantly variant from the overall record, indicating a distinctly different approach to military occupation and activity within the Roman cultural landscape.

Ports: As the location of ports did not vary from the C1st to the C2nd, they do not merit reiteration. However, the correlation between ports and the other site categories of the C2nd does suggest some variance from the C1st record. In terms of both waterway and Roman road proximity, C2nd ports were found to correlate only with military sites and towns (App. 2.4-2.5; 3.4-3.5; 4.4-4.5), suggesting a distinct locational preference arising from the notable skew in port distribution relative to both landscape factors. By contrast, the relationship between ports and road/river intersections was found to be the least skewed of any category within the C2nd record, though correlated with all contemporary site categories (App. 2.6; 3.6; 4.6).

Towns: Roman towns demonstrated the greatest skew in distribution relative to waterways, Roman roads and road/river intersections of any contemporary site category, suggesting significant connectivity between towns and maritime, riverine and terrestrial networks of transportation, contact and exchange. 83.33% of towns were found to be located within 2km of a navigable waterway, correlating with all contemporary site categories due likely to the small sample size (App. 2.4; 3.4; 4.4). All towns were located within 500m of a Roman road, indicating a highly significant connection between towns and terrestrial networks. This correlated only with contemporary military sites and ports (App. 2.5; 3.5; 4.5), demonstrating towns deviated from the majority of the C2nd cultural landscape in their locational preference for road proximity. In a strong sign of consistency in locational preference, 83.33% of the C2nd town sample were again located within 2km of a road/river intersection, correlating with industrial and military sites, as well as ports, but showing statistically significant variance from agricultural sites, domestic settlements and villas (App. 2.6; 3.6; 4.6). Therefore, towns were relatively anomalous from the overall pattern of settlement in the Midlands and northern England, conforming to a locational preference for strong connectivity to maritime, riverine and terrestrial networks of transportation, contact and exchange.

Villas: Considerable standardisation was found between C2nd villas and the overall record in their relationships with waterways, Roman roads and road/river intersections, indicating a shift in locational preferences from the C1st aligning with the increasing numbers of villas within the C2nd landscape. 52.38% of villas were located within 2km of a navigable waterway, correlating with all contemporary site categories except military sites and ports (App. 2.4; 3.4; 4.4). In stark contrast to the C1st, 38.10% of C2nd villas were within 2km of a Roman road, indicating a sharp decrease in the locational preference for road proximity. Statistical correlation was found with agricultural sites, domestic settlements and industrial sites, but not with military sites, ports or towns (App. 2.5; 3.5; 4.5), suggesting a greater inter-categorical variance in site distribution. In even greater contrast with the C1st, just 9.52% of villas were found to be located within 2km of a road/river intersection,

correlating with agricultural sites, domestic settlements and industrial sites (App. 2.6; 3.6; 4.6). Therefore, it is unlikely that villas were as significantly connected with maritime, riverine and terrestrial networks of transportation, contact and exchange as other contemporary site categories, though the small sample size does make comparative analysis of overarching trends problematic.

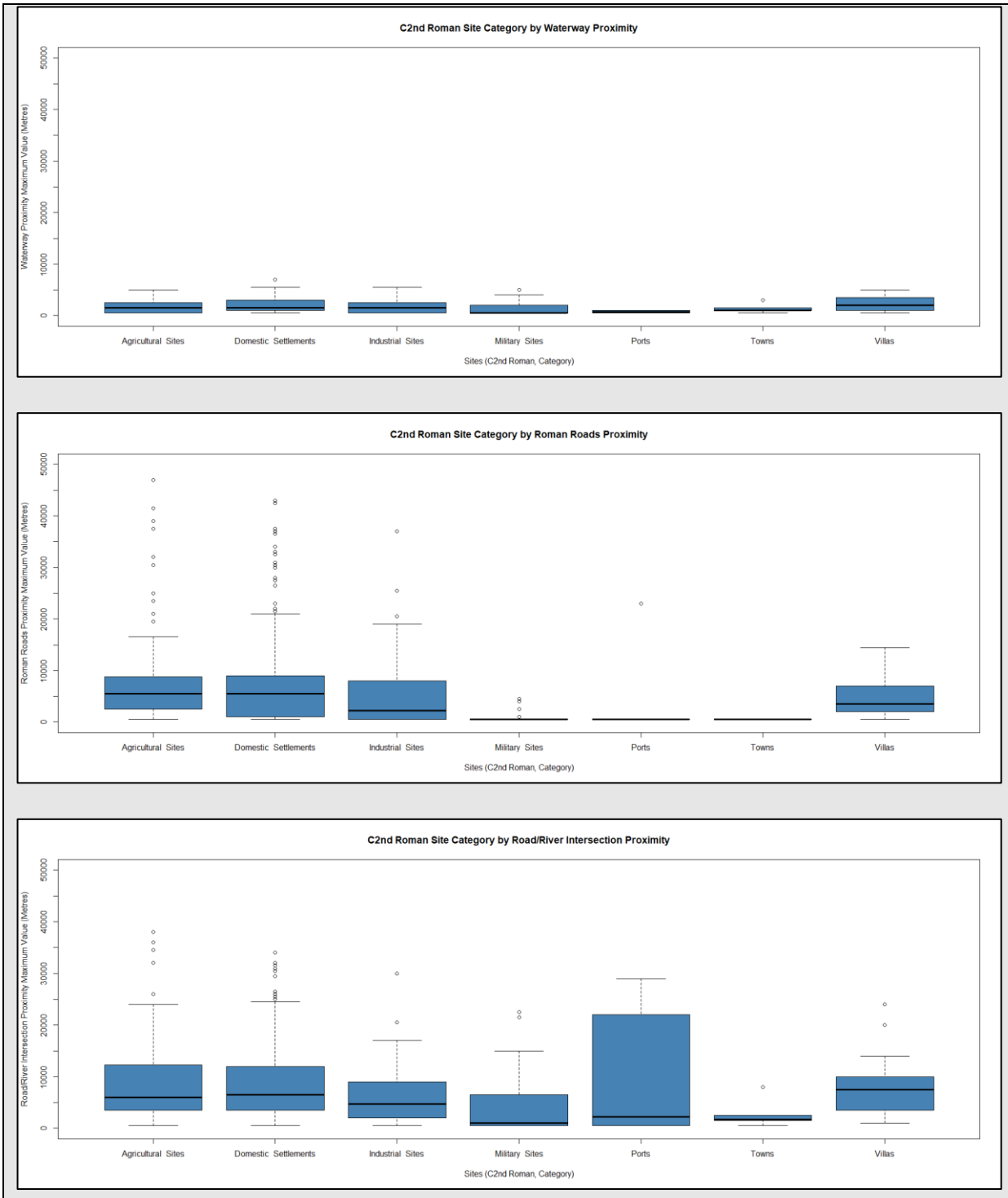

Figure 5.7: Graphs of C2nd Roman sites, when categorised by function, indicating their proximity to (top) navigable waterways, (middle) Roman roads and (bottom) road/river intersections.

5.6 Overview

The analysis of the geospatial relationships between settlement of the pre-Roman and Roman periods of the Midlands and northern England and the three landscape factors of navigable waterways, Roman roads and road/river intersections revealed significant trends of change and continuity within the cultural landscape. This can be qualified in terms of an ordering of locational preferences, with proximity to navigable waterways found to be the strongest spatial relationship, followed by Roman roads, and then waterway crossings (Fig. 5.8). Whilst significant variability was found in the relationships between periodised site samples, Roman roads and road/river intersections, the relationship between sites and navigable waterways was found to be statistically consistent over time, reinforcing the importance of settlement access to waterways regardless of cultural or temporal factors.

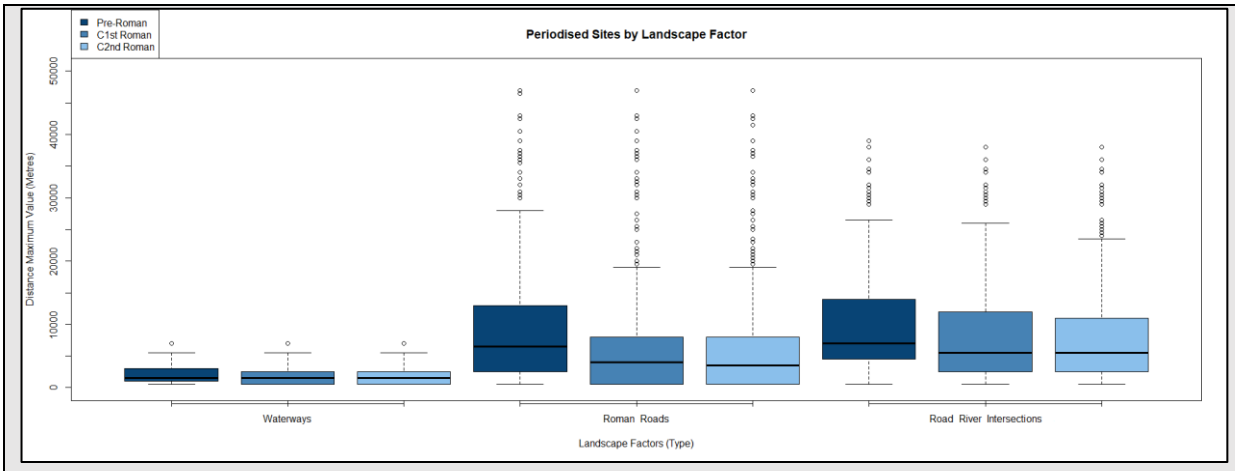

Figure 5.8: Comparative graphs of pre-Roman, C1st and C2nd Roman sites, indicating their proximity to navigable waterways, Roman roads and road/river intersections.

As the primary means of networking settlements and cultural activity through transportation, contact and exchange, the role of waterways and Roman roads within the landscape of Britain cannot be understated. Waterways were ascertained to be the most prevalent means of networking settlements in the study area, with no site located further than 7km from a waterway potentially navigable by shallow-draught boats. When factored for an average preferred walking speed of approximately five kilometres per hour, all sites would have been within a two-hour distance of a navigable waterway. This is highly significant, indicating that all sampled sites would have had ready access to waterborne networks for the movement of people or materials. The proximity of settlements to navigable waterways was also found to be broadly correlative over time, with only a minor degree of difference in distribution of pre-Roman settlements, as compared to their Roman successors. In all sampled periods, the majority of settlement activity was sited within 3km of a navigable waterway, meaning such activity was on average

within a one-hour distance of accessing maritime or riverine networks of transportation, contact and exchange.

By contrast, the spatial relationships between settlements and the Roman road network were found to be significantly more varied over time, as well as generally less skewed. Unlike navigable waterways, Roman roads were far more sparsely distributed within the landscape, with the furthest site located 47km from the nearest Roman road – a distance over six-times further than the maximum distance of a settlement from a navigable waterway. Inter-period variance in the maximum distances from sites to Roman roads can be seen, with the majority of pre-Roman sites within 13km of a Roman road, whilst the majority of Roman sites of both centuries were within 8km. Such statistics cannot be viewed as wholly accurate due to incompleteness in the archaeological record of the Roman road network in Britain, with substantial gaps in the mapping of roads likely resulting in a significant underestimation in the proximity of settlements to roads. However, the currently available evidence indicates settlements of both the pre-Roman and Roman periods were more sparsely distributed relative to the Roman road network than navigable waterways, reinforcing the ordering of spatial priorities in their locational preferences.

The nature of the Roman state's physical control of the cultural landscape can be seen through the location of key site categories in proximity to the intersections of navigable waterways and the Roman road network. This was found to have the greatest sparsity in the distribution of settlements relative to the three landscape factors, indicating a relatively lower priority of proximity to waterway crossings in the locational preferences of both the pre-Roman and Roman periods. The furthest site location from a road/river intersection was found to be 39km – a distance 8km less than the maximum range of site proximity to Roman roads, and over five times the maximum distance of a settlement from a navigable waterway. However, this trend did not sufficiently explain the distribution of settlements relative to waterway crossings, with the majority of pre-Roman sites within 14km of a road/river intersection, whilst the majority of Roman sites of both the C1st and C2nd were located within 12km and 11km respectively. In this regard, a contraction of settlement around waterway crossings can be noted during the Roman Period. Roman sites generally appeared to be following a locational preference that deviated from the overall pattern, with the majority of military sites within 9km of a waterway crossing in the C1st, and 6.5km in the C2nd, and the entire sample of Roman towns within 8km. Indeed, towns demonstrated the strongest skew in proximity to road/river intersections of any contemporary site category, whilst the distribution of military sites in close proximity to waterway crossings supports the interpretation of Bidwell that the Roman military deliberately sited their

fortifications to 'command' such locations and the movement of people and materials through them (Bidwell. 2007: 32). Statistical correlation was ascertained to be strongest between towns, ports and military sites, with a weaker correlation with industrial sites (App. 2.6; 3.6; 4.6). As towns, ports and military sites were all directly linked to the activities of the Roman state, their locational preferences for close proximity to road/river intersections should be seen as a significant insight into Roman provincial strategy, with clear interest in the control over waterway crossings as a nexus through which maritime, riverine and terrestrial networks of transportation, contact and exchange crossed.

5.7 Conclusions

The relationships between the pre-Roman and Roman settlement records and the three landscape factors of navigable waterways, Roman roads and road/river intersections demonstrated significant patterns in the ordering of spatial priorities within the landscape. A clearer emphasis was found in the locational preferences of sites for close proximity to navigable waterways and coastlines, than that for Roman roads or road/river intersections respectively. Furthermore, the degree of inter-period and inter-categorical variance was found to be greater in the relationships between settlements and the two latter landscape factors, rather than the former, indicating greater consistency in the focus of settlements towards water as a form of networking within the cultural landscape. In the relationships between settlements and Roman roads and road/river intersections, it is possible to interpret the role of the Roman state and military more easily on both land-use and land division, as well as their interactions with networks of transportation, contact and exchange. It is probable that proximity to such networks was deliberately favoured in order to maximise access to the flow of people, goods and services from both intra- and inter-provincial sources, accommodating site growth and sustainment through more efficient logistics. In the case of the Roman military, it is also likely that such proximity afforded better access for the surveillance and control of networking within the landscape, being a highly probable objective of the Roman military within the Midlands and northern England. The nature of the spatial relationships between pre-Roman and Roman settlements and waterways, Roman roads and road/river intersections was therefore revealed to be one of robust networking, with a strong emphasis on accessing, surveilling and/or controlling the movement of people, goods and resources within the cultural landscape.

Chapter Six:

Pre-Roman and Roman Patterns of Settlement, Nodal Sites and Landscape Proximity in the Midlands and Northern England

Six potentially 'nodal' site categories, comprising: pre-Roman hillforts, Roman villas of the C1st and C2nd, Roman military sites of the C1st and C2nd, and Roman towns of the C2nd, were analysed for their spatial relationships within the settlement record of the Midlands and northern England. This analysis tested if such sites formed a core and periphery relationship with the other site categories, serving as central places around which the cultural landscape was organised, and/or as locations for distinct social, cultural and economic activities. Proximity to both pre-Roman hillforts and Roman villas of the C1st and C2nd was analysed to investigate Applebaum's (1963: 11) question as to whether hillforts or villas had a greater influence over the settlement pattern of Roman Britain, whilst proximity to Roman military sites was analysed to test if they favoured proximity to local settlements to facilitate political aims in controlling the provincial landscape, or if they conformed to a more independent locational preference. As Roman settlement patterns were considered to have clustered more closely to Roman military sites to benefit from the safety, stability and economic opportunity afforded by the garrison (Bidwell. 2007: 82-89), further analysis is merited to see if such an interpretation can be supported by geospatial evidence. Lastly, site proximity to Roman towns of the C2nd was analysed to ascertain their centrality within the Roman cultural landscape. As towns - being typically the largest and most densely populated sites present in the landscape - undoubtedly had a crucial role in social, cultural and economic systems of Roman Britain (Wacher. 1995), this analysis questions if their importance was derived from their location within the settlement pattern.

6.1 Nodal Site Proximity and Settlements by Period

The spatial relationships between the periodised settlement record and the six nodal site categories demonstrated patterns of both change and continuity over time. Spatial priorities for proximity to nodal sites were ordered uniformly across the periodised samples, with all site samples distributed closest to C1st military sites, followed by C2nd military sites, hillforts, C2nd villas, towns and C1st villas respectively (App. 2.7-2.12; 3.7-3.12). Within this clear order of proximity, all periodised samples demonstrated a greater degree of skew relative to contemporary nodal sites, whilst proximity decreased the further a site sample was temporally from the nodal site's occupation.

Notable changes in proximity to hillforts was present over time, though they remained the third most central nodal site category (Fig. 6.1). When periodised, 17.96% of pre-Roman sites, and 7.89% of C1st and 4.67% of C2nd sites respectively were located within 2km of a hillfort. Correlation varied in the distribution of sites relative to hillforts between the pre-Roman Period, and the C1st and C2nd, indicating distinct pre-Roman and Roman locational preferences for hillfort proximity (App. 2.7; 3.7; 4.7). This indicated a shift over time as the abandonment of hillforts decreased their importance and centrality within the Roman landscape.

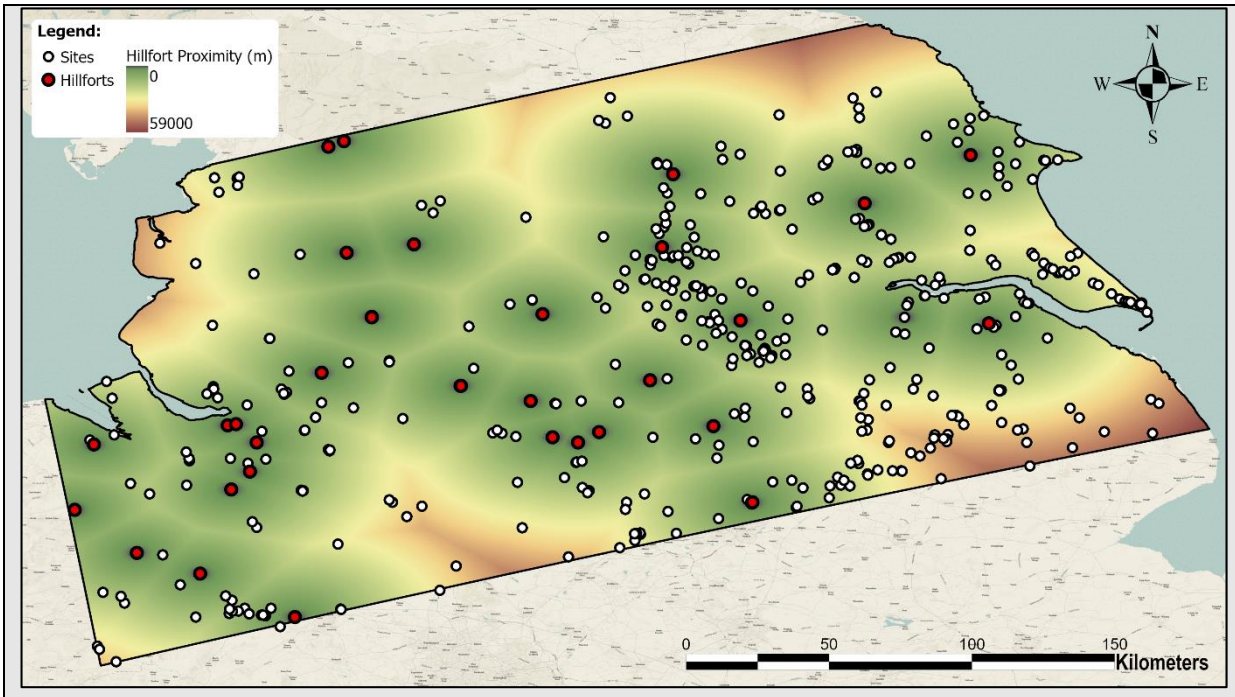

Figure 6.1: Map of site proximity in the study area to pre-Roman hillforts.

Villas increased in centrality over time, with growth in the number of villas during the C2nd increasing the skew of proximity within the landscape (Fig. 6.2-6.3). This can be seen clearly in the proportion of sites within close proximity of villas, with just 1.94% and 5.34% of pre-Roman sites, 3.16% and 6.63% of C1st sites, and 2.57% and 7.48% of C2nd sites located within 2km of a C1st and C2nd villa respectively. Correlation in proximity to C1st villas was only found between the pre-Roman and C1st samples, and C1st and C2nd, suggesting discontinuity between the pre- and post-conquest periods, though the spatial relationships with C2nd villas correlated across all samples (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). Whilst Roman sites were closer in distribution to C2nd villas, the lower numbers of C1st villas simply did not allow this site category to gain a prominent position within the landscape. C1st villas were therefore not central places, nor did the later C2nd landscape organise around them. Importantly, the distribution of sites relative to C2nd villas was more similar to that of pre-Roman hillforts than C1st villas, providing some indication that the two site categories shared a similar centrality within their respective pre-Roman and C2nd Roman landscapes.

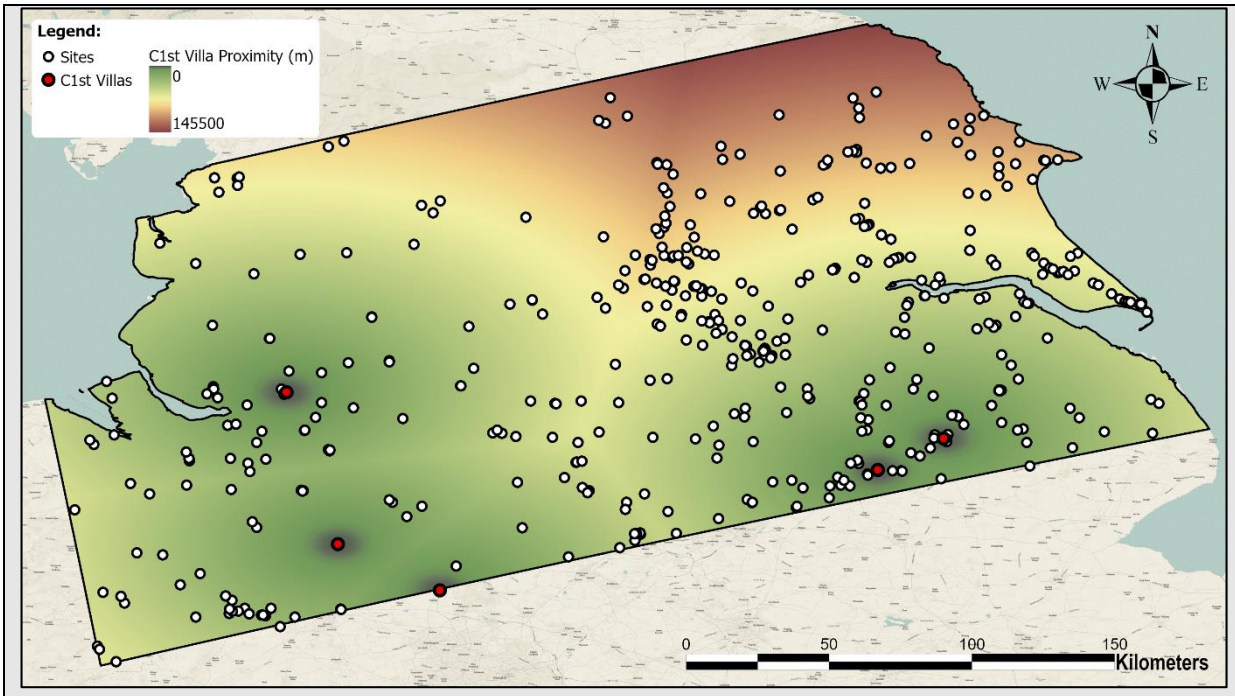

Figure 6.2: Map of site proximity in the study area to C1st Roman villas.

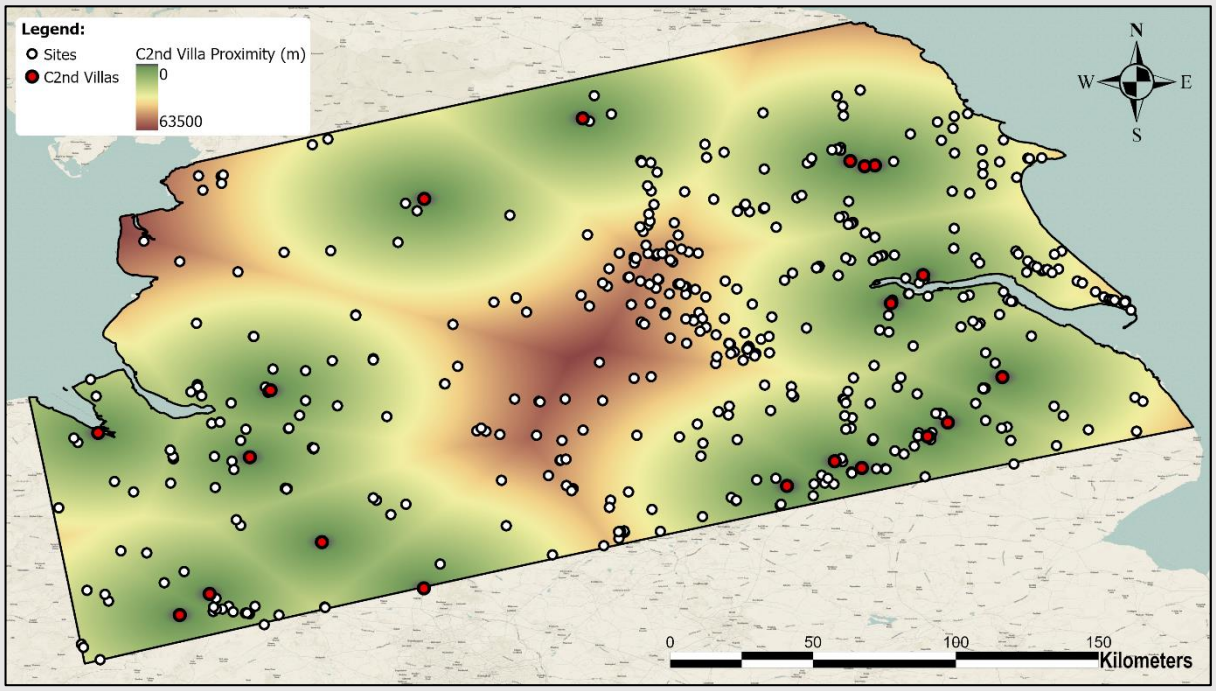

Figure 6.3: Map of site proximity in the study area to C2nd Roman villas.

The relationship between periodised sites and Roman military sites varied significantly over time, with the decreasing numbers of military sites during the C2nd lessening the skew in proximity of the C2nd settlement pattern when compared to its C1st counterpart (Fig. 6.4-6.5). This was observed clearly in the distribution of sites within close proximity of military sites, with 8.25% and 2.91% of pre-Roman sites, 26.50% and 17.04% of C1st sites, and 19.39% and 14.49% of C2nd sites located within 2km of a C1st and C2nd military site respectively. Statistical

correlation was not found between Pre-Roman, C1st and C2nd sites in their spatial relationships with Roman military sites, whilst the C1st and C2nd correlated strongly (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). Similar to hillforts, this indicated the presence of distinct pre-Roman and Roman locational preferences for military site proximity. Contrasted with the hillfort and villa proximity record, C1st military sites had a greater centrality within the cultural landscape and were more likely than other categories to have been influenced by extant pre-Roman settlement patterns.

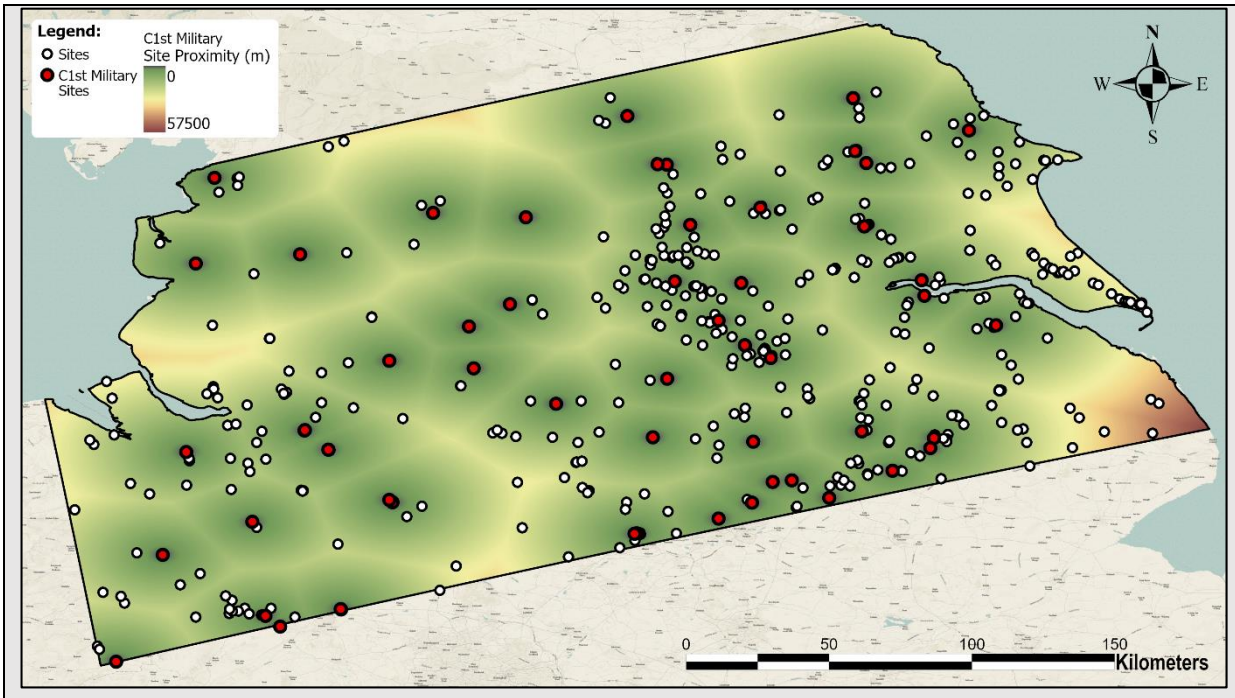

Figure 6.4: Map of site proximity in the study area to C1st Roman military sites.

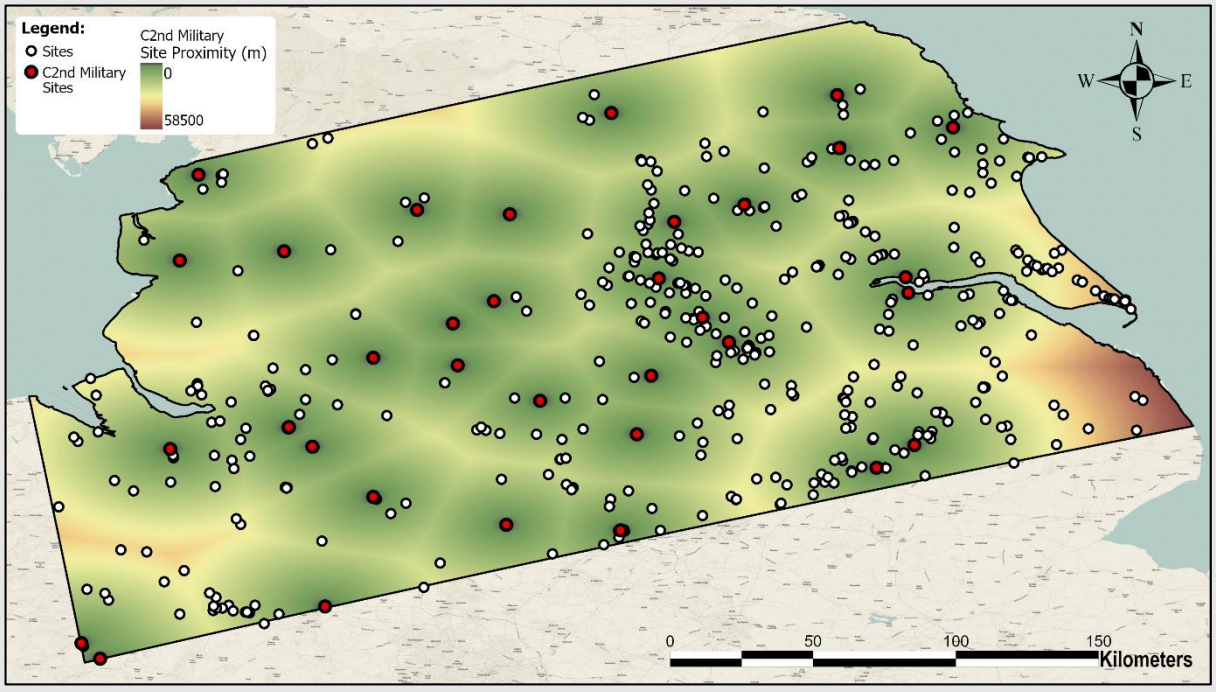

Figure 6.5: Map of site proximity in the study area to C2nd Roman military sites.

All three periodised site samples demonstrated a significant disinterest in proximity to Roman towns, with a lower degree of skew correlating across all samples (Fig. 6.6) (App. 2.12; 3.12; 4.12). The majority of the settlement record did not prioritise in their locational preferences direct or constant contact with towns, with just 0.97% of pre-Roman, 3.79% and 3.74% of C1st and C2nd sites respectively located within 2km of a town. This suggests that C2nd Roman towns had little centrality within the cultural landscape, and likewise that pre-Roman and C1st Roman sites had little-to-no influence over the subsequent location of towns.

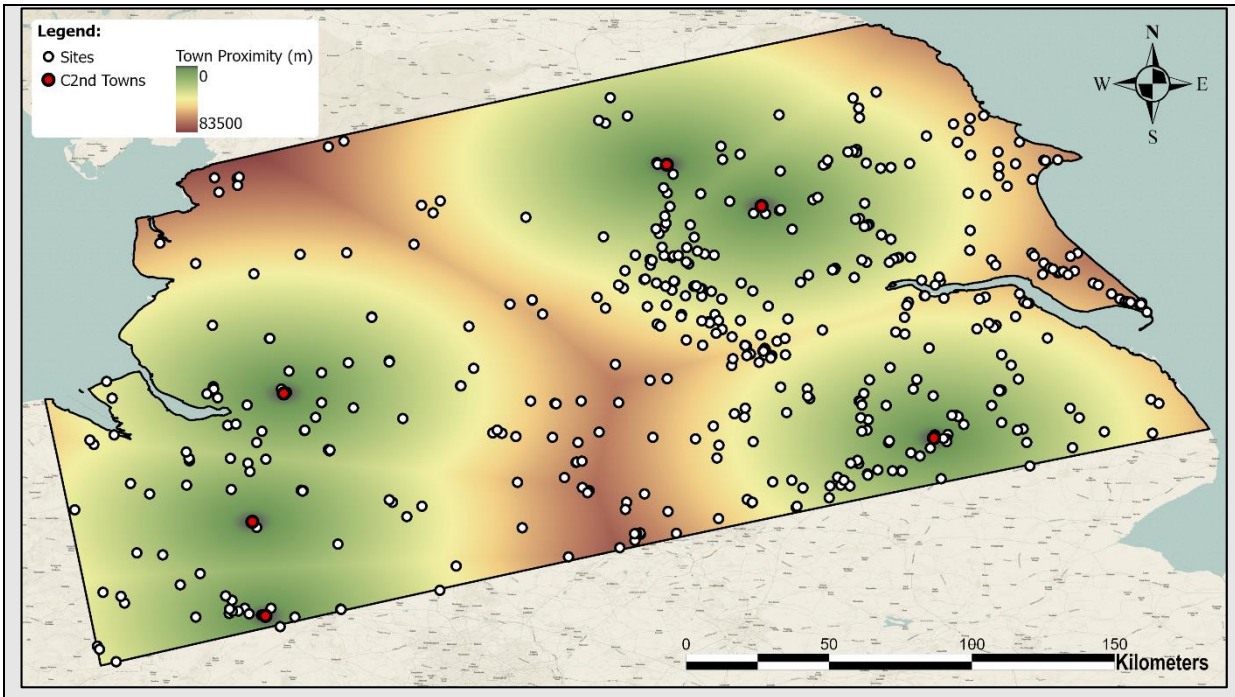

Figure 6.6: Map of site proximity in the study area to C2nd Roman towns.

6.2 Nodal Site Proximity and Settlements by Size-category

The relationships of sites of different size-categories with hillforts, villas, military sites and towns closely followed the overall pattern in their ordering of spatial priorities (Fig. 6.7-6.8). Importantly, whilst variance in location was found to be present between size-categories and different nodal sites, strong continuity was found within the same size-category over time, indicating little inter-period change in the relative centrality of nodal site categories within the landscape.

Small Size-category: Small sites closely followed the established order of spatial priorities. Inter-period continuity was found in the distribution of small sites relative to hillforts, with statistically significant skew towards hillforts present in all three small site samples (App. 2.7; 3.7). The degree of skew decreased slightly between samples, suggesting the proximity of small sites to hillforts may have gradually reduced during the Roman Period. Likewise, the small size-category followed the periodised record in the distribution of sites relative to C1st and C2nd villas, with notably lower statistical skew relative to the former correlating across all three small

site samples (App. 2.8-2.9; 3.8-3.9; 4.8-4.9), indicating locational preferences for villa proximity similar to the overall record. Statistical skew towards close proximity to military sites was found across all samples, however correlation was only found between small pre-Roman and C1st sites relative to C1st military sites, and between C1st and C2nd sites relative to C2nd military sites (App. 2.10-2.11; 3.10-3.11; 4.10-4.11), suggesting some variance in small site proximity to military sites over time. This indicated the close relationship between small pre-Roman and C1st sites and C1st military sites, as well as the slight decrease in their proximity to C2nd military sites. Small sites showed significant continuity in their distribution relative to Roman towns, with strong statistical correlation between all three small site samples (App. 2.12; 3.12; 4.12). Whilst skew was noted in all samples, the degree of significance was comparatively low (App. 2.12; 3.12; 4.12), indicating small sites had a higher sparsity of distribution relative to towns. Small sites thus demonstrated a general disinterest in locations of close proximity to Roman towns, instead following the overall trend of greater dispersal across the landscape.

Medium Size-category: Medium sites varied somewhat in their spatial relationships with nodal sites, though the ordering of spatial priorities remained consistent. The skew of medium site proximity to hillforts decreased over time, with a lack of correlation between the pre-Roman and Roman samples, whilst the C1st and C2nd samples correlated strongly (App. 2.7; 3.7; 4.7). The locational preferences of medium sites for hillfort proximity consequently changed markedly over time. Statistical correlation was found between all three periodised medium site samples in their sparse distribution relative to C1st villas, and more skewed distribution relative to C2nd ones (App. 2.8-2.9; 3.8-3.9; 4.8-4.9), with this discontinuity attributable to changes in villa numbers over time. This was similar to the small size-category, indicating medium sites closely followed the overall record in their locational preferences for villa proximity. Medium sites again followed the overall record in their marked increase in proximity to Roman military sites from the pre-Roman Period to the C1st, as well as the slight decrease in proximity during the C2nd, correlating across all three periodised samples (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). Both C1st and C2nd medium sites were normally distributed relative to towns, whilst pre-Roman sites skewed only marginally. They demonstrated slightly greater variability than their small counterparts in their proximity to Roman towns, though again this correlated with the overall record (App. 2.12; 3.12; 4.12), suggesting medium sites did not follow a different locational preference to other size-categories.

Large Size-category: Large sites also followed the overall order of proximity to nodal sites. The greatest sparsity of distribution was found between large sites and hillforts, with statistical correlation between all samples despite a slight decrease over time in the degree of skew in their proximity to hillforts (App. 2.7; 3.7; 4.7). The

large size-category again followed the established trend of being more sparsely distributed relative to C1st villas than C2nd ones, with statistical correlation between all site samples revealing significant consistency in their spatial relationships with villas of each respective century (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). Large sites correlated closely with the medium size-category in their distribution relative to Roman military sites. Distribution of pre-Roman sites was statistically normal relative to both military site samples, whilst C1st and C2nd sites were more markedly skewed. Despite this variance, significant inter-period correlation was found between large sites relative to C1st and C2nd military site samples respectively (App. 2.10-2.11; 3.10-3.11; 4.10-4.11), indicating notable continuity. Again, the degree of skew was found to be greater relative to C1st military sites, than those of the C2nd, furthering the pattern noted in other size-categories. The large size-category demonstrated the strongest inter-period statistical correlation in its spatial relationship with Roman towns (App. 2.12; 3.12; 4.12). Statistical normality was ascertained in the distribution of large sites of all three sampled periods, however a slight contraction of large C2nd sites relative to towns was noted, which should be expected given the development of towns occurred during this time. Together, this suggests little variance from the overall record, again indicating a commonality of locational preferences.

Very Large Size-category: Very large sites strongly correlated with the overall record in their spatial relationships with nodal sites. The distribution of very large sites trended away from proximity to hillforts over time, with correlation present between the pre-Roman and C1st samples, but not C2nd, whilst the C1st and C2nd correlated strongly (App. 2.7; 3.7; 4.7). As many very large Roman sites comprised military sites and towns, this presented a significant indicator of a transition in land-use and land division. Very large sites demonstrated the greatest variance in proximity relative to Roman villas, skewing strongly away from C1st villas, and strongly towards C2nd ones. Inter-period correlation was found between all samples (App. 2.8-2.9; 3.8-3.9; 4.8-4.9), suggesting broad continuity relative to each villa sample. Very large sites were similar to the medium and large size-categories in their distribution relative to Roman military sites, with strong inter-period correlation indicating little overall change in their locational preferences (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). Whilst statistical skew was noted in the distribution of all very large site samples, very large pre-Roman sites were statistically normal in distribution relative to C2nd military sites. Notable changes were again found in the distribution of very large sites relative to C1st military sites, when compared to those of the C2nd, making it unlikely that size-category had any significant role in influencing the locational preferences for military site proximity. Very large sites correlated with all other size-categories in their distribution relative to towns (App. 2.12; 3.12; 4.12). Both pre-Roman and C1st very large sites were normally distributed, with a slight skew in the C2nd. This is highly significant, as it suggests that the appearance of

towns during the C2nd had little impact on the locational preferences of contemporary very large sites, with such sites instead being strongly continuous with those of the preceding century. From this, it is possible to infer that apart from towns, very large sites of other functions were perhaps themselves 'nodal' in nature within the C2nd landscape.

