A2 Bean and Ebbsfleet Junction Improvements

Environmental Statement

Volume 2 – Appendix K.2 Archaeological Desk-Based Assessment

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Table of contents

Foreword

Highways England has committed to set out a long-term approach to improve England's motorways and major roads (also known as the 'strategic road network'), delivering £15 billion worth of investments – the largest investment in a generation. The A2 Bean and Ebbsfleet Junction Improvement Scheme forms part of this programme.

The Bean and Ebbsfleet junctions are located on the busy A2 trunk road separated by c. 2 km. Bean junction connects the Bluewater shopping centre and the B255 to the A2, and Ebbsfleet junction connects the A2 with the B259 Southfleet Road. Traffic modelling has shown that without improvements to these junctions, significant future traffic congestion will have an adverse impact on the A2 by causing considerable delays and constraining economic development and housing growth in the area.

The Improvement Scheme is located within a very rich archaeological landscape of the Ebbsfleet Valley in north Kent, and designated and non-designated heritage assets can be found within the Scheme boundary.

Highways England commissioned Atkins to undertake the Preliminary Design Stage of the Scheme starting in 2017. As part of this, AOC Archaeology Group (AOC) was commissioned to prepare an archaeological desk-based assessment. The assessment presents a baseline of the known historic environment resource, assesses its significance and provides further information on the potential of as yet buried archaeological remains that may be encountered as part of the Scheme.

Executive Summary

AOC Archaeology Group (AOC) was commissioned by Highways England to produce an archaeological desk-based assessment to inform the Preliminary Design Stage of the A2 Bean and Ebbsfleet Junction Improvement Scheme.

The assessment outlines the known historic environment resource, assesses its significance and provides further information on the potential of the Scheme to encounter as yet unknown buried archaeological remains within its design boundary.

The assessment has shown that the Scheme lies within a rich archaeological landscape dating from the Palaeolithic to Modern period. The Scheme encompasses part of the Springhead Roman settlement scheduled monument (areas beneath the existing A2 highway), the scheduled medieval enclosure at Darenth Wood and lies close to a nationally significant site known as the 'Ebbsfleet Elephant', which dates to the Lower Palaeolithic. The potential for encountering further significant prehistoric and Romano-British remains in the area is medium to high.

Construction of the Scheme has the potential to disturb, truncate or wholly destroy buried archaeological remains. The desk-based assessment recommends a programme of archaeological investigation is undertaken where previous fieldwork has not covered the Scheme. This work should be undertaken to inform design and determine any preservation *in situ* or mitigation requirements in advance of construction.

The exact scope and extent of archaeological fieldwork will be agreed in advance with the Kent County Council Heritage Conservation Group and set out in a Written Scheme of Investigation for their approval.

1. Introduction

1.1 Project background

1.1.1 The A2 Bean and Ebbsfleet Junction Improvements Scheme forms part of a wider programme of improvements to England's motorways and major roads led by Highways England. Bean Junction connects the Bluewater retail park and the B255 to the A2, and Ebbsfleet Junction connects the A2 with the B259 Southfleet Road.

1.1.2 Traffic modelling has shown that both junctions need improving. If no improvements are made, significant future traffic congestion will have an adverse impact on the A2 by causing considerable delays, environmental issues and constraining economic development and housing growth in the area.

1.2 Scope of the Document

1.2.1 The desk-based assessment presents a baseline of the current known historic environment assets within the Scheme boundary and its wider 1km study area (500m either side of the existing road corridor). It assesses the significance of all known heritage assets, and discusses the potential for encountering significant as yet unknown buried archaeological remains within the scheme boundary.

1.2.2 The full desk-based assessment can be found in Annex 1.

Annex 1 (Archaeological Desk-Based Assessment)

Proposed A2 Bean to Ebbsfleet Junction Improvement Works, Kent: Archaeological Desk-Based Assessment

Project No: 24069
February 2018

AOC Archaeology Group

ARCHAEOLOGY | HERITAGE | CONSERVATION

Proposed A2 Bean to Ebbsfleet Junction Improvement Works: Archaeological Desk-Based Assessment

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CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

1 NON-TECHNICAL SUMMARY

1.1 AOC Archaeology Group has been commissioned by Atkins to prepare an Archaeological Desk-Based Assessment in advance of the proposed A2 Bean to Ebbsfleet Junction Improvement Scheme.