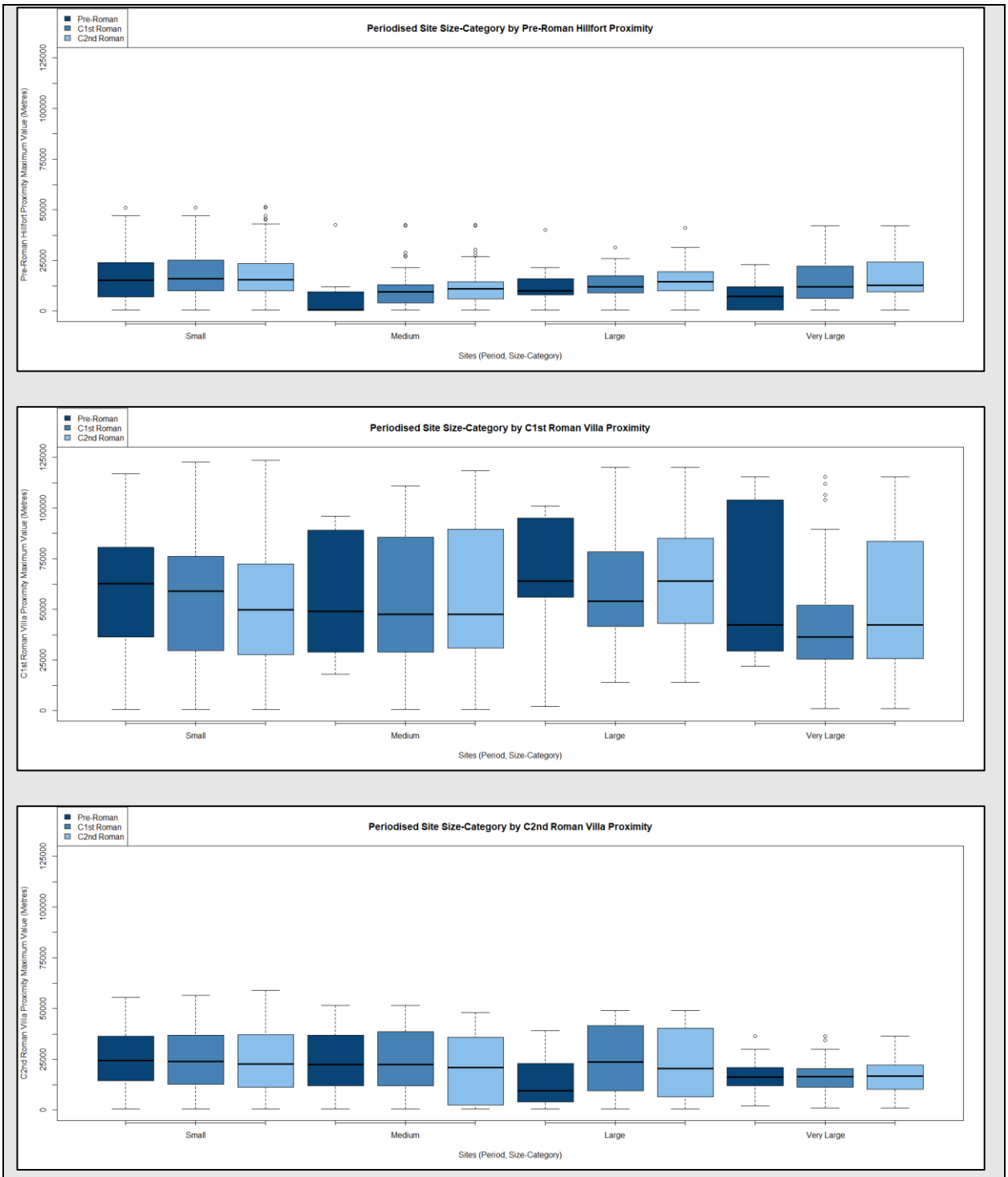

Figure 6.7: Graphs of pre-Roman, C1st and C2nd Roman sites, when categorised by the small, medium, large and very large size-categories, indicating their proximity to (top) pre-Roman hillforts, (middle) C1st Roman villas and (bottom) C2nd Roman villas.

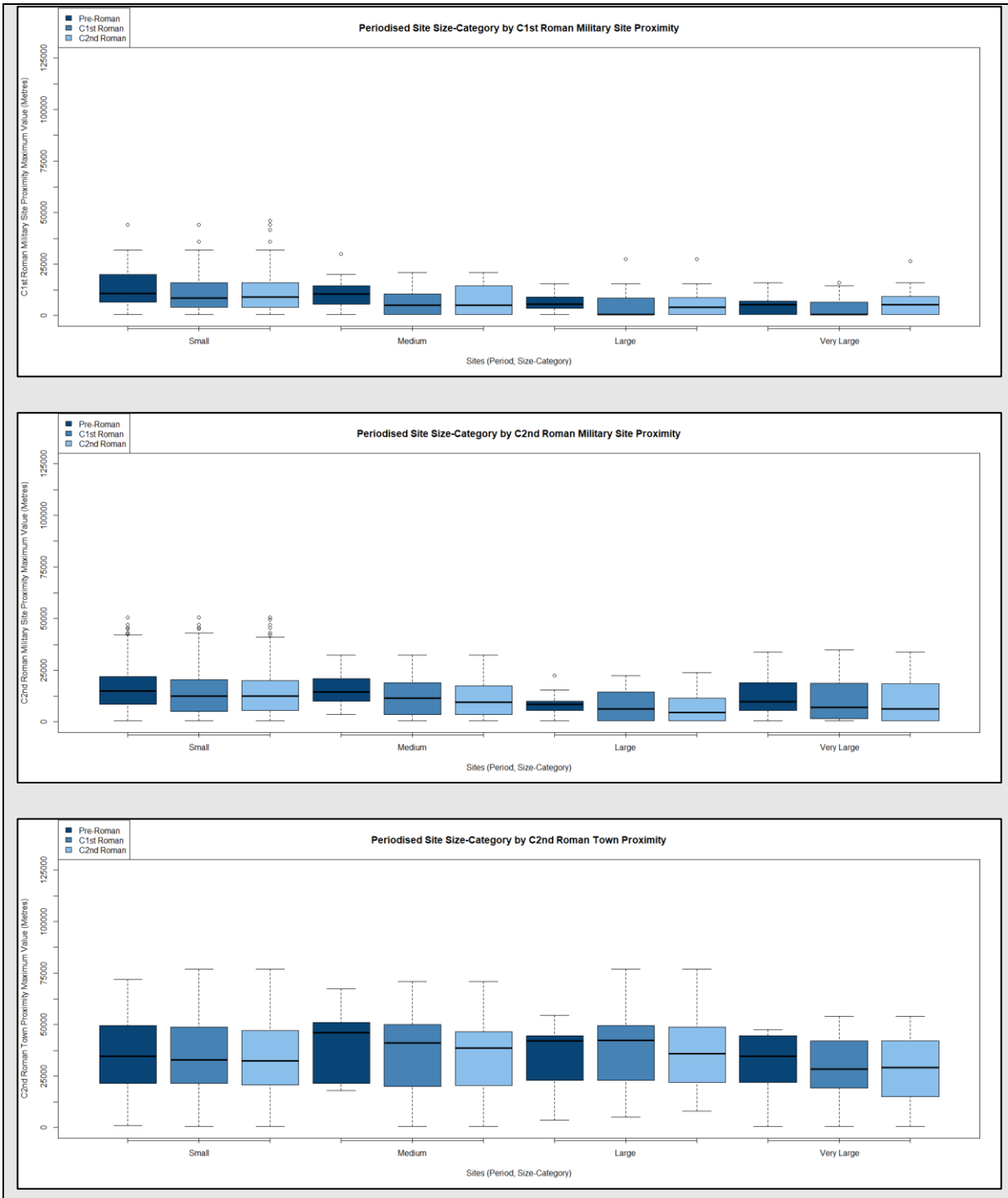

Figure 6.8: Graphs of pre-Roman, C1st and C2nd Roman sites, when categorised by the small, medium, large and very large size-categories, indicating their proximity to (top) C1st Roman military sites, (middle) C2nd Roman military sites and (bottom) C2nd Roman towns.

6.3 Nodal Site Proximity and Pre-Roman Settlements by Function

When categorised by function, the spatial relationships between the pre-Roman settlement record and the nodal site categories of pre-Roman hillforts, and Roman villas, military sites and towns correlated closely with the overall record, indicating little inter-categorical variance in location. The overarching order of spatial priorities was also found to be present in all pre-Roman site categories, with decreasing skew in distribution relative to military sites of the C1st and C2nd, followed by hillforts, C2nd villas, towns and C1st villas respectively (Fig. 6.9-6.10).

Agricultural Sites: Pre-Roman agricultural sites closely followed the overall order of distribution relative to nodal sites. They demonstrated a degree of skew towards hillforts however no site was within 2km, indicating a preference away from locations of close proximity to hillforts that correlated with all contemporary site categories (App. 2.7; 3.7; 4.7). The distribution of agricultural sites relative to Roman villas varied significantly between samples, with a far greater skew relative to C2nd villas. 4.08% and 10.20% of agricultural sites were located within 2km of a C1st and C2nd villa respectively, indicating a notable shift over time in the locational preferences for close proximity to villas. Agricultural sites correlated with all contemporary site categories except for domestic settlements in their proximity to C1st villas, whilst correlation with all categories relative to C2nd villas was found (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). This suggests C1st villas were not significantly influenced by proximity to earlier agricultural activity, whilst the greater distribution of C2nd villas throughout the landscape brought them into proximity with more pre-Roman agricultural sites, despite the obvious temporal disconnect. The greatest skew was found in the distribution of agricultural sites relative to C1st and C2nd Roman military sites respectively, with strong correlation found between agricultural sites and all contemporary site categories relative to both military site samples (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). 8.16% of agricultural sites were located within 2km of a C1st military site, whilst 4.08% were within 2km of a C2nd military site, indicating a shift in locational preferences for close proximity over time. This suggests that whilst the number of military sites decreased from the C1st to C2nd, their spatial relationships with pre-Roman agricultural sites did not deviate significantly. It is far more likely that Roman military sites were consciously located within the extant agricultural landscape to maximise proximity to improve logistics or the surveillance and control of the rural landscape. The proximity of pre-Roman agricultural sites to Roman towns similarly indicated an overarching skew in distribution, but a general lack of sites located within close proximity with just 4.08% of the sample within 2km of a town. Correlation was also found between agricultural sites and all contemporary site categories in their distribution relative to towns (App. 2.12; 3.12; 4.12), suggesting that, as with all other nodal site categories,

the pre-Roman agricultural landscape had little influence on the location of Roman towns two centuries later.

Domestic Settlements: Pre-Roman domestic settlements closely followed the overall ordering of spatial relationships with nodal site categories. Distribution of domestic settlements relative to hillforts correlated closely with agricultural sites, with just 2.59% of settlements located within 2km of a hillfort demonstrating a lack of close proximity. This correlated with all contemporary site categories (App. 2.7; 3.7; 4.7), indicating a common locational preference. The relationship between domestic settlements and C1st and C2nd villas similarly followed the overall order of spatial priorities, with a notably greater skew towards C2nd villas. Only 1.72% and 5.17% were located within 2km of a C1st and C2nd villa respectively, indicating a shift over time in the close proximity of settlements to villas. Statistical correlation was only found in the distribution of domestic settlements, industrial sites and ports relative to C1st villas, whilst domestic settlements and all other site categories correlated relative to C2nd villas (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). Military sites were found to be the closest in distribution to pre-Roman domestic settlements, with 8.62% and 3.45% within 2km of a C1st and C2nd military site respectively following the changing numbers of military sites over the centuries. Domestic settlements correlated with all contemporary site categories relative to both military site samples (App. 2.10-2.11; 3.10-3.11; 4.10-4.11), with strong consistency across the landscape suggesting military site locations were likely influenced by extant settlement patterns. Conversely, pre-Roman domestic settlements demonstrated a lower degree of skew in distribution relative to towns, with no settlements located within 2km of a town. This correlated with all contemporary categories (App. 2.12; 3.12; 4.12), reinforcing the notion that the pre-Roman settlement record had little influence over the location of Roman towns.

Hillforts: A clear ordering of spatial priorities was again found in the distribution of hillforts relative to other nodal site categories. Hillforts appeared to closely follow agricultural sites in their distribution relative to Roman villas, with the degree of skew increasing between the C1st and C2nd samples. No hillforts were located within 2km of a villa of either century, indicating a common disinterest in locations close to villas. Statistical correlation was found between hillforts and all contemporary categories except domestic settlements relative to C1st villas, and between all categories relative to those of the C2nd (App. 2.8-2.9; 3.8-3.9; 4.8-4.9), indicating broad consistency across the landscape. As with all other categories, hillforts were closely distributed relative to Roman military sites. However, as 8.82% of hillforts were located within 2km of a C1st military site and none were within 2km of a C2nd military site, military sites generally appeared disinterested in close proximity to hillforts. Statistical correlation was found between hillforts and all pre-

Roman sites relative to both military site samples (App. 2.10-2.11; 3.10-3.11; 4.10-4.11), reinforcing the strong consistency of the period. Notably, a number of military sites located close to hillforts were abandoned by the C2nd, suggesting the depopulation of the hillfort likely removed the military expediency of the location. Hillforts closely correlated with all other pre-Roman site categories in their distribution relative to Roman towns (App. 2.12; 3.12; 4.12), with a weaker skew and complete lack of hillforts within 2km of a town suggesting hillforts had little influence on the subsequent location of towns. Overall, this implies hillforts had little impact on the locational preferences of subsequent Roman nodal sites, being instead more influenced by their contemporary pre-Roman landscape.

Industrial Sites: Pre-Roman industrial sites closely followed the overall record in their distribution relative to nodal sites, with a clear ordering of spatial priorities again present. Slightly greater skew than other site categories was found in the proximity of industrial sites to both C1st and C2nd villas, whilst a lower degree of skew was found in relation to hillforts, military sites and towns. Importantly, no industrial site was found to be located within 2km of any nodal site category, indicating a significant trend away from close proximity not seen in other contemporary site categories except for pre-Roman ports. However, this variance was found to be statistically insignificant, with industrial sites correlating strongly with all other site categories in terms of their distribution relative to all nodal site categories (App. 2.7-2.12; 3.7-3.12; 4.7-4.12). Due to the small sample size of pre-Roman industrial sites, correlative analysis should be viewed as problematic, though the overall uniformity within the settlement record does allow for implications to be drawn. It is unlikely that industrial sites had a significant relationship with contemporary hillforts, nor acted as an influential point for the location of subsequent villas, military sites or towns during the early Roman Period.

Ports: Meols demonstrated a consistently distant relationship with all nodal site categories, with the closest proximity value being 19km from a C2nd Roman villa. Statistical analysis for correlation was again problematic due to the sample size of one, however across all models of nodal site proximity, Meols was found to be distributed within the interquartile range of all other contemporary site categories, indicating its location deviated little from the overall pattern (App. 2.7-2.12; 3.7-3.12; 4.7-4.12). Furthermore, the ordering of proximity values to nodal sites was found to be consistent between Meols and the overall record, again reinforcing its conformity to the pre-Roman pattern of site location relative to the chosen samples of nodal sites. As with previous modelling of site distribution relative to landscape factors, the study of ports within the pre-Roman landscape of the Midlands and northern England can therefore be seen as problematic and requiring of further archaeological survey to construct a more robust sample.

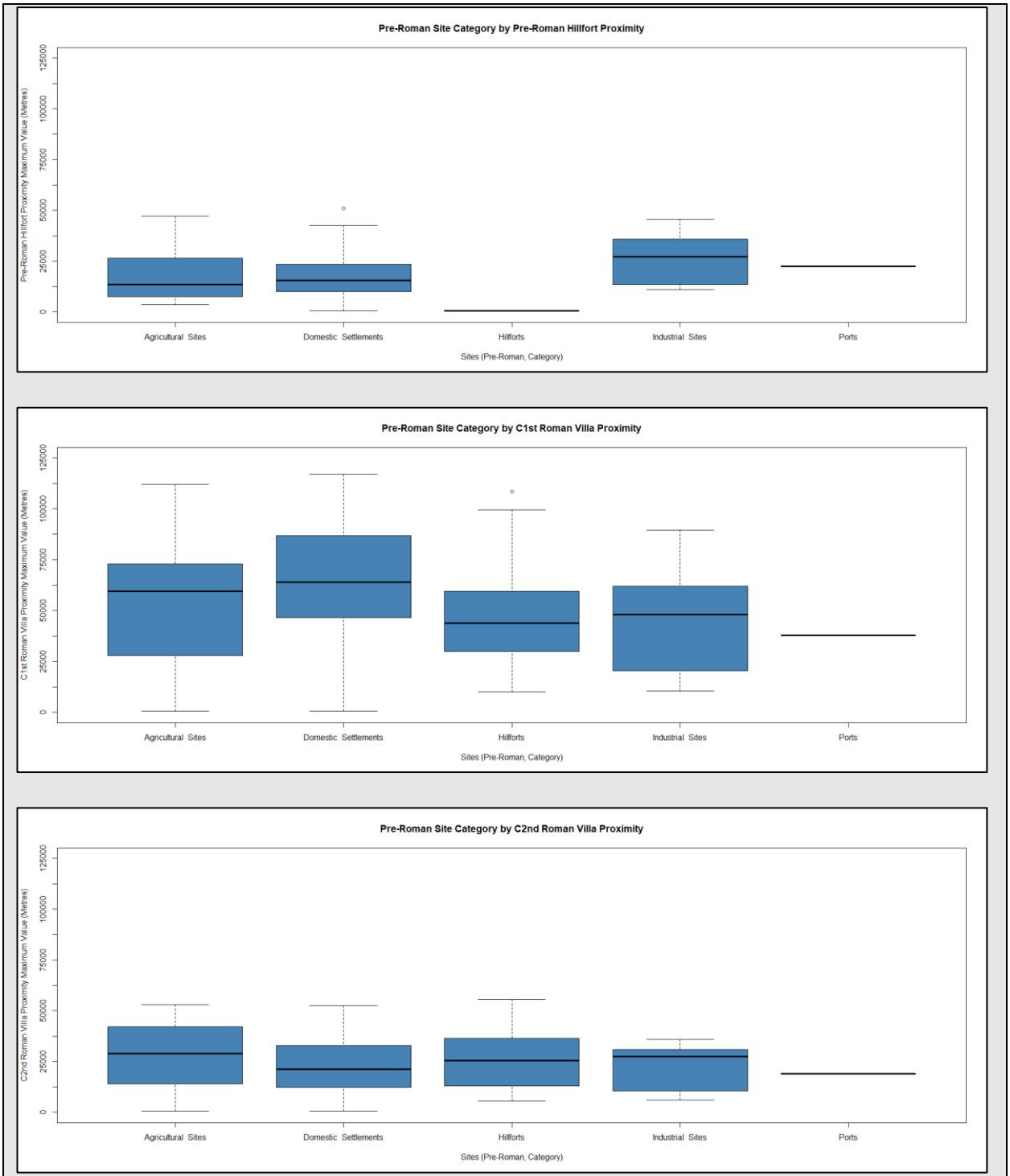

Figure 6.9: Graphs of pre-Roman sites, when categorised by function, indicating their proximity to (top) pre-Roman hillforts, (middle) C1st Roman villas and (bottom) C2nd Roman villas.

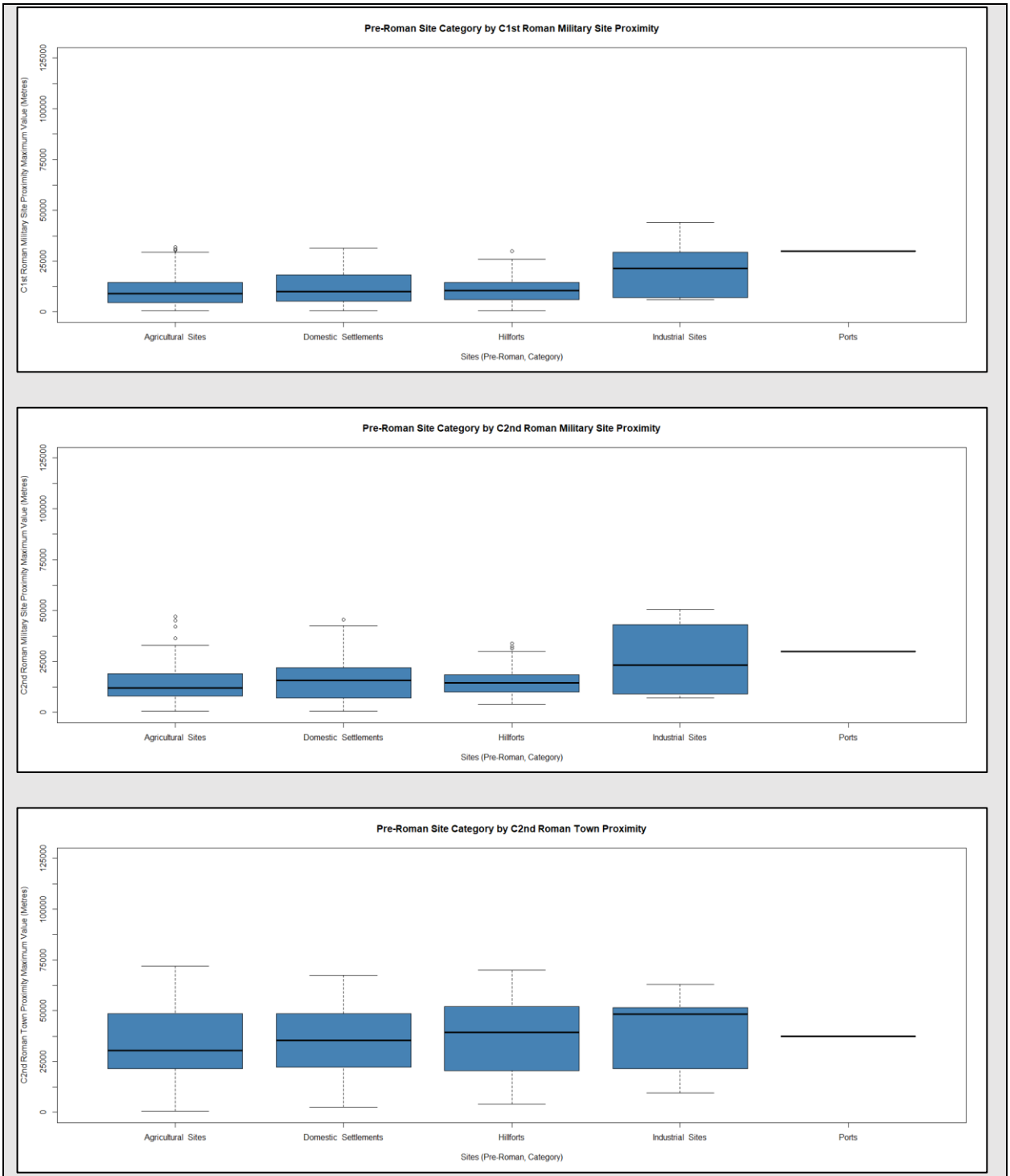

Figure 6.10: Graphs of pre-Roman sites, when categorised by function, indicating their proximity to (top) C1st Roman military sites, (middle) C2nd Roman military sites and (bottom) C2nd Roman towns.

6.4 Nodal Site Proximity and C1st Roman Settlements by Function

The C1st settlement record, when categorised by function, demonstrated notable inter-categorical variance in distribution relative to the six nodal site samples. Significant continuity from the pre-Roman Period was also found, reinforcing the commonality in the locational preferences for proximity to nodal sites transcending cultural and temporal divides (Fig. 6.11-6.12).

Agricultural Sites: C1st agricultural sites demonstrated strong inter-period and inter-categorical continuity from the pre-Roman Period in their ordered relationships with nodal sites. The distribution of agricultural sites relative to hillforts was significantly skewed, with only distribution relative to Roman military sites presenting a greater degree of skew. Agricultural sites demonstrated little interest in close proximity to hillforts, with 1.54% located within 2km correlating with all contemporary site categories except domestic settlements (App. 2.7; 3.7; 4.7). Greater variability was found in the distribution of agricultural sites relative to villas, with 3.08% and 9.23% located within 2km of a C1st and C2nd villa respectively. Agricultural sites correlated with all categories except domestic settlements relative to C1st villas, whilst correlation was found with all categories relative to C2nd villas (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). The proximity of agricultural sites to military sites was the closest of any nodal site category, though close proximity indicated a decreasing trend over time, with 4.62% and 1.54% located within 2km of a C1st and C2nd military site respectively. Agricultural sites correlated in their distribution relative to both military site samples with industrial sites, domestic settlements and villas, but not with contemporary ports, indicating significant continuity between samples (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). Conversely, agricultural sites demonstrated little skew in their proximity to Roman towns. None were found within 2km of a town, correlating with all contemporary site categories except villas (App. 2.12; 3.12; 4.12) to suggest a commonality in town proximity across the C1st landscape. Greater variation in locational preferences for nodal site proximity can therefore be seen in the C1st agricultural site record, indicating a change from the relatively uniform pre-Roman sample.

Domestic Settlements: The trends established in the overall record for the ordering of spatial priorities were once again found in the domestic settlement record of the C1st. The relationship between domestic settlements and hillforts was found to be significantly skewed. A sizeable number of settlements favoured close proximity to hillforts, with 14% located within 2km, correlating only with contemporary military sites and ports (App. 2.7; 3.7; 4.7) to suggest a deviation in locational preferences from other categories. By contrast, the proximity of settlements to C1st and C2nd villas followed the overall record more closely, with a notably lower degree of skew relative to C1st villas than C2nd ones. The close proximity range demonstrated a

weaker skew, with just 2% and 6% of settlements within 2km of a C1st and C2nd villa respectively. Domestic settlements correlated only with ports relative to C1st villas, whilst correlation was found in distribution relative to C2nd villas between domestic settlements and all contemporary site categories (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). The relationships between settlements and military sites of the C1st and C2nd was skewed in a manner consistent with both the overall record, as well as site categories across all three periods. Close proximity of settlements to military sites was notable, with 8.67% and 4.67% of the sample located within 2km of a C1st and C2nd military site respectively indicating a shift over time matching with the decrease in the number of military sites. However, statistical correlation was found between domestic settlements and all contemporary site categories except ports in their distribution relative to military sites of both centuries (App. 2.10-2.11; 3.10-3.11; 4.10-4.11), suggesting broad continuity in locational preferences despite the noted decrease in close proximity. Significant inter-categorical consistency was again ascertained in the distribution of settlements relative to C2nd towns, with 1.33% located within 2km of a Roman town correlating strongly with all contemporary site categories except villas (App. 2.12; 3.12; 4.12). As such, the relationships between domestic settlements and all nodal site categories conformed closely to the overall record, as well as the ordering of spatial priorities common to other site categories.

Industrial Sites: C1st industrial sites again followed the order of spatial priorities present in the overall record. A degree of variance was observed in certain models of proximity, particularly the skew in distribution relative to hillforts and towns being slightly lower than other contemporary site categories. The location of industrial sites relative to hillforts correlated with agricultural sites, ports and villas, but not with military sites or domestic settlements, with just 2.94% of sites within 2km of a hillfort (App. 2.7; 3.7; 4.7). No industrial site was located within 2km of either a C1st or C2nd villa, correlating with agricultural sites, military sites and ports relative to C1st villas, whilst correlation with agricultural sites, military sites and domestic settlements was found in relation to C2nd villas (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). Proximity to military sites appeared to be more standardised, with correlation noted between industrial sites and agricultural sites, domestic settlements and villas, but not with ports, with 20.59% and 14.71% of industrial sites within 2km of C1st and C2nd military sites respectively (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). Proximity of C1st industrial sites to towns was the most consistent within the landscape, correlating with all contemporary site categories except villas, with no industrial site located within 2km of a town (App. 2.12; 3.12; 4.12). Industrial sites therefore did not significantly deviate from the overall pattern, remaining closely consistent with other site categories present in the rural landscape.

Military Sites: C1st Roman military sites closely followed the overall record in their order of spatial priorities for proximity to nodal sites. The distribution of military sites relative to hillforts correlated with agricultural sites, domestic settlements and ports, but not with industrial sites or villas, with just 3.64% of the sample located within 2km of a hillfort (App. 2.7; 3.7; 4.7). C1st military sites were similar in their spatial relationships with C1st and C2nd villas, correlating with agricultural sites, industrial sites and ports in relation to C1st villas, and with agricultural sites, industrial sites, domestic settlements and ports in relation to C2nd villas (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). No military site was located within 2km of a C1st villa, whilst just 1.82% were within the same range of a C2nd villa, indicating a significant disinterest in close proximity to villas. Conversely, the relationships between C1st military sites and towns were far closer, with 10.91% located within 2km of a town correlating with all contemporary site categories (App. 2.12; 3.12; 4.12). As 66.67% of towns evolved from extant military sites, this relationship is to be expected, and is more indicative of trends established in the C2nd, rather than the C1st.

Ports: Roman ports demonstrated significant variability in their proximity to nodal sites, being more strongly skewed towards locations close to hillforts, C1st and C2nd military sites, and C2nd villas than other site categories, whilst closely following the overall distribution relative to hillforts and C1st villas. Ports correlated with all other categories relative to hillforts, however none were located within 2km of a hillfort (App. 2.7; 3.7; 4.7), suggesting a lack of interest in close proximity. Ports skewed towards villas more than any contemporary site category, with 12.5% located within 2km of both villa samples. Correlation was found between ports and all other categories relative to C1st villas, and with all categories except industrial sites relative to C2nd villas (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). Strong skew was also found in the distribution of ports relative to military sites, with 75% and 62.50% of the sample located within 2km of C1st and C2nd military sites respectively correlating only with villas across both samples (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). The relationship between ports and towns again varied, with 37.50% located within 2km of a town correlating with all contemporary site categories (App. 2.12; 3.12; 4.12). Whilst issues of sampling remain, the closeness between ports and nodal sites does suggest their potential significance as gateways for movement within the landscape.

Villas: C1st villas varied significantly in their location relative to nodal sites. No villas were located within 2km of a hillfort, with their overall distribution being the least skewed of any site category. This correlated with agricultural sites, industrial sites and ports, but not with domestic settlements or military sites (App. 2.7; 3.7; 4.7). By contrast, villas closely followed all other categories in their distribution relative to C1st and C2nd military sites, with none located within 2km of a military site of either century correlating with all contemporary site categories relative to both

military site samples (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). The relationship between villas and towns showed the greatest skew of any C1st site category. Only one villa, accounting for 20% of the sample, was located within 2km of a town, which correlated only with contemporary military sites and ports (App. 2.12; 3.12; 4.12). This suggests the locational preferences of C1st villas were distinct from contemporary nodal sites, instead being similar to C2nd military sites and towns.

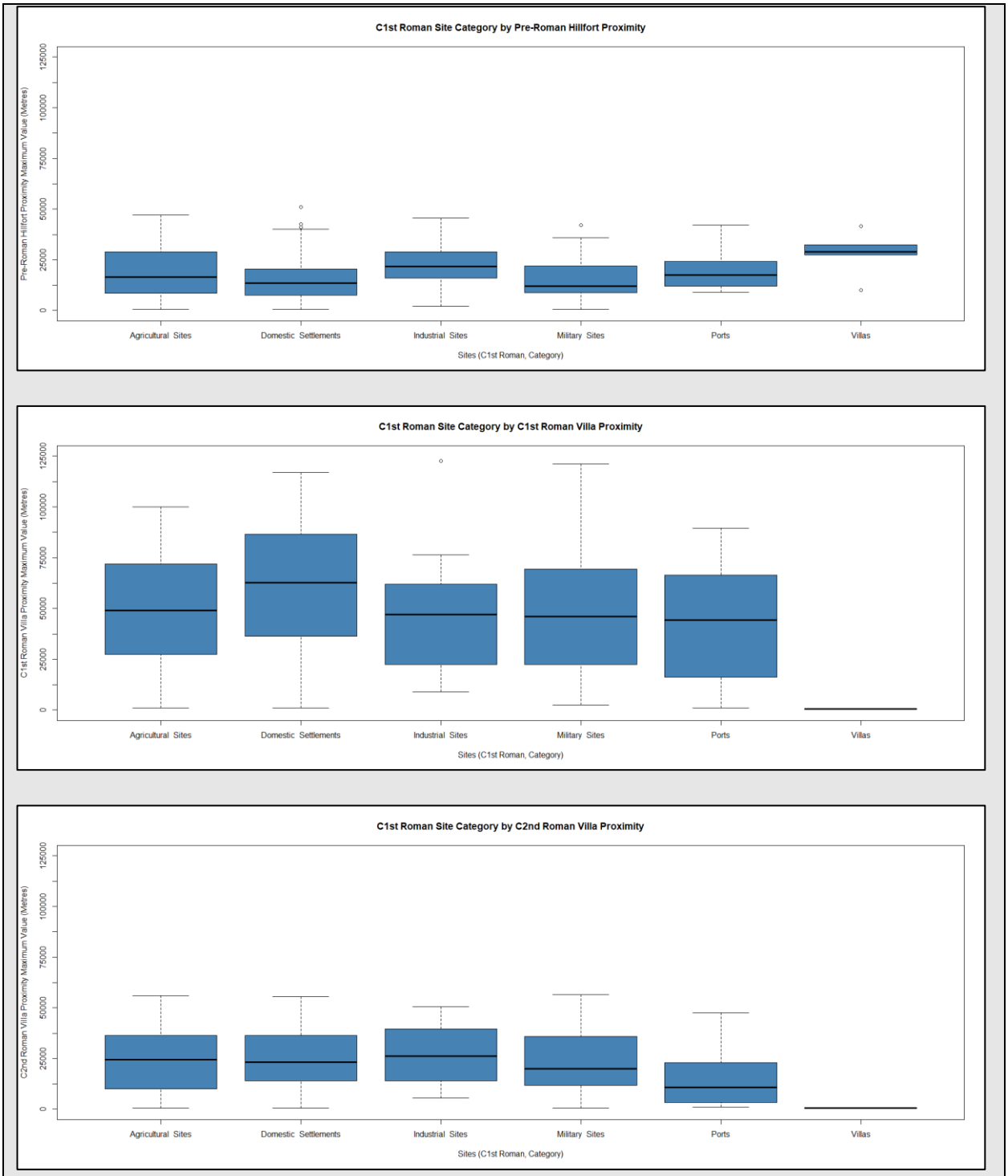

Figure 6.11: Graphs of C1st Roman sites, when categorised by function, indicating their proximity to (top) pre-Roman hillforts, (middle) C1st Roman villas and (bottom) C2nd Roman villas.

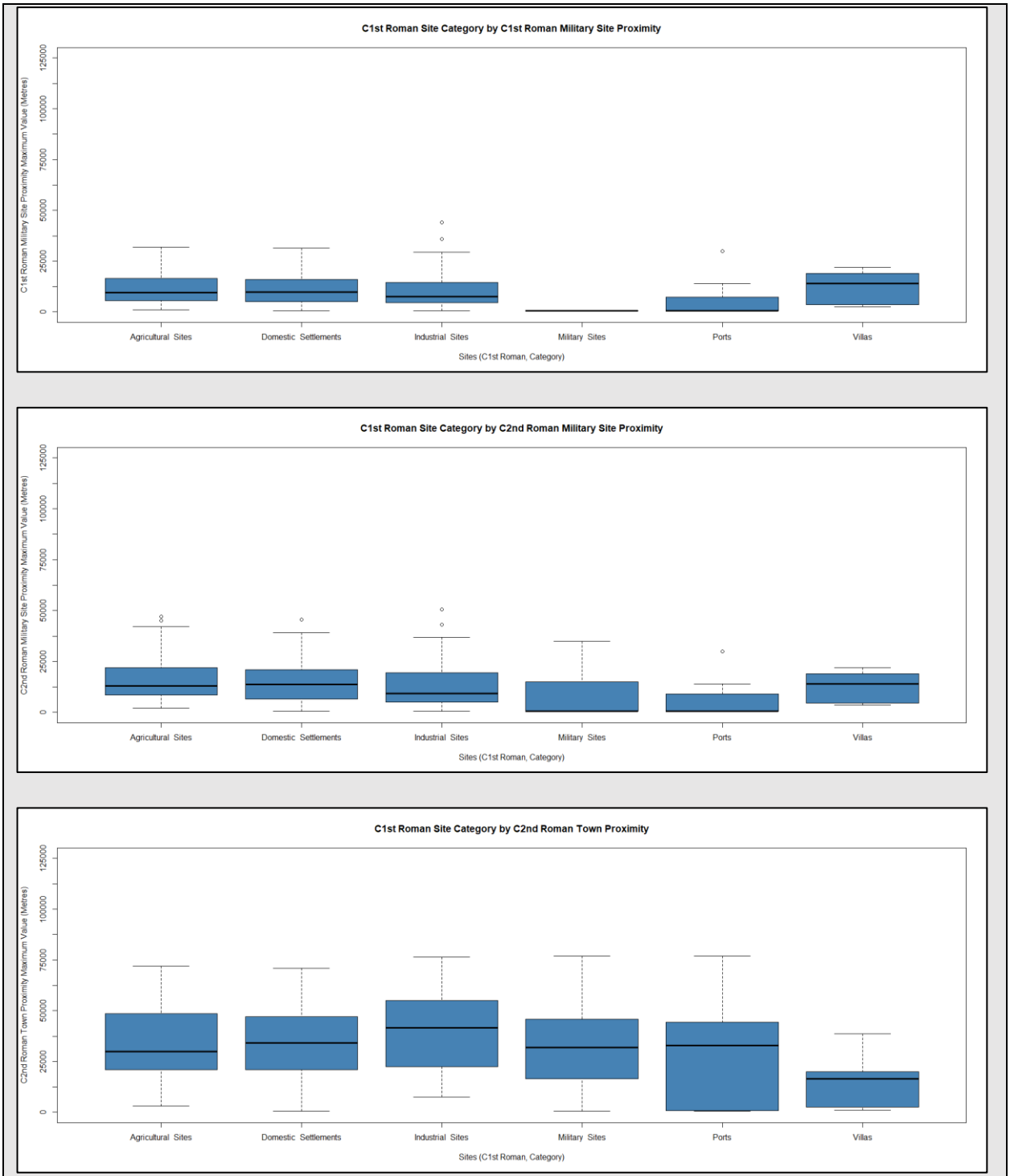

Figure 6.12: Graphs of C1st Roman sites, when categorised by function, indicating their proximity to (top) C1st Roman military sites, (middle) C2nd Roman military sites and (bottom) C2nd Roman towns.

6.5 Nodal Site Proximity and C2nd Roman Settlements by Function

Categorisation of the C2nd settlement record by function revealed significant patterns of both change and continuity from the preceding century, with the ordering of spatial priorities noted in the overall record maintaining a strong consistency over time, whilst individual site categories exhibited some evidence of variation in their locational preferences for proximity to nodal sites (Fig. 6.13-6.14).

Agricultural Sites: C2nd agricultural sites were continuous with the C1st in the ordering of their spatial relationships with nodal site categories. Agricultural sites skewed significantly towards hillforts in their overall distribution, though none were located within 2km of a hillfort, correlating strongly with all contemporary site categories except domestic settlements (App. 2.7; 3.7; 4.7). The relationships between agricultural sites and villas varied significantly between samples, with a greater skew in distribution relative to villas of the C1st, than the C2nd, though only 2.20% and 3.30% were located within 2km of a C1st and C2nd villa respectively, indicating greater consistency in the close proximity range. Agricultural sites correlated with all contemporary categories except domestic settlements relative to C1st villas, whilst correlation was only found with industrial and military sites relative to C2nd villas (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). This suggested a greater degree of variance in the relationships with villas due to their expansion within the C2nd landscape. Agricultural sites skewed significantly towards military sites, with 4.40% and 2.20% located within 2km of a C1st and C2nd military site respectively. Correlation was only found between agricultural sites, industrial sites and villas in their proximity to C1st military sites, whilst they correlated with all categories except ports relative to C2nd ones (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). The proximity of agricultural sites to towns was similarly varied, with a low degree of skew and no site found within 2km of a town indicating a general preference in locations further from towns. Agricultural sites correlated with industrial sites, military sites and ports, but not with domestic settlements or villas, reinforcing their variability in town proximity (App. 2.12; 3.12; 4.12). It is therefore apparent that C2nd agricultural sites were significantly more varied in their locational preferences for proximity to nodal sites, albeit within the framework of following the overall ordering of spatial priorities.

Domestic Settlements: As with the C1st record, C2nd domestic settlements demonstrated a greater variation in proximity to nodal sites, though they continued to follow the overall order of spatial priorities. The distribution of settlements relative to hillforts skewed markedly, with 9.65% located within 2km of a hillfort. Statistical correlation in distribution relative to hillforts was found between settlements and all categories except agricultural and industrial sites (App. 2.7; 3.7; 4.7), indicating a greater commonality of locational preferences. The distribution of settlements relative to villas again varied significantly between the centuries, with

far greater skew in the C2nd sample. Only 1.02% and 3.05% of settlements were located within 2km of a C1st and C2nd villa respectively, indicating an increase over time, though small enough that a locational preference for close proximity to villas appears unlikely across both samples. Domestic settlements correlated with all contemporary categories except agricultural and industrial sites relative to C1st villas, whilst correlation was found with all categories except agricultural sites relative to C2nd villas (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). This suggests a more consistent inter-categorical locational preference for proximity to villas within the C2nd landscape, likely due to the expansion of the category during that period. Greater variation was also found in the relationships between settlements and C1st and C2nd military sites, though the degree of skew relative to both samples remained the strongest of any nodal site category, with 10.66% and 6.09% of settlements within 2km of a C1st and C2nd military site respectively. Correlation was only ascertained between domestic settlements, industrial sites and villas in their distribution relative to C1st military sites, whilst correlation between settlements and all contemporary categories except ports was found relative to C2nd military sites (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). The relationship between settlements and towns again indicated greater variability within the C2nd landscape, with just 1.52% located within 2km of a town suggesting a weaker locational preference for close proximity. Correlation was found between domestic settlements and all categories except agricultural sites relative to towns (App. 2.12; 3.12; 4.12). This again reinforces the strong consistency of the C2nd domestic settlement pattern in its proximity to contemporary C2nd nodal site categories, contrasted against the more varied preferences for proximity to nodal sites in previous periods.

Industrial Sites: C2nd industrial sites were consistent with both the overall record and other contemporary site categories in their order of proximity relative to nodal sites. The skew of the proximity of industrial sites to hillforts was similar to other categories, with just 1.43% located within 2km of a hillfort indicating a disinterest in close proximity. Industrial sites correlated with all categories except domestic settlements (App. 2.7; 3.7; 4.7), reinforcing the common locational preferences for hillfort proximity across the C2nd landscape, despite their temporal disconnect. Industrial sites were similarly consistent in their distribution relative to villas, with a notably greater skew in proximity towards C2nd villas than their C1st predecessors. No industrial sites were located within 2km of either villa sample, suggesting a strong trend away from locations of close proximity. Correlation was found between industrial sites and all contemporary site categories except domestic settlements in their weaker proximity to C1st villas, whilst correlation was found with all contemporary categories relative to C2nd villas (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). A strong skew was again ascertained in the distribution of industrial sites relative to C1st and C2nd military sites, closely mirroring the overall record and other

contemporary site categories. Industrial sites demonstrated a significant locational preference for close proximity to military sites of both centuries, with 18.57% and 10% of the sample located within 2km of a C1st and C2nd military site respectively. Statistical correlation was found between industrial sites and agricultural sites, domestic settlements and villas, but not ports or towns, in their distribution relative to C1st military sites, whilst correlation was found with all categories except ports in relation to C2nd military sites (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). Industrial site proximity to towns again followed the overall record, with only modest skew in distribution and just 2.86% located within 2km of a town. This correlated with all contemporary site categories except for villas (App. 2.12; 3.12; 4.12), reinforcing the broad inter-categorical consistency in town proximity across the C2nd landscape.

Military Sites: C2nd military sites more closely followed contemporary agricultural sites in their relationships with other nodal site categories. The distribution of military sites relative to hillforts demonstrated notable skew, however none were within 2km of a hillfort, indicating a disinterest in close proximity. This correlated with all contemporary site categories (App. 2.7; 3.7; 4.7), reinforcing the broad consistency of hillfort proximity across the landscape. The relationship between C2nd military sites and C1st and C2nd villas once again demonstrated change in skew between the samples, though no military sites were located within 2km of either villa sample, suggesting they had little interest in locations close to villas. Military sites correlated with all contemporary site categories in their distribution relative to both villa samples (App. 2.8-2.9; 3.8-3.9; 4.8-4.9), indicating significant consistency within the C2nd landscape despite the changes in villa distribution between the centuries. Significant continuity was found in the location of C2nd military sites relative to their C1st counterparts, with only Forden Gaer and Rocester being located on previously unoccupied sites. These were found to be outliers, with the remainder of C2nd military sites continuing directly from C1st locations (App. 5.1). Military sites also indicated notable dispersal relative to towns, with just 2.86% located within 2km suggesting the Roman military had little interest in close proximity to towns. This correlated with all categories except villas (App. 2.12; 3.12; 4.12), suggesting that C2nd military sites were strongly similar to those of the C1st.

Ports: Roman ports did not change position relative to nodal sites over time, though their correlation with other C2nd categories merit discussion. The proximity of ports to hillforts and C1st villas correlated with all other categories, whilst correlation was found with all contemporary categories except agricultural sites relative to C2nd villas (App. 2.8-2.9; 3.8-3.9; 4.8-4.9). Inter-categorical variation was found in the relationships between ports and C1st and C2nd military sites, with ports being closer to military sites than other site categories. Correlation was only ascertained between ports and towns across both military site samples (App. 2.10-2.11; 3.10-3.11; 4.10-

4.11), indicating notable deviation from the overall pattern. By contrast, ports demonstrated closer correlation with all other categories in their distribution relative to contemporary C2nd Roman towns (App. 2.12; 3.12; 4.12), indicating an expectedly more standardised locational preference for town proximity during the C2nd.

Towns: C2nd Roman towns again followed the overall order of spatial priorities, suggesting their own potential role as a nodal site had little influence on their relationships with other nodal site categories. The distribution of towns relative to hillforts closely followed other categories, with no towns located within 2km of a hillfort indicating their disinterest in close proximity. This correlated with all contemporary site categories (App. 2.7; 3.7; 4.7). However, towns were more varied in location relative to villas, displaying the largest interquartile range of proximity to C1st villas of any C2nd category, whilst conversely demonstrating the greatest skew relative to C2nd villas. This suggests towns changed significantly in their spatial relationships between the periodised villa samples. Only one town, accounting for 16.66% of the sample, was located within 2km of either a C1st or C2nd villa, correlating with all contemporary site categories relative to C1st villas, and with all categories except agricultural sites relative to C2nd ones (App. 2.8-2.9; 3.8-3.9; 4.8-4.9) indicating a minor interest in proximity to villas. Towns skewed more strongly towards military sites, with 83.33% and 16.67% located within 2km of a C1st and C2nd military site respectively indicating significant change over time. Towns only correlated with ports relative to C1st military sites, whilst correlation was found between towns and all contemporary site categories relative to C2nd military sites (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). The change in skew was due to the majority of C2nd towns having evolved from C1st military sites, being a product of changing site functions, rather than any broader settlement pattern.

Villas: Unlike the C1st sample, C2nd villas more closely followed the overall record in their order of proximity to nodal sites. A greater skew of C2nd villas towards hillforts matched other categories present in the rural landscape, however no villas were found within 2km of a hillfort, indicating a disinterest in close proximity. This correlated with all site categories (App. 2.7; 3.7; 4.7), suggesting a notable commonality in hillfort proximity. C2nd villas were distributed similar to other sites relative to C1st villas, correlating with all categories except domestic settlements (App. 2.8-2.9; 3.8-3.9; 4.8-4.9), indicating their expansion throughout the landscape did not cluster around extant villa locations, but rather dispersed into new locations following a distinct locational preference. C2nd villas again followed other site categories in their locations relative to military sites, with 4.76% located within 2km of a C1st military site, whilst none were within 2km of a C2nd military site, indicating a trend away from close proximity. Villas correlated with agricultural sites, industrial sites and domestic settlements, but not ports or towns, relative to

C1st military sites, whilst they correlated with all contemporary sites except ports relative to C2nd military sites (App. 2.10-2.11; 3.10-3.11; 4.10-4.11). Proximity of C2nd villas to contemporary towns again reinforced the relative variance between villas and other site categories during the C2nd, with 4.76% located within 2km of a Roman town correlating only with ports (App. 2.12; 3.12; 4.12). As such, villas of the C2nd can be seen as having greater distribution within the rural landscape, whilst also maintaining a relatively distant relationship with other nodal site categories.

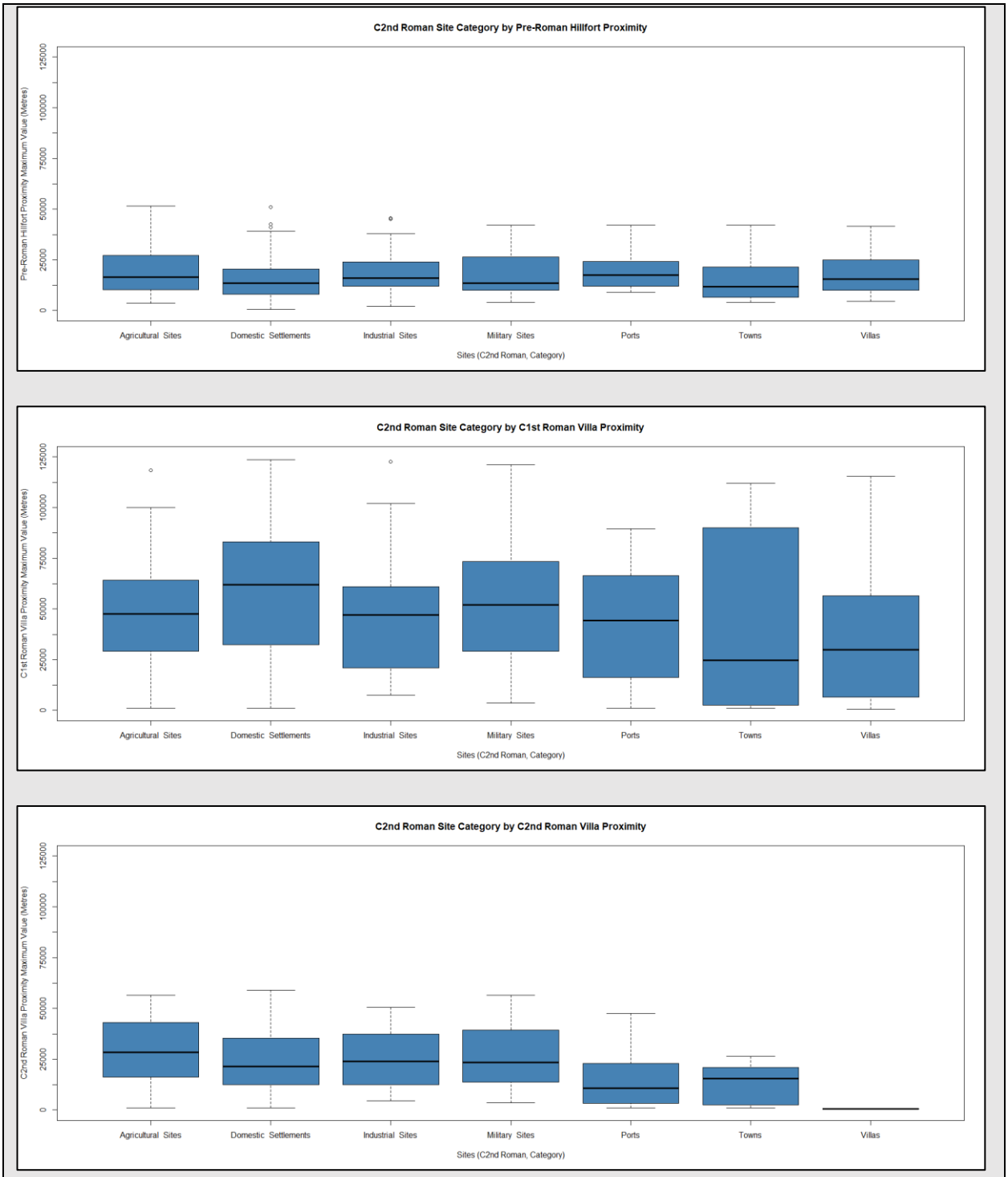

Figure 6.13: Graphs of C2nd Roman sites, when categorised by function, indicating their proximity to (top) pre-Roman hillforts, (middle) C1st Roman villas and (bottom) C2nd Roman villas.

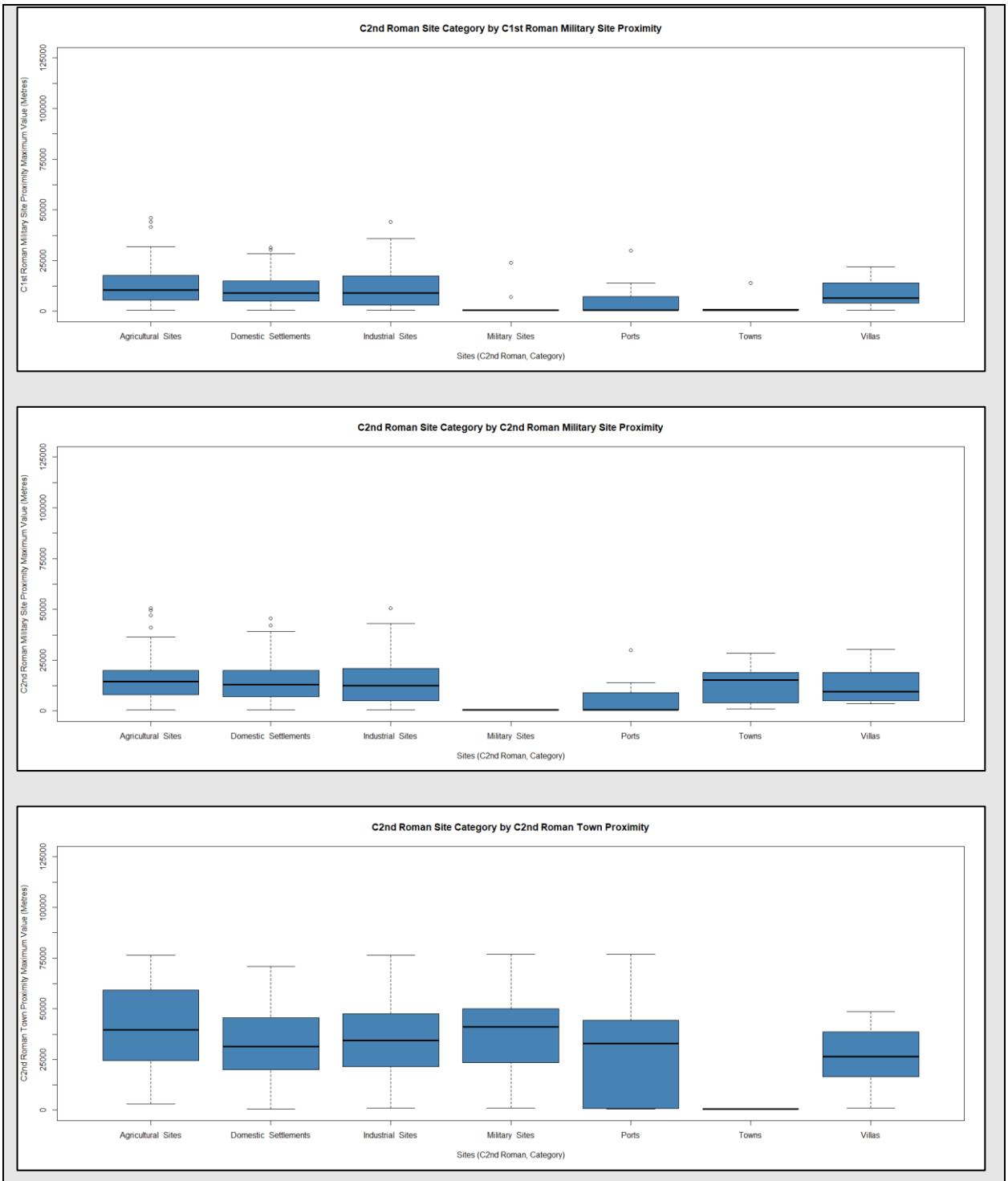

Figure 6.14: Graphs of C2nd Roman sites, when categorised by function, indicating their proximity to (top) C1st Roman military sites, (middle) C2nd Roman military sites and (bottom) C2nd Roman towns.

6.6 Overview

Analysis of the proximity of the settlement record to six selected 'nodal' site categories revealed significant patterns of both concentration and dispersal within the pre-Roman and Roman cultural landscapes, allowing for the rejection of a simple 'core and periphery' model in favour of more complex models of land-use and land division, as well as site interaction and networking. When the median proximity values of each nodal site category are taken, a clear order of the centrality of sites becomes apparent (Fig. 6.15). This order heavily favoured pre-Roman hillforts and military sites of both the C1st and C2nd, with sites found to be closest in proximity to, in descending order: C1st Roman military sites, C2nd Roman military sites and then pre-Roman hillforts. Following this, site proximity was closest to C2nd Roman villas, C2nd Roman towns and C1st Roman villas, indicating a clear divide between the centrality of key military and civil sites within the cultural landscape.

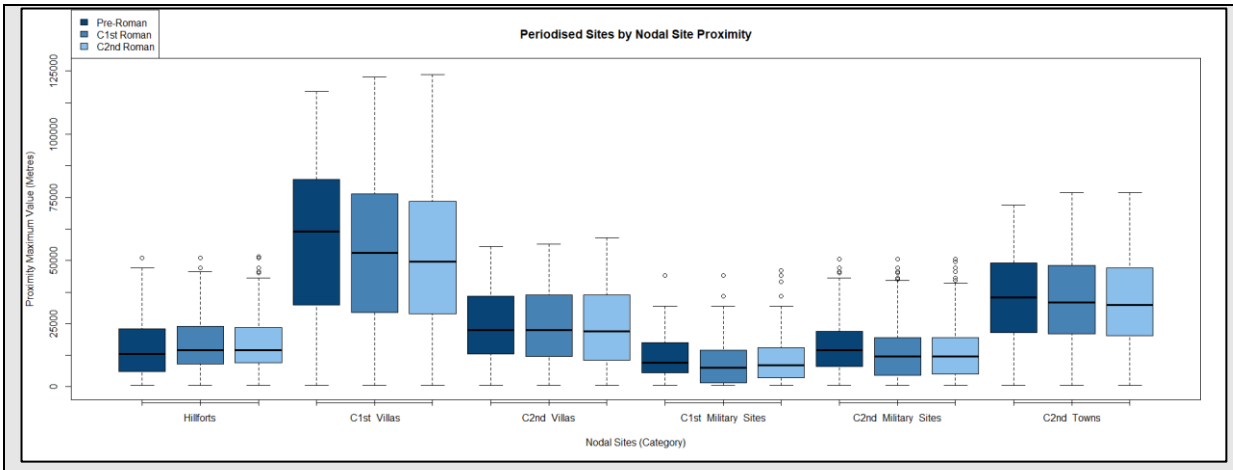

Figure 6.15: Graph of the proximity of pre-Roman, C1st and C2nd Roman sites to hillforts, C1st and C2nd villas, C1st and C2nd military sites and C2nd towns.

The nature of landscape centrality between hillforts and villas is clearly defined relative to the settlement record (Fig. 6.16). Whilst both had a clearly stronger relationship with the landscape factors of navigable waterways, Roman roads and road/river intersections than any periodised site sample, the degree of skew in distribution of sites of all three periods was ascertained to be significantly closer to hillforts than villas of either the C1st or C2nd. The median distribution of settlement relative to hillforts ranged from approximately 13km in the pre-Roman Period, to 14.5km in both the C1st and C2nd samples. This uniformity between periodised samples indicated a strong integration of hillforts within the landscape, with their locations maintaining significant centrality within the settlement record despite the discontinuity of their occupation during the Roman Period. By contrast, the median distribution of sites relative to C1st villas ranged from approximately 61.5km in the pre-Roman Period, to 53km and 49.5km in the C1st and C2nd respectively, indicating that the majority of sites were within approximately one to two days

walking distance from the nearest C1st villa. With the noted expansion of villas into the regions of Yorkshire and the Humber, and the Northwest, a significantly greater proportion of the settlement record was found to be within close proximity of a C2nd villa, with a deviation of median villa proximity of 500m from 22.5km in the pre-Roman Period and C1st, to 22km in the contemporary record of the C2nd. This suggests a significant shift in land-use and land division, as villas of the C2nd assumed a centrality more proximate to hillforts and contemporary Roman military sites, than their C1st villa predecessors. In neither case did villas approach the closeness in distribution between pre-Roman agricultural sites, domestic settlements and hillforts. As such, notions of villas subsuming a similar function from hillforts following their abandonment during the post-conquest period should be questioned.

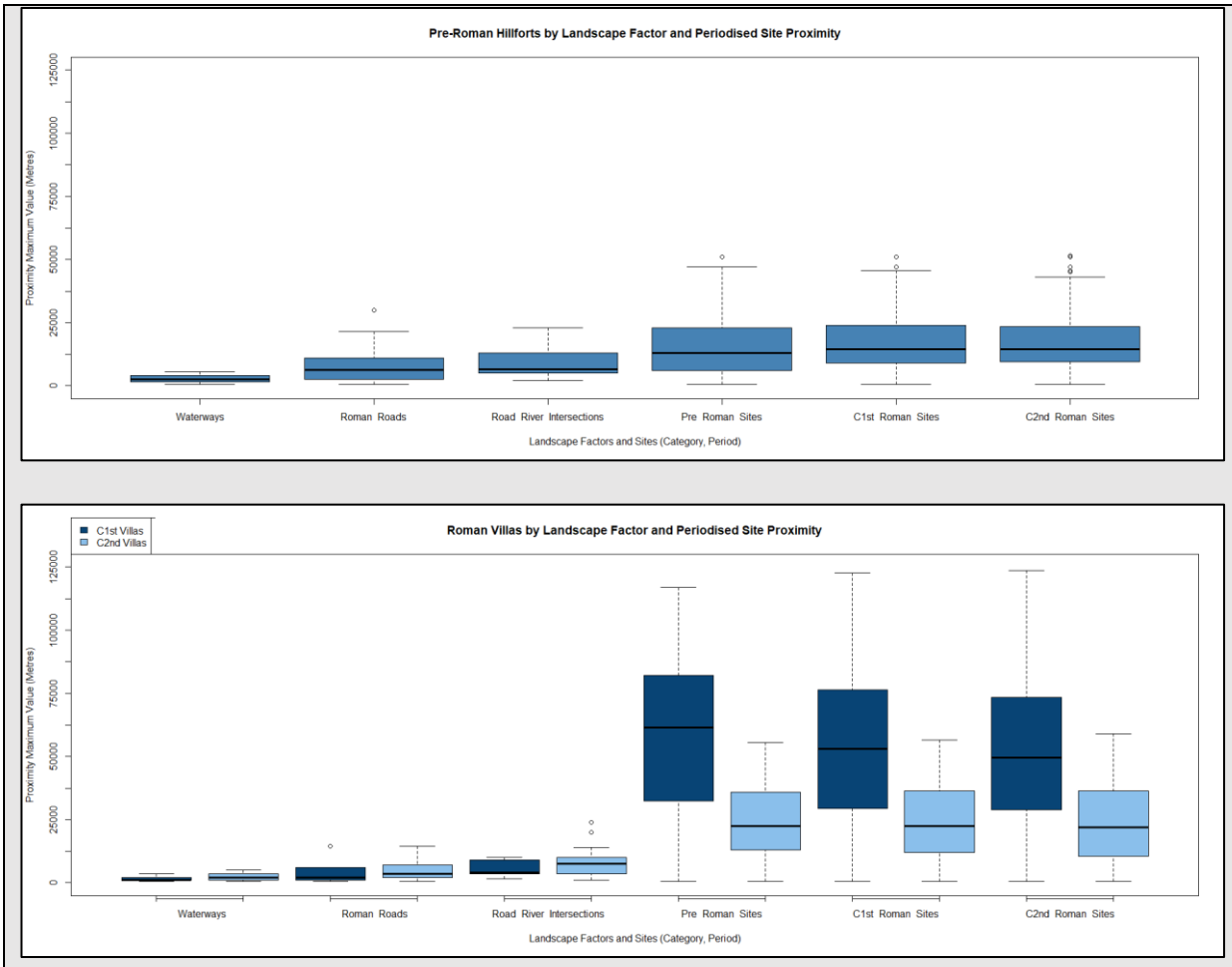

Figure 6.16: Graphs of (top) pre-Roman hillforts and (bottom) C1st and C2nd Roman villas, indicating their proximity to navigable waterways, Roman roads, road/river intersections, and pre-Roman, C1st and C2nd sites.

The contrasting distributions of Roman military sites and towns likewise indicated important trends of Roman state control and influence within the settlement record, with military sites demonstrating a far greater integration and centrality within the landscape than towns (Fig. 6.17). A median distance from settlements to Roman military sites of less than 15km in both the C1st and C2nd suggests that military sites

were found to be easily accessible by the remainder of the settlement record, and vice-versa. This would make the majority of sites within a half-day marching distance of a Roman military site, suggesting a highly significant military integration into the cultural landscape. However, this is further complicated when a comparison is conducted between the landscape factors, with proximity to Roman roads and navigable waterways, followed by waterway crossings, being found to be the stronger influence on the locational preferences of Roman military sites of both the C1st and C2nd than any site sample. Roman towns were found to be largely anomalous from the other sites thus far sampled, with the notable exception of Roman villas of the C1st. Of the C2nd site sample, towns appear to have the least centrality within their contemporary cultural landscape, with both military sites and villas having stronger connections with other site categories than towns. Whilst a slight increase in the proximity of sites to Roman towns was noted over time, with the C2nd expectedly showing the closest relationship with towns due to their contemporaneous existence, the degree of mean variance was only 3km, from 35.5km in the pre-Roman Period, to 33.5km in the C1st and 32.5km in the C2nd.

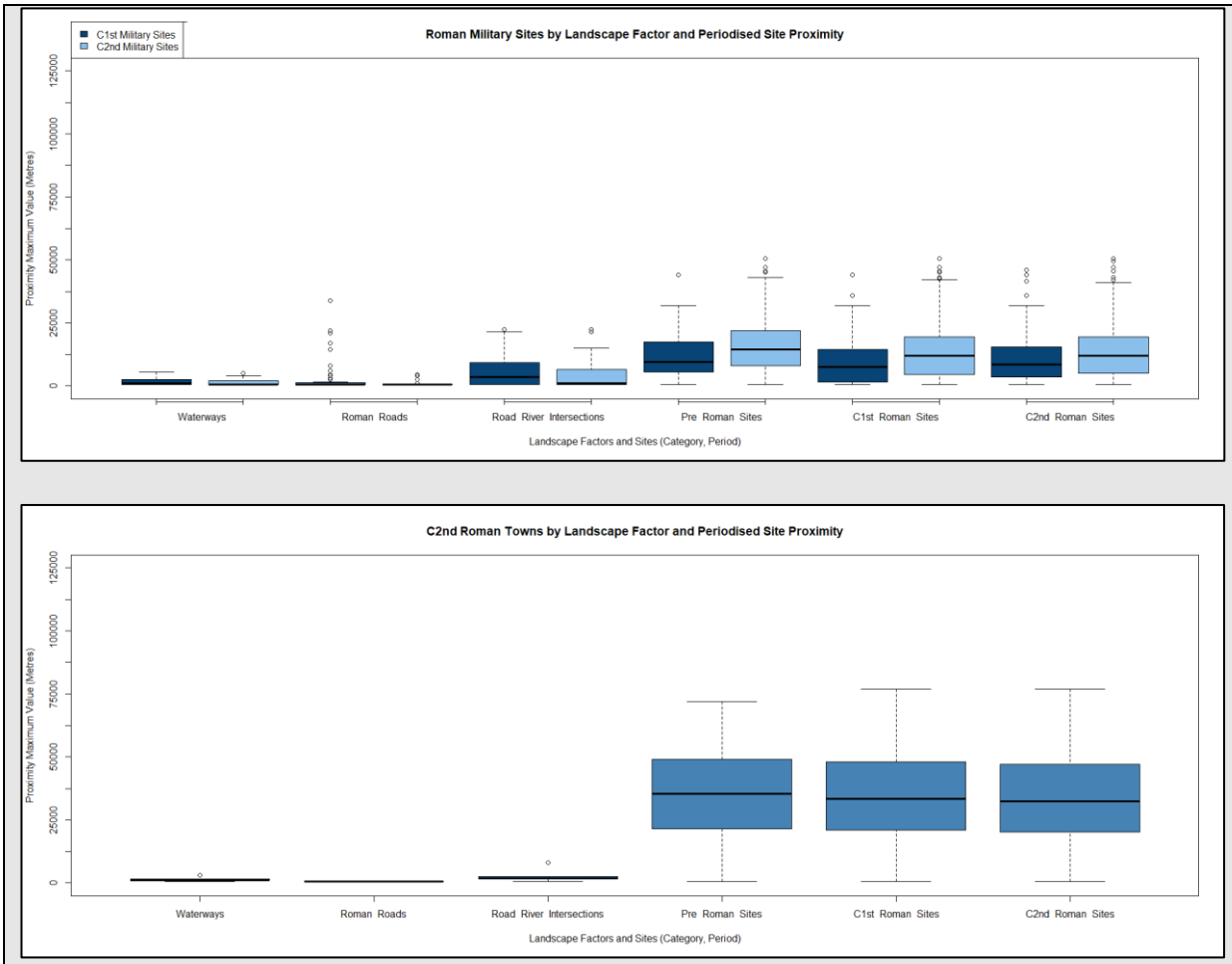

Figure 6.17: Graphs of (top) C1st and C2nd Roman military sites and (bottom) C2nd Roman towns, indicating their proximity to navigable waterways, Roman roads, road/river intersections, and pre-Roman, C1st and C2nd sites.

Notably, the overall pattern of rural settlement categories relative to Roman towns was found to correlate over time, with little change in locational preferences between the periods prior to and following the foundation of towns, suggesting the rural landscape had little role in shaping the positioning of Roman towns, and likewise had little interest in developing in proximity to them. Consequently, it is likely the C2nd rural landscape operated largely independently of Roman towns, being satisfied in their economic role through connection with maritime, riverine and terrestrial networks of transportation, contact and exchange, as discussed previously, rather than in simple proximity to towns as nodal sites within such networks.

6.7 Conclusions

The relative centrality of certain nodal site categories within the landscape of the Midlands and northern England was therefore revealed to be significantly more varied than posited in the scholarship, with sites of both the pre-Roman and Roman C1st and C2nd periods ordering their spatial priorities to favour proximity to certain nodal sites over others. Particularly, both hillforts and Roman military sites of the C1st and C2nd appear to have had the greatest centralising role within the landscape, with both categories being easily accessible to the majority of the settlement record, whilst both Roman villas of the C1st and C2nd, as well as Roman towns, appeared to have had less centrality within the landscape than traditionally posited. As hillforts and military sites varied significantly in terms of both their morphology and the nature and scale of their occupation and function, it remains problematic to posit that such sites acted as a definitive or unifying 'central place' around which economic, socio-political and cultural activities within the landscape were organised. However, it is clear that despite the apparent variation in nodal site scale and function, the landscape of the Midlands and northern England was significantly influenced by the location of fortified sites during both the pre-Roman and Roman periods, reinforcing notions of the region as a predominantly militarised landscape around which agricultural, industrial and domestic activities occurred.

Chapter Seven:

Geospatial Implications, the Settlement Pattern of the Midlands and Northern England in its Landscape Context, and Future Research

The analysis of patterns of settlement, connectivity, land-use and land division in the Midlands and northern England from the pre-Roman Period to the C1st and C2nd Roman periods reveals a significant continuity of practices transcending both cultural and temporal divisions. Across the three periods, the landscape was dominated by a small scale, highly localised agrarian socio-spatial framework, with marked variation in both agricultural sites and domestic settlements indicating a mixed agricultural economy of cereal cultivation and pastoralism constituted the most likely subsistence practice. Furthermore, correlations between the settlement pattern, waterways and the Roman road network suggests that despite the localism in settlement and land-use patterns, the cultural landscapes of both the pre-Roman and Roman periods had significant connections to maritime, riverine and terrestrial networks of transportation, contact and exchange, enabling the movement of people, goods and resources between the Midlands and northern England, other regions of Britain and continental Europe.

7.1 Geospatial Continuity in Pre-Roman and Roman Settlement Patterns, Land-Use and Land Division

The results of a geospatial analysis of the relationships between settlements and the topographic landscape factors of elevation, slope and aspect indicated clear locational preferences across all three factors, with settlement overwhelmingly preferring low-lying locales of level to gentle slopes and predominantly south-facing aspects conducive to solar orientation. In periods defined by an agricultural regime dependent entirely on animal-driven ploughs or manual cultivation, the topographic conditions of arable land should be viewed as critical in terms of labour input. Comprehensive geospatial analyses of Italy during the pre-Roman to Roman transition have shown correlations between gradient and the viability of agricultural regimes, suggesting deliberate efforts were taken to maximise the agricultural potential of sites through the choice of specific topographic conditions (Casarotto. 2017: 167; Goodchild. 2007: 123-140). Indeed, the writings of Roman agriculturalist author Columella during the C1st should be viewed as an important insight into the relationship between the idealised Roman agricultural regime of the C1st and the topography of the agricultural landscape:

> "Let some of the hills be bare of trees, to serve for grain crops only; still these crops thrive better in moderately dry and fertile plains than in steep places, and for that reason even the higher grainfields should have some level sections and should be of as gentle a slope as possible and very much like flat land." (Columella. *Rust*. 1.2.4)

Given the substantial body of evidence for a skew of sites in the study area towards locations on gentler slopes of less than 15° in gradient, connections between the locational preferences of the settlement record for topography, and an agricultural regime, are to be expected. Across all three time periods, correlations were found between agricultural sites and domestic settlements in terms of their distribution relative to slope, supporting the noted agricultural function of a large number of domestic settlements, as well as the connections between topography and agricultural practices. It is likely, therefore, that the agricultural regime of the pre-Roman and Roman periods was closely linked to the locational preference towards slopes of milder gradient, indicating continuity of land-use practices over time.

The strong inter-period continuity of practice relative to topography does require some recontextualisation of the interpretations of Lodwick, *et. al*. (2021: 22) and Van der Veen (2016: 810) of a developing extensive agricultural regime during the Roman Period in which labour inputs were dispersed across a greater area of cultivated land. Changes in site numbers and settlement density between the pre-Roman, C1st and C2nd Roman periods indicated a notable increase in activity within the cultural landscape which was conducive to a more extensive regime of land-use following the Roman conquest. However, the distribution of such sites relative to topography indicated that whilst a greater proportion of the landscape was being utilised, such activities were largely constrained to areas of similar topographic conditions, with little variance in the distribution of different activities within the landscape relative to topography. This stability in locational preferences should be seen as highly significant, suggesting that changes from the pre-Roman to Roman periods were not in terms of utilising new cultivation practices to 'open up' less agriculturally viable land units for cultivation, but rather in potentially reducing the labour inputs required for cultivating a landscape with pre-existing definitions of agricultural viability relative to topography. Indeed, evidence for extensive utilisation and occupational permanence of lowland, mildly sloping terrain favourable for cereal cultivation is consistent with the existence of a mixed agricultural model, as suggested by Taylor (2007: 59), in that more permanent settlements subsisting on cereal cultivation could exist comfortably alongside more ephemeral and mobile transhumance pastoralist practices occurring on those remaining portions of the landscape – namely the steeper and less sheltered slopes of the Pennine uplands.

As it has been posited that the sustainment of Roman settlements, particularly those of a military nature, was heavily reliant on accessing goods and services from other provinces of the Roman Empire (Bidwell. 1995: 395; Ellis Jones. 2009: 24; Evers. 2011: 43-44; Fulford. 2020: 298; Harding. 2004: 215), the connections between settlements and navigable waterways can be readily explained in economic terms. However, the closeness of pre-Roman population indices with navigable waterways also highlights the strong connection between settlements and navigable waterways in Britain, regardless of culture or time period. With the noted continuity in occupation of the majority of pre-Roman settlements into the first two centuries of the Roman Period, the relationship with waterways can be seen as a further point of notable continuity in the division and use of the cultural landscape of the Midlands and northern England, potentially indicating the pre-Roman exploitation of riverine and maritime networks to a similar degree to the Romans. The close proximity of pre-Roman industrial sites to navigable waterways also merits discussion, suggesting industrial production during the pre-Roman Period may have relied more heavily on transportation of materials and goods by maritime or riverine networks than their terrestrial equivalents, as well as the potential for industrial outputs to have been transported from the Midlands and northern England to areas further afield, including continental Europe. Furthermore, the presence of continental wares at the pre-Roman port of Meols indicates some degree of reciprocal trade occurred between the Midlands and northern England, and continental Europe, with local elites likely exploiting access to maritime and riverine networks of transportation, contact and exchange to acquire prestige goods (Harding. 2004: 65). Together, this suggests that pre-Roman social groups inhabiting the Midlands and northern England had a close relationship with waterways as a means of mobility and accessing materials and services. The Romans thus adopted and further expanded the extant locational preference for proximity to navigable waterways, with the introduction of Roman technologies such as shallow-draught river boats likely enabling greater efficiency in the riverine network than during the pre-Roman Period.

The weaker relationships between pre-Roman settlements and Roman roads further indicate that the terrestrial network was not laid out to service extant population centres, or in reference to a robust network of pre-Roman trackways, instead being surveyed with far greater emphasis on establishing networks between contemporary and developing Roman sites. Settlements were, at most, three to four times further from a Roman road than a navigable waterway, necessitating greater cost in the transportation of materials and people through terrestrial networks than their maritime or riverine counterparts. An exception to this can be seen in the closer proximity of sites of the large and very large size-categories to Roman roads. Such sites primarily constituted hillforts, military sites and towns in the respective pre-

Roman and Roman samples. It appears likely therefore, that the Roman road network was surveyed in relation to extant major centres of pre-Roman activity and with the initial purpose of facilitating Roman military and administrative movement within the landscape during the C1st. An increasing number of substantial roadside domestic settlements and the expansion of early Roman towns into the Midlands and northern England as road network nodes followed in the C2nd. The hand of the Roman state is clearly evident, with Roman roads being closely linked to ports, military installations and towns across both centuries. Whilst there is room for sampling bias in this distribution, as many modern population centres conducive to widespread archaeological survey coincide with the sites of the three discussed Roman settlement categories, the statistically significant close association between sites of Roman state importance and the Roman road network, as we would expect, indicates a tangible historical connection between the two not seen in the remainder of the Roman rural settlement record. It is again likely the Roman military in northern England was heavily reliant on terrestrial networks of transportation, contact and exchange for the movement of people and goods necessary for the sustainment of the military units and their attendant civilian populations inhabiting the numerous *vici* noted within the study area (Bidwell. 1995: 395; Ellis Jones. 2009: 24; Evers. 2011: 43-44; Fulford. 2020: 298; Harding. 2004: 215). This appears as a notable factor for explaining the Roman military's preference for proximity to roads. It is also possible Roman military sites were strategically located within the road network as nodes, with a function in overseeing and protecting terrestrial movement. Such a proposition is commonly posited (Bidwell. 2007: 30-33; Symonds. 2018: 55-92) to be a crucial factor in the distribution of Roman military garrisons and roads across the cultural landscape of northern England, which finds support from the results of the analysis in this study. Consequently, the connection between Roman state-administered sites and the road network can be quantified in terms of control, surveillance and/or sustainment, with significant potential for all three factors to be important influences over the locational preferences of Roman military installations, and potentially ports and towns, in their proximity to the road network.

The spatial relationship between the settlement pattern and waterway crossings again reinforces the role of the Roman state within the landscape of the Midlands and northern England as one primarily concerned with surveillance and control of specific locations through which people, agricultural and industrial outputs and inter-provincial traded commodities could have moved. Analysis of proximity values placed the majority of Roman military sites, and all Roman towns, within a three-to-four-hour walking distance of a waterway crossing. As with the analysis of the distribution of settlements relative to Roman roads, such a trend can be seen largely as indicative of the increasing interest of the Roman state in the creation,

surveillance, and control of systems of mobility throughout the landscape, with waterway crossings affording a nexus of maritime, riverine, and terrestrial networks of transportation, contact and exchange. It is therefore unsurprising that the analysis points towards a general concentration of Roman military sites and towns around waterway crossings, compared to a generally greater sparsity of other site categories present in the cultural landscape. By contrast, the overall trend indicates that for the remainder of the settlement record, comprised mostly of agricultural, domestic, and industrial sites, proximity to waterway crossings presented relatively little advantage in terms of activity, with simple proximity to navigable waterways or Roman roads individually being more prevalent in the locational preferences of such sites. It is also important to note the changing spatial relationships between industrial and military sites during the Roman Period in terms of their locational preferences for road/river intersections, with correlation between the two categories during the C1st, but not the C2nd. This suggests a decoupling of spatial priorities between Roman industrial and military sites over time and their connectivity to networks of transportation, contact and exchange afforded by road/river intersections. With the increase in pottery and metalworking industries during the C2nd of a notably civil character (Allen, *et. al*. 2018), it is possible to posit the rise of a more localised and civilian-driven industrial sector separate from Roman state influence as a factor in the changes in the locational preferences of industrial sites over time. Together, this suggests an interesting trend in the distribution of the cultural landscape, with a shift in geospatial priorities arising from the development of the Roman road network, whilst access to navigable waterways formed a significant point of continuity within the landscape.

The character of the landscape of the Midlands and northern England during the pre-Roman and early Roman periods appears to have been influenced significantly by the nature and distribution of fortified sites, with pre-Roman hillforts and the plethora of Roman military site subcategories maintaining close spatial relationships with the majority-rural cultural landscape. Furthermore, the close spatial connections between hillforts and Roman military sites opens the potential for significant connections to be drawn between the two categories in terms of their implied role within the settlement record. With the absence of Cunliffe's 'Wessex' type of complex hillforts in the Midlands and northern England (Harding. 2004: 41), the majority of hillforts were of univallate or bivallate morphology, with few exceeding four hectares in area. Such sites simply could not have facilitated the complex socio-economic activities of their far larger southern counterparts, with little evidence of permanent occupation or craft specialisations indicative of a nodal settlement. Instead, Harding's (2004: 62) conclusion that many northern hillforts were only seasonally occupied, or utilised as defensive positions in times of crisis, finds greater support. If this position is taken, then a clear divide becomes evident in

the settlement record between hillforts of southern England and those few larger hillforts found in the Midlands, such as the Wrekin Hillfort and Old Oswestry, and the majority of smaller hillforts of northern England. Conversely, the distribution of hillforts suggests significant connectivity with the majority of the settlement record, with the median distance from a given site to a hillfort being, on average, traversable in less than half a day. Such a distribution suggests that hillforts could have been utilised far more readily than the structural and material culture records suggest, opening the greater possibility for such sites functioning primarily in either low intensity domestic occupation, or as a component of the pastoralist rural economy as potential animal corrals. Overall, whilst the trend of settlement towards close proximity to hillforts can be identified as a significant factor for locational preferences in the geospatial record, far more work is required in order to ascertain the nature and socio-cultural implications of such a trend, particularly how the majority of small northern hillforts may have been either occupied or utilised in the activities of pre-Roman cultural groups.

Analysis of the relationship between Roman villas and the remainder of the settlement record of the Midlands and northern England during the pre-Roman Period and first two centuries of the Roman Period reveals a far more dichotomous geospatial distribution than any other site category, with significant variability between C1st and C2nd samples. Indeed, it may appear that the C1st and C2nd samples of Roman villas are in fact entirely separate categories of settlement. Based on median distance of site distribution, villas of the C1st were distributed sparsely over an area three times greater than that of the C2nd sample, indicating notable change in the villa record over time. This can be attributed to the nature of villa evolution in the Midlands and northern England, with villas being slow to develop in the regions of Yorkshire and the Humber, and Northwest, whilst C1st villas were limited mostly to the Midlands. The noted exception was the Loushers Lane villa, which was a development of an existing pre-Roman farmstead, indicated by roundhouses predating the construction of the main villa structure (Allen, *et. al.* 2018). The C1st villa record is thus left with just four sites, all geographically constrained to the Midlands. It is expected that the spatial relationships between such C1st villas and, for example, sites located in the northeast of Yorkshire, should be so distant as to suggest little chance for interaction of cultural activity. By contrast, the C2nd demonstrated a significantly closer relationship between villas and the settlement record, likely correlating to a change in land-use and land division, as well as the growing emphasis on civil infrastructure and rural settlement following the stabilisation of the Hadrianic and Antonine frontiers during the first half of the century. In this regard, geospatial analysis finds no evidence to support the assertion of Applebaum (1963: 11) that closer links should be found between villas and settlements than between hillforts and settlements. It is instead apparent

that for the first decades following the Roman conquest of the Midlands and northern England, hillforts retained a central position within the cultural landscape, even after their abandonment or depopulation by the Roman military. Conversely, villas displayed a significant locational preference for southern locales in the Midlands which afforded greater connectivity to the settled and largely pacified lands of southern England, rather than the expanding frontier landscape to the north.