1.2 The proposed upgrade scheme (the Site) is located within the very rich archaeological landscape of the Ebbsfleet Valley in North Kent and there are 41 known heritage assets within the scheme redline boundary (the Site). The majority of known assets date to the Roman period and were discovered during previous archaeological investigations within the east of the Site and associated with the nationally important settlement at *Vagniacae*. The majority of known heritage assets have been recorded through excavation and have thus been removed from the Site. This assessment has identified six known remaining heritage assets within the Site: Springhead Roman Site (MKE1632), Springhead Roman Temple (MKE99355) Watling Street Roman Road (MKE404) Springhead Field System (MKE77177) Watling Street junction (MKE99389) and Springhead springs (MKE99362).

1.3 Additionally, this assessment has found that the proposed scheme lies within an area known to contain extensive archaeological remains dating from the Lower Palaeolithic onwards. The Site lies in close proximity to the site of excavated nationally important remains of Lower Palaeolithic date on Southfleet Road and nationally important remains of Middle and Upper Palaeolithic and later prehistory are known to extend south and east of the Site within the Ebbsfleet Valley. A further 554 heritage assets are known within the Study Area. This assessment has established that the north eastern part of the Site has a Medium potential for the preservation of Middle Pleistocene deposits which in turn have the potential to preserve Lower Palaeolithic remains. In addition, a Medium potential for encountering Later Palaeolithic and Holocene prehistoric remains and a High potential for encountering Roman and early medieval remains in the east of the Site has been identified. Review of geological borehole record and previous investigations indicates that solid geology of the Thanet Sand Formation and Cretaceous Chalk occurs close to the surface and the potential for Pleistocene deposits in the west of the site is considered low. A low potential for later medieval, post medieval and modern remains has been identified.

1.4 Construction of the proposed upgrade scheme has the potential to disturb, damage or destroy features or buried remains of cultural heritage interest. Other construction activities, such as vehicle movements, soil and overburden storage and landscaping also have the potential to cause direct permanent and irreversible effects on cultural heritage assets. In view of the known archaeological potential of the Site it is advised that a detailed programme of further archaeological works will be required in advance of the construction of each junction as well as areas of road widening outside the current highway boundary where no previous works have been undertaken. In view of the extensive previous archaeological works undertaken within the Site further mitigation should be limited to areas where no previous intrusive investigations have been undertaken and/or to where such investigations have been limited.

1.5 The exact scope and extent of any programme of archaeological works required would depend upon the conclusions of the Environmental Statement and would have to be agreed in advance by Dartford and Gravesham Borough Councils, as advised by the Kent County Council Heritage Conservation Group. The programme of works may include an archaeological evaluation by intrusive or non intrusive means. Should deeply stratified deposits be encountered a detailed single context excavation strategy and programme of environmental sampling may be required. If significant archaeological remains were encountered, then further archaeological fieldwork, post-excavation analysis and reporting, including publication, may also be required.

1.6 A full impact assessment and detailed recommendations for additional archaeological assessment and mitigation will be presented in the Environmental Statement.

2 INTRODUCTION

2.1 Project Background & Site Location

2.1.1 AOC Archaeology Group has been commissioned by Atkins to prepare an Archaeological Desk-Based Assessment of land adjacent to the A2 carriageway and the Bean and Ebbsfleet junctions of the A2 which are proposed for junction and motorway upgrade (hereafter referred to as 'the Site'). The proposed development upgrade works will be focussed around two main road junctions along the A2 highway: Bean to the west and Ebbsfleet to the east separated by a 2km stretch of road carriageway. The Bean junction connects the Bluewater shopping centre and the B255 to the A2. The Ebbsfleet junction connects the A2 with the B259 Southfleet Road.