The place of military sites of the Roman Period within the cultural landscape also merits discussion, as their positions of greatest centrality have a number of significant implications. Roman military sites of both centuries were shown to have a clear ordering of priorities for locational preferences, favouring site locations in close proximity to navigable waterways or coastlines, as well as the Roman road network, whilst also maximising access to the local population through the selection of locations of close inter-site proximity within their settlement pattern. The implication of this pattern in proximity is that the Roman military was significantly connected to maritime, riverine and terrestrial networks of transportation contact and exchange, as discussed previously. Secondary engagement in activities of surveillance and control of local population centres, as well as potentially a reliance on local logistics sources from the rural landscape of the Midlands and northern England occurred to a greater extent than previously suggested (Bidwell. 2007: 30-32; Evers. 2011: 43-44; Fulford. 2020: 298; Harding. 2004: 215).

When compared to other indices, the relationship between towns and other domestic settlements was shown to be the least significant landscape factor in their locational preferences, with proximity to navigable waterways and coastlines, as well as the Roman road network, being by far the primary factors. This suggests a highly significant degree of connection between Roman towns of the C2nd and maritime, riverine and terrestrial networks of transportation, contact and exchange, with the majority of activity conducted in Roman towns likely being facilitated by such networks. Conversely, connection by direct proximity to other sites present within the settlement pattern appeared to have been of far less significance to Roman towns, with an approximate median distance from a Roman town to the nearest settlement 31 times further than the distance from a town to a waterway or Roman road. It is therefore unlikely that Roman towns acted as direct central places within the settlement pattern. Rather, they acted as nodes within networks formed by waterways and Roman roads, with people and goods likely being transported from rural settlements to the nearest waterway or road, and then via that network to a Roman town. Unlike the Roman military site record, this also indicates that direct surveillance and control of the cultural landscape was not a primary function of

Roman towns, with the administrative bodies of towns likely delegating such a role in landscape control to the Roman military and its own administrative structure.

7.2 Conclusions

It is apparent that settlements during the pre-Roman and Roman periods in the Midlands and northern England were strongly centred around a small-scale, localised and agricultural pattern, significantly influenced in its locational preferences by topographic conditions and connectivity within maritime, riverine and terrestrial networks of transportation, contact and exchange. Whilst the application of a 'core and periphery' model to settlement location was possible, the nature of site proximity was significantly more varied than other indices, suggesting notional 'core' or 'nodal' sites stood somewhat apart from the settlement pattern in terms of raw proximity values, but were more closely connected to the maritime, riverine and terrestrial networks, acting as network nodes, rather than cores of a simple settlement proximity radius. The profound continuity of the landscape across both the pre-Roman and Roman periods is also notable, indicating a relative stability of the settlement pattern, with the cultural landscape favouring an inter-period and inter-cultural structured framework focused on particular spatial priorities, rather than a distinct approach to any particular group or time period. In this regard, the impacts of the Roman conquest on the Midlands and northern England appear quantified in terms of their introduction of new categories of settlement, land-use and activity within the established framework, rather than the wholesale replacement of extant practices with an entirely different framework. This is exemplified in the abandonment of hillforts during the pre-Roman to Roman transition, with military sites appearing to take their place in an arrangement of the majority-rural landscape correlating closely with extant practices. Such a finding in the geospatial record of settlement in the Midlands and northern England reinforces trends in recent scholarship towards a revaluation of how Roman conquest and colonisation may have both impacted and been influenced by extant pre-Roman populations, with a far greater emphasis on continuity between the two groups and their patterns of settlement than has been commonly believed. Furthermore, this study has demonstrated the significant value of applying geospatial analysis methods to understanding macrospatial patterns within the archaeological record, particularly in situations where varying views are present as to the interactions between different cultural or temporal groups.

Continuity in British Landscapes - 700 BC to AD 200: a geospatial analysis of landscapes and routeways in the Midlands and Northern England

Appendices

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Appendix One:

Statistical Data for Site Samples Categorised by Period, Size and Function, and Regional Distribution

Appendix 1.1: Table of Overall Site Distribution – Region

Region:	Area (km²):	Sites:	% of Total:	Density (Sites/km²):
Northwest	7124.24	64	13.25%	0.00898
Yorkshire and the Humber	13827.68	247	51.14%	0.01786
East Midlands	6806.46	126	26.09%	0.01851
West Midlands	3630.46	34	7.04%	0.00937
Wales	1381.06	12	2.49%	0.00869

Appendix 1.2: Table of Pre-Roman Site Distribution – Region

Region:	Area (km²):	Sites:	% of Total:	Density (Sites/km²):
Northwest	7124.24	22	10.68%	0.00309
Yorkshire and the Humber	13827.68	135	65.53%	0.00976
East Midlands	6806.46	37	17.96%	0.00544
West Midlands	3630.46	8	3.88%	0.00220
Wales	1381.06	4	1.94%	0.00290

Appendix 1.3: Table of C1st Roman Site Distribution – Region

Region:	Area (km²):	Sites:	% of Total:	Density (Sites/km²):
Northwest	7124.24	38	11.99%	0.00533
Yorkshire and the Humber	13827.68	171	53.94%	0.01237
East Midlands	6806.46	82	25.87%	0.01205
West Midlands	3630.46	20	6.31%	0.00551
Wales	1381.06	6	1.89%	0.00435

Appendix 1.4: Table of C2nd Roman Site Distribution – Region

Region:	Area (km²):	Sites:	% of Total:	Density (Sites/km²):
Northwest	7124.24	56	13.08%	0.00786
Yorkshire and the Humber	13827.68	223	52.10%	0.01613
East Midlands	6806.46	110	25.70%	0.01616
West Midlands	3630.46	29	6.78%	0.00799
Wales	1381.06	10	2.34%	0.00724

Appendix 1.5: Table of Pre-Roman Site Distribution, Categorised by Function - Region

Category:	Northwest	Yorkshire and the Humber	East Midlands	West Midlands	Wales
Agricultural	5	31	11	2	0
Domestic	4	91	16	3	2
Hillfort	12	10	7	3	2
Industrial	0	3	3	0	0
Port	1	0	0	0	0

Appendix 1.6: Table of Pre-Roman Site Distribution, Categorised by Size - Region

Region:	Small:	Medium:	Large:	Very Large:
Northwest	18	2	0	2
Yorkshire and the Humber	111	8	8	8
East Midlands	28	6	1	2
West Midlands	5	1	0	2
Wales	4	0	0	0

Appendix 1.7: Table of C1st Roman Site Distribution, Categorised by Function - Region

Category:	Northwest	Yorkshire and the Humber	East Midlands	West Midlands	Wales
Agricultural	4	37	20	4	0
Domestic	12	99	31	4	4
Industrial	8	10	13	1	2
Military	9	22	15	9	0
Port	4	3	1	0	0
Villa	1	0	2	2	0

Appendix 1.8: Table of C1st Roman Site Distribution, Categorised by Size - Region

Region:	Small:	Medium:	Large:	Very Large:
Northwest	27	0	5	6
Yorkshire and the Humber	135	13	13	10
East Midlands	61	11	4	6
West Midlands	10	4	2	4
Wales	5	1	0	0

Appendix 1.9: Table of C2nd Roman Site Distribution, Categorised by Function - Region

Category:	Northwest	Yorkshire and the Humber	East Midlands	West Midlands	Wales
Agricultural	6	40	37	7	1
Domestic	20	127	36	9	5
Industrial	14	28	23	3	2
Military	9	15	6	4	1
Port	4	3	1	0	0
Town	1	2	1	2	0
Villa	2	8	6	4	1

Appendix 1.10: Table of C2nd Roman Site Distribution, Categorised by Size - Region

Region:	Small:	Medium:	Large:	Very Large:
Northwest	45	0	5	6
Yorkshire and the Humber	180	15	15	13
East Midlands	97	8	1	4
West Midlands	19	4	2	4
Wales	7	2	0	1

Appendix 1.11: Table of Pre-Roman Sites, Categorised by Function and Size

Category:	Small:	Medium:	Large:	Very Large:
Agricultural	42	4	1	2
Domestic	97	4	8	7
Hillfort	21	9	0	4
Industrial	5	0	0	1
Port	1	0	0	0

Appendix 1.12: Table of C1st Roman Sites, Categorised by Function and Size

Category:	Small:	Medium:	Large:	Very Large:
Agricultural	60	2	3	0
Domestic	120	13	7	10
Industrial	31	1	1	1
Military	20	9	13	13
Port	4	2	0	2
Villa	3	2	0	0

Appendix 1.13: Table of C2nd Roman Sites, Categorised by Function and Size

Category:	Small:	Medium:	Large:	Very Large:
Agricultural	86	3	1	1
Domestic	164	11	9	13
Industrial	31	1	1	1
Military	15	4	9	7
Port	4	2	0	2
Town	1	1	0	4
Villa	12	7	2	0

Appendix Two:

Results of Statistical Analysis for Minimum, Maximum, Mean, Median, Mode and Standard Deviation in Site Samples, Categorised by Period, Size and Function

Appendix 2.1: Statistical Data for Site Distribution – Elevation

Pre-Roman Sites:	Minimum (m)	Maximum (m)	Mean (m)	Median (m)	Mode (m)	Standard Deviation
Overall	20.00	720.00	74.66019417	40.00	20.00	92.61844661
Categorised - Size-Scale:						
Small	20.00	500.00	64.81927711	40.00	20.00	73.68632895
Medium	20.00	720.00	155.2941176	100.00	20.00	187.8203146
Large	20.00	60.00	46.66666667	40.00	40.00	14.14213562

Very Large	20.00	400.00	126.6666667	100.00	40.00	110.645489
Categorised - Function:						
Agricultural Sites	20.00	260.00	53.87755102	40.00	20.00	45.13019714
Domestic Settlements	20.00	320.00	46.20689655	40.00	20.00	38.97948563
Hillforts	20.00	720.00	212.3529412	160.00	160.00	146.392143
Industrial Sites	20.00	40.00	23.33333333	20.00	20.00	8.164965809
Ports	20.00	20.00	20.00	20.00	20.00	N / A - One Value

C1st Roman Sites:

Overall	20.00	500.00	68.89589905	40.00	20.00	73.57321258
Categorised - Size-Scale:						
Small	20.00	500.00	64.10041841	40.00	20.00	69.99309636
Medium	20.00	500.00	118.6206897	100.00	60.00	106.6276612
Large	20.00	260.00	52.72727273	40.00	40.00	50.34942835
Very Large	20.00	220.00	75.20	40.00	40.00	62.25752967
Categorised - Function:						
Agricultural Sites	20.00	260.00	54.76923077	40.00	20.00	55.37112549
Domestic Settlements	20.00	500.00	70.93333333	40.00	20.00	82.30200293
Industrial Sites	20.00	300.00	81.76470588	40.00	20.00	80.05568472
Military Sites	20.00	280.00	78.90909091	40.00	40.00	67.04538892
Ports	20.00	60.00	32.50	30.00	20.00	14.88047618
Villas	20.00	140.00	68.00	40.00	40.00	50.19960159

C2nd Roman Sites:

Overall	20.00	380.00	67.24299065	40.00	20.00	64.09058886
Categorised - Size-Scale:						
Small	20.00	380.00	65.34482759	40.00	20.00	64.12733793
Medium	20.00	280.00	100.00	80.00	60.00	72.11102551
Large	20.00	260.00	54.7826087	40.00	40.00	50.88932423
Very Large	20.00	220.00	70.76923077	40.00	40.00	59.92816212
Categorised - Function:						

Agricultural Sites	20.00	300.00	72.96703297	60.00	20.00	69.113345
Domestic Settlements	20.00	340.00	61.72588832	40.00	20.00	58.02063312
Industrial Sites	20.00	380.00	69.42857143	40.00	20.00	74.50096224
Military Sites	20.00	280.00	82.85714286	40.00	40.00	75.48164672
Ports	20.00	60.00	32.50	30.00	20.00	14.88047618
Towns	20.00	120.00	60.00	50.00	40.00	35.77708764
Villas	20.00	160.00	76.19047619	80.00	20.00	50.04759639

Appendix 2.2: Statistical Data for Site Distribution – Slope

Pre-Roman Sites:	**Minimum (°)**	**Maximum (°)**	**Mean (°)**	**Median (°)**	**Mode (°)**	**Standard Deviation**
Overall	0.50	15.00	2.871359223	2.00	2.00	2.29670073
Categorised - Size-Scale:						
Small	0.50	15.00	2.656626506	2.00	2.00	2.031461201
Medium	0.50	10.00	4.764705882	5.00	5.00	3.396310715
Large	0.50	5.00	2.333333333	2.00	2.00	1.639359631
Very Large	0.50	10.00	3.464285714	2.00	2.00	3.015755332
Categorised - Function:						
Agricultural Sites	0.50	10.00	2.653061224	2.00	2.00	1.800474711
Domestic Settlements	0.50	5.00	2.090517241	2.00	2.00	1.271081597
Hillforts	0.50	15.00	5.985294118	5.00	5.00	3.129733492
Industrial Sites	0.50	2.00	1.75	2.00	2.00	0.612372436
Ports	5.00	5.00	5.00	5.00	5.00	N / A - One Value

C1st Roman Sites:						
Overall	0.50	30.00	3.255520505	2.00	2.00	3.444084471
Categorised - Size-Scale:						
Small	0.50	30.00	3.119747899	2.00	2.00	3.530659675

Medium	0.50	15.00	4.189655172	5.00	5.00	3.171901731
Large	0.50	10.00	3.125	2.00	2.00	2.931278101
Very Large	0.50	15.00	3.576923077	2.00	2.00	3.357654859
Categorised - Function:						
Agricultural Sites	0.50	15.00	2.953846154	2.00	2.00	2.471277309
Domestic Settlements	0.50	15.00	2.68	2.00	2.00	2.170794553
Industrial Sites	0.50	30.00	5.279411765	2.00	2.00	7.161757843
Military Sites	0.50	15.00	3.627272727	2.00	2.00	3.162597066
Ports	0.50	15.00	5.1875	3.50	2.00	4.956507267
Villas	0.50	5.00	3.50	5.00	5.00	2.121320344

C2nd Roman Sites:						
Overall	0.50	30.00	3.21728972	2.00	2.00	3.254897969
Categorised - Size-Scale:						
Small	0.50	30.00	3.163793103	2.00	2.00	3.302546303
Medium	0.50	15.00	3.586206897	2.00	2.00	2.729040142
Large	0.50	10.00	2.97826087	2.00	2.00	3.00937271
Very Large	0.50	15.00	3.696428571	2.00	2.00	3.435488228
Categorised - Function:						
Agricultural Sites	0.50	15.00	3.648351648	2.00	2.00	3.162712009
Domestic Settlements	0.50	10.00	2.497461929	2.00	2.00	1.780347265
Industrial Sites	0.50	30.00	3.978571429	2.00	2.00	5.484785091
Military Sites	0.50	10.00	3.742857143	2.00	2.00	2.988633931
Ports	0.50	15.00	5.1875	3.50	2.00	4.956507267
Towns	2.00	10.00	3.333333333	2.00	2.00	3.265986324
Villas	0.50	10.00	3.666666667	5.00	5.00	2.237930592

Appendix 2.3: Statistical Data for Site Distribution – Aspect

Pre-Roman Sites:	Minimum (°)	Maximum (°)	Mean (°)	Median (°)	Mode (°)	Standard Deviation
Overall	0	337.5	186.1165049	202.5	292.5	93.19186094
Categorised - Size-Scale:						
Small	0.00	337.50	190.1656627	202.50	292.50	90.73192931
Medium	22.50	337.50	170.7352941	157.50	22.50	116.6584381
Large	22.50	292.50	207.50	247.50	247.50	85.51315688
Very Large	0.00	292.50	143.0357143	135.00	112.50	91.54747912
Categorised - Function:						
Agricultural Sites	22.50	337.50	185.0510204	202.50	202.50	94.4894309
Domestic Settlements	0.00	337.50	177.2844828	202.50	202.50	90.59259554
Hillforts	22.50	337.50	226.3235294	270.00	292.50	94.15540686
Industrial Sites	112.50	292.50	165.00	157.50	157.50	66.2382065
Ports	22.50	22.50	22.50	22.50	22.50	N / A - One Value

C1st Roman Sites:						
Overall	0.00	337.50	184.4006309	202.50	202.50	95.37440578
Categorised - Size-Scale:						
Small	0.00	337.50	184.6129707	202.50	202.50	92.45929038
Medium	67.50	337.50	188.5344828	202.50	157.50	106.9661104
Large	22.50	337.50	198.4090909	247.50	247.50	101.9644705
Very Large	0.00	337.50	166.6666667	157.50	112.50	105.2126967
Categorised - Function:						
Agricultural Sites	22.50	337.50	208.7307692	202.50	202.50	83.76413486
Domestic Settlements	0.00	337.50	177.00	180.00	157.50	94.87628822
Industrial Sites	0.00	337.50	175.3676471	157.50	157.50	97.80572184
Military Sites	22.50	337.50	177.1363636	157.50	22.50	109.1204505
Ports	22.50	292.50	168.75	202.50	202.50	82.45128432
Villas	157.50	292.50	220.50	202.50	202.50	51.30789413

C2nd Roman Sites:						
Overall	0.00	337.50	178.2651869	180.00	202.50	99.57160171
Categorised - Size-Scale:						
Small	0.00	337.50	178.7068966	180.00	202.50	98.63777654
Medium	67.50	337.50	169.9137931	157.50	157.50	102.6838133
Large	22.50	337.50	190.7608696	202.50	247.50	103.524357
Very Large	0.00	337.50	171.1607143	157.50	112.50	108.7438422
Categorised - Function:						
Agricultural Sites	0.00	337.50	179.010989	157.50	202.50	96.97428004
Domestic Settlements	0.00	337.50	176.2309645	157.50	157.50	97.35455507
Industrial Sites	0.00	337.50	172.9285714	157.50	22.50	110.6616886
Military Sites	22.50	337.50	183.2142857	157.50	337.50	113.5726177
Ports	22.50	292.50	168.75	202.50	202.50	82.45128432
Towns	67.50	337.50	225.00	225.00	202.50	93.31398609
Villas	22.50	292.50	193.9285714	202.50	202.50	81.27334829

Appendix 2.4: Statistical Data for Site Distribution – Navigable Waterway Proximity

Pre-Roman Sites:	**Minimum (m)**	**Maximum (m)**	**Mean (m)**	**Median (m)**	**Mode (m)**	**Standard Deviation**
Overall	500.00	7000.00	1990.291262	1500.00	500.00	1336.140387
Categorised - Size-Scale:						
Small	500.00	5000.00	1858.433735	1500.00	500.00	1214.616021
Medium	500.00	5500.00	2735.294118	2000.00	1500.00	1705.850659
Large	500.00	4500.00	1833.333333	1500.00	500.00	1414.213562
Very Large	500.00	7000.00	2750.00	2750.00	3000.00	1740.358053
Categorised - Function:						
Agricultural Sites	500.00	4500.00	1908.163265	1500.00	500.00	1273.420056
Domestic Settlements	500.00	7000.00	1870.689655	1500.00	1000.00	1259.95288

Hillforts	500.00	5500.00	2617.647059	2500.00	500.00	1566.983318
Industrial Sites	500.00	3500.00	1666.666667	1750.00	500.00	1125.462868
Ports	500.00	500.00	500.00	500.00	500.00	N / A - One Value
C1st Roman Sites:						
Overall	500.00	7000.00	1802.839117	1500.00	500.00	1370.377668
Categorised - Size-Scale:						
Small	500.00	7000.00	1757.322176	1500.00	500.00	1303.557972
Medium	500.00	5500.00	2465.517241	2000.00	500.00	1592.005892
Large	500.00	4500.00	1409.090909	500.00	500.00	1333.062743
Very Large	500.00	7000.00	1814.814815	1500.00	500.00	1569.836764
Categorised - Function:						
Agricultural Sites	500.00	4500.00	1846.153846	1500.00	500.00	1313.758554
Domestic Settlements	500.00	7000.00	1976.666667	1500.00	500.00	1439.305233
Industrial Sites	500.00	5000.00	1661.764706	1500.00	500.00	1253.604429
Military Sites	500.00	5500.00	1618.181818	1000.00	500.00	1446.463236
Ports	500.00	1000.00	750.00	750.00	500.00	267.2612419
Villas	500.00	3500.00	1600.00	1000.00	1000.00	1193.733639
C2nd Roman Sites:						
Overall	500.00	7000.00	1850.46729	1500.00	500.00	1353.657468
Categorised - Size-Scale:						
Small	500.00	7000.00	1818.965517	1500.00	500.00	1292.401678
Medium	500.00	5500.00	2655.172414	2500.00	500.00	1576.067939
Large	500.00	5500.00	1565.217391	500.00	500.00	1547.023152
Very Large	500.00	7000.00	1642.857143	1000.00	500.00	1471.061237
Categorised - Function:						

Agricultural Sites	500.00	5000.00	1791.208791	1500.00	500.00	1284.665832
Domestic Settlements	500.00	7000.00	1989.847716	1500.00	500.00	1396.021489
Industrial Sites	500.00	5500.00	1742.857143	1500.00	500.00	1235.76784
Military Sites	500.00	5000.00	1471.428571	500.00	500.00	1382.361881
Ports	500.00	1000.00	750.00	750.00	500.00	267.2612419
Towns	500.00	3000.00	1333.333333	1000.00	1000.00	875.5950358
Villas	500.00	5000.00	2357.142857	2000.00	500.00	1590.148241

Appendix 2.5: Statistical Data for Site Distribution – Roman Road Proximity

Pre-Roman Sites:	**Minimum (m)**	**Maximum (m)**	**Mean (m)**	**Median (m)**	**Mode (m)**	**Standard Deviation**
Overall	500.00	47000.00	10259.70874	6500.00	500.00	11311.95258
Categorised - Size-Scale:						
Small	500.00	47000.00	11240.96386	7000.00	500.00	11927.77798
Medium	500.00	21500.00	8235.294118	6500.00	7000.00	6939.735331
Large	500.00	8000.00	2611.111111	500.00	500.00	3110.242934
Very Large	500.00	30000.00	6000.00	3500.00	500.00	8315.879157
Categorised - Function:						
Agricultural Sites	500.00	47000.00	9612.244898	5500.00	500.00	12090.05502
Domestic Settlements	500.00	46500.00	11008.62069	6500.00	500.00	11941.15695
Hillforts	500.00	30000.00	7779.411765	6250.00	500.00	6972.012422
Industrial Sites	5000.00	37000.00	13000.00	8750.00	N / A - All Unique	11928.95637
Ports	23000.00	23000.00	23000.00	23000.00	23000.00	N / A - One Value
C1st Roman Sites:						
Overall	500.00	47000.00	7318.611987	4000.00	500.00	9740.025763
Categorised - Size-Scale:						
Small	500.00	47000.00	8345.188285	5000.00	500.00	10473.00892

Medium	500.00	21500.00	5310.344828	3000.00	500.00	6343.463724
Large	500.00	22000.00	3272.727273	500.00	500.00	5637.306163
Very Large	500.00	34000.00	5870.37037	500.00	500.00	9535.956844
Categorised - Function:						
Agricultural Sites	500.00	47000.00	10153.84615	6000.00	6000.00	11871.35572
Domestic Settlements	500.00	43000.00	8406.666667	5500.00	500.00	9852.159963
Industrial Sites	500.00	37000.00	5279.411765	2500.00	500.00	7084.117079
Military Sites	500.00	34000.00	3072.727273	500.00	500.00	6480.325053
Ports	500.00	23000.00	3312.50	500.00	500.00	7954.951288
Villas	500.00	14500.00	4800.00	2000.00	N / A - All Unique	5837.379549

C2nd Roman Sites:						
Overall	500.00	47000.00	6586.448598	3500.00	500.00	8641.073612
Categorised - Size-Scale:						
Small	500.00	47000.00	7268.678161	4500.00	500.00	8979.985525
Medium	500.00	21500.00	4275.862069	2500.00	500.00	5851.718623
Large	500.00	16000.00	2021.73913	500.00	500.00	3721.797772
Very Large	500.00	30000.00	4250.00	500.00	500.00	7908.621643
Categorised - Function:						
Agricultural Sites	500.00	47000.00	8686.813187	5500.00	500.00	10263.91964
Domestic Settlements	500.00	43000.00	7677.664975	5500.00	500.00	9096.220825
Industrial Sites	500.00	37000.00	5171.428571	2250.00	500.00	6676.199189
Military Sites	500.00	4500.00	785.7142857	500.00	500.00	933.7284078
Ports	500.00	23000.00	3312.50	500.00	500.00	7954.951288
Towns	500.00	500.00	500.00	500.00	500.00	0.00
Villas	500.00	14500.00	4619.047619	3500.00	500.00	3830.485485

Appendix 2.6: Statistical Data for Site Distribution – Road / River Intersection Proximity

Pre-Roman Sites:	Minimum (m)	Maximum (m)	Mean (m)	Median (m)	Mode (m)	Standard Deviation
Overall	500.00	39000.00	10682.03883	7000.00	3500.00	9382.37152
Categorised - Size-Scale:						
Small	500.00	39000.00	10963.85542	7500.00	4500.00	9836.630099
Medium	1500.00	24500.00	8852.941176	6000.00	3500.00	6533.004444
Large	500.00	24000.00	10666.66667	5000.00	5000.00	8909.264841
Very Large	500.00	23000.00	9571.428571	6750.00	5500.00	7208.054103
Categorised - Function:						
Agricultural Sites	500.00	38000.00	9642.857143	6000.00	3500.00	9922.617262
Domestic Settlements	500.00	39000.00	11530.17241	7500.00	4500.00	9949.063489
Hillforts	2000.00	23000.00	8676.470588	6500.00	5000.00	5200.353066
Industrial Sites	5500.00	30000.00	11083.33333	7750.00	N / A - All Unique	9324.251534
Ports	29000.00	29000.00	29000.00	29000.00	29000.00	N / A - One Value
C1st Roman Sites:						
Overall	500.00	38000.00	8599.369085	5500.00	500.00	8284.043659
Categorised - Size-Scale:						
Small	500.00	38000.00	9092.050209	6000.00	500.00	8757.823608
Medium	500.00	24500.00	7620.689655	5500.00	500.00	6370.488841
Large	500.00	24000.00	7454.545455	4750.00	500.00	7893.50108
Very Large	500.00	26000.00	7722.222222	5500.00	500.00	7880.51801
Categorised - Function:						
Agricultural Sites	500.00	38000.00	10130.76923	6000.00	3500.00	9582.404498
Domestic Settlements	500.00	34000.00	9390.00	6500.00	4500.00	8347.500932

Industrial Sites	500.00	30000.00	6691.176471	5000.00	2000.00	6282.509036
Military Sites	500.00	22500.00	5900.00	3500.00	500.00	6383.137508
Ports	500.00	29000.00	9875.00	2250.00	500.00	12191.18534
Villas	1500.00	10000.00	5600.00	4000.00	N / A - All Unique	3697.972417
C2nd Roman Sites:						
Overall	500.00	38000.00	8109.813084	5500.00	500.00	7755.988664
Categorised - Size-Scale:						
Small	500.00	38000.00	8392.241379	6000.00	500.00	7897.161247
Medium	500.00	24500.00	7741.37931	6500.00	500.00	6424.868939
Large	500.00	24000.00	6413.043478	3000.00	500.00	7543.287464
Very Large	500.00	26000.00	6375.00	3000.00	500.00	7342.954547
Categorised - Function:						
Agricultural Sites	500.00	38000.00	9313.186813	6000.00	5000.00	8810.236581
Domestic Settlements	500.00	34000.00	8898.477157	6500.00	500.00	7912.135326
Industrial Sites	500.00	30000.00	6285.714286	4750.00	500.00	5629.61336
Military Sites	500.00	22500.00	4385.714286	1000.00	500.00	5882.533611
Ports	500.00	29000.00	9875.00	2250.00	500.00	12191.18534
Towns	500.00	8000.00	2666.666667	1750.00	1500.00	2695.675549
Villas	1000.00	24000.00	8666.666667	7500.00	3500.00	6358.721045

Appendix 2.7: Statistical Data for Site Distribution – Pre-Roman Hillfort Proximity

Pre-Roman Sites:	**Minimum (m)**	**Maximum (m)**	**Mean (m)**	**Median (m)**	**Mode (m)**	**Standard Deviation**
Overall	500.00	51000.00	14694.17476	13000.00	500.00	11405.33316
Categorised - Size-Scale:						
Small	500.00	51000.00	16162.6506	15250.00	500.00	11300.33747

Medium	500.00	42500.00	6411.764706	500.00	500.00	10309.63641
Large	500.00	40000.00	13777.77778	10000.00	N / A - All Unique	11535.573
Very Large	500.00	23000.00	7928.571429	7250.00	500.00	7119.467198
Categorised - Function:						
Agricultural Sites	3500.00	47000.00	17071.42857	13500.00	16500.00	11496.82927
Domestic Settlements	500.00	51000.00	17159.48276	15500.00	15500.00	9634.539121
Hillforts	500.00	500.00	500.00	500.00	500.00	0.00
Industrial Sites	11000.00	45500.00	26750.00	27250.00	N / A - All Unique	13284.38933
Ports	22500.00	22500.00	22500.00	22500.00	22500.00	N / A - One Value

C1st Roman Sites:						
Overall	500.00	51000.00	16782.33438	14500.00	500.00	10856.94975
Categorised - Size-Scale:						
Small	500.00	51000.00	17918.41004	16000.00	500.00	10790.04346
Medium	500.00	42500.00	11810.34483	9500.00	500.00	11714.16556
Large	500.00	31500.00	13681.81818	12000.00	10000.00	7342.870618
Very Large	500.00	42000.00	14592.59259	12000.00	500.00	11090.56862
Categorised - Function:						
Agricultural Sites	500.00	47000.00	19061.53846	16500.00	5500.00	12004.07082
Domestic Settlements	500.00	51000.00	14736.66667	13500.00	500.00	10137.26209
Industrial Sites	2000.00	45500.00	22176.47059	21750.00	5500.00	10576.47644
Military Sites	500.00	42000.00	15563.63636	12000.00	31500.00	10413.2459
Ports	9000.00	42000.00	19812.50	17500.00	N / A - All Unique	10832.94413
Villas	10000.00	41500.00	28100.00	29000.00	N / A - All Unique	11485.86087

C2nd Roman Sites:						
Overall	500.00	51500.00	16948.59813	14500.00	12000.00	10415.1944
Categorised - Size-Scale:						
Small	500.00	51500.00	17344.82759	15500.00	12000.00	10307.88578
Medium	500.00	42500.00	13603.44828	11000.00	500.00	11566.87026
Large	500.00	41000.00	15739.13043	14500.00	10000.00	8821.293408
Very Large	500.00	42000.00	16482.14286	12750.00	11000.00	11503.20579
Categorised - Function:						
Agricultural Sites	3500.00	51500.00	19258.24176	16500.00	13500.00	11777.88951
Domestic Settlements	500.00	51000.00	15017.7665	13500.00	500.00	9766.583964
Industrial Sites	2000.00	45500.00	18278.57143	16000.00	12000.00	9189.485057
Military Sites	4000.00	42000.00	17971.42857	13500.00	9000.00	10481.73682
Ports	9000.00	42000.00	19812.50	17500.00	N / A - All Unique	10832.94413
Towns	4000.00	42000.00	16250.00	11750.00	N / A - All Unique	13981.23743
Villas	4500.00	41500.00	18023.80952	15500.00	4500.00	10734.84535

Appendix 2.8: Statistical Data for Site Distribution – C1st Roman Villa Proximity

Pre-Roman Sites:	**Minimum (m)**	**Maximum (m)**	**Mean (m)**	**Median (m)**	**Mode (m)**	**Standard Deviation**
Overall	500.00	117000.00	58740.29126	61500.00	63000.00	29714.44221
Categorised - Size-Scale:						
Small	500.00	117000.00	59021.08434	62750.00	63000.00	29444.41874
Medium	18000.00	96000.00	53676.47059	49000.00	29000.00	28200.14471
Large	2000.00	101000.00	65777.77778	64000.00	N / A - All Unique	31552.6456
Very Large	22000.00	115500.00	57035.71429	42250.00	N / A - All Unique	35441.97006

Categorised - Function:						
Agricultural Sites	500.00	112000.00	52969.38776	59500.00	28000.00	29538.35927
Domestic Settlements	500.00	117000.00	64810.34483	64000.00	63000.00	30055.43105
Hillforts	10000.00	108500.00	49132.35294	43750.00	29000.00	25098.083
Industrial Sites	10500.00	89500.00	46416.66667	48000.00	N / A - All Unique	28522.65182
Ports	38000.00	38000.00	38000.00	38000.00	38000.00	N / A - One Value
C1st Roman Sites:						
Overall	500.00	122500.00	54011.04101	53000.00	64000.00	30573.66655
Categorised - Size-Scale:						
Small	500.00	122500.00	54792.88703	59000.00	64000.00	30194.50239
Medium	500.00	111000.00	51086.2069	47500.00	500.00	31675.83265
Large	14000.00	120000.00	59727.27273	54000.00	N / A - All Unique	28918.08104
Very Large	1000.00	115500.00	45574.07407	36500.00	29500.00	33800.23433
Categorised - Function:						
Agricultural Sites	1000.00	100000.00	49330.76923	49000.00	64000.00	28922.88736
Domestic Settlements	1000.00	117000.00	61060.00	62750.00	64000.00	30374.11694
Industrial Sites	9000.00	122500.00	46000.00	47000.00	47000.00	23894.33811
Military Sites	2500.00	121000.00	49927.27273	46000.00	14000.00	32027.68163
Ports	1000.00	89500.00	43062.50	44250.00	N / A - All Unique	31941.28262
Villas	500.00	500.00	500.00	500.00	500.00	0.00
C2nd Roman Sites:						
Overall	500.00	123500.00	52504.6729	49500.00	64000.00	30118.8703
Categorised - Size-Scale:						
Small	500.00	123500.00	51836.2069	49750.00	64000.00	29435.67029
Medium	500.00	118500.00	53655.17241	47500.00	500.00	33333.56938

Large	14000.00	120000.00	64217.3913	64000.00	14000.00	29290.01773
Very Large	1000.00	115500.00	50000.00	42250.00	29500.00	35055.51153
Categorised - Function:						
Agricultural Sites	1000.00	118500.00	48554.94505	47500.00	61500.00	26896.45273
Domestic Settlements	1000.00	123500.00	58916.24365	62000.00	64000.00	30702.10456
Industrial Sites	7500.00	122500.00	44485.71429	47000.00	20500.00	23780.69663
Military Sites	3500.00	121000.00	54585.71429	52000.00	49000.00	31186.22568
Ports	1000.00	89500.00	43062.50	44250.00	N / A - All Unique	31941.28262
Towns	1000.00	112000.00	42500.00	24750.00	N / A - All Unique	47082.9056
Villas	500.00	115500.00	39190.47619	30000.00	500.00	37395.6803

Appendix 2.9: Statistical Data for Site Distribution – C2nd Roman Villa Proximity

Pre-Roman Sites:	**Minimum (m)**	**Maximum (m)**	**Mean (m)**	**Median (m)**	**Mode (m)**	**Standard Deviation**
Overall	500.00	55500.00	24686.8932	22500.00	20000.00	14729.60427
Categorised - Size-Scale:						
Small	500.00	55500.00	25957.83133	24500.00	20000.00	14726.64146
Medium	500.00	51500.00	24382.35294	22500.00	22500.00	15711.78838
Large	500.00	39000.00	14333.33333	9500.00	N / A - All Unique	13360.38922
Very Large	2000.00	36500.00	16642.85714	16250.00	N / A - All Unique	9505.926434
Categorised - Function:						
Agricultural Sites	500.00	53000.00	27612.2449	29000.00	500.00	16960.51337
Domestic Settlements	500.00	52500.00	23112.06897	21250.00	20000.00	13747.74072
Hillforts	5500.00	55500.00	26294.11765	25500.00	5500.00	14934.76605
Industrial Sites	6000.00	36000.00	23083.33333	27500.00	N / A - All Unique	12093.04208

Ports	19000.00	19000.00	19000.00	19000.00	19000.00	N / A - One Value
C1st Roman Sites:						
Overall	500.00	56500.00	24354.88959	22500.00	500.00	15102.74149
Categorised - Size-Scale:						
Small	500.00	56500.00	25251.04603	24000.00	500.00	15180.2112
Medium	500.00	51500.00	23965.51724	22500.00	500.00	16039.53321
Large	500.00	49000.00	25181.81818	23750.00	4000.00	16447.27902
Very Large	1000.00	36500.00	16166.66667	16500.00	16500.00	9460.443964
Categorised - Function:						
Agricultural Sites	500.00	56000.00	25184.61538	24500.00	500.00	16650.95935
Domestic Settlements	500.00	55500.00	25063.33333	23250.00	2000.00	14442.00351
Industrial Sites	5500.00	50500.00	26705.88235	26250.00	42500.00	13841.15386
Military Sites	500.00	56500.00	22790.90909	20000.00	21000.00	14683.92006
Ports	1000.00	47500.00	15312.50	10750.00	N / A - All Unique	15995.39554
Villas	500.00	500.00	500.00	500.00	500.00	0.00
C2nd Roman Sites:						
Overall	500.00	59000.00	23697.42991	22000.00	500.00	15432.2245
Categorised - Size-Scale:						
Small	500.00	59000.00	24635.05747	22750.00	500.00	15548.44176
Medium	500.00	48000.00	19879.31034	21000.00	500.00	15553.85527
Large	500.00	49000.00	22760.86957	20500.00	500.00	17145.01622
Very Large	1000.00	36500.00	16767.85714	16750.00	16500.00	9562.157419
Categorised - Function:						
Agricultural Sites	1000.00	56500.00	28318.68132	28500.00	47500.00	15899.42635
Domestic Settlements	1000.00	59000.00	23748.73096	21500.00	4500.00	14236.57839

Industrial Sites	4500.00	50500.00	25000.00	24000.00	5500.00	14076.65351
Military Sites	3500.00	56500.00	26342.85714	23500.00	4500.00	15742.77212
Ports	1000.00	47500.00	15312.50	10750.00	N / A - All Unique	15995.39554
Towns	1000.00	26500.00	13666.66667	15500.00	N / A - All Unique	10496.031
Villas	500.00	500.00	500.00	500.00	500.00	0.00

Appendix 2.10: Statistical Data for Site Distribution – C1st Roman Military Site Proximity

Pre-Roman Sites:	**Minimum (m)**	**Maximum (m)**	**Mean (m)**	**Median (m)**	**Mode (m)**	**Standard Deviation**
Overall	500.00	44000.00	12126.21359	9500.00	500.00	8607.064157
Categorised - Size-Scale:						
Small	500.00	44000.00	13147.59036	10750.00	4000.00	8758.245997
Medium	500.00	30000.00	10676.47059	10500.00	10500.00	7441.314519
Large	500.00	15500.00	6388.888889	5500.00	N / A - All Unique	4820.384955
Very Large	500.00	16000.00	5464.285714	5250.00	500.00	5051.52028
Categorised - Function:						
Agricultural Sites	500.00	32000.00	11234.69388	9000.00	500.00	8945.495864
Domestic Settlements	500.00	31500.00	12168.10345	10000.00	500.00	8260.683192
Hillforts	500.00	30000.00	11073.52941	10500.00	500.00	6841.420587
Industrial Sites	6000.00	44000.00	21583.33333	21500.00	21500.00	14287.81532
Ports	30000.00	30000.00	30000.00	30000.00	30000.00	N / A - One Value
C1st Roman Sites:						
Overall	500.00	44000.00	9507.886435	7500.00	500.00	8730.082264
Categorised - Size-Scale:						
Small	500.00	44000.00	10849.37238	8500.00	500.00	8971.729035

Medium	500.00	21000.00	6948.275862	5000.00	500.00	7072.765709
Large	500.00	27500.00	4522.727273	500.00	500.00	6880.748286
Very Large	500.00	16000.00	4444.444444	500.00	500.00	5086.432431
Categorised - Function:						
Agricultural Sites	1000.00	32000.00	12446.15385	9500.00	4500.00	8804.794094
Domestic Settlements	500.00	31500.00	11133.33333	9750.00	500.00	7519.475088
Industrial Sites	500.00	44000.00	10955.88235	7500.00	1000.00	10410.78087
Military Sites	500.00	500.00	500.00	500.00	500.00	0.00
Ports	500.00	30000.00	5875.00	500.00	500.00	10832.32596
Villas	2500.00	22000.00	12200.00	14000.00	N / A - All Unique	8878.34444

C2nd Roman Sites:						
Overall	500.00	46000.00	10047.8972	8500.00	500.00	8442.291789
Categorised - Size-Scale:						
Small	500.00	46000.00	10893.67816	9000.00	500.00	8564.228616
Medium	500.00	21000.00	7517.241379	5000.00	500.00	7300.29691
Large	500.00	27500.00	5521.73913	4000.00	500.00	6651.176008
Very Large	500.00	26500.00	5875.00	5250.00	500.00	6450.129198
Categorised - Function:						
Agricultural Sites	500.00	46000.00	13137.36264	10500.00	4500.00	9640.500775
Domestic Settlements	500.00	31500.00	10307.1066	9000.00	500.00	6948.854718
Industrial Sites	500.00	44000.00	11007.14286	9000.00	1000.00	9466.375604
Military Sites	500.00	24000.00	1357.142857	500.00	500.00	4090.108996
Ports	500.00	30000.00	5875.00	500.00	500.00	10832.32596
Towns	500.00	14000.00	2833.333333	500.00	500.00	5474.181826
Villas	500.00	22000.00	9166.666667	6500.00	3500.00	6417.424198

Appendix 2.11: Statistical Data for Site Distribution – C2nd Roman Military Site Proximity

Pre-Roman Sites:	Minimum (m)	Maximum (m)	Mean (m)	Median (m)	Mode (m)	Standard Deviation
Overall	500.00	50500.00	16191.74757	14500.00	9000.00	10561.70625
Categorised - Size-Scale:						
Small	500.00	50500.00	16846.38554	15000.00	9000.00	10757.05064
Medium	3500.00	32500.00	15588.23529	14500.00	5500.00	8848.084705
Large	500.00	22500.00	9055.555556	8500.00	N / A - All Unique	6559.556218
Very Large	500.00	34000.00	13750.00	9750.00	500.00	10950.50052
Categorised - Function:						
Agricultural Sites	500.00	47000.00	15214.28571	12000.00	9000.00	11435.50757
Domestic Settlements	500.00	45500.00	16081.89655	15750.00	22000.00	10195.89516
Hillforts	4000.00	34000.00	15838.23529	14500.00	7000.00	8266.141774
Industrial Sites	7000.00	50500.00	26000.00	23250.00	N / A - All Unique	17666.3522
Ports	30000.00	30000.00	30000.00	30000.00	30000.00	N / A - One Value
C1st Roman Sites:						
Overall	500.00	50500.00	13194.00631	12000.00	500.00	10675.56933
Categorised - Size-Scale:						
Small	500.00	50500.00	14020.9205	12500.00	500.00	10866.04754
Medium	500.00	32500.00	11862.06897	11500.00	500.00	9629.657085
Large	500.00	22500.00	7681.818182	6250.00	500.00	7602.545712
Very Large	500.00	35000.00	11796.2963	7000.00	500.00	11036.00685
Categorised - Function:						
Agricultural Sites	2000.00	47000.00	16192.30769	13000.00	9000.00	10862.66984
Domestic Settlements	500.00	45500.00	14446.66667	13750.00	18500.00	9376.027311

Industrial Sites	500.00	50500.00	12838.23529	9250.00	1000.00	12123.5562
Military Sites	500.00	35000.00	6681.818182	500.00	500.00	9673.543357
Ports	500.00	30000.00	6312.50	500.00	500.00	10653.42835
Villas	3500.00	22000.00	12600.00	14000.00	N / A - All Unique	8362.116957
C2nd Roman Sites:						
Overall	500.00	50500.00	13079.43925	12000.00	500.00	10025.82135
Categorised - Size-Scale:						
Small	500.00	50500.00	13873.56322	12500.00	500.00	10056.17318
Medium	500.00	32500.00	11396.55172	9500.00	500.00	9574.313954
Large	500.00	24000.00	7217.391304	4500.00	500.00	7664.597017
Very Large	500.00	34000.00	9767.857143	6250.00	500.00	9759.593706
Categorised - Function:						
Agricultural Sites	500.00	50500.00	16082.41758	14500.00	4500.00	11009.91062
Domestic Settlements	500.00	45500.00	13944.16244	13000.00	18500.00	8743.47739
Industrial Sites	500.00	50500.00	13957.14286	12500.00	25000.00	10388.72816
Military Sites	500.00	500.00	500.00	500.00	500.00	0.00
Ports	500.00	30000.00	6312.50	500.00	500.00	10653.42835
Towns	1000.00	28500.00	13833.33333	15250.00	N / A - All Unique	10102.80489
Villas	3500.00	30500.00	12357.14286	9500.00	5000.00	8168.755807

Appendix 2.12: Statistical Data for Site Distribution – C2nd Roman Town Proximity

Pre-Roman Sites:	**Minimum (m)**	**Maximum (m)**	**Mean (m)**	**Median (m)**	**Mode (m)**	**Standard Deviation**
Overall	500.00	72000.00	36155.33981	35500.00	64000.00	18250.69716
Categorised - Size-Scale:						
Small	1000.00	72000.00	36126.50602	34750.00	64000.00	18761.31471

Medium	18000.00	67500.00	40382.35294	46000.00	N / A - All Unique	16646.63011
Large	3500.00	54500.00	35555.55556	42000.00	N / A - All Unique	16659.16498
Very Large	500.00	47500.00	31750.00	34750.00	42000.00	15120.98644
Categorised - Function:						
Agricultural Sites	500.00	72000.00	34153.06122	30500.00	64000.00	19991.97862
Domestic Settlements	2500.00	67500.00	36224.13793	35500.00	23000.00	17300.83497
Hillforts	4000.00	70000.00	38029.41176	39250.00	32500.00	19214.47575
Industrial Sites	9500.00	63000.00	40333.33333	48250.00	N / A - All Unique	20348.62813
Ports	37500.00	37500.00	37500.00	37500.00	37500.00	N / A - One Value

C1st Roman Sites:

Overall	500.00	77000.00	35127.76025	33500.00	500.00	18948.80475
Categorised - Size-Scale:						
Small	500.00	77000.00	35759.41423	33000.00	64000.00	19057.89679
Medium	500.00	71000.00	34982.75862	41000.00	500.00	20393.22487
Large	5000.00	77000.00	37977.27273	42250.00	44500.00	17285.05911
Very Large	500.00	54000.00	27370.37037	28500.00	500.00	16642.50385
Categorised - Function:						
Agricultural Sites	3000.00	72000.00	34538.46154	30000.00	64000.00	19702.33721
Domestic Settlements	500.00	71000.00	35086.66667	34250.00	46500.00	17136.32143
Industrial Sites	7500.00	76500.00	41955.88235	41500.00	22500.00	20414.03544
Military Sites	500.00	77000.00	32545.45455	32000.00	500.00	19753.63837
Ports	500.00	77000.00	29187.50	33000.00	500.00	27412.11606
Villas	1000.00	38500.00	15700.00	16500.00	N / A - All Unique	15242.21113

C2nd Roman Sites:

Overall	500.00	77000.00	34306.07477	32500.00	500.00	18736.45673

Categorised - Size-Scale:						
Small	500.00	77000.00	34810.34483	32500.00	47000.00	18922.33351
Medium	500.00	71000.00	34293.10345	38500.00	500.00	18165.17333
Large	8000.00	77000.00	35847.82609	36000.00	N / A - All Unique	17280.72677
Very Large	500.00	54000.00	26785.71429	29250.00	500.00	17341.57313
Categorised - Function:						
Agricultural Sites	3000.00	76500.00	39719.78022	39500.00	64000.00	19700.00124
Domestic Settlements	500.00	71000.00	32634.51777	31500.00	31500.00	16595.3776
Industrial Sites	1000.00	76500.00	36285.71429	34500.00	22000.00	19948.22491
Military Sites	1000.00	77000.00	37671.42857	41000.00	14000.00	18603.81952
Ports	500.00	77000.00	29187.50	33000.00	500.00	27412.11606
Towns	500.00	500.00	500.00	500.00	500.00	0.00
Villas	1000.00	48500.00	25928.57143	26500.00	20000.00	14281.35648

Appendix Three:

Results of Statistical Analysis for Normality of Distribution in Site Samples Categorised by Period, Size and Function

Appendix 3.1: Results of Shapiro-Wilk Normality Test – Elevation

Pre-Roman Sites:	**Shapiro-Wilk Normality Test**	**Normal Distribution: Yes/No**
Overall	W = 0.60759, p-value < 2.2e-16	
Categorised - Size:		
Small	W = 19822, p-value = 0.9892	
Medium	W = 0.69702, p-value = 0.000107	
Large	W = 0.8054, p-value = 0.02353	
Very Large	W = 0.7746, p-value = 0.002463	
Categorised - Function:		
Agricultural Sites	W = 0.72718, p-value = 3.299e-08	
Domestic Settlements	W = 0.64223, p-value = 2.08e-15	
Hillforts	W = 0.85447, p-value = 0.0003528	

Industrial Sites	W = 0.49609, p-value = 2.073e-05	
Ports	Unable to determine - Sample of < 3	

C1st Roman Sites:		
Overall	W = 0.68138, p-value < 2.2e-16	
Categorised - Size-Scale:		
Small	W = 0.66276, p-value < 2.2e-16	
Medium	W = 0.79836, p-value = 7.808e-05	
Large	W = 0.55093, p-value = 4.102e-07	
Very Large	W = 0.76537, p-value = 3.639e-05	
Categorised - Function:		
Agricultural Sites	W = 0.64635, p-value = 3.063e-11	
Domestic Settlements	W = 0.63225, p-value < 2.2e-16	
Industrial Sites	W = 0.78255, p-value = 1.199e-05	
Military Sites	W = 0.79682, p-value = 2.833e-07	
Ports	W = 0.79758, p-value = 0.02697	
Villas	W = 0.88104, p-value = 0.314	

C2nd Roman Sites:		
Overall	W = 0.73231, p-value < 2.2e-16	
Categorised - Size:		
Small	W = 0.71192, p-value < 2.2e-16	
Medium	W = 0.88573, p-value = 0.004536	
Large	W = 0.60593, p-value = 1.049e-06	
Very Large	W = 0.75717, p-value = 2.048e-05	
Categorised - Function:		
Agricultural Sites	W = 0.74911, p-value = 3.62e-11	
Domestic Settlements	W = 0.70587, p-value < 2.2e-16	
Industrial Sites	W = 0.68376, p-value = 5.388e-11	
Military Sites	W = 0.76927, p-value = 5.382e-06	
Ports	W = 0.79758, p-value = 0.02697	
Towns	W = 0.93341, p-value = 0.6067	
Villas	W = 0.87901, p-value = 0.014	

Appendix 3.2: Results of Shapiro-Wilk Normality Test – Slope

Pre-Roman Sites:	**Shapiro-Wilk Normality Test**	**Normal Distribution: Yes/No**
Overall	W = 0.70975, p-value < 2.2e-16	
Categorised - Size:		
Small	W = 0.68692, p-value < 2.2e-16	
Medium	W = 0.84085, p-value = 0.007802	
Large	W = 0.78502, p-value = 0.01376	
Very Large	W = 0.6732, p-value = 0.0001977	
Categorised - Function:		
Agricultural Sites	W = 0.7088, p-value = 1.507e-08	
Domestic Settlements	W = 0.68297, p-value = 2.018e-14	

Hillforts	W = 0.80364, p-value = 2.407e-05	
Industrial Sites	W = 0.49609, p-value = 2.073e-05	
Ports	Unable to determine - Sample of <3	
C1st Roman Sites:		
Overall	W = 0.58982, p-value < 2.2e-16	
Categorised - Size:		
Small	W = 0.53953, p-value < 2.2e-16	
Medium	W = 0.78223, p-value = 4.076e-05	
Large	W = 0.68176, p-value = 5.836e-06	
Very Large	W = 0.66441, p-value = 1.791e-06	
Categorised - Function:		
Agricultural Sites	W = 0.66184, p-value = 5.833e-11	
Domestic Settlements	W = 0.69077, p-value = 2.277e-16	
Industrial Sites	W = 0.60857, p-value = 2.532e-08	
Military Sites	W = 0.74861, p-value = 2.395e-08	
Ports	W = 0.83716, p-value = 0.07043	
Villas	W = 0.76672, p-value = 0.0422	
C2nd Roman Sites:		
Overall	W = 0.60113, p-value < 2.2e-16	
Categorised - Size:		
Small	W = 0.5795, p-value < 2.2e-16	
Medium	W = 0.65625, p-value = 5.258e-07	
Large	W = 0.66283, p-value = 4.784e-06	
Very Large	W = 0.63024, p-value = 3.387e-07	
Categorised - Function:		
Agricultural Sites	W = 0.72016, p-value = 7.064e-12	
Domestic Settlements	W = 0.70098, p-value < 2.2e-16	
Industrial Sites	W = 0.53909, p-value = 1.734e-13	
Military Sites	W = 0.76851, p-value = 5.213e-06	
Ports	W = 0.83716, p-value = 0.07043	
Towns	W = 0.49609, p-value = 2.073e-05	
Villas	W = 0.8092, p-value = 0.0009102	

Appendix 3.3: Results of Shapiro-Wilk Normality Test – Aspect

Pre-Roman Sites:	**Shapiro-Wilk Normality Test**	**Normal Distribution: Yes/No**
Overall	W = 0.94118, p-value = 2.053e-07	
Categorised - Size:		
Small	W = 0.94088, p-value = 2.178e-06	
Medium	W = 0.89204, p-value = 0.05008	
Large	W = 0.86409, p-value = 0.1062	
Very Large	W = 0.9499, p-value = 0.5592	
Categorised - Function:		
Agricultural Sites	W = 0.94382, p-value = 0.02089	
Domestic Settlements	W = 0.94672, p-value = 0.0001763	

Hillforts	W = 0.86192, p-value = 0.0004351	
Industrial Sites	W = 0.75114, p-value = 0.02044	
Ports	Unable to determine - Sample of < 3	
C1st Roman Sites:		
Overall	W = 0.94441, p-value = 1.491e-09	
Categorised - Size:		
Small	W = 0.94719, p-value = 1.278e-07	
Medium	W = 0.91347, p-value = 0.0209	
Large	W = 0.8832, p-value = 0.01391	
Very Large	W = 0.92981, p-value = 0.06837	
Categorised - Function:		
Agricultural Sites	W = 0.94237, p-value = 0.004499	
Domestic Settlements	W = 0.94477, p-value = 1.235e-05	
Industrial Sites	W = 0.9483, p-value = 0.1092	
Military Sites	W = 0.91217, p-value = 0.0006787	
Ports	W = 0.9056, p-value = 0.3241	
Villas	W = 0.96086, p-value = 0.814	
C2nd Roman Sites:		
Overall	W = 0.942, p-value = 6.999e-12	
Categorised - Size:		
Small	W = 0.94402, p-value = 3.378e-10	
Medium	W = 0.92014, p-value = 0.03073	
Large	W = 0.91314, p-value = 0.04759	
Very Large	W = 0.92742, p-value = 0.05309	
Categorised - Function:		
Agricultural Sites	W = 0.94573, p-value = 0.0008538	
Domestic Settlements	W = 0.93782, p-value = 1.783e-07	
Industrial Sites	W = 0.91778, p-value = 0.0002107	
Military Sites	W = 0.89825, p-value = 0.00355	
Ports	W = 0.9056, p-value = 0.3241	
Towns	W = 0.945, p-value = 0.6997	
Villas	W = 0.89631, p-value = 0.0297	

Appendix 3.4: Results of Shapiro-Wilk Normality Test – Navigable Waterway Proximity

Pre-Roman Sites:	**Shapiro-Wilk Normality Test**	**Normal Distribution: Yes/No**
Overall	W = 0.90102, p-value = 1.885e-10	
Categorised - Size-Scale:		
Small	W = 0.89906, p-value = 3.074e-09	
Medium	W = 0.87803, p-value = 0.02955	
Large	W = 0.88166, p-value = 0.1635	
Very Large	W = 0.92446, p-value = 0.2548	
Categorised - Function:		

Agricultural Sites	W = 0.88875, p-value = 0.0002406	
Domestic Settlements	W = 0.88617, p-value = 6.149e-08	
Hillforts	W = 0.93505, p-value = 0.04399	
Industrial Sites	W = 0.90501, p-value = 0.4044	
Ports	Unable to determine - Sample of < 3	

C1st Roman Sites:		
Overall	W = 0.85675, p-value < 2.2e-16	
Categorised - Size-Scale:		
Small	W = 0.85986, p-value = 5.9e-14	
Medium	W = 0.92434, p-value = 0.03933	
Large	W = 0.71926, p-value = 3.475e-05	
Very Large	W = 0.8029, p-value = 0.0001537	
Categorised - Function:		
Agricultural Sites	W = 0.86574, p-value = 4.429e-06	
Domestic Settlements	W = 0.87615, p-value = 7.31e-10	
Industrial Sites	W = 0.85167, p-value = 0.000305	
Military Sites	W = 0.77619, p-value = 9.46e-08	
Ports	W = 0.66466, p-value = 0.0008917	
Villas	W = 0.87657, p-value = 0.2941	

C2nd Roman Sites:		
Overall	W = 0.87385, p-value < 2.2e-16	
Categorised - Size-Scale:		
Small	W = 0.87969, p-value = 7.295e-16	
Medium	W = 0.94034, p-value = 0.1024	
Large	W = 0.73478, p-value = 4.098e-05	
Very Large	W = 0.75791, p-value = 2.104e-05	
Categorised - Function:		
Agricultural Sites	W = 0.86851, p-value = 1.792e-07	
Domestic Settlements	W = 0.88897, p-value = 6.646e-11	
Industrial Sites	W = 0.87963, p-value = 6.652e-06	
Military Sites	W = 0.72577, p-value = 9.596e-07	
Ports	W = 0.66466, p-value = 0.0008917	
Towns	W = 0.79689, p-value = 0.0551	
Villas	W = 0.88485, p-value = 0.01799	

Appendix 3.5: Results of Shapiro-Wilk Normality Test – Roman Road Proximity

Pre-Roman Sites:	**Shapiro-Wilk Normality Test**	**Normal Distribution: Yes/No**
Overall	W = 0.77837, p-value = 2.316e-16	
Categorised - Size-Scale:		
Small	W = 0.78951, p-value = 3.507e-14	
Medium	W = 0.82808, p-value = 0.005055	
Large	W = 0.70741, p-value = 0.001732	

Very Large	W = 0.70561, p-value = 0.0004226	
Categorised - Function:		
Agricultural Sites	W = 0.7272, p-value = 3.302e-08	
Domestic Settlements	W = 0.79003, p-value = 1.386e-11	
Hillforts	W = 0.85612, p-value = 0.0003847	
Industrial Sites	W = 0.66121, p-value = 0.00235	
Ports	Unable to determine - Sample of < 3	

C1st Roman Sites:		
Overall	W = 0.70673, p-value < 2.2e-16	
Categorised - Size-Scale:		
Small	W = 0.72482, p-value < 2.2e-16	
Medium	W = 0.73643, p-value = 7.33e-06	
Large	W = 0.57443, p-value = 7.126e-07	
Very Large	W = 0.63934, p-value = 6.169e-07	
Categorised - Function:		
Agricultural Sites	W = 0.74663, p-value = 2.968e-09	
Domestic Settlements	W = 0.74706, p-value = 8.785e-15	
Industrial Sites	W = 0.66395, p-value = 1.44e-07	
Military Sites	W = 0.46508, p-value = 7.298e-13	
Ports	W = 0.4184, p-value = 1.047e-06	
Villas	W = 0.81069, p-value = 0.09875	

C2nd Roman Sites:		
Overall	W = 0.70546, p-value < 2.2e-16	
Categorised - Size-Scale:		
Small	W = 0.72277, p-value < 2.2e-16	
Medium	W = 0.66553, p-value = 6.989e-07	
Large	W = 0.48487, p-value = 6.164e-08	
Very Large	W = 0.54481, p-value = 3.414e-08	
Categorised - Function:		
Agricultural Sites	W = 0.72125, p-value = 7.495e-12	
Domestic Settlements	W = 0.75097, p-value < 2.2e-16	
Industrial Sites	W = 0.7182, p-value = 2.737e-10	
Military Sites	W = 0.34548, p-value = 2.389e-11	
Ports	W = 0.4184, p-value = 1.047e-06	
Towns	Unable to determine - Values identical	
Villas	W = 0.90417, p-value = 0.04219	

Appendix 3.6: Results of Shapiro-Wilk Normality Test – Road / River Intersection Proximity

Pre-Roman Sites:	**Shapiro-Wilk Normality Test**	**Normal Distribution: Yes/No**
Overall	W = 0.83055, p-value = 3.138e-14	
Categorised - Size-Scale:		
Small	W = 0.81685, p-value = 3.734e-13	

Medium	W = 0.85049, p-value = 0.01091	
Large	W = 0.86867, p-value = 0.119	
Very Large	W = 0.90655, p-value = 0.1404	
Categorised - Function:		
Agricultural Sites	W = 0.76094, p-value = 1.524e-07	
Domestic Settlements	W = 0.85457, p-value = 2.658e-09	
Hillforts	W = 0.88328, p-value = 0.001708	
Industrial Sites	W = 0.60506, p-value = 0.0005277	
Ports	Unable to determine - Sample of < 3	
C1st Roman Sites:		
Overall	W = 0.83501, p-value < 2.2e-16	
Categorised - Size-Scale:		
Small	W = 0.82082, p-value = 6.776e-16	
Medium	W = 0.89937, p-value = 0.00946	
Large	W = 0.82936, p-value = 0.001496	
Very Large	W = 0.83149, p-value = 0.0005063	
Categorised - Function:		
Agricultural Sites	W = 0.81172, p-value = 1.136e-07	
Domestic Settlements	W = 0.84242, p-value = 2.135e-11	
Industrial Sites	W = 0.83082, p-value = 0.0001073	
Military Sites	W = 0.81723, p-value = 8.973e-07	
Ports	W = 0.74865, p-value = 0.007893	
Villas	W = 0.8899, p-value = 0.3566	
C2nd Roman Sites:		
Overall	W = 0.82879, p-value < 2.2e-16	
Categorised - Size-Scale:		
Small	W = 0.81923, p-value < 2.2e-16	
Medium	W = 0.90368, p-value = 0.01201	
Large	W = 0.78516, p-value = 0.0002239	
Very Large	W = 0.77862, p-value = 4.585e-05	
Categorised - Function:		
Agricultural Sites	W = 0.78728, p-value = 3.841e-10	
Domestic Settlements	W = 0.84396, p-value = 2.875e-13	
Industrial Sites	W = 0.85963, p-value = 1.37e-06	
Military Sites	W = 0.71005, p-value = 5.355e-07	
Ports	W = 0.74865, p-value = 0.007893	
Towns	W = 0.72916, p-value = 0.01236	
Villas	W = 0.89084, p-value = 0.02334	

Appendix 3.7: Results of Shapiro-Wilk Normality Test – Pre-Roman Hillfort Proximity

Pre-Roman Sites:	**Shapiro-Wilk Normality Test**	**Normal Distribution: Yes/No**
Overall	W = 0.93673, p-value = 8.386e-08	

Categorised - Size-Scale:		
Small	W = 0.95638, p-value = 4.795e-05	
Medium	W = 0.60389, p-value = 1.136e-05	
Large	W = 0.86467, p-value = 0.1077	
Very Large	W = 0.89791, p-value = 0.1052	
Categorised - Function:		
Agricultural Sites	W = 0.90574, p-value = 0.0008504	
Domestic Settlements	W = 0.95428, p-value = 0.000579	
Hillforts	Unable to determine - Values identical	
Industrial Sites	W = 0.95786, p-value = 0.8031	
Ports	Unable to determine - Sample of < 3	

C1st Roman Sites:		
Overall	W = 0.95699, p-value = 4.943e-08	
Categorised - Size-Scale:		
Small	W = 0.96686, p-value = 2.332e-05	
Medium	W = 0.83089, p-value = 0.0003153	
Large	W = 0.96234, p-value = 0.538	
Very Large	W = 0.92635, p-value = 0.05627	
Categorised - Function:		
Agricultural Sites	W = 0.93839, p-value = 0.00292	
Domestic Settlements	W = 0.94953, p-value = 2.996e-05	
Industrial Sites	W = 0.98125, p-value = 0.8112	
Military Sites	W = 0.89201, p-value = 0.0001328	
Ports	W = 0.8761, p-value = 0.1728	
Villas	W = 0.92914, p-value = 0.5905	

C2nd Roman Sites:		
Overall	W = 0.9468, p-value = 2.845e-11	
Categorised - Size-Scale:		
Small	W = 0.9494, p-value = 1.488e-09	
Medium	W = 0.86296, p-value = 0.001421	
Large	W = 0.93081, p-value = 0.1139	
Very Large	W = 0.93395, p-value = 0.07757	
Categorised - Function:		
Agricultural Sites	W = 0.92116, p-value = 3.732e-05	
Domestic Settlements	W = 0.94983, p-value = 2.139e-06	
Industrial Sites	W = 0.95105, p-value = 0.00823	
Military Sites	W = 0.90425, p-value = 0.005153	
Ports	W = 0.8761, p-value = 0.1728	
Towns	W = 0.84723, p-value = 0.1495	
Villas	W = 0.93583, p-value = 0.1801	

Appendix 3.8: Results of Shapiro-Wilk Normality Test – C1st Roman Villa Proximity

Pre-Roman Sites:	Shapiro-Wilk Normality Test	Normal Distribution: Yes/No
Overall	W = 0.97604, p-value = 0.001374	
Categorised - Size-Scale:		
Small	W = 0.96994, p-value = 0.001136	
Medium	W = 0.87235, p-value = 0.02395	
Large	W = 0.91612, p-value = 0.3611	
Very Large	W = 0.77992, p-value = 0.002848	
Categorised - Function:		
Agricultural Sites	W = 0.96114, p-value = 0.1055	
Domestic Settlements	W = 0.96632, p-value = 0.005153	
Hillforts	W = 0.93451, p-value = 0.04239	
Industrial Sites	W = 0.96402, p-value = 0.8501	
Ports	Unable to determine - Sample of < 3	
C1st Roman Sites:		
Overall	W = 0.97719, p-value = 6.262e-05	
Categorised - Size-Scale:		
Small	W = 0.9761, p-value = 0.0004617	
Medium	W = 0.94207, p-value = 0.1136	
Large	W = 0.96325, p-value = 0.5576	
Very Large	W = 0.88351, p-value = 0.005726	
Categorised - Function:		
Agricultural Sites	W = 0.94939, p-value = 0.009885	
Domestic Settlements	W = 0.97443, p-value = 0.006726	
Industrial Sites	W = 0.9339, p-value = 0.04067	
Military Sites	W = 0.93758, p-value = 0.006734	
Ports	W = 0.95006, p-value = 0.7118	
Villas	Unable to determine - Values identical	
C2nd Roman Sites:		
Overall	W = 0.97641, p-value = 2.009e-06	
Categorised - Size-Scale:		
Small	W = 0.97701, p-value = 2.372e-05	
Medium	W = 0.93876, p-value = 0.09306	
Large	W = 0.97302, p-value = 0.7607	
Very Large	W = 0.92461, p-value = 0.04516	
Categorised - Function:		
Agricultural Sites	W = 0.97777, p-value = 0.1216	
Domestic Settlements	W = 0.97361, p-value = 0.0009018	
Industrial Sites	W = 0.93258, p-value = 0.0009854	
Military Sites	W = 0.96329, p-value = 0.2863	
Ports	W = 0.95006, p-value = 0.7118	
Towns	W = 0.84487, p-value = 0.143	
Villas	W = 0.88126, p-value = 0.01542	

Appendix 3.9: Results of Shapiro-Wilk Normality Test – C2nd Roman Villa Proximity

Pre-Roman Sites:	Shapiro-Wilk Normality Test	Normal Distribution: Yes/No
Overall	W = 0.96119, p-value = 2.012e-05	
Categorised - Size-Scale:		
Small	W = 0.96366, p-value = 0.0002466	
Medium	W = 0.95261, p-value = 0.4992	
Large	W = 0.89416, p-value = 0.2201	
Very Large	W = 0.96549, p-value = 0.8113	
Categorised - Function:		
Agricultural Sites	W = 0.93049, p-value = 0.006402	
Domestic Settlements	W = 0.95848, p-value = 0.001209	
Hillforts	W = 0.93309, p-value = 0.0385	
Industrial Sites	W = 0.88824, p-value = 0.309	
Ports	Unable to determine - Sample of < 3	
C1st Roman Sites:		
Overall	W = 0.96054, p-value = 1.479e-07	
Categorised - Size-Scale:		
Small	W = 0.96299, p-value = 7.526e-06	
Medium	W = 0.93728, p-value = 0.08511	
Large	W = 0.92149, p-value = 0.08163	
Very Large	W = 0.95966, p-value = 0.3631	
Categorised - Function:		
Agricultural Sites	W = 0.94291, p-value = 0.004775	
Domestic Settlements	W = 0.96684, p-value = 0.001104	
Industrial Sites	W = 0.93193, p-value = 0.03562	
Military Sites	W = 0.94129, p-value = 0.009649	
Ports	W = 0.85629, p-value = 0.1102	
Villas	Unable to determine - Values identical	
C2nd Roman Sites:		
Overall	W = 0.95702, p-value = 7.594e-10	
Categorised - Size-Scale:		
Small	W = 0.95808, p-value = 2.036e-08	
Medium	W = 0.90118, p-value = 0.01046	
Large	W = 0.89831, p-value = 0.02334	
Very Large	W = 0.96537, p-value = 0.4633	
Categorised - Function:		
Agricultural Sites	W = 0.95268, p-value = 0.002296	
Domestic Settlements	W = 0.95873, p-value = 1.674e-05	
Industrial Sites	W = 0.93137, p-value = 0.0008643	
Military Sites	W = 0.94179, p-value = 0.06347	
Ports	W = 0.85629, p-value = 0.1102	
Towns	W = 0.90955, p-value = 0.4334	
Villas	Unable to determine - Values identical	

Appendix 3.10: Results of Shapiro-Wilk Normality Test – C1st Roman Military Site Proximity

Pre-Roman Sites:	Shapiro-Wilk Normality Test	Normal Distribution: Yes/No
Overall	W = 0.92833, p-value = 1.7e-08	
Categorised - Size-Scale:		
Small	W = 0.93211, p-value = 4.582e-07	
Medium	W = 0.92908, p-value = 0.21	
Large	W = 0.94679, p-value = 0.6549	
Very Large	W = 0.85215, p-value = 0.02376	
Categorised - Function:		
Agricultural Sites	W = 0.86944, p-value = 6.357e-05	
Domestic Settlements	W = 0.94166, p-value = 7.401e-05	
Hillforts	W = 0.94085, p-value = 0.06536	
Industrial Sites	W = 0.92631, p-value = 0.552	
Ports	Unable to determine - Sample of < 3	
C1st Roman Sites:		
Overall	W = 0.88955, p-value = 2.205e-14	
Categorised - Size-Scale:		
Small	W = 0.91442, p-value = 1.759e-10	
Medium	W = 0.8304, p-value = 0.0003085	
Large	W = 0.66335, p-value = 6.925e-06	
Very Large	W = 0.77648, p-value = 5.501e-05	
Categorised - Function:		
Agricultural Sites	W = 0.89035, p-value = 3.102e-05	
Domestic Settlements	W = 0.94633, p-value = 1.644e-05	
Industrial Sites	W = 0.84612, p-value = 0.0002295	
Military Sites	Unable to determine - Values identical	
Ports	W = 0.59567, p-value = 0.0001415	
Villas	W = 0.88469, p-value = 0.3311	
C2nd Roman Sites:		
Overall	W = 0.90615, p-value = 1.325e-15	
Categorised - Size-Scale:		
Small	W = 0.9163, p-value = 5.297e-13	
Medium	W = 0.83833, p-value = 0.0004417	
Large	W = 0.76987, p-value = 0.0001311	
Very Large	W = 0.81544, p-value = 0.0002023	
Categorised - Function:		
Agricultural Sites	W = 0.89845, p-value = 3.098e-06	
Domestic Settlements	W = 0.9491, p-value = 1.822e-06	
Industrial Sites	W = 0.89466, p-value = 2.402e-05	
Military Sites	W = 0.22035, p-value = 1.921e-12	
Ports	W = 0.59567, p-value = 0.0001415	
Towns	W = 0.51925, p-value = 4.292e-05	
Villas	W = 0.90551, p-value = 0.04481	

Appendix 3.11: Results of Shapiro-Wilk Normality Test – C2nd Roman Military Site Proximity

Pre-Roman Sites:	Shapiro-Wilk Normality Test	Normal Distribution: Yes/No
Overall	W = 0.93448, p-value = 5.403e-08	
Categorised - Size-Scale:		
Small	W = 0.93056, p-value = 3.52e-07	
Medium	W = 0.94731, p-value = 0.4153	
Large	W = 0.92635, p-value = 0.4474	
Very Large	W = 0.91113, p-value = 0.1636	
Categorised - Function:		
Agricultural Sites	W = 0.87956, p-value = 0.0001261	
Domestic Settlements	W = 0.94475, p-value = 0.00012	
Hillforts	W = 0.91621, p-value = 0.01264	
Industrial Sites	W = 0.91671, p-value = 0.482	
Ports	Unable to determine - Sample of < 3	
C1st Roman Sites:		
Overall	W = 0.92224, p-value = 8.931e-12	
Categorised - Size-Scale:		
Small	W = 0.92557, p-value = 1.34e-09	
Medium	W = 0.9134, p-value = 0.02082	
Large	W = 0.85259, p-value = 0.003773	
Very Large	W = 0.87891, p-value = 0.00455	
Categorised - Function:		
Agricultural Sites	W = 0.89744, p-value = 5.666e-05	
Domestic Settlements	W = 0.95027, p-value = 3.447e-05	
Industrial Sites	W = 0.83686, p-value = 0.0001443	
Military Sites	W = 0.68128, p-value = 1.203e-09	
Ports	W = 0.65044, p-value = 0.0006123	
Villas	W = 0.89202, p-value = 0.3674	
C2nd Roman Sites:		
Overall	W = 0.92898, p-value = 2.223e-13	
Categorised - Size-Scale:		
Small	W = 0.93249, p-value = 1.864e-11	
Medium	W = 0.90703, p-value = 0.01449	
Large	W = 0.83549, p-value = 0.001501	
Very Large	W = 0.8588, p-value = 0.001415	
Categorised - Function:		
Agricultural Sites	W = 0.90278, p-value = 4.856e-06	
Domestic Settlements	W = 0.9616, p-value = 3.407e-05	
Industrial Sites	W = 0.91553, p-value = 0.0001686	
Military Sites	Unable to determine - Values identical	
Ports	W = 0.65044, p-value = 0.0006123	
Towns	W = 0.95817, p-value = 0.8055	
Villas	W = 0.89324, p-value = 0.02594	

Appendix 3.12: Results of Shapiro-Wilk Normality Test – C2nd Roman Town Proximity

Pre-Roman Sites:	Shapiro-Wilk Normality Test	Normal Distribution: Yes/No
Overall	W = 0.97011, p-value = 0.0002289	
Categorised - Size-Scale:		
Small	W = 0.96019, p-value = 0.000111	
Medium	W = 0.88967, p-value = 0.04575	
Large	W = 0.91869, p-value = 0.3815	
Very Large	W = 0.8915, p-value = 0.08496	
Categorised - Function:		
Agricultural Sites	W = 0.95302, p-value = 0.04899	
Domestic Settlements	W = 0.96904, p-value = 0.008712	
Hillforts	W = 0.96001, p-value = 0.2433	
Industrial Sites	W = 0.89113, p-value = 0.3241	
Ports	Unable to determine - Sample of < 3	
C1st Roman Sites:		
Overall	W = 0.97998, p-value = 0.0002082	
Categorised - Size-Scale:		
Small	W = 0.97393, p-value = 0.0002199	
Medium	W = 0.94437, p-value = 0.1305	
Large	W = 0.97519, p-value = 0.8269	
Very Large	W = 0.92923, p-value = 0.06619	
Categorised - Function:		
Agricultural Sites	W = 0.93873, p-value = 0.003028	
Domestic Settlements	W = 0.97972, p-value = 0.02582	
Industrial Sites	W = 0.9388, p-value = 0.05678	
Military Sites	W = 0.97236, p-value = 0.2344	
Ports	W = 0.89272, p-value = 0.248	
Villas	W = 0.91423, p-value = 0.4934	
C2nd Roman Sites:		
Overall	W = 0.98033, p-value = 1.476e-05	
Categorised - Size-Scale:		
Small	W = 0.97662, p-value = 2e-05	
Medium	W = 0.96369, p-value = 0.4036	
Large	W = 0.96311, p-value = 0.529	
Very Large	W = 0.91528, p-value = 0.02656	
Categorised - Function:		
Agricultural Sites	W = 0.96056, p-value = 0.007502	
Domestic Settlements	W = 0.9822, p-value = 0.01337	
Industrial Sites	W = 0.946, p-value = 0.0045	
Military Sites	W = 0.98152, p-value = 0.8076	
Ports	W = 0.89272, p-value = 0.248	
Towns	Unable to determine - Values identical	
Villas	W = 0.96195, p-value = 0.5562	

Appendix Four:

Results of Statistical Analysis for Correlation Between Site Samples Categorised by Period, Size and Function

Appendix 4.1: Results of Wilcoxon Rank Sum Test – Elevation

Periodised:	Wilcoxon Rank Sum Test	Correlation: Yes/No
P-R / C1st	W = 32916, p-value = 0.8715	
P-R / C2nd	W = 43408, p-value = 0.7476	
C1st / C2nd	W = 66199, p-value = 0.5613	
Categorised - Size-Scale - Inter-Period:		
Small P-R / C1st	W = 19822, p-value = 0.9892	
Small P-R / C2nd	W = 27421, p-value = 0.3365	
Small C1st / C2nd	W = 39493, p-value = 0.2829	
Medium P-R / C1st	W = 254.5, p-value = 0.8634	
Medium P-R / C2nd	W = 265, p-value = 0.6791	
Medium C1st / C2nd	W = 441, p-value = 0.7539	
Large P-R / C1st	W = 111, p-value = 0.5974	
Large P-R / C2nd	W = 113, p-value = 0.6921	
Large C1st / C2nd	W = 247.5, p-value = 0.9056	
Very Large P-R / C1st	W = 225, p-value = 0.3107	
Very Large P-R / C2nd	W = 239.5, p-value = 0.234	
Very Large C1st / C2nd	W = 391, p-value = 0.8272	
Categorised - Size-Scale - Intra-Period:		
Small / Medium P-R	W = 845.5, p-value = 0.004784	
Small / Large P-R	W = 683, p-value = 0.6552	
Small / Very Large P-R	W = 809.5, p-value = 0.05075	
Medium / Large P-R	W = 113, p-value = 0.0487	
Medium / Very Large P-R	W = 128, p-value = 0.7333	
Large / Very Large P-R	W = 53, p-value = 0.5303	
Small / Medium C1st	W = 2019, p-value = 0.0001459	
Small / Large C1st	W = 2598.5, p-value = 0.9265	
Small / Very Large C1st	W = 2829.5, p-value = 0.2763	
Medium / Large C1st	W = 474.5, p-value = 0.002744	
Medium / Very Large C1st	W = 514, p-value = 0.04269	
Large / Very Large C1st	W = 269.5, p-value = 0.5733	
Small / Medium C2nd	W = 3323.5, p-value = 0.001697	
Small / Large C2nd	W = 4135, p-value = 0.784	
Small / Very Large C2nd	W = 4708, p-value = 0.7607	
Medium / Large C2nd	W = 475.5, p-value = 0.008131	
Medium / Very Large C2nd	W = 526.5, p-value = 0.05216	
Large / Very Large C2nd	W = 306.5, p-value = 0.7679	
Categorised - Pre-Roman - Function:		

Agricultural / Domestic	W = 3075, p-value = 0.3846	
Agricultural / Hillfort	W = 139, p-value = 7.646e-11	
Agricultural / Industrial	W = 217.5, p-value = 0.04436	
Agricultural / Port	W = 38.5, p-value = 0.3244	
Domestic / Hillfort	W = 3667, p-value = 6.091e-15	
Domestic / Industrial	W = 184.5, p-value = 0.04124	
Domestic / Port	W = 92, p-value = 0.2961	
Hillfort / Industrial	W = 7, p-value = 0.000317	
Hillfort / Port	W = 33, p-value = 0.1229	
Industrial / Port	W = 3.5, p-value = 1	
Categorised - C1st Roman - Function:		
Agricultural / Domestic	W = 4279, p-value = 0.1397	
Agricultural / Industrial	W = 914, p-value = 0.1391	
Agricultural / Military	W = 1301.5, p-value = 0.008405	
Agricultural / Port	W = 305, p-value = 0.4	
Agricultural / Villa	W = 120, p-value = 0.3092	
Domestic / Industrial	W = 2698.5, p-value = 0.5862	
Domestic / Military	W = 4759, p-value = 0.08412	
Domestic / Port	W = 783, p-value = 0.1346	
Domestic / Villa	W = 327.5, p-value = 0.6236	
Industrial / Military	W = 862.5, p-value = 0.5352	
Industrial / Port	W = 180, p-value = 0.1476	
Industrial / Villa	W = 82, p-value = 0.9141	
Military / Port	W = 326.5, p-value = 0.02461	
Military / Villa	W = 145, p-value = 0.8479	
Port / Villa	W = 11, p-value = 0.1872	
Categorised - C2nd Roman - Function:		
Agricultural / Domestic	W = 9561.5, p-value = 0.3492	
Agricultural / Industrial	W = 3389, p-value = 0.4752	
Agricultural / Military	W = 1470.5, p-value = 0.4988	
Agricultural / Port	W = 498, p-value = 0.07661	
Agricultural / Town	W = 262.5, p-value = 0.8776	
Agricultural / Villa	W = 832, p-value = 0.3466	
Domestic / Industrial	W = 6907, p-value = 0.983	
Domestic / Military	W = 3977.5, p-value = 0.1367	
Domestic / Port	W = 1036, p-value = 0.1203	
Domestic / Town	W = 514.5, p-value = 0.5807	
Domestic / Villa	W = 1639, p-value = 0.1082	
Industrial / Military	W = 1058, p-value = 0.2436	
Industrial / Port	W = 364, p-value = 0.1537	
Industrial / Town	W = 181.5, p-value = 0.5782	
Industrial / Villa	W = 615.5, p-value = 0.2497	
Military / Port	W = 202.5, p-value = 0.0438	
Military / Town	W = 108, p-value = 0.9239	
Military / Villa	W = 367.5, p-value = 1	
Port / Town	W = 11.5, p-value = 0.1044	
Port / Villa	W = 44, p-value = 0.04741	

Town / Villa	W = 54.5, p-value = 0.6355	
Categorised - Function - Inter-Period:		
Agricultural P-R / C1st	W = 1678, p-value = 0.6058	
Agricultural P-R / C2nd	W = 1955.5, p-value = 0.2156	
Agricultural C1st / C2nd	W = 2465.5, p-value = 0.06521	
Domestic P-R / C1st	W = 7368, p-value = 0.03458	
Domestic P-R / C2nd	W = 9697.5, p-value = 0.02779	
Domestic C1st / C2nd	W = 14930, p-value = 0.8629	
Industrial P-R / C1st	W = 48, p-value = 0.03315	
Industrial P-R / C2nd	W = 93.5, p-value = 0.02013	
Industrial C1st / C2nd	W = 1256.5, p-value = 0.6372	
Military C1st / C2nd	W = 975, p-value = 0.9187	
Port P-R / C1st	W = 2, p-value = 0.516	
Port P-R / C2nd	W = 2, p-value = 0.516	
Port C1st / C2nd	W = 32, p-value = 1	
Villa C1st / C2nd	W = 49.5, p-value = 0.8682	