2.1.2 At the Bean junction, a new bridge for southbound traffic is proposed to the east of the existing Bean Lane overbridge. A new slip road onto the A2 is proposed for eastbound traffic. Northbound traffic will use the existing over bridge. The north and south roundabouts at Bean Junction will be enlarged and signal controlled. At the Ebbsfleet junction, the road that links the two roundabouts will be widened to two lanes and the west and east roundabouts will be enlarged and signal controlled. The eastbound and westbound slip roads onto the A2 will also be widened.

2.2 Topographical & Geological Conditions

2.2.1 The Bean Junction is located on a ridge in the landscape between 50m to 70m AOD with a valley to its west. South of the A296/A2 the topography undulates from Darenth Country Park to the west of the Ebbsfleet Junction. The lit slopes from east to west towards the Ebbsfleet junction which is located at between 30 to 40m AOD. To the north of the A296, the topography is dominated by quarries; the western quarry has been developed as Bluewater Shopping Centre and the Eastern Quarries are planned for housing and mixed-use development.

2.2.2 In the early 19th century the Ebbsfleet was a small tidal stream less than 3km long, running northward from Springhead to join the Thames. Extraction of chalk from the quart at Bean and the Eastern Quarry to supply the cement producing plat at Northfleet north of the Site changed the local water regime in the late 19th and early 20th centuries. Quarrying of sand and gravels, and the excavation of chalk and clay is recorded in the vicinity of the Site and includes the Bluewater and Swanscombe Chalk Pits north of Watling Street at Bean and the Eastern Quarry north of the Site (west of Southfleet Road).

2.2.3 The British Geological Survey website (BGS Viewer) maps geology within the vicinity of the Site as upper chalk locally overlain by sands of the Thanet Formation. The Bean junction in the west of the Site is shown underlain by Seaford Chalk Formation. To the south of the junction the dominant geology is Thanet Sand Formation, with small pockets of Lambeth Group sand and clay with the London Clay Formation shown to the east of the junction. At Ebbsfleet, the south east and east area of the junction is shown dominated by the Seaford Chalk Formation.

2.2.4 The 1998 BGS Map shows that the Palaeogene and Late Cretaceous chalk and sand deposits are overlain in places by a complex sequence of Quaternary deposits mainly of alluvium, head and terrace gravel. Alluvium deposits are found locally around the River Ebbsfleet in the east of the Site whereas terrace gravel deposits are more frequently located in the west of the Site. Colluvial deposit infilling a dry valley are mapped to the north of the Site in the vicinity of Southfleet Road. It should be noted however that geoarchaeological investigations within the immediate vicinity of the Site (Figure 4.3; Oxford Archaeology, 2014; Wessex Archaeology 2011; Wenban Smith 2013) have revealed a drift geology at variance to that mapped by the BGS and show deposits of Pleistocene Gravels to extend further south towards the Site than shown on current mapping. Further detail regarding the Pleistocene

geology of the Site and surrounding area and its links to the Palaeolithic and later prehistoric potential of the Site are discussed below (See section 5.3).

2.2.5 Colluvial deposits up to a depth of 4m have been recorded on the lower valley sides within the Ebbsfleet valley in the vicinity of the Site. These colluvial deposits appear to have formed as a consequence of destabilisation of the valley sides following post-Roman ploughing (Wessex 2004). The formation of these superficial Holocene deposit and links to the potential for the survival of prehistoric remains are discussed further below (See section 5.4)

3 ASSESSMENT METHODOLOGY & CRITERIA

3.1 Assessment Methodology & Criteria

3.1.1 This report aims to identify and map the nature of the archaeological resource on the Site and includes an assessment of the relative value / importance of the known and potential archaeological resource. This desk-based assessment forms a supporting document to the Project Control Framework process. Detailed impact assessment will be undertaken in the Environmental Statement. Impacts upon the setting of the heritage assets are not considered here as they will be assessed in the Environmental Statement. This assessment will identify known heritage assets within the Site and the potential for hitherto unknown archaeological remains to survive. Comments upon the mitigation which could potentially be required will be offered, however detailed mitigation proposals will be presented in the Environmental Statement and will be in line with the results of the full impact assessment.

3.1.2 The assessment has been carried out in accordance with the Chartered Institute for Archaeologists' Standards and Guidance for Historic Environment Desk-Based Assessment (CIfA2017). This assessment has been prepared with regard to relevant statutory requirements, national, regional and local guidance, including the Ancient Monuments and Archaeological Areas Act, 1979; Planning (Listed Buildings and Conservation Areas) Act, 1990; National Planning Policy Framework (March 2012) and regional and local planning policy.

3.1.3 All assets within the Site boundary have been identified to assess the likely nature and extent of the archaeological and built heritage resource. In addition all assets within a 500m Study Area have been identified. The Kent Historic Environment Record (HER) is the primary source of information concerning the current state of archaeological and architectural knowledge in the study area. The following sources were consulted during the preparation of this assessment:

- Designated Heritage Asset data, downloaded from the online National Heritage List for England (National Heritage List) maintained by Historic England;
- The Kent Historic Environment Record;
- An assessment of topographical, geological, archaeological and historical information from web based and in-house sources;
- Review of borehole records held by British Geological Survey (BGS) and review of existing geoarchaeological reports.
- Historic maps showing the Site;

3.1.4 An assessment of relevant published and unpublished archaeological sources is listed in Section 7; the assessment criteria used to identify the known and likely archaeological potential of the Site are laid out in detail in Appendix 1.

3.1.5 The heritage assets and other relevant find spots or evidence, identified from the sources listed above, have been described and presented in the Gazetteers of Heritage Assets (Appendix 2 and 3) and are plotted on Figures 2, 2.1,2.2 and 3.1 - 3.3. Areas subject to previous archaeological investigation are shown on Figures 4.1 and 4.2. Areas subject to previous geoarchaeological study are shown on Figure 4.3.

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3.2 Limitations

3.2.1 It should be noted that the report has been prepared under the express instructions and solely for the use of Atkins and other project stakeholders. All the work carried out in this report is based upon AOC Archaeology Group's professional knowledge and understanding of current (February 2018) and relevant United Kingdom standards and codes, technology and legislation.

3.2.2 Changes in these areas may occur in the future and cause changes to the conclusions, advice, or recommendations given. AOC Archaeology Group does not accept responsibility for advising Atkins or associated parties of the facts or implications of any such changes in the future.

3.2.3 This desk-based assessment is based upon data obtained from publicly accessible archives as described in Section 3.1.3 above, National Heritage List for England (NHLE) and the Kent Historic Environment Record (HER) data was obtained from Atkins in September 2017.

4 PLANNING BACKGROUND

4.1 Identified Heritage Assets & Key Planning Considerations

4.1.1 Forty-one heritage assets have been identified within the Site. No World Heritage Sites, Registered Parks and Gardens, Conservation Area or Registered Battlefields are located within 500m of the Site's boundary.

4.1.2 There is one designated heritage asset, the Grade II Listed: Swanscombe Cutting Footbridge (1119762; MKE25561), which crosses the A2 east of the 296 Junction within the Site. Additionally four Grade II Listed Buildings; Stone Castle, Lower Bean Farmhouse, Barn South East of Lower Bean Farmhouse, and Blue House stand within 500m of the Site

4.1.3 The boundary of the Scheduled Medieval Woodland Boundary in Darenth Wood (1013378) is located 5m either side of the western area of the Site (See Figure 2.1) and the Scheduled area of Springhead Roman Site (*Vagniacae*) (1005140) extends to within 25m to the south of the eastern area of the Site (See Figure 2.2). The Scheduled Neolithic Sites Near Ebbsfleet (1004206) are located 200m north of the Site and the Roman Enclosure south-east of Vagniacae (1004226) is located 190m south of the Site (See Figure 3.3).

4.2 National & Local Planning Policy

The National Planning Policy Framework (NPPF)

4.2.1 The National Planning Policy Framework (NPPF) (DCLG 2012) sets out 12 Core Planning Principles of which the conservation of historic environment is one. One of the NPPF's core principles is that '*planning should conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations*' (DCLG 2012, Para 17).