Appendix 4.2: Results of Wilcoxon Rank Sum Test – Slope

Periodised:	**Wilcoxon Rank Sum Test**	**Correlation: Yes/No**
P-R / C1st	W = 31803, p-value = 0.5771	
P-R / C2nd	W = 42727, p-value = 0.4835	
C1st / C2nd	W = 67529, p-value = 0.906	
Categorised - Size-Scale - Inter-Period:		
Small P-R / C1st	W = 19246, p-value = 0.6215	
Small P-R / C2nd	W = 27401, p-value = 0.2919	
Small C1st / C2nd	W = 40402, p-value = 0.5769	
Medium P-R / C1st	W = 268, p-value = 0.6128	
Medium P-R / C2nd	W = 291, p-value = 0.2827	
Medium C1st / C2nd	W = 463.5, p-value = 0.4731	
Large P-R / C1st	W = 98, p-value = 0.6676	
Large P-R / C2nd	W = 100.5, p-value = 0.9073	
Large C1st / C2nd	W = 292.5, p-value = 0.7035	
Very Large P-R / C1st	W = 180, p-value = 0.9608	
Very Large P-R / C2nd	W = 190, p-value = 0.8607	
Very Large C1st / C2nd	W = 357.5, p-value = 0.9027	
Categorised - Size-Scale - Intra-Period:		
Small / Medium P-R	W = 903.5, p-value = 0.006426	
Small / Large P-R	W = 803.5, p-value = 0.6674	
Small / Very Large P-R	W = 1017.5, p-value = 0.3809	
Medium / Large P-R	W = 108.5, p-value = 0.07481	
Medium / Very Large P-R	W = 146.5, p-value = 0.2542	
Large / Very Large P-R	W = 50.5, p-value = 0.3883	

Small / Medium C1st	W = 2519, p-value = 0.009041	
Small / Large C1st	W = 2872, p-value = 0.9611	
Small / Very Large C1st	W = 2772.5, p-value = 0.3327	
Medium / Large C1st	W = 438.5, p-value = 0.0859	
Medium / Very Large C1st	W = 443, p-value = 0.2333	
Large / Very Large C1st	W = 277.5, p-value = 0.454	
Small / Medium C2nd	W = 4171.5, p-value = 0.08558	
Small / Large C2nd	W = 4359.5, p-value = 0.4258	
Small / Very Large C2nd	W = 4391, p-value = 0.3323	
Medium / Large C2nd	W = 417, p-value = 0.09485	
Medium / Very Large C2nd	W = 439.5, p-value = 0.5518	
Large / Very Large C2nd	W = 259.5, p-value = 0.1749	
Categorised - Pre-Roman - Function:		
Agricultural / Domestic	W = 3294, p-value = 0.04058	
Agricultural / Hillfort	W = 296.5, p-value = 5.038e-08	
Agricultural / Industrial	W = 183.5, p-value = 0.2486	
Agricultural / Port	W = 6.5, p-value = 0.1604	
Domestic / Hillfort	W = 3562.5, p-value = 2.857e-14	
Domestic / Industrial	W = 321.5, p-value = 0.7369	
Domestic / Port	W = 7, p-value = 0.07143	
Hillfort / Industrial	W = 15.5, p-value = 0.000364	
Hillfort / Port	W = 19.5, p-value = 0.8684	
Industrial / Port	W = 0, p-value = 0.119	
Categorised - C1st Roman - Function:		
Agricultural / Domestic	W = 5193, p-value = 0.3921	
Agricultural / Industrial	W = 976.5, p-value = 0.2966	
Agricultural / Military	W = 1626, p-value = 0.3464	
Agricultural / Port	W = 197, p-value = 0.2158	
Agricultural / Villa	W = 130, p-value = 0.4129	
Domestic / Industrial	W = 2988.5, p-value = 0.08281	
Domestic / Military	W = 4745.5, p-value = 0.06694	
Domestic / Port	W = 424, p-value = 0.1197	
Domestic / Villa	W = 280.5, p-value = 0.2872	
Industrial / Military	W = 971, p-value = 0.7473	
Industrial / Port	W = 122, p-value = 0.6478	
Industrial / Villa	W = 82.5, p-value = 0.9295	
Military / Port	W = 185, p-value = 0.4436	
Military / Villa	W = 126, p-value = 0.7517	
Port / Villa	W = 22, p-value = 0.8184	
Categorised - C2nd Roman - Function:		
Agricultural / Domestic	W = 10746, p-value = 0.002189	

Agricultural / Industrial	W = 3483, p-value = 0.2678	
Agricultural / Military	W = 1558, p-value = 0.8409	
Agricultural / Port	W = 311.5, p-value = 0.4701	
Agricultural / Town	W = 296, p-value = 0.7122	
Agricultural / Villa	W = 862, p-value = 0.4529	
Domestic / Industrial	W = 7499.5, p-value = 0.2137	
Domestic / Military	W = 4194.5, p-value = 0.01992	
Domestic / Port	W = 539.5, p-value = 0.08295	
Domestic / Town	W = 519.5, p-value = 0.5601	
Domestic / Villa	W = 1422, p-value = 0.007323	
Industrial / Military	W = 1092.5, p-value = 0.3269	
Industrial / Port	W = 221.5, p-value = 0.2959	
Industrial / Town	W = 204, p-value = 0.9057	
Industrial / Villa	W = 596.5, p-value = 0.1578	
Military / Port	W = 122, p-value = 0.5602	
Military / Town	W = 115, p-value = 0.7007	
Military / Villa	W = 343.5, p-value = 0.6698	
Port / Town	W = 29, p-value = 0.5189	
Port / Villa	W = 90.5, p-value = 0.7542	
Town / Villa	W = 50.5, p-value = 0.4445	
Categorised - Function - Inter-Period:		
Agricultural P-R / C1st	W = 1539, p-value = 0.727	
Agricultural P-R / C2nd	W = 1897, p-value = 0.1078	
Agricultural C1st / C2nd	W = 2621.5, p-value = 0.1825	
Domestic P-R / C1st	W = 7526, p-value = 0.03985	
Domestic P-R / C2nd	W = 10097, p-value = 0.05978	
Domestic C1st / C2nd	W = 15096, p-value = 0.6928	
Industrial P-R / C1st	W = 67.5, p-value = 0.1619	
Industrial P-R / C2nd	W = 158, p-value = 0.267	
Industrial C1st / C2nd	W = 1307.5, p-value = 0.3773	
Military C1st / C2nd	W = 925.5, p-value = 0.7442	
Port P-R / C1st	W = 5, p-value = 0.8411	
Port P-R / C2nd	W = 5, p-value = 0.8411	
Port C1st / C2nd	W = 32, p-value = 1	
Villa C1st / C2nd	W = 52, p-value = 1	

Appendix 4.3: Results of Wilcoxon Rank Sum Test – Aspect

Periodised:	**Wilcoxon Rank Sum Test**	**Correlation: Yes/No**
P-R / C1st	W = 32995, p-value = 0.8372	
P-R / C2nd	W = 46129, p-value = 0.3395	

C1st / C2nd	W = 70308, p-value = 0.3909	
Categorised - Size-Scale - Inter-Period:		
Small P-R / C1st	W = 20549, p-value = 0.5348	
Small P-R / C2nd	W = 30861, p-value = 0.2051	
Small C1st / C2nd	W = 43068, p-value = 0.4589	
Medium P-R / C1st	W = 224.5, p-value = 0.6199	
Medium P-R / C2nd	W = 245, p-value = 0.9816	
Medium C1st / C2nd	W = 463, p-value = 0.508	
Large P-R / C1st	W = 100.5, p-value = 0.9645	
Large P-R / C2nd	W = 110.5, p-value = 0.7824	
Large C1st / C2nd	W = 261.5, p-value = 0.8537	
Very Large P-R / C1st	W = 164.5, p-value = 0.5049	
Very Large P-R / C2nd	W = 168, p-value = 0.459	
Very Large C1st / C2nd	W = 372, p-value = 0.9255	
Categorised - Size-Scale - Intra-Period:		
Small / Medium P-R	W = 1558.5, p-value = 0.4748	
Small / Large P-R	W = 660, p-value = 0.5542	
Small / Very Large P-R	W = 1507, p-value = 0.06271	
Medium / Large P-R	W = 62, p-value = 0.4445	
Medium / Very Large P-R	W = 137.5, p-value = 0.47	
Large / Very Large P-R	W = 89.5, p-value = 0.09748	
Small / Medium C1st	W = 3361, p-value = 0.7896	
Small / Large C1st	W = 2330, p-value = 0.3732	
Small / Very Large C1st	W = 3613.5, p-value = 0.3025	
Medium / Large C1st	W = 299, p-value = 0.7079	
Medium / Very Large C1st	W = 442.5, p-value = 0.4031	
Large / Very Large C1st	W = 354, p-value = 0.2522	
Small / Medium C2nd	W = 5279.5, p-value = 0.6768	
Small / Large C2nd	W = 3693.5, p-value = 0.5329	
Small / Very Large C2nd	W = 5105, p-value = 0.6717	
Medium / Large C2nd	W = 290, p-value = 0.4238	
Medium / Very Large C2nd	W = 409, p-value = 0.9679	
Large / Very Large C2nd	W = 355.5, p-value = 0.5286	
Categorised - Pre-Roman - Function:		
Agricultural / Domestic	W = 2729.5, p-value = 0.6865	
Agricultural / Hillfort	W = 621, p-value = 0.04714	
Agricultural / Industrial	W = 171, p-value = 0.5213	
Agricultural / Port	W = 47, p-value = 0.1238	
Domestic / Hillfort	W = 2428, p-value = 0.03865	
Domestic / Industrial	W = 267.5, p-value = 0.3382	
Domestic / Port	W = 107, p-value = 0.1389	
Hillfort / Industrial	W = 59, p-value = 0.09801	
Hillfort / Port	W = 33, p-value = 0.114	
Industrial / Port	W = 6, p-value = 0.1902	

Categorised - C1st Roman - Function:		
Agricultural / Domestic	W = 5777, p-value = 0.02963	
Agricultural / Industrial	W = 1322, p-value = 0.1064	
Agricultural / Military	W = 2088, p-value = 0.1103	
Agricultural / Port	W = 324, p-value = 0.254	
Agricultural / Villa	W = 151, p-value = 0.7988	
Domestic / Industrial	W = 2508.5, p-value = 0.8826	
Domestic / Military	W = 4133, p-value = 0.984	
Domestic / Port	W = 628.5, p-value = 0.8225	
Domestic / Villa	W = 273, p-value = 0.299	
Industrial / Military	W = 926, p-value = 0.9422	
Industrial / Port	W = 139, p-value = 0.9353	
Industrial / Villa	W = 58.5, p-value = 0.269	
Military / Port	W = 228.5, p-value = 0.8675	
Military / Villa	W = 105, p-value = 0.3876	
Port / Villa	W = 12.5, p-value = 0.2796	
Categorised - C2nd Roman - Function:		
Agricultural / Domestic	W = 9068.5, p-value = 0.8725	
Agricultural / Industrial	W = 3276, p-value = 0.7554	
Agricultural / Military	W = 1563.5, p-value = 0.8754	
Agricultural / Port	W = 375.5, p-value = 0.8863	
Agricultural / Town	W = 194.5, p-value = 0.2376	
Agricultural / Villa	W = 846.5, p-value = 0.4135	
Domestic / Industrial	W = 6765, p-value = 0.814	
Domestic / Military	W = 3582, p-value = 0.7117	
Domestic / Port	W = 820, p-value = 0.8467	
Domestic / Town	W = 417.5, p-value = 0.218	
Domestic / Villa	W = 1838.5, p-value = 0.399	
Industrial / Military	W = 1165, p-value = 0.6828	
Industrial / Port	W = 284, p-value = 0.9535	
Industrial / Town	W = 150.5, p-value = 0.2512	
Industrial / Villa	W = 643, p-value = 0.3845	
Military / Port	W = 149, p-value = 0.7883	
Military / Town	W = 82.5, p-value = 0.4124	
Military / Villa	W = 347, p-value = 0.7328	
Port / Town	W = 14.5, p-value = 0.2254	
Port / Villa	W = 67.5, p-value = 0.423	
Town / Villa	W = 77.5, p-value = 0.4041	
Categorised - Function - Inter-Period:		
Agricultural P-R / C1st	W = 1368, p-value = 0.1943	
Agricultural P-R / C2nd	W = 2317, p-value = 0.701	
Agricultural C1st / C2nd	W = 3490, p-value = 0.05295	
Domestic P-R / C1st	W = 8603, p-value = 0.972	
Domestic P-R / C2nd	W = 11343, p-value = 0.9843	

Domestic C1st / C2nd	W = 14848, p-value = 0.9365	
Industrial P-R / C1st	W = 89.5, p-value = 0.6449	
Industrial P-R / C2nd	W = 198, p-value = 0.823	
Industrial C1st / C2nd	W = 1207, p-value = 0.9081	
Military C1st / C2nd	W = 933, p-value = 0.8084	
Port P-R / C1st	W = 0.5, p-value = 0.2207	
Port P-R / C2nd	W = 0.5, p-value = 0.2207	
Port C1st / C2nd	W = 32, p-value = 1	
Villa C1st / C2nd	W = 59.5, p-value = 0.6648	

Appendix 4.4: Results of Wilcoxon Rank Sum Test – Navigable Waterway Proximity

Periodised:	**Wilcoxon Rank Sum Test**	**Correlation: Yes/No**
P-R / C1st	W = 36123, p-value = 0.03718	
P-R / C2nd	W = 47482, p-value = 0.111	
C1st / C2nd	W = 65983, p-value = 0.5164	
Categorised - Size-Scale - Inter-Period:		
Small P-R / C1st	W = 21307, p-value = 0.1981	
Small P-R / C2nd	W = 29970, p-value = 0.4846	
Small C1st / C2nd	W = 40163, p-value = 0.4741	
Medium P-R / C1st	W = 270, p-value = 0.5984	
Medium P-R / C2nd	W = 251.5, p-value = 0.918	
Medium C1st / C2nd	W = 389.5, p-value = 0.6334	
Large P-R / C1st	W = 120.5, p-value = 0.3307	
Large P-R / C2nd	W = 121, p-value = 0.4509	
Large C1st / C2nd	W = 242.5, p-value = 0.8049	
Very Large P-R / C1st	W = 259.5, p-value = 0.05142	
Very Large P-R / C2nd	W = 283.5, p-value = 0.01854	
Very Large C1st / C2nd	W = 402.5, p-value = 0.6793	
Categorised - Size-Scale - Intra-Period:		
Small / Medium P-R	W = 974.5, p-value = 0.03412	
Small / Large P-R	W = 782, p-value = 0.8135	
Small / Very Large P-R	W = 791.5, p-value = 0.04574	
Medium / Large P-R	W = 101.5, p-value = 0.1833	
Medium / Very Large P-R	W = 119.5, p-value = 1	
Large / Very Large P-R	W = 42.5, p-value = 0.2031	
Small / Medium C1st	W = 2545, p-value = 0.01779	
Small / Large C1st	W = 3236.5, p-value = 0.06774	
Small / Very Large C1st	W = 3275, p-value = 0.8974	
Medium / Large C1st	W = 456.5, p-value = 0.00779	
Medium / Very Large C1st	W = 497.5, p-value = 0.08032	
Large / Very Large C1st	W = 231, p-value = 0.171	

Small / Medium C2nd	W = 3453.5, p-value = 0.004211	
Small / Large C2nd	W = 4832, p-value = 0.09058	
Small / Very Large C2nd	W = 5437.5, p-value = 0.2998	
Medium / Large C2nd	W = 478, p-value = 0.006951	
Medium / Very Large C2nd	W = 571, p-value = 0.007955	
Large / Very Large C2nd	W = 281, p-value = 0.4247	
Categorised - Pre-Roman - Function:		
Agricultural / Domestic	W = 2877.5, p-value = 0.8995	
Agricultural / Hillfort	W = 615, p-value = 0.04228	
Agricultural / Industrial	W = 160, p-value = 0.7326	
Agricultural / Port	W = 43.5, p-value = 0.1943	
Domestic / Hillfort	W = 2522.5, p-value = 0.01268	
Domestic / Industrial	W = 323, p-value = 0.7691	
Domestic / Port	W = 105, p-value = 0.1634	
Hillfort / Industrial	W = 66, p-value = 0.1758	
Hillfort / Port	W = 31.5, p-value = 0.1632	
Industrial / Port	W = 5, p-value = 0.4319	
Categorised - C1st Roman - Function:		
Agricultural / Domestic	W = 4651.5, p-value = 0.59	
Agricultural / Industrial	W = 1194.5, p-value = 0.5045	
Agricultural / Military	W = 2065, p-value = 0.1344	
Agricultural / Port	W = 392, p-value = 0.01787	
Agricultural / Villa	W = 174.5, p-value = 0.79	
Domestic / Industrial	W = 2223, p-value = 0.2383	
Domestic / Military	W = 3280, p-value = 0.02258	
Domestic / Port	W = 944, p-value = 0.005771	
Domestic / Villa	W = 422.5, p-value = 0.6301	
Industrial / Military	W = 1017, p-value = 0.4761	
Industrial / Port	W = 196, p-value = 0.04948	
Industrial / Villa	W = 83.5, p-value = 0.9658	
Military / Port	W = 276, p-value = 0.2274	
Military / Villa	W = 120.5, p-value = 0.6453	
Port / Villa	W = 10, p-value = 0.1312	
Categorised - C2nd Roman - Function:		
Agricultural / Domestic	W = 8210.5, p-value = 0.2463	
Agricultural / Industrial	W = 3229.5, p-value = 0.8787	
Agricultural / Military	W = 1933, p-value = 0.05744	
Agricultural / Port	W = 544, p-value = 0.01873	
Agricultural / Town	W = 314, p-value = 0.5374	
Agricultural / Villa	W = 761, p-value = 0.1422	
Domestic / Industrial	W = 6215.5, p-value = 0.2156	
Domestic / Military	W = 2463.5, p-value = 0.006418	
Domestic / Port	W = 1250, p-value = 0.004508	
Domestic / Town	W = 736, p-value = 0.3025	

Domestic / Villa	W = 1804.5, p-value = 0.3324	
Industrial / Military	W = 1458, p-value = 0.1036	
Industrial / Port	W = 416, p-value = 0.02257	
Industrial / Town	W = 239, p-value = 0.5763	
Industrial / Villa	W = 574.5, p-value = 0.1262	
Military / Port	W = 162, p-value = 0.4684	
Military / Town	W = 88, p-value = 0.5194	
Military / Villa	W = 230, p-value = 0.01641	
Port / Town	W = 12, p-value = 0.1038	
Port / Villa	W = 32, p-value = 0.01014	
Town / Villa	W = 42, p-value = 0.2253	
Categorised - Function - Inter-Period:		
Agricultural P-R / C1st	W = 1660.5, p-value = 0.6953	
Agricultural P-R / C2nd	W = 2370.5, p-value = 0.5333	
Agricultural C1st / C2nd	W = 3014.5, p-value = 0.8364	
Domestic P-R / C1st	W = 8442.5, p-value = 0.7659	
Domestic P-R / C2nd	W = 10897, p-value = 0.5716	
Domestic C1st / C2nd	W = 14568, p-value = 0.8215	
Industrial P-R / C1st	W = 107.5, p-value = 0.8464	
Industrial P-R / C2nd	W = 209, p-value = 0.9922	
Industrial C1st / C2nd	W = 1136, p-value = 0.7054	
Military C1st / C2nd	W = 1032, p-value = 0.5456	
Port P-R / C1st	W = 2, p-value = 0.5023	
Port P-R / C2nd	W = 2, p-value = 0.5023	
Port C1st / C2nd	W = 32, p-value = 1	
Villa C1st / C2nd	W = 39, p-value = 0.3916	

Appendix 4.5: Results of Wilcoxon Rank Sum Test – Roman Road Proximity

Periodised:	**Wilcoxon Rank Sum Test**	**Correlation: Yes/No**
P-R / C1st	W = 39802, p-value = 2.043e-05	
P-R / C2nd	W = 54602, p-value = 9.574e-07	
C1st / C2nd	W = 68764, p-value = 0.7472	
Categorised - Size-Scale - Inter-Period:		
Small P-R / C1st	W = 23728, p-value = 0.00056	
Small P-R / C2nd	W = 35500, p-value = 2.517e-05	
Small C1st / C2nd	W = 42315, p-value = 0.6524	
Medium P-R / C1st	W = 330, p-value = 0.05667	
Medium P-R / C2nd	W = 359.5, p-value = 0.009478	
Medium C1st / C2nd	W = 470.5, p-value = 0.4313	
Large P-R / C1st	W = 102.5, p-value = 0.8841	
Large P-R / C2nd	W = 122, p-value = 0.3582	

Large C1st / C2nd	W = 290.5, p-value = 0.3161	
Very Large P-R / C1st	W = 220, p-value = 0.3673	
Very Large P-R / C2nd	W = 248.5, p-value = 0.129	
Very Large C1st / C2nd	W = 406, p-value = 0.5962	
Categorised - Size-Scale - Intra-Period:		
Small / Medium P-R	W = 1514.5, p-value = 0.6202	
Small / Large P-R	W = 1194.5, p-value = 0.002501	
Small / Very Large P-R	W = 1584.5, p-value = 0.02404	
Medium / Large P-R	W = 119, p-value = 0.02209	
Medium / Very Large P-R	W = 157, p-value = 0.1338	
Large / Very Large P-R	W = 48.5, p-value = 0.3572	
Small / Medium C1st	W = 4037, p-value = 0.1449	
Small / Large C1st	W = 3779, p-value = 0.0006255	
Small / Very Large C1st	W = 4231.5, p-value = 0.00749	
Medium / Large C1st	W = 415.5, p-value = 0.05682	
Medium / Very Large C1st	W = 462.5, p-value = 0.2257	
Large / Very Large C1st	W = 278.5, p-value = 0.6844	
Small / Medium C2nd	W = 6365.5, p-value = 0.01862	
Small / Large C2nd	W = 6261, p-value = 4.932e-06	
Small / Very Large C2nd	W = 6900.5, p-value = 0.0002223	
Medium / Large C2nd	W = 453, p-value = 0.01696	
Medium / Very Large C2nd	W = 487.5, p-value = 0.1652	
Large / Very Large C2nd	W = 284.5, p-value = 0.3945	
Categorised - Pre-Roman - Function:		
Agricultural / Domestic	W = 2537, p-value = 0.2767	
Agricultural / Hillfort	W = 792.5, p-value = 0.7105	
Agricultural / Industrial	W = 89.5, p-value = 0.123	
Agricultural / Port	W = 7, p-value = 0.2375	
Domestic / Hillfort	W = 1819.5, p-value = 0.4944	
Domestic / Industrial	W = 451.5, p-value = 0.222	
Domestic / Port	W = 20, p-value = 0.2662	
Hillfort / Industrial	W = 145.5, p-value = 0.1027	
Hillfort / Port	W = 1, p-value = 0.124	
Industrial / Port	W = 1, p-value = 0.5714	
Categorised - C1st Roman - Function:		
Agricultural / Domestic	W = 5216.5, p-value = 0.4143	
Agricultural / Industrial	W = 1427, p-value = 0.01755	
Agricultural / Military	W = 2934.5, p-value = 5.806e-10	
Agricultural / Port	W = 444, p-value = 0.001143	
Agricultural / Villa	W = 215, p-value = 0.2348	
Domestic / Industrial	W = 2023, p-value = 0.05909	
Domestic / Military	W = 1898.5, p-value = 1.662e-09	
Domestic / Port	W = 960, p-value = 0.004093	
Domestic / Villa	W = 456, p-value = 0.4128	

Industrial / Military	W = 1327, p-value = 0.0003423	
Industrial / Port	W = 207.5, p-value = 0.01923	
Industrial / Villa	W = 84.5, p-value = 1	
Military / Port	W = 253, p-value = 0.4	
Military / Villa	W = 75.5, p-value = 0.05339	
Port / Villa	W = 8.5, p-value = 0.06636	
Categorised - C2nd Roman - Function:		
Agricultural / Domestic	W = 9680, p-value = 0.2744	
Agricultural / Industrial	W = 4063.5, p-value = 0.002654	
Agricultural / Military	W = 2934.5, p-value = 1.09e-13	
Agricultural / Port	W = 615.5, p-value = 0.001231	
Agricultural / Town	W = 519, p-value = 0.0002278	
Agricultural / Villa	W = 1154, p-value = 0.1393	
Domestic / Industrial	W = 5661.5, p-value = 0.02533	
Domestic / Military	W = 930, p-value = 2.818e-12	
Domestic / Port	W = 1251, p-value = 0.004636	
Domestic / Town	W = 1059, p-value = 0.0008999	
Domestic / Villa	W = 2302.5, p-value = 0.3931	
Industrial / Military	W = 1996, p-value = 2.538e-08	
Industrial / Port	W = 422, p-value = 0.01714	
Industrial / Town	W = 360, p-value = 0.003243	
Industrial / Villa	W = 667, p-value = 0.5205	
Military / Port	W = 136.5, p-value = 0.8664	
Military / Town	W = 117, p-value = 0.4101	
Military / Villa	W = 97.5, p-value = 1.544e-07	
Port / Town	W = 27, p-value = 0.4705	
Port / Villa	W = 35, p-value = 0.01484	
Town / Villa	W = 12, p-value = 0.002472	
Categorised - Function - Inter-Period:		
Agricultural P-R / C1st	W = 1494.5, p-value = 0.576	
Agricultural P-R / C2nd	W = 2170, p-value = 0.7963	
Agricultural C1st / C2nd	W = 3056.5, p-value = 0.7229	
Domestic P-R / C1st	W = 9809.5, p-value = 0.07385	
Domestic P-R / C2nd	W = 13344, p-value = 0.01283	
Domestic C1st / C2nd	W = 15346, p-value = 0.5358	
Industrial P-R / C1st	W = 166.5, p-value = 0.01465	
Industrial P-R / C2nd	W = 338, p-value = 0.01303	
Industrial C1st / C2nd	W = 1224.5, p-value = 0.8115	
Military C1st / C2nd	W = 1163, p-value = 0.02551	
Port P-R / C1st	W = 7.5, p-value = 0.1088	
Port P-R / C2nd	W = 7.5, p-value = 0.1088	
Port C1st / C2nd	W = 32, p-value = 1	
Villa C1st / C2nd	W = 47, p-value = 0.7431	

Appendix 4.6: Results of Wilcoxon Rank Sum Test – Road / River Intersection Proximity

Periodised:	Wilcoxon Rank Sum Test	Correlation: Yes/No
P-R / C1st	W = 37713, p-value = 0.002706	
P-R / C2nd	W = 51951, p-value = 0.0002683	
C1st / C2nd	W = 69206, p-value = 0.6376	
Categorised - Size-Scale - Inter-Period:		
Small P-R / C1st	W = 33401, p-value = 0.004103	
Small P-R / C2nd	W = 22411, p-value = 0.02627	
Small C1st / C2nd	W = 42580, p-value = 0.6226	
Medium P-R / C1st	W = 280, p-value = 0.4519	
Medium P-R / C2nd	W = 274.5, p-value = 0.5308	
Medium C1st / C2nd	W = 414.5, p-value = 0.9317	
Large P-R / C1st	W = 123.5, p-value = 0.2924	
Large P-R / C2nd	W = 137.5, p-value = 0.1566	
Large C1st / C2nd	W = 269, p-value = 0.7214	
Very Large P-R / C1st	W = 227.5, p-value = 0.2946	
Very Large P-R / C2nd	W = 259, p-value = 0.09402	
Very Large C1st / C2nd	W = 418.5, p-value = 0.4989	
Categorised - Size-Scale - Intra-Period:		
Small / Medium P-R	W = 1485.5, p-value = 0.7218	
Small / Large P-R	W = 772.5, p-value = 0.8658	
Small / Very Large P-R	W = 1179.5, p-value = 0.9276	
Medium / Large P-R	W = 76.5, p-value = 1	
Medium / Very Large P-R	W = 111, p-value = 0.7653	
Large / Very Large P-R	W = 60.5, p-value = 0.8996	
Small / Medium C1st	W = 3651, p-value = 0.6386	
Small / Large C1st	W = 3076, p-value = 0.1872	
Small / Very Large C1st	W = 3619, p-value = 0.3005	
Medium / Large C1st	W = 358, p-value = 0.4625	
Medium / Very Large C1st	W = 415.5, p-value = 0.6995	
Large / Very Large C1st	W = 270.5, p-value = 0.5994	
Small / Medium C2nd	W = 5119.5, p-value = 0.8969	
Small / Large C2nd	W = 5002, p-value = 0.04462	
Small / Very Large C2nd	W = 5989, p-value = 0.04344	
Medium / Large C2nd	W = 401, p-value = 0.215	
Medium / Very Large C2nd	W = 484.5, p-value = 0.2117	
Large / Very Large C2nd	W = 296, p-value = 0.627	
Categorised - Pre-Roman - Function:		
Agricultural / Domestic	W = 2440, p-value = 0.1519	
Agricultural / Hillfort	W = 717, p-value = 0.2841	
Agricultural / Industrial	W = 99, p-value = 0.199	
Agricultural / Port	W = 4.5, p-value = 0.1758	

Domestic / Hillfort	W = 1860, p-value = 0.6165	
Domestic / Industrial	W = 380.5, p-value = 0.7046	
Domestic / Port	W = 13.5, p-value = 0.1923	
Hillfort / Industrial	W = 127, p-value = 0.3527	
Hillfort / Port	W = 0, p-value = 0.1017	
Industrial / Port	W = 1, p-value = 0.5714	
Categorised - C1st Roman - Function:		
Agricultural / Domestic	W = 4910, p-value = 0.9343	
Agricultural / Industrial	W = 1340, p-value = 0.08367	
Agricultural / Military	W = 2385.5, p-value = 0.001615	
Agricultural / Port	W = 329.5, p-value = 0.2225	
Agricultural / Villa	W = 199.5, p-value = 0.4045	
Domestic / Industrial	W = 2062.5, p-value = 0.08219	
Domestic / Military	W = 2863, p-value = 0.0007898	
Domestic / Port	W = 733.5, p-value = 0.2912	
Domestic / Villa	W = 465, p-value = 0.3644	
Industrial / Military	W = 1076, p-value = 0.2331	
Industrial / Port	W = 147, p-value = 0.7357	
Industrial / Villa	W = 86, p-value = 0.9832	
Military / Port	W = 205.5, p-value = 0.7698	
Military / Villa	W = 112, p-value = 0.5	
Port / Villa	W = 17, p-value = 0.7129	
Categorised - C2nd Roman - Function:		
Agricultural / Domestic	W = 9062.5, p-value = 0.8808	
Agricultural / Industrial	W = 3865.5, p-value = 0.02029	
Agricultural / Military	W = 2349.5, p-value = 3.644e-05	
Agricultural / Port	W = 451, p-value = 0.2663	
Agricultural / Town	W = 452.5, p-value = 0.007295	
Agricultural / Villa	W = 905, p-value = 0.7091	
Domestic / Industrial	W = 5569, p-value = 0.01684	
Domestic / Military	W = 1860.5, p-value = 1.417e-05	
Domestic / Port	W = 951, p-value = 0.3229	
Domestic / Town	W = 941, p-value = 0.01362	
Domestic / Villa	W = 1961.5, p-value = 0.6981	
Industrial / Military	W = 1626.5, p-value = 0.006134	
Industrial / Port	W = 301.5, p-value = 0.7289	
Industrial / Town	W = 301, p-value = 0.08074	
Industrial / Villa	W = 543.5, p-value = 0.07168	
Military / Port	W = 114, p-value = 0.4082	
Military / Town	W = 95, p-value = 0.7177	
Military / Villa	W = 175.5, p-value = 0.001057	
Port / Town	W = 27.5, p-value = 0.6944	
Port / Villa	W = 65.5, p-value = 0.3791	
Town / Villa	W = 18.5, p-value = 0.01015	

Categorised - Function - Inter-Period:		
Agricultural P-R / C1st	W = 1520, p-value = 0.6798	
Agricultural P-R / C2nd	W = 2166, p-value = 0.7829	
Agricultural C1st / C2nd	W = 3009, p-value = 0.8544	
Domestic P-R / C1st	W = 9644, p-value = 0.1292	
Domestic P-R / C2nd	W = 13016, p-value = 0.03978	
Domestic C1st / C2nd	W = 15218, p-value = 0.6328	
Industrial P-R / C1st	W = 141.5, p-value = 0.1386	
Industrial P-R / C2nd	W = 292, p-value = 0.1159	
Industrial C1st / C2nd	W = 1222.5, p-value = 0.8242	
Military C1st / C2nd	W = 1131.5, p-value = 0.1549	
Port P-R / C1st	W = 7.5, p-value = 0.2353	
Port P-R / C2nd	W = 7.5, p-value = 0.2353	
Port C1st / C2nd	W = 32, p-value = 1	
Villa C1st / C2nd	W = 41, p-value = 0.4728	

Appendix 4.7: Results of Wilcoxon Rank Sum Test – Pre-Roman Hillfort Proximity

Periodised:	**Wilcoxon Rank Sum Test**	**Correlation: Yes/No**
P-R / C1st	W = 28786, p-value = 0.02199	
P-R / C2nd	W = 38162, p-value = 0.006093	
C1st / C2nd	W = 66967, p-value = 0.7643	
Categorised - Size-Scale - Inter-Period:		
Small P-R / C1st	W = 17984, p-value = 0.1097	
Small P-R / C2nd	W = 27002, p-value = 0.2318	
Small C1st / C2nd	W = 42968, p-value = 0.4937	
Medium P-R / C1st	W = 155, p-value = 0.03498	
Medium P-R / C2nd	W = 124, p-value = 0.005075	
Medium C1st / C2nd	W = 364.5, p-value = 0.3869	
Large P-R / C1st	W = 87.5, p-value = 0.6317	
Large P-R / C2nd	W = 78.5, p-value = 0.304	
Large C1st / C2nd	W = 217.5, p-value = 0.4263	
Very Large P-R / C1st	W = 121.5, p-value = 0.06457	
Very Large P-R / C2nd	W = 109, p-value = 0.02067	
Very Large C1st / C2nd	W = 341.5, p-value = 0.5439	
Categorised - Size-Scale - Intra-Period:		
Small / Medium P-R	W = 2218, p-value = 0.0001014	
Small / Large P-R	W = 858.5, p-value = 0.4527	
Small / Very Large P-R	W = 1677.5, p-value = 0.005862	
Medium / Large P-R	W = 37.5, p-value = 0.03267	
Medium / Very Large P-R	W = 87, p-value = 0.1938	
Large / Very Large P-R	W = 82, p-value = 0.2414	

Small / Medium C1st	W = 4788, p-value = 0.0007935	
Small / Large C1st	W = 3231.5, p-value = 0.07553	
Small / Very Large C1st	W = 3875.5, p-value = 0.0869	
Medium / Large C1st	W = 237.5, p-value = 0.1229	
Medium / Very Large C1st	W = 314, p-value = 0.2057	
Large / Very Large C1st	W = 296.5, p-value = 1	
Small / Medium C2nd	W = 6402.5, p-value = 0.01615	
Small / Large C2nd	W = 4282.5, p-value = 0.5739	
Small / Very Large C2nd	W = 5249.5, p-value = 0.4955	
Medium / Large C2nd	W = 252, p-value = 0.1354	
Medium / Very Large C2nd	W = 335.5, p-value = 0.2635	
Large / Very Large C2nd	W = 324, p-value = 0.9773	
Categorised - Pre-Roman - Function:		
Agricultural / Domestic	W = 2678, p-value = 0.5597	
Agricultural / Hillfort	W = 1666, p-value = 1.361e-15	
Agricultural / Industrial	W = 79.5, p-value = 0.07037	
Agricultural / Port	W = 15.5, p-value = 0.5557	
Domestic / Hillfort	W = 34, p-value < 2.2e-16	
Domestic / Industrial	W = 499.5, p-value = 0.07371	
Domestic / Port	W = 35.5, p-value = 0.5146	
Hillfort / Industrial	W = 204, p-value = 6.097e-10	
Hillfort / Port	W = 0, p-value = 1.519e-08	
Industrial / Port	W = 4, p-value = 0.8571	
Categorised - C1st Roman - Function:		
Agricultural / Domestic	W = 5777.5, p-value = 0.03119	
Agricultural / Industrial	W = 911.5, p-value = 0.1549	
Agricultural / Military	W = 2087.5, p-value = 0.1146	
Agricultural / Port	W = 240.5, p-value = 0.7371	
Agricultural / Villa	W = 98, p-value = 0.1443	
Domestic / Industrial	W = 3596, p-value = 0.0001899	
Domestic / Military	W = 4119, p-value = 0.9883	
Domestic / Port	W = 452, p-value = 0.2414	
Domestic / Villa	W = 139.5, p-value = 0.01715	
Industrial / Military	W = 1285, p-value = 0.003157	
Industrial / Port	W = 160.5, p-value = 0.4418	
Industrial / Villa	W = 54, p-value = 0.1999	
Military / Port	W = 159, p-value = 0.2114	
Military / Villa	W = 59.5, p-value = 0.03809	
Port / Villa	W = 11, p-value = 0.2222	
Categorised - C2nd Roman - Function:		
Agricultural / Domestic	W = 10641, p-value = 0.01068	
Agricultural / Industrial	W = 3172.5, p-value = 0.9673	
Agricultural / Military	W = 1690.5, p-value = 0.5953	
Agricultural / Port	W = 342.5, p-value = 0.7874	

Agricultural / Town	W = 332, p-value = 0.3808	
Agricultural / Villa	W = 1008, p-value = 0.6982	
Domestic / Industrial	W = 8357.5, p-value = 0.008404	
Domestic / Military	W = 3903.5, p-value = 0.213	
Domestic / Port	W = 585.5, p-value = 0.2192	
Domestic / Town	W = 618.5, p-value = 0.8489	
Domestic / Villa	W = 1758, p-value = 0.259	
Industrial / Military	W = 1302, p-value = 0.6029	
Industrial / Port	W = 268.5, p-value = 0.8561	
Industrial / Town	W = 267, p-value = 0.2761	
Industrial / Villa	W = 755.5, p-value = 0.8505	
Military / Port	W = 122, p-value = 0.5846	
Military / Town	W = 122.5, p-value = 0.5304	
Military / Villa	W = 358.5, p-value = 0.8856	
Port / Town	W = 32.5, p-value = 0.3001	
Port / Villa	W = 90.5, p-value = 0.7696	
Town / Villa	W = 52, p-value = 0.5401	
Categorised - Function - Inter-Period:		
Agricultural P-R / C1st	W = 1428, p-value = 0.3477	
Agricultural P-R / C2nd	W = 1941.5, p-value = 0.2089	
Agricultural C1st / C2nd	W = 2904.5, p-value = 0.8503	
Domestic P-R / C1st	W = 9899, p-value = 0.05394	
Domestic P-R / C2nd	W = 12910, p-value = 0.05489	
Domestic C1st / C2nd	W = 14582, p-value = 0.8347	
Industrial P-R / C1st	W = 124, p-value = 0.4151	
Industrial P-R / C2nd	W = 293.5, p-value = 0.1096	
Industrial C1st / C2nd	W = 1465, p-value = 0.05699	
Military C1st / C2nd	W = 823, p-value = 0.2496	
Port P-R / C1st	W = 5.5, p-value = 0.6973	
Port P-R / C2nd	W = 5.5, p-value = 0.6973	
Port C1st / C2nd	W = 32, p-value = 1	
Villa C1st / C2nd	W = 78, p-value = 0.1033	

Appendix 4.8: Results of Wilcoxon Rank Sum Test – C1st Roman Villa Proximity

Periodised:	**Wilcoxon Rank Sum Test**	**Correlation: Yes/No**
P-R / C1st	W = 35724, p-value = 0.06882	
P-R / C2nd	W = 49592, p-value = 0.01078	
C1st / C2nd	W = 69820, p-value = 0.4951	
Categorised - Size-Scale - Inter-Period:		
Small P-R / C1st	W = 21529, p-value = 0.1444	
Small P-R / C2nd	W = 33188, p-value = 0.006276	

Small C1st / C2nd	W = 44114, p-value = 0.2105	
Medium P-R / C1st	W = 254, p-value = 0.8734	
Medium P-R / C2nd	W = 240, p-value = 0.8913	
Medium C1st / C2nd	W = 402.5, p-value = 0.7854	
Large P-R / C1st	W = 118, p-value = 0.4204	
Large P-R / C2nd	W = 111, p-value = 0.769	
Large C1st / C2nd	W = 228.5, p-value = 0.5855	
Very Large P-R / C1st	W = 225.5, p-value = 0.3219	
Very Large P-R / C2nd	W = 218, p-value = 0.5659	
Very Large C1st / C2nd	W = 348, p-value = 0.6192	
Categorised - Size-Scale - Intra-Period:		
Small / Medium P-R	W = 1583, p-value = 0.4096	
Small / Large P-R	W = 657.5, p-value = 0.5476	
Small / Very Large P-R	W = 1277.5, p-value = 0.539	
Medium / Large P-R	W = 50, p-value = 0.161	
Medium / Very Large P-R	W = 113.5, p-value = 0.8426	
Large / Very Large P-R	W = 78, p-value = 0.3686	
Small / Medium C1st	W = 3773, p-value = 0.436	
Small / Large C1st	W = 2455.5, p-value = 0.6096	
Small / Very Large C1st	W = 3874, p-value = 0.08771	
Medium / Large C1st	W = 265.5, p-value = 0.3134	
Medium / Very Large C1st	W = 442, p-value = 0.4122	
Large / Very Large C1st	W = 390, p-value = 0.06293	
Small / Medium C2nd	W = 4974, p-value = 0.8991	
Small / Large C2nd	W = 3076, p-value = 0.06316	
Small / Very Large C2nd	W = 5153, p-value = 0.6122	
Medium / Large C2nd	W = 264, p-value = 0.2036	
Medium / Very Large C2nd	W = 438.5, p-value = 0.6094	
Large / Very Large C2nd	W = 409.5, p-value = 0.09953	
Categorised - Pre-Roman - Function:		
Agricultural / Domestic	W = 2220, p-value = 0.02665	
Agricultural / Hillfort	W = 916.5, p-value = 0.4421	
Agricultural / Industrial	W = 169.5, p-value = 0.5525	
Agricultural / Port	W = 33, p-value = 0.5793	
Domestic / Hillfort	W = 1274, p-value = 0.001741	
Domestic / Industrial	W = 211, p-value = 0.106	
Domestic / Port	W = 92, p-value = 0.3212	
Hillfort / Industrial	W = 101, p-value = 0.9849	
Hillfort / Port	W = 19.5, p-value = 0.8429	
Industrial / Port	W = 4, p-value = 0.8571	
Categorised - C1st Roman - Function:		
Agricultural / Domestic	W = 3808.5, p-value = 0.01093	
Agricultural / Industrial	W = 1196.5, p-value = 0.5024	
Agricultural / Military	W = 1823.5, p-value = 0.8517	

Agricultural / Port	W = 292.5, p-value = 0.5719	
Agricultural / Villa	W = 325, p-value = 0.0002193	
Domestic / Industrial	W = 1769, p-value = 0.005374	
Domestic / Military	W = 3190.5, p-value = 0.01307	
Domestic / Port	W = 792, p-value = 0.1288	
Domestic / Villa	W = 750, p-value = 0.0001488	
Industrial / Military	W = 913, p-value = 0.8559	
Industrial / Port	W = 139, p-value = 0.9361	
Industrial / Villa	W = 170, p-value = 0.0003765	
Military / Port	W = 239, p-value = 0.7025	
Military / Villa	W = 275, p-value = 0.0002465	
Port / Villa	W = 40, p-value = 0.003321	
Categorised - C2nd Roman - Function:		
Agricultural / Domestic	W = 7177, p-value = 0.006563	
Agricultural / Industrial	W = 3482.5, p-value = 0.3111	
Agricultural / Military	W = 1429, p-value = 0.3746	
Agricultural / Port	W = 398, p-value = 0.6671	
Agricultural / Town	W = 327, p-value = 0.423	
Agricultural / Villa	W = 1187.5, p-value = 0.08436	
Domestic / Industrial	W = 4917.5, p-value = 0.0003671	
Domestic / Military	W = 3092.5, p-value = 0.3326	
Domestic / Port	W = 1007.5, p-value = 0.183	
Domestic / Town	W = 763, p-value = 0.2263	
Domestic / Villa	W = 2807.5, p-value = 0.007192	
Industrial / Military	W = 962, p-value = 0.07428	
Industrial / Port	W = 275, p-value = 0.9409	
Industrial / Town	W = 252, p-value = 0.4238	
Industrial / Villa	W = 877.5, p-value = 0.1808	
Military / Port	W = 168, p-value = 0.3905	
Military / Town	W = 133, p-value = 0.3103	
Military / Villa	W = 482.5, p-value = 0.05252	
Port / Town	W = 26, p-value = 0.8461	
Port / Villa	W = 95.5, p-value = 0.5904	
Town / Villa	W = 65, p-value = 0.9301	
Categorised - Function - Inter-Period:		
Agricultural P-R / C1st	W = 1697, p-value = 0.5516	
Agricultural P-R / C2nd	W = 2447.5, p-value = 0.3419	
Agricultural C1st / C2nd	W = 3026, p-value = 0.8069	
Domestic P-R / C1st	W = 9369, p-value = 0.2826	
Domestic P-R / C2nd	W = 12696, p-value = 0.1005	
Domestic C1st / C2nd	W = 15347, p-value = 0.537	
Industrial P-R / C1st	W = 103, p-value = 0.9849	
Industrial P-R / C2nd	W = 218, p-value = 0.885	
Industrial C1st / C2nd	W = 1235, p-value = 0.7576	

Military C1st / C2nd	W = 854, p-value = 0.3712	
Port P-R / C1st	W = 3.5, p-value = 1	
Port P-R / C2nd	W = 3.5, p-value = 1	
Port C1st / C2nd	W = 32, p-value = 1	
Villa C1st / C2nd	W = 12.5, p-value = 0.008132	

Appendix 4.9: Results of Wilcoxon Rank Sum Test – C2nd Roman Villa Proximity

Periodised:	**Wilcoxon Rank Sum Test**	**Correlation: Yes/No**
P-R / C1st	W = 33131, p-value = 0.7766	
P-R / C2nd	W = 46050, p-value = 0.3628	
C1st / C2nd	W = 69742, p-value = 0.5123	
Categorised - Size-Scale - Inter-Period:		
Small P-R / C1st	W = 20398, p-value = 0.6285	
Small P-R / C2nd	W = 30559, p-value = 0.2877	
Small C1st / C2nd	W = 42712, p-value = 0.5771	
Medium P-R / C1st	W = 250, p-value = 0.9455	
Medium P-R / C2nd	W = 285.5, p-value = 0.3791	
Medium C1st / C2nd	W = 475, p-value = 0.3988	
Large P-R / C1st	W = 59.5, p-value = 0.08923	
Large P-R / C2nd	W = 72, p-value = 0.1931	
Large C1st / C2nd	W = 273, p-value = 0.6575	
Very Large P-R / C1st	W = 193, p-value = 0.9233	
Very Large P-R / C2nd	W = 189, p-value = 0.8622	
Very Large C1st / C2nd	W = 361, p-value = 0.7809	
Categorised - Size-Scale - Intra-Period:		
Small / Medium P-R	W = 1503.5, p-value = 0.6582	
Small / Large P-R	W = 1081.5, p-value = 0.02403	
Small / Very Large P-R	W = 1598, p-value = 0.02	
Medium / Large P-R	W = 105.5, p-value = 0.1243	
Medium / Very Large P-R	W = 153.5, p-value = 0.1769	
Large / Very Large P-R	W = 52.5, p-value = 0.5286	
Small / Medium C1st	W = 3620.5, p-value = 0.6951	
Small / Large C1st	W = 2637.5, p-value = 0.9812	
Small / Very Large C1st	W = 4363, p-value = 0.002715	
Medium / Large C1st	W = 295, p-value = 0.6547	
Medium / Very Large C1st	W = 514, p-value = 0.04531	
Large / Very Large C1st	W = 394, p-value = 0.05233	
Small / Medium C2nd	W = 5930.5, p-value = 0.1169	
Small / Large C2nd	W = 4309.5, p-value = 0.5376	
Small / Very Large C2nd	W = 6245.5, p-value = 0.01307	
Medium / Large C2nd	W = 289, p-value = 0.4162	

Medium / Very Large C2nd	W = 449.5, p-value = 0.4919	
Large / Very Large C2nd	W = 374.5, p-value = 0.3248	
Categorised - Pre-Roman - Function:		
Agricultural / Domestic	W = 3291, p-value = 0.1097	
Agricultural / Hillfort	W = 879, p-value = 0.6734	
Agricultural / Industrial	W = 173.5, p-value = 0.4826	
Agricultural / Port	W = 33, p-value = 0.5792	
Domestic / Hillfort	W = 2195, p-value = 0.3178	
Domestic / Industrial	W = 370.5, p-value = 0.7945	
Domestic / Port	W = 71.5, p-value = 0.7002	
Hillfort / Industrial	W = 92.5, p-value = 0.7331	
Hillfort / Port	W = 19, p-value = 0.8819	
Industrial / Port	W = 4, p-value = 0.8571	
Categorised - C1st Roman - Function:		
Agricultural / Domestic	W = 4853, p-value = 0.9591	
Agricultural / Industrial	W = 1023, p-value = 0.5481	
Agricultural / Military	W = 1916, p-value = 0.5001	
Agricultural / Port	W = 355.5, p-value = 0.09333	
Agricultural / Villa	W = 317.5, p-value = 0.0004209	
Domestic / Industrial	W = 2713.5, p-value = 0.561	
Domestic / Military	W = 3700.5, p-value = 0.2598	
Domestic / Port	W = 835.5, p-value = 0.06234	
Domestic / Villa	W = 745, p-value = 0.0001821	
Industrial / Military	W = 1087.5, p-value = 0.1992	
Industrial / Port	W = 198, p-value = 0.04868	
Industrial / Villa	W = 170, p-value = 0.0003763	
Military / Port	W = 296.5, p-value = 0.1165	
Military / Villa	W = 272.5, p-value = 0.0003178	
Port / Villa	W = 40, p-value = 0.003321	
Categorised - C2nd Roman - Function:		
Agricultural / Domestic	W = 10534, p-value = 0.0169	
Agricultural / Industrial	W = 3565, p-value = 0.1955	
Agricultural / Military	W = 1721, p-value = 0.4856	
Agricultural / Port	W = 544, p-value = 0.02116	
Agricultural / Town	W = 420, p-value = 0.0282	
Agricultural / Villa	W = 1911, p-value = 9.096e-13	
Domestic / Industrial	W = 7231, p-value = 0.5454	
Domestic / Military	W = 3774.5, p-value = 0.3722	
Domestic / Port	W = 1084.5, p-value = 0.07189	
Domestic / Town	W = 822.5, p-value = 0.1031	
Domestic / Villa	W = 4137, p-value = 5.065e-14	
Industrial / Military	W = 1169.5, p-value = 0.7084	
Industrial / Port	W = 397.5, p-value = 0.0539	
Industrial / Town	W = 302, p-value = 0.07786	

Industrial / Villa	W = 1470, p-value = 3.329e-12	
Military / Port	W = 201, p-value = 0.05886	
Military / Town	W = 157.5, p-value = 0.05504	
Military / Villa	W = 735, p-value = 1.748e-10	
Port / Town	W = 24, p-value = 1	
Port / Villa	W = 168, p-value = 2.321e-07	
Town / Villa	W = 126, p-value = 5.52e-07	
Categorised - Function - Inter-Period:		
Agricultural P-R / C1st	W = 1724, p-value = 0.4532	
Agricultural P-R / C2nd	W = 2188.5, p-value = 0.8595	
Agricultural C1st / C2nd	W = 2638.5, p-value = 0.2521	
Domestic P-R / C1st	W = 8011, p-value = 0.2684	
Domestic P-R / C2nd	W = 11234, p-value = 0.8049	
Domestic C1st / C2nd	W = 15656, p-value = 0.3415	
Industrial P-R / C1st	W = 82, p-value = 0.4597	
Industrial P-R / C2nd	W = 187.5, p-value = 0.6716	
Industrial C1st / C2nd	W = 1289.5, p-value = 0.4924	
Military C1st / C2nd	W = 822.5, p-value = 0.248	
Port P-R / C1st	W = 5.5, p-value = 0.6973	
Port P-R / C2nd	W = 5.5, p-value = 0.6973	
Port C1st / C2nd	W = 32, p-value = 1	
Villa C1st / C2nd	W = 52.5, p-value = N / A	

Appendix 4.10: Results of Wilcoxon Rank Sum Test – C1st Roman Military Site Proximity

Periodised:	**Wilcoxon Rank Sum Test**	**Correlation: Yes/No**
P-R / C1st	W = 39404, p-value = 6.17e-05	
P-R / C2nd	W = 50895, p-value = 0.0016	
C1st / C2nd	W = 63736, p-value = 0.1567	
Categorised - Size-Scale - Inter-Period:		
Small P-R / C1st	W = 0.92908, p-value = 0.21	
Small P-R / C2nd	W = 0.8304, p-value = 0.0003085	
Small C1st / C2nd	W = 0.83833, p-value = 0.0004417	
Medium P-R / C1st	W = 324.5, p-value = 0.07306	
Medium P-R / C2nd	W = 312, p-value = 0.1348	
Medium C1st / C2nd	W = 400, p-value = 0.7487	
Large P-R / C1st	W = 137, p-value = 0.08658	
Large P-R / C2nd	W = 125.5, p-value = 0.3597	
Large C1st / C2nd	W = 211.5, p-value = 0.3217	
Very Large P-R / C1st	W = 215, p-value = 0.4596	
Very Large P-R / C2nd	W = 195, p-value = 0.989	
Very Large C1st / C2nd	W = 328, p-value = 0.381	

Categorised - Size-Scale - Intra-Period:		
Small / Medium P-R	W = 1590.5, p-value = 0.3894	
Small / Large P-R	W = 1095, p-value = 0.01886	
Small / Very Large P-R	W = 1804, p-value = 0.000609	
Medium / Large P-R	W = 107, p-value = 0.1051	
Medium / Very Large P-R	W = 170.5, p-value = 0.04147	
Large / Very Large P-R	W = 72.5, p-value = 0.567	
Small / Medium C1st	W = 4425, p-value = 0.01476	
Small / Large C1st	W = 3960.5, p-value = 8.22e-05	
Small / Very Large C1st	W = 4754, p-value = 5.349e-05	
Medium / Large C1st	W = 390, p-value = 0.1533	
Medium / Very Large C1st	W = 462, p-value = 0.2262	
Large / Very Large C1st	W = 278.5, p-value = 0.6917	
Small / Medium C2nd	W = 6342.5, p-value = 0.02142	
Small / Large C2nd	W = 5711.5, p-value = 0.0005954	
Small / Very Large C2nd	W = 6780.5, p-value = 0.0005575	
Medium / Large C2nd	W = 382, p-value = 0.3644	
Medium / Very Large C2nd	W = 452.5, p-value = 0.4511	
Large / Very Large C2nd	W = 308.5, p-value = 0.7996	
Categorised - Pre-Roman - Function:		
Agricultural / Domestic	W = 2593, p-value = 0.3753	
Agricultural / Hillfort	W = 753.5, p-value = 0.4641	
Agricultural / Industrial	W = 82.5, p-value = 0.08373	
Agricultural / Port	W = 3, p-value = 0.1452	
Domestic / Hillfort	W = 1895.5, p-value = 0.7329	
Domestic / Industrial	W = 489, p-value = 0.09613	
Domestic / Port	W = 3, p-value = 0.1065	
Hillfort / Industrial	W = 147.5, p-value = 0.08806	
Hillfort / Port	W = 0.5, p-value = 0.1129	
Industrial / Port	W = 1, p-value = 0.4492	
Categorised - C1st Roman - Function:		
Agricultural / Domestic	W = 5167, p-value = 0.4864	
Agricultural / Industrial	W = 1267, p-value = 0.2338	
Agricultural / Military	W = 3575, p-value < 2.2e-16	
Agricultural / Port	W = 417, p-value = 0.005679	
Agricultural / Villa	W = 170, p-value = 0.8731	
Domestic / Industrial	W = 2298, p-value = 0.3696	
Domestic / Military	W = 165, p-value < 2.2e-16	
Domestic / Port	W = 937, p-value = 0.007587	
Domestic / Villa	W = 356.5, p-value = 0.8553	
Industrial / Military	W = 1815, p-value < 2.2e-16	
Industrial / Port	W = 209, p-value = 0.01971	
Industrial / Villa	W = 72, p-value = 0.5991	
Military / Port	W = 165, p-value = 0.0002123	

Military / Villa	W = 0, p-value = 2.106e-14	
Port / Villa	W = 7.5, p-value = 0.06424	
Categorised - C2nd Roman - Function:		
Agricultural / Domestic	W = 10326, p-value = 0.03812	
Agricultural / Industrial	W = 3689, p-value = 0.08586	
Agricultural / Military	W = 3061.5, p-value = 6.518e-16	
Agricultural / Port	W = 581.5, p-value = 0.005316	
Agricultural / Town	W = 485, p-value = 0.001533	
Agricultural / Villa	W = 1178.5, p-value = 0.09706	
Domestic / Industrial	W = 6764.5, p-value = 0.8147	
Domestic / Military	W = 440.5, p-value < 2.2e-16	
Domestic / Port	W = 1208.5, p-value = 0.01062	
Domestic / Town	W = 1007, p-value = 0.00336	
Domestic / Villa	W = 2281, p-value = 0.4402	
Industrial / Military	W = 2286.5, p-value = 1.608e-13	
Industrial / Port	W = 434, p-value = 0.01132	
Industrial / Town	W = 358.5, p-value = 0.004295	
Industrial / Villa	W = 769.5, p-value = 0.7485	
Military / Port	W = 112, p-value = 0.08858	
Military / Town	W = 77, p-value = 0.04885	
Military / Villa	W = 48.5, p-value = 9.46e-10	
Port / Town	W = 23.5, p-value = 1	
Port / Villa	W = 39.5, p-value = 0.03054	
Town / Villa	W = 18.5, p-value = 0.01001	
Categorised - Function - Inter-Period:		
Agricultural P-R / C1st	W = 1441, p-value = 0.387	
Agricultural P-R / C2nd	W = 1932.5, p-value = 0.195	
Agricultural C1st / C2nd	W = 2838, p-value = 0.6687	
Domestic P-R / C1st	W = 9231.5, p-value = 0.3933	
Domestic P-R / C2nd	W = 12692, p-value = 0.1015	
Domestic C1st / C2nd	W = 15548, p-value = 0.4038	
Industrial P-R / C1st	W = 157, p-value = 0.03874	
Industrial P-R / C2nd	W = 317.5, p-value = 0.03909	
Industrial C1st / C2nd	W = 1166.5, p-value = 0.8732	
Military C1st / C2nd	W = 907.5, p-value = 0.07731	
Port P-R / C1st	W = 7.5, p-value = 0.1649	
Port P-R / C2nd	W = 7.5, p-value = 0.1649	
Port C1st / C2nd	W = 32, p-value = 1	
Villa C1st / C2nd	W = 59, p-value = 0.6958	

Appendix 4.11: Results of Wilcoxon Rank Sum Test – C2nd Roman Military Site Proximity

Periodised:	Wilcoxon Rank Sum Test	Correlation: Yes/No
P-R / C1st	W = 38548, p-value = 0.0004761	
P-R / C2nd	W = 51855, p-value = 0.0003191	
C1st / C2nd	W = 67199, p-value = 0.8258	
Categorised - Size-Scale - Inter-Period:		
Small P-R / C1st	W = 23131, p-value = 0.004459	
Small P-R / C2nd	W = 33521, p-value = 0.003227	
Small C1st / C2nd	W = 41139, p-value = 0.8249	
Medium P-R / C1st	W = 306, p-value = 0.1785	
Medium P-R / C2nd	W = 316.5, p-value = 0.1131	
Medium C1st / C2nd	W = 438.5, p-value = 0.7844	
Large P-R / C1st	W = 115, p-value = 0.4924	
Large P-R / C2nd	W = 124, p-value = 0.3943	
Large C1st / C2nd	W = 257, p-value = 0.9345	
Very Large P-R / C1st	W = 215, p-value = 0.4804	
Very Large P-R / C2nd	W = 240.5, p-value = 0.2367	
Very Large C1st / C2nd	W = 411.5, p-value = 0.5743	
Categorised - Size-Scale - Intra-Period:		
Small / Medium P-R	W = 1455, p-value = 0.8343	
Small / Large P-R	W = 1077, p-value = 0.02597	
Small / Very Large P-R	W = 1367.5, p-value = 0.2734	
Medium / Large P-R	W = 108.5, p-value = 0.08928	
Medium / Very Large P-R	W = 136, p-value = 0.5121	
Large / Very Large P-R	W = 49, p-value = 0.3942	
Small / Medium C1st	W = 3849.5, p-value = 0.3302	
Small / Large C1st	W = 3590, p-value = 0.004536	
Small / Very Large C1st	W = 3685, p-value = 0.2263	
Medium / Large C1st	W = 398.5, p-value = 0.1279	
Medium / Very Large C1st	W = 401, p-value = 0.8819	
Large / Very Large C1st	W = 237, p-value = 0.2233	
Small / Medium C2nd	W = 5799.5, p-value = 0.1815	
Small / Large C2nd	W = 5694, p-value = 0.0006789	
Small / Very Large C2nd	W = 6169.5, p-value = 0.019	
Medium / Large C2nd	W = 419.5, p-value = 0.1108	
Medium / Very Large C2nd	W = 445.5, p-value = 0.5304	
Large / Very Large C2nd	W = 273.5, p-value = 0.3544	
Categorised - Pre-Roman - Function:		
Agricultural / Domestic	W = 2593, p-value = 0.3753	

Agricultural / Hillfort	W = 722, p-value = 0.306	
Agricultural / Industrial	W = 91, p-value = 0.1337	
Agricultural / Port	W = 7, p-value = 0.2384	
Domestic / Hillfort	W = 1990, p-value = 0.9374	
Domestic / Industrial	W = 475, p-value = 0.1341	
Domestic / Port	W = 9.5, p-value = 0.1551	
Hillfort / Industrial	W = 132.5, p-value = 0.2556	
Hillfort / Port	W = 3.5, p-value = 0.1977	
Industrial / Port	W = 2, p-value = 0.8571	
Categorised - C1st Roman - Function:		
Agricultural / Domestic	W = 5212, p-value = 0.4217	
Agricultural / Industrial	W = 1364.5, p-value = 0.05619	
Agricultural / Military	W = 2819, p-value = 3.806e-08	
Agricultural / Port	W = 427, p-value = 0.003262	
Agricultural / Villa	W = 189.5, p-value = 0.5454	
Domestic / Industrial	W = 2117.5, p-value = 0.1233	
Domestic / Military	W = 1914.5, p-value = 3.736e-09	
Domestic / Port	W = 954.5, p-value = 0.004977	
Domestic / Villa	W = 415, p-value = 0.689	
Industrial / Military	W = 1389, p-value = 7.388e-05	
Industrial / Port	W = 210.5, p-value = 0.01748	
Industrial / Villa	W = 82, p-value = 0.9162	
Military / Port	W = 222.5, p-value = 0.9618	
Military / Villa	W = 65, p-value = 0.03147	
Port / Villa	W = 8.5, p-value = 0.09716	
Categorised - C2nd Roman - Function:		
Agricultural / Domestic	W = 9689, p-value = 0.2698	
Agricultural / Industrial	W = 3518.5, p-value = 0.256	
Agricultural / Military	W = 3167.5, p-value < 2.2e-16	
Agricultural / Port	W = 592.5, p-value = 0.003409	
Agricultural / Town	W = 298.5, p-value = 0.708	
Agricultural / Villa	W = 1129, p-value = 0.197	
Domestic / Industrial	W = 6706, p-value = 0.734	
Domestic / Military	W = 122.5, p-value < 2.2e-16	
Domestic / Port	W = 1241.5, p-value = 0.005869	
Domestic / Town	W = 594.5, p-value = 0.9831	
Domestic / Villa	W = 2285, p-value = 0.4317	
Industrial / Military	W = 2415, p-value < 2.2e-16	
Industrial / Port	W = 443, p-value = 0.007372	
Industrial / Town	W = 213, p-value = 0.9616	
Industrial / Villa	W = 791.5, p-value = 0.5975	

Military / Port	W = 87.5, p-value = 0.0002387	
Military / Town	W = 0, p-value = 3.634e-10	
Military / Villa	W = 0, p-value = 9.025e-13	
Port / Town	W = 10, p-value = 0.07401	
Port / Villa	W = 35, p-value = 0.01756	
Town / Villa	W = 65, p-value = 0.9302	
Categorised - Function - Inter-Period:		
Agricultural P-R / C1st	W = 1473.5, p-value = 0.4973	
Agricultural P-R / C2nd	W = 2059, p-value = 0.4575	
Agricultural C1st / C2nd	W = 2954.5, p-value = 0.9928	
Domestic P-R / C1st	W = 9503.5, p-value = 0.1967	
Domestic P-R / C2nd	W = 12717, p-value = 0.09505	
Domestic C1st / C2nd	W = 15062, p-value = 0.7569	
Industrial P-R / C1st	W = 155.5, p-value = 0.04432	
Industrial P-R / C2nd	W = 305.5, p-value = 0.06694	
Industrial C1st / C2nd	W = 1057, p-value = 0.3579	
Military C1st / C2nd	W = 1312.5, p-value = 7.03e-05	
Port P-R / C1st	W = 7.5, p-value = 0.2008	
Port P-R / C2nd	W = 7.5, p-value = 0.2008	
Port C1st / C2nd	W = 32, p-value = 1	
Villa C1st / C2nd	W = 50, p-value = 0.8962	

Appendix 4.12: Results of Wilcoxon Rank Sum Test – C2nd Roman Town Proximity

Periodised:	**Wilcoxon Rank Sum Test**	**Correlation: Yes/No**
P-R / C1st	W = 33798, p-value = 0.4973	
P-R / C2nd	W = 46693, p-value = 0.2272	
C1st / C2nd	W = 69489, p-value = 0.5699	
Categorised - Size-Scale - Inter-Period:		
Small P-R / C1st	W = 20116, p-value = 0.8104	
Small P-R / C2nd	W = 30053, p-value = 0.4582	
Small C1st / C2nd	W = 42685, p-value = 0.5865	
Medium P-R / C1st	W = 281, p-value = 0.4388	
Medium P-R / C2nd	W = 292, p-value = 0.3055	
Medium C1st / C2nd	W = 434, p-value = 0.8396	
Large P-R / C1st	W = 93.5, p-value = 0.8276	
Large P-R / C2nd	W = 106, p-value = 0.9331	
Large C1st / C2nd	W = 273.5, p-value = 0.6495	
Very Large P-R / C1st	W = 219.5, p-value = 0.4085	
Very Large P-R / C2nd	W = 229.5, p-value = 0.3773	

Very Large C1st / C2nd	W = 382, p-value = 0.9529	
Categorised - Size-Scale - Intra-Period:		
Small / Medium P-R	W = 1206.5, p-value = 0.3267	
Small / Large P-R	W = 739.5, p-value = 0.9623	
Small / Very Large P-R	W = 1277, p-value = 0.5408	
Medium / Large P-R	W = 86.5, p-value = 0.6086	
Medium / Very Large P-R	W = 156.5, p-value = 0.1417	
Large / Very Large P-R	W = 72.5, p-value = 0.5702	
Small / Medium C1st	W = 3479.5, p-value = 0.9727	
Small / Large C1st	W = 2419.5, p-value = 0.5373	
Small / Very Large C1st	W = 3943.5, p-value = 0.05861	
Medium / Large C1st	W = 301, p-value = 0.7392	
Medium / Very Large C1st	W = 483.5, p-value = 0.1332	
Large / Very Large C1st	W = 394.5, p-value = 0.05107	
Small / Medium C2nd	W = 5024, p-value = 0.9696	
Small / Large C2nd	W = 3870, p-value = 0.7918	
Small / Very Large C2nd	W = 5911.5, p-value = 0.06038	
Medium / Large C2nd	W = 329, p-value = 0.9412	
Medium / Very Large C2nd	W = 498, p-value = 0.1436	
Large / Very Large C2nd	W = 404.5, p-value = 0.1203	
Categorised - Pre-Roman - Function:		
Agricultural / Domestic	W = 2652, p-value = 0.4991	
Agricultural / Hillfort	W = 740, p-value = 0.3916	
Agricultural / Industrial	W = 120, p-value = 0.4742	
Agricultural / Port	W = 20, p-value = 0.7816	
Domestic / Hillfort	W = 2078.5, p-value = 0.6342	
Domestic / Industrial	W = 406, p-value = 0.496	
Domestic / Port	W = 52.5, p-value = 0.8823	
Hillfort / Industrial	W = 114, p-value = 0.663	
Hillfort / Port	W = 19, p-value = 0.8819	
Industrial / Port	W = 4, p-value = 0.8571	
Categorised - C1st Roman - Function:		
Agricultural / Domestic	W = 4649.5, p-value = 0.5912	
Agricultural / Industrial	W = 876, p-value = 0.09219	
Agricultural / Military	W = 1858.5, p-value = 0.7104	
Agricultural / Port	W = 295.5, p-value = 0.5364	
Agricultural / Villa	W = 254, p-value = 0.03792	
Domestic / Industrial	W = 2998, p-value = 0.1105	
Domestic / Military	W = 3771, p-value = 0.3475	
Domestic / Port	W = 702.5, p-value = 0.4185	
Domestic / Villa	W = 607, p-value = 0.01904	
Industrial / Military	W = 1151, p-value = 0.06875	
Industrial / Port	W = 172.5, p-value = 0.2488	
Industrial / Villa	W = 147.5, p-value = 0.009186	

Military / Port	W = 244, p-value = 0.6274	
Military / Villa	W = 202, p-value = 0.08682	
Port / Villa	W = 23.5, p-value = 0.6597	
Categorised - C2nd Roman - Function:		
Agricultural / Domestic	W = 10784, p-value = 0.005605	
Agricultural / Industrial	W = 3506, p-value = 0.2744	
Agricultural / Military	W = 1679, p-value = 0.6395	
Agricultural / Port	W = 458.5, p-value = 0.2274	
Agricultural / Town	W = 546, p-value = 4.467e-05	
Agricultural / Villa	W = 1337.5, p-value = 0.004451	
Domestic / Industrial	W = 7489, p-value = 0.2848	
Domestic / Military	W = 3978.5, p-value = 0.1471	
Domestic / Port	W = 885, p-value = 0.5574	
Domestic / Town	W = 1179, p-value = 3.398e-05	
Domestic / Villa	W = 2537, p-value = 0.08849	
Industrial / Military	W = 1152.5, p-value = 0.6244	
Industrial / Port	W = 335.5, p-value = 0.3648	
Industrial / Town	W = 420, p-value = 5.371e-05	
Industrial / Villa	W = 949, p-value = 0.04421	
Military / Port	W = 174.5, p-value = 0.2885	
Military / Town	W = 210, p-value = 0.0001129	
Military / Villa	W = 504.5, p-value = 0.02084	
Port / Town	W = 42, p-value = 0.01235	
Port / Villa	W = 86.5, p-value = 0.9222	
Town / Villa	W = 0, p-value = 0.000246	
Categorised - Function - Inter-Period:		
Agricultural P-R / C1st	W = 1602.5, p-value = 0.9566	
Agricultural P-R / C2nd	W = 1877, p-value = 0.124	
Agricultural C1st / C2nd	W = 2496, p-value = 0.0974	
Domestic P-R / C1st	W = 8983, p-value = 0.6498	
Domestic P-R / C2nd	W = 12743, p-value = 0.08863	
Domestic C1st / C2nd	W = 15988, p-value = 0.19	
Industrial P-R / C1st	W = 101, p-value = 0.9849	
Industrial P-R / C2nd	W = 248.5, p-value = 0.4639	
Industrial C1st / C2nd	W = 1377, p-value = 0.196	
Military C1st / C2nd	W = 816.5, p-value = 0.2283	
Port P-R / C1st	W = 4.5, p-value = 1	
Port P-R / C2nd	W = 4.5, p-value = 1	
Port C1st / C2nd	W = 32, p-value = 1	
Villa C1st / C2nd	W = 30.5, p-value = 0.161	

Appendix Five:

Table of Sites Comprising the Settlement Record

Appendix 5.1: Sites Comprising the Settlement Record Arranged by County, Site Name, Earliest Date, Latest Date, Size, Pre-Roman Category, C1st Roman Category and C2nd Roman Category

#	County	Site Name	Earliest Date	Latest Date	Size	Category - PR	Category - C1st	Category - C2nd
1	DBY	Longwalls Lane, Blackbrook	75	225	Small	N/A	Industrial: Quarry	Industrial: Quarry
2	DBY	Lumb Brook, Hazelwood	150	250	Small	N/A	N/A	Industrial: Pottery
3	DBY	Little Hay Grange Farm, Ockbrook	-100	400	Small	Agricultural Site	Agricultural Site	Agricultural Site
4	DBY	Brough Field, Carsington, Site A	140	400	Small	N/A	N/A	Industrial: Metalworking
5	DBY	Staden, Buxton	-100	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
6	DBY	Poole's Cavern, Buxton	120	220	Small	N/A	N/A	Industrial: Metalworking
7	DBY	Roystone Grange 1	100	400	Small	N/A	N/A	Agricultural Site
8	DBY	Wattscliffe, Harthill Moor	100	400	Small	N/A	N/A	Agricultural Site
9	DBY	Robin Hood's Stride, Harthill Moor	100	400	Small	N/A	N/A	Agricultural Site
10	DBY	Carsington, Owslow Barn	50	400	Small	N/A	Domestic Settlement	Domestic Settlement
11	DBY	Thieves Den, Harthill Moor	100	300	Small	N/A	N/A	Agricultural Site
12	DBY	Sherwood Lodge, Bolsover	150	400	Small	N/A	N/A	Agricultural Site
13	DBY	Derby Racecourse Park	50	400	Small	N/A	Industrial: Pottery	Industrial: Pottery
14	DBY	Children's Hospital, North Street, Derby	50	150	Small	N/A	Industrial: Quarry	Industrial: Quarry
15	DBY	192 Duffield Road, Derby	100	200	Small	N/A	N/A	Agricultural Site
16	DBY	Highfields Farm, Findern	150	300	Small	N/A	N/A	Agricultural Site
17	DBY	Hope Shale Quarry, Derbyshire	150	300	Small	N/A	N/A	Agricultural Site
18	DBY	The Warren, Outseats	50	400	Small	N/A	Agricultural Site	Agricultural Site
19	DBY	Derby Racecourse	80	350	Small	N/A	Industrial: Pottery	Industrial: Metalworking
20	DBY	Lodge House, Smalley	100	200	Small	N/A	N/A	Agricultural Site
21	DBY	Ripley, Derbyshire	100	400	Small	N/A	N/A	Agricultural Site
22	DBY	Stubbin Wood, Langwith Junction, near Shirebrook	190	280	Small	N/A	N/A	Agricultural Site
23	DBY	Thirst House Cave, Deepdale	75	250	Small	N/A	Industrial: Metalworking	Industrial: Metalworking

24	LIN	Dragonby	-100	400	Large	Domestic Settlement	Agricultural Site	Domestic Settlement
25	LIN	Miles Cross Hill, Well	150	400	Small	N/A	N/A	Agricultural Site
26	LIN	Mount Pleasant House, Nettleton and Rothwell	-100	350	Very Large	Domestic Settlement	Domestic Settlement	Domestic Settlement
27	LIN	Patchett's Cliff	150	300	Small	N/A	N/A	Domestic Settlement
28	LIN	Blyborough to Cottam Pipeline, Site 46	50	350	Small	N/A	Agricultural Site	Agricultural Site
29	LIN	Green Lane, Lea	150	400	Small	N/A	N/A	Industrial: Pottery
30	LIN	Newton on Trent	70	150	Small	N/A	Industrial: Pottery	Industrial: Pottery
31	LIN	Kirmington Roman Fort and Settlement	-100	400	Very Large	Domestic Settlement	Military: Fort + Vicus	Domestic Settlement
32	LIN	Thonock, Golf Course Lakes	1	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
33	LIN	Scamblesby	75	275	Small	N/A	Agricultural Site	Agricultural Site
34	LIN	Mareham Road, Horncastle	-200	400	Small	Agricultural Site	Agricultural Site	Agricultural Site
35	LIN	Navenby, Chapel Heath	50	400	Large	N/A	Domestic Settlement	Domestic Settlement
36	LIN	Newport, Lincoln, Bishop Grosseteste College	100	325	Small	N/A	N/A	Domestic Settlement
37	LIN	Hall Field, Water Lane, Bassingham	50	400	Small	N/A	Agricultural Site	Agricultural Site
38	LIN	Swinethorpe Iron Age Enclosure	-100	50	Small	Agricultural Site	Agricultural Site	N/A
39	LIN	Abbey Farm, Northorpe	50	400	Small	N/A	Domestic Settlement	Domestic Settlement
40	LIN	Dunholme	-50	100	Small	Agricultural Site	Agricultural Site	Agricultural Site
41	LIN	Stenigot Reservoir, Donington-on-Bain,	-50	60	Small	Agricultural Site	Agricultural Site	N/A
42	LIN	Market Rasen, East of Linwood Road (site 1)	100	400	Small	N/A	N/A	Industrial: Pottery
43	LIN	Market Rasen, Linwood Road (site 1)	100	200	Small	N/A	N/A	Industrial: Pottery
44	LIN	Market Rasen, Land West of Linwood Road	100	300	Small	N/A	N/A	Industrial: Pottery
45	LIN	Land off Scothern Lane, Dunholme	50	400	Small	N/A	Agricultural Site	Agricultural Site
46	LIN	Market Rasen, East of Linwood Road (site 2)	150	300	Small	N/A	N/A	Industrial: Pottery
47	LIN	Market Rasen, Linwood Road (site 2)	-100	400	Small	Industrial: Pottery	Industrial: Pottery	Industrial: Pottery
48	LIN	Bunkers Hill, Lincoln	-100	50	Large	Domestic Settlement	Domestic Settlement	N/A
49	LIN	Harpswell	50	200	Small	N/A	Domestic Settlement	Domestic Settlement
50	LIN	Field 13, Maltby-le-Marsh to Manby Replacement Water Main	150	325	Small	N/A	N/A	Agricultural Site
51	LIN	Field 6, Maltby-le-Marsh to Manby Replacement Water Main	150	400	Small	N/A	N/A	Agricultural Site
52	LIN	Tonge's Farm, Norton Disney Quarry, Norton Disney	50	125	Small	N/A	Military: Camp	Military: Camp
53	LIN	Wygate Park, Spalding	-100	400	Small	Industrial: Pottery	Industrial: Pottery	Industrial: Pottery
54	LIN	Caistor Grammar School Playing Field	125	175	Small	N/A	N/A	Domestic Settlement
55	LIN	Land adjacent to Beech Street /Newark Road, Lincoln	50	125	Small	N/A	Military: Camp	Military: Camp
56	LIN	Allenby Road Industrial Estate Roads	75	150	Small	N/A	Agricultural Site	Agricultural Site

57	LIN	Sudbrooke	-100	250	Small	Agricultural Site	Agricultural Site	Villa
58	LIN	Langton Hill, plots 1/5 & 1/6	-50	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
59	LIN	Langton Hill Farm	-100	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
60	LIN	Winteringham	50	400	Small	N/A	Military: Camp	Military: Camp
61	LIN	Winterton Villa	75	400	Small	N/A	Domestic Settlement	Villa
62	LIN	Ashby Grange South, Bottesford	-50	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
63	LIN	Grange Farm, High Street, Bassingham	100	300	Small	N/A	N/A	Agricultural Site
64	LIN	Market Rasen, Linwood Road (site 3)	100	200	Small	N/A	N/A	Industrial: Pottery
65	LIN	Chase Farm, North Killingholme	-100	350	Medium	Domestic Settlement	Domestic Settlement	Domestic Settlement
66	LIN	Blackhills Farm and The Hollys, Wickenby	-50	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
67	LIN	Knaith Park	50	400	Small	N/A	Industrial: Metalworking	Industrial: Metalworking
68	LIN	The Chase, off North Road, Tetford	75	300	Small	N/A	Industrial: Pottery	Industrial: Pottery
69	LIN	Land Between 17 and 21 Lincoln Road, Welton	100	400	Small	N/A	N/A	Domestic Settlement
70	LIN	Palmer Lane, Barrow upon Humber	100	400	Small	N/A	N/A	Domestic Settlement
71	LIN	East Halton Skitter, Site 26	50	400	Very Large	N/A	N/A	Domestic Settlement
72	LIN	The Bridles, St Barnabas Road, Barnetby le Wold	-100	325	Small	Agricultural Site	Agricultural Site	Agricultural Site
73	LIN	Winterton Landfill Site	50	150	Small	N/A	Agricultural Site	Agricultural Site
74	LIN	Humberside Airport, Kirmington	100	150	Small	N/A	N/A	Domestic Settlement
75	LIN	Land off Horkstow Road, South Ferriby, North Lincolnshire	100	200	Small	N/A	N/A	Agricultural Site
76	LIN	Barrow on Humber Water Treatment Works	100	350	Small	N/A	N/A	Industrial: Quarry
77	LIN	Goltho	50	200	Small	N/A	Agricultural Site	Agricultural Site
78	LIN	Norton Disney Roman Villa	50	360	Medium	N/A	Villa	Villa
79	LIN	Market Rasen, Fairfield, Linwood Road	-100	250	Small	Domestic Settlement	Industrial: Pottery	Industrial: Pottery
80	LIN	Meadow Lane North Hykeham, CLAU Site	100	400	Small	N/A	N/A	Domestic Settlement
81	LIN	Moor Farm, Bucknall	-50	400	Medium	Domestic Settlement	Domestic Settlement	Domestic Settlement
82	LIN	North Hykeham pottery kiln	70	100	Small	N/A	Industrial: Pottery	Industrial: Pottery
83	LIN	Immingham	-50	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
84	LIN	Little London, Torksey	150	250	Small	N/A	N/A	Industrial: Pottery
85	LIN	The Hollies Solar Park, Burgh-le-Marsh	-50	300	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
86	LIN	Aylesby, South Humberside	-50	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
87	LIN	Killingholme, Area D3	-100	-1	Small	Domestic Settlement	N/A	N/A
88	LIN	Killingholme, Area D5	100	350	Small	N/A	N/A	Agricultural Site
89	LIN	Burringham Road, Scunthorpe	-100	400	Small	Agricultural Site	Agricultural Site	Agricultural Site

90	NTT	Harby Iron Age Gully	-100	43	Small	Industrial: Metalworking	N/A	N/A
91	NTT	Harby Iron Age Enclosure Entrance	-100	43	Small	Domestic Settlement	N/A	N/A
92	NTT	Steetley Lane, Holme Carr Farm, Near Worksop	100	200	Small	N/A	N/A	Agricultural Site
93	NTT	Glebe Farm, Brough	-100	43	Small	Agricultural Site	N/A	N/A
94	NTT	Moor Pool Close, Rampton	1	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
95	NTT	Sturton le Steeple, Site B	100	400	Small	N/A	N/A	Domestic Settlement
96	NTT	Sturton Le Steeple, Site C	50	400	Small	N/A	Industrial: Metalworking	Industrial: Metalworking
97	NTT	Raymoth Lane, Worksop	100	425	Small	N/A	N/A	Agricultural Site
98	NTT	Newark, North Gate Retail Park	100	400	Small	N/A	N/A	Domestic Settlement
99	NTT	Oxton Road, near Burntstump, Ramsdale, Arnold	100	250	Small	N/A	N/A	Domestic Settlement
100	NTT	Blaco Hill, Mattersey	100	400	Small	N/A	N/A	Agricultural Site
101	NTT	Averham Relief Road	-100	400	Small	Agricultural Site	Agricultural Site	Agricultural Site
102	NTT	Scrooby Top Quarry Extension, Scrooby Top	50	400	Small	N/A	Domestic Settlement	Domestic Settlement
103	NTT	Manor House Farm, Little Carlton	50	400	Small	N/A	Agricultural Site	Agricultural Site
104	NTT	Ferry Lane Farm	-50	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
105	NTT	Mons Pool	50	350	Small	N/A	Domestic Settlement	Domestic Settlement
106	NTT	Gleadthorpe Farm, Warsop	*c. -100	*c. 400	Medium	Agricultural Site	Military: Camp	N/A
107	NTT	Hoveringham (SMR 1770b)	50	400	Small	N/A	Agricultural Site	Agricultural Site
108	NTT	Tiln North	50	400	Small	N/A	Agricultural Site	Agricultural Site
109	NTT	Southwell Roman Villa, Church Street	100	400	Small	N/A	N/A	Villa
110	NTT	Lamb's Close, Kelham	50	250	Small	N/A	Agricultural Site	Agricultural Site
111	NTT	Dorket Head	-50	80	Very Large	Hillfort	Military: Camp	N/A
112	NTT	Gonalston	-100	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
113	NTT	Menagerie Wood, Worksop	150	400	Small	N/A	N/A	Domestic Settlement
114	NTT	Chainbridge Lane, Lound	75	250	Small	N/A	Domestic Settlement	Domestic Settlement
115	NTT	Dunston's Clump	-25	300	Small	Agricultural Site	Agricultural Site	Agricultural Site
116	NTT	South Muskham	100	200	Small	N/A	N/A	Agricultural Site
117	NTT	Mansfield Woodhouse	80	350	Medium	N/A	Domestic Settlement	Domestic Settlement
118	CHS	Engine Vein, Alderley Edge	50	340	Small	N/A	Industrial: Mine	Industrial: Mine
119	CHS	Wilderspool, Warrington	70	325	Small	N/A	Domestic Settlement	Town
120	CHS	Loushers Lane	-100	400	Small	Agricultural Site	Villa	Villa
121	CHS	Town Farm Quarry, Norley	150	200	Small	N/A	N/A	Domestic Settlement

122	CHS	Middlewich Roman Fort and Vicus	-100	360	Very Large	Agricultural Site	Military: Fort + Vicus	Military: Fort + Vicus
123	CHS	Stockton Heath, Warrington	75	275	Small	N/A	Domestic Settlement	Domestic Settlement
124	CHS	Nantwich, Snow Hill Car Park	100	200	Small	N/A	N/A	Domestic Settlement
125	CHS	Heronbridge (2002-2003 excavations)	90	400	Very Large	N/A	Domestic Settlement	Domestic Settlement
126	CHS	Brook House Farm, Bruen Stapleford	-100	-1	Small	Domestic Settlement	N/A	N/A
127	CHS	Birch Heath, Tarporley	100	250	Small	N/A	N/A	Domestic Settlement
128	CHS	Warrington Friary	100	300	Small	N/A	N/A	Domestic Settlement
129	CHS	Legh Oaks Farm, High Legh	100	200	Small	N/A	N/A	Domestic Settlement
130	CHS	Nantwich, Kingsley Fields	100	300	Small	N/A	N/A	Industrial: Salt
131	CHS	Nantwich, St Anne's Lane	100	300	Small	N/A	N/A	Industrial: Metalworking
132	CHS	Southworth Quarry, Winwick, Warrington, Cheshire	125	175	Small	N/A	N/A	Industrial: Metalworking
133	CHS	Tatton Park	140	600	Small	N/A	N/A	Agricultural Site
134	CHS	Eaton Road, Eccleston	100	300	Small	N/A	N/A	Agricultural Site
135	CHS	Halton Brow, Runcorn	100	400	Small	N/A	N/A	Domestic Settlement
136	CHS	Heronbridge (early to mid 20th century excavations)	90	400	Small	N/A	Industrial: Metalworking	Industrial: Metalworking
137	CHS	Sea Bank, Middlewich	75	200	Small	N/A	Industrial: Salt	Industrial: Salt
138	CHS	Aston Park, Great Budworth	100	300	Small	N/A	N/A	Agricultural Site
139	CHS	Eaton-By-Tarporley Villa	100	400	Small	N/A	N/A	Villa
140	CHS	Great Woolden Hall	-50	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
141	CHS	Northwich Roman Fort (Condate)	75	150	Large	N/A	Military: Fort + Vicus	Military: Fort + Vicus
142	CHS	Jersey Way, Middlewich	70	120	Small	N/A	Industrial: Salt	Industrial: Salt
143	SAL	Meole Brace	150	350	Large	N/A	N/A	Domestic Settlement
144	SAL	Preston Farm	1	50	Small	Agricultural Site	Agricultural Site	N/A
145	SAL	Duncote Farm	1	300	Small	Agricultural Site	Agricultural Site	Agricultural Site
146	SAL	Heath Road, near Whitchurch	100	300	Small	N/A	N/A	Industrial: Metalworking
147	SAL	Sharpstones Hill Site A	1	100	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
148	SAL	Sharpstones Hill Site E/Meole Brace	1	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
149	SAL	The Berth	-100	100	Medium	Hillfort	Domestic Settlement	Domestic Settlement
150	SAL	Ismore Coppice, Wroxeter	100	200	Small	N/A	N/A	Industrial: Tile
151	SAL	Lea Cross, Pontesbury	150	350	Small	N/A	N/A	Villa
152	SAL	Nesscliff Hill	150	400	Small	N/A	N/A	Agricultural Site

153	SAL	Ellesmere Road, Shrewsbury	120	350	Small	N/A	N/A	Agricultural Site
154	SAL	Oak Street Head, Belle Vue, Shrewsbury	100	300	Small	N/A	N/A	Domestic Settlement
155	SAL	Redhill, Telford	65	400	Medium	N/A	Military: Camp	Domestic Settlement
156	SAL	Alkmund Park, Berwick	100	200	Small	N/A	N/A	Villa
157	SAL	Chilton Farm, Atcham	100	325	Small	N/A	N/A	Domestic Settlement
158	STS	Wetton Fields	50	400	Large	N/A	Agricultural Site	Agricultural Site
159	STS	Holditch	60	275	Small	N/A	Military: Workshop	Domestic Settlement
160	STS	Tutbury Castle	*c. 43	*c. 200	Small	N/A	Agricultural Site	Agricultural Site
161	STS	Acton Trussell Villa	-100	400	Small	Domestic Settlement	Villa	Villa
162	STS	Shallowford	100	300	Very Large	N/A	N/A	Agricultural Site
163	STS	Trent Vale, Stoke-on-Trent	50	70	Small	N/A	Industrial: Pottery	N/A
164	STS	Hales Roman Villa	50	360	Medium	N/A	Villa	Villa
165	STS	Bucknall, Stoke-on-Trent	100	180	Small	N/A	N/A	Agricultural Site
166	ERY	Langeled Receiving Facilities, Easington	-25	300	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
167	ERY	High Wold, Bempton Lane, Bridlington	75	250	Small	N/A	Agricultural Site	Agricultural Site
168	ERY	Low Caythorpe, gas pipeline storage facility (Area 1)	1	410	Large	Domestic Settlement	Domestic Settlement	Domestic Settlement
169	ERY	Shiptonthorpe	100	410	Large	N/A	N/A	Domestic Settlement
170	ERY	Burnby Lane, Hayton	-100	400	Small	Domestic Settlement	Agricultural Site	Agricultural Site
171	ERY	Hayton, Glen Garth	1	700	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
172	ERY	Hayton, Plough Inn	100	400	Small	N/A	N/A	Industrial: Quarry
173	ERY	Hayton, Bridge Farm and Grove Farm	-50	400	Large	Domestic Settlement	Domestic Settlement	Domestic Settlement
174	ERY	Melton A63	-80	250	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
175	ERY	Westermost Rough Offshore Windfarm Area 1	100	175	Small	N/A	N/A	Agricultural Site
176	ERY	Westermost Rough Offshore Windfarm Area 2	-100	-25	Small	Domestic Settlement	N/A	N/A
177	ERY	Westermost Rough Offshore Windfarm Area 3 and 5 (Daisy Hill Farm)	-50	275	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
178	ERY	Westermost Rough Offshore Windfarm Area 4	100	200	Small	N/A	N/A	Agricultural Site
179	ERY	Beacon Lagoons, Easington	-50	400	Small	Agricultural Site	Agricultural Site	Agricultural Site
180	ERY	Sixpenny Wood Wind Farm, Howden	25	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
181	ERY	Manor Farm, Fraisthorpe	-50	100	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
182	ERY	Old Ellerby, Ellerby (Easington to Ganstead Plot 3)	1	375	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
183	ERY	Burton Constable, Ellerby (Easington to Ganstead Plot 9)	-100	400	Small	Domestic Settlement	N/A	Domestic Settlement
184	ERY	Brandywell, Sproatley (Easington to Ganstead Plots 25 and 26)	-50	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
185	ERY	Nuttles, Burstwick (Easington to Ganstead Plot 31)	-50	300	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement

186	ERY	Lelley, Burstwick (Easington to Ganstead Plot 35)	1	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
187	ERY	New York, Burstwick (Easington to Ganstead Plot 36)	-50	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
188	ERY	Braemere Hill, Burstwick (Easington to Ganstead Plot 47)	-50	150	Small	Agricultural Site	Agricultural Site	Agricultural Site
189	ERY	Burstwick (Easington to Ganstead Plot 51)	1	100	Small	Agricultural Site	Agricultural Site	Agricultural Site
190	ERY	Churchlands, Halsham (Easington to Ganstead Plot 68)	-50	43	Small	Domestic Settlement	N/A	N/A
191	ERY	Winestead, Rimswell (Easington to Ganstead Plot 73)	1	300	Small	Agricultural Site	Agricultural Site	Agricultural Site
192	ERY	Patrington (Easington to Ganstead Plot 88)	1	300	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
193	ERY	Bluegate Corner, Welwick (Easington to Ganstead Plot 98)	-50	400	Small	Domestic Settlement	Agricultural Site	Agricultural Site
194	ERY	Scorborough Hill, Skeffling (Easington to Ganstead Plot 104)	-50	200	Small	Agricultural Site	Agricultural Site	Domestic Settlement
195	ERY	Gilcross, Skeffling (Easington to Ganstead Plot 107)	-100	43	Small	Domestic Settlement	N/A	N/A
196	ERY	Out Newton Road, Skeffling (Easington to Ganstead Plot 108)	-50	200	Small	Industrial: Indeterminate	Industrial: Indeterminate	Industrial: Indeterminate
197	ERY	Hull Road, Easington (Easington to Ganstead Plot 113)	-50	50	Small	Agricultural Site	Agricultural Site	N/A
198	ERY	Dimlington, Easington (Easington to Ganstead Plot 115)	-50	50	Small	Domestic Settlement	Domestic Settlement	N/A
199	ERY	Gibraltar Farm, Kingston upon Hull	150	400	Small	N/A	N/A	Domestic Settlement
200	ERY	Home Farm, Sewerby (Area E)	-50	150	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
201	ERY	Eastgate South and Albion Street, Driffield	100	410	Small	N/A	N/A	Agricultural Site
202	ERY	Malmo Road, Hull	100	400	Small	N/A	N/A	Domestic Settlement
203	ERY	Shepherd Lane, Woodmansey (Ganstead to Asselby Plots 53 and 55)	-50	300	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
204	ERY	Rudstone Dale, Newbald (Ganstead to Asselby Plots 103 and 104)	1	375	Large	Domestic Settlement	Domestic Settlement	Domestic Settlement
205	ERY	Hardmoor Lane, Hotham (Ganstead to Asselby Plot 121)	-50	43	Small	Domestic Settlement	N/A	N/A
206	ERY	Warren Hill Spring, Hotham (Ganstead to Asselby Plot 123)	50	400	Small	N/A	Domestic Settlement	Domestic Settlement
207	ERY	Carrcliffe Crossroad, Hotham (Ganstead to Asselby Plot 126)	43	150	Small	N/A	Industrial: Salt	Industrial: Salt
208	ERY	Black Dike, North Cave (Ganstead to Asselby Plots 131, 132, 133 and 134)	-50	325	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
209	ERY	Howden Common, Eastrington (Ganstead to Asselby Plots 178 and 179)	-50	350	Small	Domestic Settlement	Agricultural Site	Agricultural Site
210	ERY	Wood Lane, Eastrington (Ganstead to Asselby Plot 180)	1	250	Small	Agricultural Site	Agricultural Site	Agricultural Site
211	ERY	Thorpe Hall, Eastrington (Ganstead to Asselby Plots 182 and 184)	-50	400	Small	Domestic Settlement	Domestic Settlement	Industrial: Salt
212	ERY	West Dene, Howden (Ganstead to Asselby Plot 186)	-50	150	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
213	ERY	Oxen Stang, Barmby on the Marsh (Ganstead to Asselby Plot 213)	50	375	Small	N/A	Agricultural Site	Domestic Settlement
214	ERY	Stamford Bridge, water pipeline	125	350	Very Large	N/A	N/A	Domestic Settlement
215	ERY	Balk Field, Pocklington	-100	250	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
216	ERY	Melton wastewater works, near Brough	50	400	Small	N/A	Domestic Settlement	Domestic Settlement

217	ERY	Pocklington wastewater treatment works	125	400	Small	N/A	N/A	Domestic Settlement
218	ERY	Sewerby Cottage Farm, Bridlington	-75	250	Small	Agricultural Site	Agricultural Site	Agricultural Site
219	ERY	Hasholme Hall	50	350	Small	N/A	Industrial: Pottery	Industrial: Pottery
220	ERY	Bursea House	50	400	Small	N/A	Industrial: Pottery	Industrial: Pottery
221	ERY	Hawling Road, Market Weighton	-50	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
222	ERY	Rudston	1	375	Medium	Domestic Settlement	Domestic Settlement	Domestic Settlement
223	ERY	Kelk 6	-50	70	Small	Industrial: Metalworking	Domestic Settlement	N/A
224	ERY	Stamford Bridge, Moor Lane	70	350	Small	N/A	Agricultural Site	Agricultural Site
225	ERY	Burton Fleming, water treatment works	1	400	Large	Domestic Settlement	Domestic Settlement	Domestic Settlement
226	ERY	Wansford	-50	250	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
227	ERY	Chapel Garth, Arram	-50	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
228	ERY	Aldborough Gas Storage Facility, Aldborough	1	300	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
229	ERY	Salt End To Aldborough, Plot N10	-75	100	Small	Domestic Settlement	Domestic Settlement	N/A
230	ERY	Welton villa	-50	410	Large	Agricultural Site	Agricultural Site	Villa
231	NYK	Millfield Farm, Wheldrake	150	400	Small	N/A	N/A	Domestic Settlement
232	NYK	Cat Babbleton Farm, Ganton	-50	350	Very Large	Domestic Settlement	Domestic Settlement	Domestic Settlement
233	NYK	Womersley	150	350	Small	N/A	N/A	Domestic Settlement
234	NYK	Wharram Le Street	100	400	Medium	N/A	N/A	Villa
235	NYK	Wharram Grange	100	400	Medium	N/A	N/A	Villa
236	NYK	Langton Roman Villa	70	400	Medium	N/A	Military: Fortlet	Villa
237	NYK	Jamie's Craggs, Crambeck	100	410	Small	N/A	N/A	Industrial: Pottery
238	NYK	Beadlam Roman Villa	150	400	Medium	N/A	N/A	Agricultural Site
239	NYK	Newham's Pit, Staxton	75	140	Small	N/A	Military: Fortlet	Military: Fortlet
240	NYK	Newbridge Quarry, Pickering	-100	350	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
241	NYK	Hensall Quarry	25	200	Small	Agricultural Site	Agricultural Site	Domestic Settlement
242	NYK	Crankley Lane, Easingwold By-pass	-100	1	Small	Domestic Settlement	N/A	N/A
243	NYK	Malton Roman Fort and Vicus	75	500	Small	N/A	Military: Fort + Vicus	Military: Fort + Vicus
244	NYK	Bank Newton	100	325	Small	N/A	N/A	Domestic Settlement
245	NYK	A1(M)/A53 intersection (Castle Hills), Site M	-100	200	Small	Domestic Settlement	Agricultural Site	Agricultural Site
246	NYK	A1(M), Site 16, Wetherby Lane	-50	300	Small	Domestic Settlement	Agricultural Site	Agricultural Site
247	NYK	Healam Bridge Roman Fort and Settlement	75	425	Large	N/A	Military: Fort + Vicus	Military: Fort + Vicus
248	NYK	Levisham Moor enclosures (A-E)	43	400	Small	N/A	Industrial: Metalworking	Industrial: Metalworking

249	NYK	Asselby to Pannal pipeline, Site 1	-50	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
250	NYK	Asselby to Pannal pipeline, Site 17-3	-100	375	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
251	NYK	Asselby to Pannal pipeline, Site 18-5	-100	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
252	NYK	Asselby to Pannal pipeline, Site 18-11a	-50	200	Small	Agricultural Site	Agricultural Site	Agricultural Site
253	NYK	Dringhouses, 42-50 Tadcaster Road	150	250	Small	N/A	N/A	Domestic Settlement
254	NYK	Norton Grange (Field 79)	-50	100	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
255	NYK	A165 Reighton Bypass	-50	300	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
256	NYK	Bayram Hill, nr Knaresborough	50	400	Small	N/A	Domestic Settlement	Domestic Settlement
257	NYK	Crossgates, Seamer	-100	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
258	NYK	Flaxby quarry	150	400	Small	N/A	N/A	Domestic Settlement
259	NYK	Freemans Way, Leeming Bar	100	400	Small	N/A	N/A	Domestic Settlement
260	NYK	Gale Common Ash Disposal Site, Womersley	-50	410	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
261	NYK	Mount Pleasant Farm	-50	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
262	NYK	Hutton Hill Farm	-50	410	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
263	NYK	Jackdaw Crag Quarry	-100	175	Small	Agricultural Site	Agricultural Site	Agricultural Site
264	NYK	Land South of Crossgates Lane, Pickering	-50	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
265	NYK	Low Farm, Kirby Grindalythe	-50	350	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
266	NYK	Nosterfield Quarry	-50	200	Very Large	Domestic Settlement	Domestic Settlement	Domestic Settlement
267	NYK	Scarborough Integrated Transport Scheme, Fieldwork Area B and Former Play Area	-100	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
268	NYK	Teesside to Saltend Ethylene Pipeline, Site 716, Acaster Hill	-50	43	Small	Domestic Settlement	N/A	N/A
269	NYK	Teesside to Saltend Ethylene Pipeline, Site 718, Sike Spa, Crayke	1	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
270	NYK	Teesside to Saltend Ethylene Pipeline, Site 169, West Lilling	150	400	Small	N/A	N/A	Domestic Settlement
271	NYK	Wykeham Quarry, West Ayton	-50	150	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
272	NYK	Marton to Acomb Landing pipeline, Field 22	50	400	Small	N/A	Domestic Settlement	Domestic Settlement
273	NYK	St. Oswald's School, Fulford	75	325	Small	N/A	Domestic Settlement	Domestic Settlement
274	NYK	Heslington East, Areas A1 and A2	-100	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
275	NYK	Heslington East, Area 3 (Fields 8 and 9)	-50	450	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
276	NYK	Heslerton	1	500	Very Large	Domestic Settlement	Domestic Settlement	Domestic Settlement
277	NYK	Norton, 27 Wood Street	70	300	Small	N/A	Domestic Settlement	Domestic Settlement
278	NYK	Norton, Bright Steels	70	400	Small	N/A	Domestic Settlement	Domestic Settlement
279	NYK	Malton Rugby Club	1	300	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
280	NYK	Norton Community Primary School	175	400	Large	N/A	N/A	Industrial: Pottery
281	NYK	Malton, St Leonard's Church	190	360	Small	N/A	N/A	Domestic Settlement

282	NYK	West Lodge 2, Malton	100	300	Small	N/A	N/A	Domestic Settlement
283	SYK	Catesby Business Park, Balby Carr	-100	150	Medium	Agricultural Site	Agricultural Site	Agricultural Site
284	SYK	Billingley Drive, Thurnscoe	150	350	Small	N/A	N/A	Agricultural Site
285	SYK	Sandtoft	150	400	Small	N/A	N/A	Domestic Settlement
286	SYK	Cantley Housing Estate, Doncaster: site 1, kilns 1-3	110	170	Small	N/A	N/A	Industrial: Pottery
287	SYK	Cantley Housing Estate, Doncaster: site 2, kilns 4-6	110	170	Small	N/A	N/A	Industrial: Pottery
288	SYK	Cantley Housing Estate, Doncaster: site 3, kilns 7-8 and 22-29	100	350	Small	N/A	N/A	Industrial: Pottery
289	SYK	Cantley Housing Estate, Doncaster: kilns 9-12	150	300	Small	N/A	N/A	Industrial: Pottery
290	SYK	Cantley Housing Estate, Doncaster: kiln 14	150	300	Small	N/A	N/A	Industrial: Pottery
291	SYK	Sandall Stones Road, Kirk Sandall	150	350	Small	N/A	N/A	Domestic Settlement
292	SYK	Rossington Colliery	-100	350	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
293	SYK	Blaxton Quarry, Auckley	160	250	Small	N/A	N/A	Industrial: Pottery
294	SYK	Gunhills, Armthorpe	1	350	Very Large	Industrial: Metalworking	Industrial: Metalworking	Industrial: Metalworking
295	SYK	Carr Lodge Farm, Doncaster	-50	300	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
296	SYK	Barnburgh Hall, Barnburgh	100	200	Small	N/A	N/A	Domestic Settlement
297	SYK	Barnsdale Bar Quarry	100	400	Medium	N/A	N/A	Agricultural Site
298	SYK	Enclosure 8, Land at Redhouse Farm, Adwick le Street	1	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
299	SYK	Hazel Lane Quarry, Hampole (TVAS)	100	200	Small	N/A	N/A	Domestic Settlement
300	SYK	High Street, Shafton	1	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
301	SYK	Holme Hall Quarry, near Stainton	75	350	Small	N/A	Domestic Settlement	Domestic Settlement
302	SYK	Bessacarr, Doncaster	75	200	Small	N/A	Industrial: Metalworking	Industrial: Metalworking
303	SYK	Huggin Lakes, Armthorpe	100	325	Small	N/A	N/A	Domestic Settlement
304	SYK	Area 7, Land at Redhouse Farm, Adwick le Street	1	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
305	SYK	Shafton By-Pass	1	225	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
306	SYK	Warning Tongue Lane, Bessacarr	*c. 43	*c. 200	Small	N/A	Agricultural Site	Agricultural Site
307	SYK	Hazel Lane Quarry, Hampole (ASWYAS)	1	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
308	SYK	Ashfields, Kirton Road, Stainforth	100	400	Small	N/A	N/A	Industrial: Metalworking
309	SYK	Whirlow Hall Farm	1	250	Small	Agricultural Site	Agricultural Site	Agricultural Site
310	SYK	Doncaster A638 QBC, Scawthorpe	100	400	Small	N/A	N/A	Domestic Settlement
311	SYK	Topham Farm, Sykehouse	-100	200	Small	Agricultural Site	Agricultural Site	Domestic Settlement
312	SYK	Pickburn Leys, Adwick-Le-Street	-50	300	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
313	SYK	Land off St Wilfrid's Road, Cantley	75	325	Small	N/A	Domestic Settlement	Industrial: Pottery

314	SYK	Doncaster Roman Fort (Danum)	69	500	Large	N/A	Military: Fort + Vicus	Military: Fort + Vicus
315	SYK	Doncaster, 10-14A Hall Gate	1	400	Small	Agricultural Site	Domestic Settlement	Domestic Settlement
316	SYK	Edlington Wood	100	300	Small	N/A	N/A	Agricultural Site
317	SYK	Rossington Bridge, pumping station	43	350	Small	N/A	Domestic Settlement	Industrial: Pottery
318	SYK	Doncaster, 8-10 High Street	70	350	Small	N/A	Domestic Settlement	Industrial: Metalworking
319	SYK	Whitley, Wharnscliffe	150	250	Small	N/A	N/A	Domestic Settlement
320	WYK	Grimescar Wood, Fixby	75	150	Small	N/A	Industrial: Tile	Industrial: Tile
321	WYK	Pontefract Road, Knottingley	100	250	Small	N/A	N/A	Domestic Settlement
322	WYK	Stile Hill, Colton	100	200	Small	N/A	N/A	Domestic Settlement
323	WYK	Riskin Avenue, Wrenthorpe	100	300	Small	N/A	N/A	Agricultural Site
324	WYK	Church Farm Access Track, Darrington	100	400	Small	N/A	N/A	Domestic Settlement
325	WYK	Knottingley Road, A1(M), Site XX8	100	400	Small	N/A	N/A	Domestic Settlement
326	WYK	Holmfield Interchange, A1(M), Ferrybridge, Site Q	-100	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
327	WYK	Holmfield Interchange, A1(M), Ferrybridge (incl. Site P)	-50	350	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
328	WYK	A1(M) Site C4SA	100	400	Small	N/A	N/A	Domestic Settlement
329	WYK	Dalton Parlours	-100	375	Medium	Agricultural Site	Domestic Settlement	Domestic Settlement
330	WYK	Nostell Priory	1	350	Small	Agricultural Site	Industrial: Pottery	Domestic Settlement
331	WYK	Wattle Syke	-100	410	Large	Domestic Settlement	Domestic Settlement	Domestic Settlement
332	WYK	Asselby to Pannal pipeline, Site 20-2	-50	400	Small	Agricultural Site	Agricultural Site	Agricultural Site
333	WYK	Asselby to Pannal pipeline, Tr 50 and Tr 51	-100	200	Small	Agricultural Site	Agricultural Site	Domestic Settlement
334	WYK	Asselby to Pannal pipeline, Site 26-2	-50	300	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
335	WYK	Wetherby, St James' Street	50	400	Small	N/A	Domestic Settlement	Domestic Settlement
336	WYK	Bell Hill, Stourton	100	300	Small	N/A	N/A	Agricultural Site
337	WYK	Cedar Ridge, Garforth	150	500	Small	N/A	N/A	Industrial: Quarry
338	WYK	Bulcliffe Wood, Netherton	-50	200	Small	Agricultural Site	Agricultural Site	Agricultural Site
339	WYK	Carr Gate Police Headquarters, Wakefield	1	200	Small	Agricultural Site	Agricultural Site	Agricultural Site
340	WYK	Field Lane Site C, South Elmsall	-100	100	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
341	WYK	Darrington Quarry northern extension	-100	400	Small	Agricultural Site	Domestic Settlement	Domestic Settlement
342	WYK	Glasshoughton Coalfields Link Road	100	200	Small	N/A	N/A	Agricultural Site
343	WYK	Hemsworth Bypass (Site A)	75	400	Small	N/A	Domestic Settlement	Domestic Settlement
344	WYK	Hemsworth Bypass (Site C)	*c. 100	*c. 400	Small	N/A	N/A	Industrial: Indeterminate
345	WYK	Thorntree Hill, Walton	100	300	Small	N/A	N/A	Agricultural Site

346	WYK	Killingbeck Hospital, Leeds	50	300	Small	N/A	Domestic Settlement	Domestic Settlement
347	WYK	Mitchell Laithes Farm, Ossett	100	350	Small	N/A	N/A	Industrial: Metalworking
348	WYK	Castleford Roman Fort and Vicus (Lagentium)	71	400	Large	N/A	Military: Fort + Vicus	Military: Fort + Vicus
349	WYK	Castleford, West Street	70	200	Small	N/A	Domestic Settlement	Domestic Settlement
350	WYK	Adel	75	400	Medium	N/A	Domestic Settlement	Domestic Settlement
351	WYK	Apple Tree Close, Pontefract	150	350	Small	N/A	N/A	Industrial: Metalworking
352	WYK	Moss Carr, Methley Site 1	-100	50	Small	Domestic Settlement	Domestic Settlement	N/A
353	WYK	Moss Carr, Methley Site 2	-80	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
354	WYK	Low Common, Whitwood	1	400	Small	Agricultural Site	Agricultural Site	Agricultural Site
355	WYK	Whitwood Common, Whitwood	1	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
356	WYK	Bullerthorpe Lane, Swillington	-50	300	Small	Domestic Settlement	N/A	Domestic Settlement
357	WYK	Swillington Common	-100	450	Small	Agricultural Site	Agricultural Site	Agricultural Site
358	WYK	Manor Farm, Garforth	-100	50	Small	Domestic Settlement	Domestic Settlement	N/A
359	WYK	Parlington Hollins	-100	500	Small	Agricultural Site	Agricultural Site	Domestic Settlement
360	WYK	Roman Ridge	1	400	Small	Agricultural Site	Agricultural Site	Agricultural Site
361	GTM	Wigan	75	150	Small	N/A	Domestic Settlement	Industrial: Metalworking
362	GTM	Castleshaw Roman Fort (Rigodunum)	79	150	Small	N/A	Military: Fort	Military: Fortlet + Vicus
363	MSY	Meols	-100	400	Small	Port	Port	Port
364	GTM	Manchester Roman Fort and Vicus	77	400	Large	N/A	Military: Fort + Vicus	Military: Fort + Vicus
365	LAN	Kirkham Roman Fort	70	200	Large	N/A	Military: Fortlet	Military: Fort + Vicus
366	MSY	Ochre Brook/Tarbock Roundabout, Junction 6, M62	100	400	Small	N/A	N/A	Industrial: Tile
367	GTM	Old Vicarage, Mellor, Stockport	-100	400	Very Large	Hillfort	Domestic Settlement	Domestic Settlement
368	GTM	City of Salford Stadium, Barton, Salford	*c. -100	*c. 100	Small	Agricultural Site	Agricultural Site	N/A
369	GTM	Manchester, Chester Road/Great Jackson Street	100	250	Small	N/A	N/A	Domestic Settlement
370	GTM	Castle Steads, Bury	-100	200	Small	Hillfort	Domestic Settlement	Domestic Settlement
371	LAN	Barker House Farm, Lancaster University	27	379	Small	Agricultural Site	Agricultural Site	Agricultural Site
372	LAN	Dutton's Farm, Lathom, West Lancashire	-100	200	Small	Agricultural Site	Agricultural Site	Agricultural Site
373	MSY	Brunt Boggart	75	200	Small	N/A	Agricultural Site	Agricultural Site
374	MSY	Court Farm, Halewood, Knowsley	100	400	Small	N/A	N/A	Industrial: Metalworking
375	GTM	Wigan, Grand Arcade Development	100		Small	N/A	N/A	Domestic Settlement

376	LAN	Lythe Brow Kiln	*c. 80	*c. 170	Small	N/A	Industrial: Tile	Industrial: Tile
377	LAN	Lancaster Roman Fort and Vicus	80	350	Large	N/A	Military: Fort	Military: Fort + Vicus
378	LAN	Lythe Brow (Leather and Webster site)	70	125	Small	N/A	Industrial: Pottery	Industrial: Pottery
379	LAN	Low Pleasant, Quernmore	80	140	Small	N/A	Industrial: Tile	Industrial: Tile
380	MSY	Brook House Farm, Halewood	-150	300	Small	Domestic Settlement	N/A	Domestic Settlement
381	LAN	Poulton-le-Fylde	175	250	Small	N/A	N/A	Domestic Settlement
382	LAN	Walton le Dale	70	350	Large	N/A	Industrial: Metalworking	Industrial: Metalworking
383	LAN	Ribchester Roman Fort and Vicus	72	200	Very Large	N/A	Military: Fort + Vicus	Military: Fort + Vicus
384	MSY	Irby, Wirral	-400	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
385	CWD-POW	Maesydd	100	150	Small	N/A	N/A	Domestic Settlement
386	CWD-POW	Plas Coch, Wrexham	150	325	Small	N/A	N/A	Agricultural Site
387	CWD-POW	Ffrith	80	300	Small	N/A	Domestic Settlement	Domestic Settlement
388	CWD-POW	Forden Gaer Roman Fort and Vicus	100	250	Very Large	N/A	N/A	Military: Fort + Vicus
389	CWD-POW	Holt	87	250	Small	N/A	Industrial: Tile	Industrial: Tile
390	CWD-POW	Arddleen, Llandrinio	1	200	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
391	CWD-POW	Collfryn, Llansantffraid Deuddwr, Powys	-100	400	Small	Domestic Settlement	Domestic Settlement	Domestic Settlement
392	CWD-POW	Pentre Farm, Flint	120	240	Medium	N/A	N/A	Villa
393	CWD-POW	Jamesford, Montgomery	100	300	Small	N/A	N/A	Domestic Settlement
394	LAN	Portfield Camp	-100	800	Small	Hillfort	Domestic Settlement	Domestic Settlement
395	LAN	Castercliff	-800	-400	Small	Hillfort	N/A	N/A
396	NYK	Grafton Hills	-800	200	Small	Hillfort	Domestic Settlement	Domestic Settlement
397	ERY	Grimthorpe	-800	410	Small	Hillfort	Domestic Settlement	Domestic Settlement
398	ERY	Paddock Hill	-1200	-400	Small	Hillfort	N/A	N/A
399	WYK	Barwick-in-Elmet	-600	50	Medium	Hillfort	Domestic Settlement	N/A
400	GTM	Castle Steads, Buryÿÿ	-550	250	Small	Hillfort	Domestic Settlement	Domestic Settlement
401	GTM	Great Woolden Hall	-500	200	Small	Hillfort	Domestic Settlement	Domestic Settlement
402	WYK	Castle Hill	-800	-400	Small	Hillfort	N/A	N/A
403	SYK	Sutton Common	-350	-310	Small	Hillfort	N/A	N/A
404	GTM	Mellor	-900	180	Small	Hillfort	Domestic Settlement	Domestic Settlement
405	CHS	Helsby Hill Camp	-1200	-90	Small	Hillfort	N/A	N/A
406	CHS	Woodhouses Hill Fort	-1200	-400	Small	Hillfort	N/A	N/A
407	LIN	Yarborough Camp	-50	400	Small	Hillfort	Domestic Settlement	Domestic Settlement

408	NTT	Dorket Head	-800	180	Medium	Hillfort	Domestic Settlement	Domestic Settlement
409	DBY	Markland Grips	-400	400	Medium	Hillfort	Domestic Settlement	Domestic Settlement
410	SYK	Wincobank Camp	-800	50	Small	Hillfort	Domestic Settlement	N/A
411	DBY	Mam Tor	-1200	50	Medium	Hillfort	Domestic Settlement	N/A
412	DBY	Gardom's Edge	-1200	50	Medium	Hillfort	Domestic Settlement	N/A
413	DBY	Ball Cross	-800	50	Small	Hillfort	Domestic Settlement	N/A
414	DBY	Fin Cop	-450	300	Small	Hillfort	Domestic Settlement	Domestic Settlement
415	CHS	Castle Ditch, Eddisbury	-400	43	Medium	Hillfort	N/A	N/A
416	CHS	Beeston Castle	-650	-200	Medium	Hillfort	N/A	N/A
417	CHS	Maiden Castle, Bickerton	-860	-10	Small	Hillfort	N/A	N/A
418	CWD-POW	Moel-y-Gaer, Rhosesmor	-800	-400	Small	Hillfort	N/A	N/A
419	CWD-POW	Moel-y-Gaer, Llantysilio	-400	50	Small	Hillfort	Domestic Settlement	N/A
420	NTT	Ad Pontem Roman Fortlet and Settlement	-100	400	Small	Domestic Settlement	Military: Fortlet	Domestic Settlement
421	DBY	Buxton Roman Settlement (Aquae Arnemetiae)	43	400	Small	N/A	Domestic Settlement	Domestic Settlement
422	WYK	Slack Roman Fort and Vicus (Camulodonum)	80	350	Medium	N/A	Military: Fort	Military: Fort + Vicus
423	LIN	Washingborough Road, Washingborough, Canwick	43	400	Small	Agricultural Site	Agricultural Site	Agricultural Site
424	DBY	Carsington Site B - Roman Farmstead	150	400	Small	N/A	N/A	Agricultural Site
425	STS	Chesterton Roman Fort and Settlement	43	200	Very Large	N/A	Military: Fort + Vicus	Military: Fort + Vicus
426	LIN	Lincoln Roman Colony (Lindum Colonia)	45	410	Very Large	N/A	Military: Fortress + Vicus	Town
427	LIN	Lincoln Roman Port	45	410	Medium	N/A	Port	Port
428	CHS	Condate Roman Fort and Vicus	70	300	Small	N/A	Military: Fort + Vicus	Military: Fort + Vicus
429	NTT	Cromwell Iron Age Settlement and Roman Villa	-100	410	Small	Domestic Settlement	Domestic Settlement	Villa
430	CHS	Chester Roman Fortress (Deva)	50	383	Very Large	N/A	Military: Fortress + Vicus	Military: Fortress + Vicus
431	CHS	Chester Roman Port	50	383	Small	N/A	Port	Port
432	LIN	Greetwell Roman Villa	43	410	Small	N/A	Villa	Villa
433	LIN	Hibaldstow	-100	410	Very Large	Domestic Settlement	Domestic Settlement	Domestic Settlement
434	SAL	Whitchurch Roman Fort and Town (Mediolanum)	50	410	Medium	N/A	Military: Fort	Town
435	LIN	Owmby	43	400	Small	N/A	Domestic Settlement	Domestic Settlement
436	NTT	Segelocum Roman Town	43	410	Very Large	N/A	Domestic Settlement	Domestic Settlement
437	SYK	Templebrough Roman Fort	43	410	Medium	N/A	Military: Fort + Vicus	Military: Fort + Vicus
438	SAL	Uxacona Roman Fortlet	50	410	Small	N/A	Military: Fortlet	Military: Fortlet

439	SAL	Wroxeter Roman City (Viroconium Cornovirum)	43	410	Very Large	N/A	Military: Fortress + Vicus	Town
440	LIN	Winterton Roman Villa	-100	410	Medium	Agricultural Site	Agricultural Site	Villa
441	DBY	Melandra Castle Roman Fort (Ardotalia/Zerdotalia)	70	300	Medium	N/A	Military: Fort + Vicus	Military: Fort + Vicus
442	CWD-POW	Halkyn Mountain Roman Lead Mines	43	410	Medium	N/A	Industrial: Mine	Industrial: Mine
443	SAL	The Wrekin Hillfort	-800	43	Very Large	Hillfort	N/A	N/A
444	SAL	Old Oswestry	-250	300	Very Large	Hillfort	Domestic Settlement	Domestic Settlement
445	LIN	Old Winteringham Roman Settlement	-50	410	Very Large	Domestic Settlement	Port	Port
446	NTT	Broxtowe Roman Camp	50	75	Large	N/A	Military: Camp	N/A
447	WYK	Grimscar Roman tilery	80	200	Small	N/A	Industrial: Tile	Industrial: Tile
448	NYK	York Roman City (Eburacum)	71	410	Very Large	N/A	Military: Fortress + Vicus	Military: Fortress + Vicus
449	NYK	York Roman Port	71	410	Medium	N/A	Port	Port
450	NYK	York Roman Fortress (Eboracum)	100	410	Very Large	N/A	N/A	Town
451	ERY	Harpham Roman Settlement and Villa	-100	410	Medium	Domestic Settlement	Domestic Settlement	Domestic Settlement
452	WYK	Ilkley Roman Fort and Vicus (Verbeia)	80	410	Very Large	N/A	Military: Fort + Vicus	Military: Fort + Vicus
453	NYK	Aldborough Roman Town (Isurium)	-100	410	Very Large	Agricultural Site	Military: Fort + Vicus	Town
454	NYK	Kirk Sink Roman Villa	140	410	Large	N/A	N/A	Villa
455	NYK	Newton Kyme Roman Fort	50	400	Large	N/A	Military: Fort + Vicus	Military: Fort + Vicus
456	NYK	Elslack Burwen Castle Roman Forts	70	300	Small	N/A	Military: Fort	Military: Fort
457	NYK	Well Roman Baths and Villa	101	400	Small	N/A	N/A	Villa
458	NTT	Farnsfield Roman Temporary Camp	43	100	Small	N/A	Military: Camp	N/A
459	SAL	Leighton Roman Fort	43	100	Large	N/A	Military: Camp	N/A
460	SAL	Whittington Roman Camp	43	100	Very Large	N/A	Military: Camp	N/A
461	LIN	Newton On Trent Roman Fort	43	100	Very Large	N/A	Military: Camp	N/A
462	NYK	Cawthorn Roman Forts and Camp	*c. 43	120	Small	N/A	Military: Camp	Military: Camp
463	NTT	Crococolana Roman Settlement, Brough	*c. 43	300	Very Large	N/A	Domestic Settlement	Domestic Settlement
464	SAL	Brompton Roman Fort	*c. 43	300	Small	N/A	Military: Fort + Vicus	Military: Fort + Vicus
465	SAL	Bell Brook Kilns	117	192	Small	N/A	N/A	Industrial: Pottery
466	DBY	Little Chester (Derventio Coritanorum) Roman Fort	70	400	Medium	N/A	Military: Fort + Vicus	Military: Fort + Vicus
467	DBY	Navio Roman Fort and Vicus	80	350	Small	N/A	Military: Fort + Vicus	Military: Fort + Vicus

468	LIN	Walesby Roman Villa	*c. 100	*c. 400	Small	N/A	N/A	Villa
469	ERY	Hayton Roman Fort	70	80	Small	N/A	Military: Fort	N/A
470	LAN	Lancaster Port	80	350	Small	N/A	Port	Port
471	ERY	Petuaria Roman Town	-50	400	Large	Domestic Settlement	Military: Fort + Vicus	Military: Fort + Vicus
472	ERY	Brough-on-Humber Roman Port	80	400	Small	N/A	Port	Port
473	SYK	Rossington Fortress	60	70	Large	N/A	Military: Camp	N/A
474	CHS	Wilderspool Port, Warrington	70	325	Very Large	N/A	Port	Port
475	STS	Rocester Roman Fort and Vicus	160	410	Small	N/A	N/A	Military: Fort + Vicus
476	DBY	Strutts Park Roman Fort	50	80	Small	N/A	Military: Fort	N/A
477	NTT	Osmanthorpe Roman Fort	43	96	Large	N/A	Military: Camp	N/A
478	DBY	Chesterfield Roman Fort	54	140	Small	N/A	Military: Fort	Military: Fort
479	SYK	Burghwallis Roman Fort	*c. 43	*c. 300	Small	N/A	Military: Fort	Military: Fort
480	NYK	Roall Roman Fort and Vicus	69	96	Small	N/A	Military: Fort + Vicus	N/A
481	NYK	Roecliffe Roman Fort and Vicus, Aldborough	71	85	Medium	N/A	Military: Fort + Vicus	N/A
482	NYK	Ingleborough Hillfort	*c. -800	*c. 43	Medium	Hillfort	N/A	N/A
483	NYK	Yarlsber Camp	*c. -800	*c. 43	Small	Hillfort	N/A	N/A

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