4.2.2 Where designated assets are concerned great weight should be given to the asset's conservation and loss of significance should require '*clear and convincing justification. Substantial harm to or loss of a grade II listed building, park or garden should be exceptional. Substantial harm to or loss of designated assets of the highest significance, notably scheduled monuments, protected wreck sites, battlefields, grade I and grade II* listed buildings, grade I and II* registered parks and gardens should be wholly exceptional'* (DCLG 2012, Para 132).

4.2.3 Impacts upon non-designated heritage assets are also a pertinent planning consideration. Paragraph 135 states that '*in weighing applications that affect directly or indirectly non-designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset*.' Paragraph 139 goes on to add that '*non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets*'.

4.2.4 Where a heritage asset is to be lost, either in part or in whole, as a result of the development, the local planning authority should require developers to '*record and advance the understanding of the significance of the heritage asset's […] in a manner appropriate to their importance and the impact, and should make this evidence… publicly accessible*. (Paragraph 141)'.

Planning Practice Guidance (PPG) 2014

4.2.5 The DCLG published Planning Practice Guidance online in 2014, to expand upon the NPPF. '18a: Conserving and Enhancing the Historic Environment' was published in April 2014. The Guidance notes that '*conservation is an active process of maintenance and managing change. It requires a flexible and thoughtful approach to get the best out of assets as diverse as listed buildings to as yet undiscovered, undesignated buried remains of archaeological interest*'.

4.2.6 In relation to the Site, the key considerations are set out in the sections on non-designated heritage assets.

4.2.7 The NPPF and the PPG identify two categories of non-designated sites of archaeological interest:

- *'Those that are demonstrably of equivalent significance to scheduled monuments and are therefore considered subject to the same policies as those for designated heritage assets'* (PPG *citing* National Planning Policy'. Framework Paragraph 139); and
- *'Other non-designated heritage assets of archaeological interest. By comparison this is a much larger category of lesser heritage significance, although still subject to the conservation objective. On occasion the understanding of a site may change following assessment and evaluation prior to a planning decision and move it from this category to the first*' (PPG).

4.2.8 The approach to be taken during development management is outlined in Paragraph 128 of the NPPF which states that when determining applications '*local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation*' (Para 128).

National Policy Statement for National Networks

4.2.9 In addition to the overarching regulatory and policy framework discussed above, the impacts and effects of the proposed scheme have been reviewed in light of relevant historic environment legislation and policy.

4.2.10 Policy with regard to assessment of the historic environment effects of nationally significant transport infrastructure is laid out in the National Policy Statement for National Networks (NPSNN).

4.2.11 Historic Environment Policy is laid out in paragraphs 5.120 to 5.142 of the NPSNN. The key aspects which should be addressed are as follows:

- the significance, setting and viability of the heritage assets likely to be affected by the proposed development should be considered;
- when considering the impact of a proposed development on the significance of a designated heritage asset great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be;
- harm or loss affecting any designated heritage asset should require clear and convincing justification - substantial harm to or loss of a grade II Listed building or grade II Registered Park or Garden should be exceptional; substantial harm to or loss of designated assets of the highest significance should be wholly exceptional.

4.2.12 There is no definition of what constitutes ‘substantial harm’ in the NPSNN or other published policy documents. However, guidance in Planning Policy Guidance (PPG), supporting policy advice and case law indicates that whilst clearly a step down from total loss, substantial harm still represents a considerable degree of change to the significance of an asset. This could, for example, be as the result of removal of significant elements of fabric or the degradation / removal of key aspects of an asset's setting that notably contribute to its significance.

4.2.13 When considering the consequences of substantial harm there is a strong presumption against development unless it can be demonstrated that the substantial harm or loss is necessary to achieve substantial public benefits that outweigh that harm.

4.2.14 NPSNN embodies an underlying principle of balancing harm and benefit which places greater weight on the conservation of more important assets. Where less than substantial harm would occur, there is a need to ensure that harm is justified and minimised and that the wider public benefits of the proposal are appropriately articulated.

Local Planning Policy

4.2.15 The majority of the Site is located within Dartford Borough Council area. The east of the Site at the A2 slip road at Ebbsfleet extends into the Gravesham Borough Council area.

4.2.16 The statutory development plan for Dartford Borough Council is outlined within the Core Strategy (2011); and complemented by the Development Policies Local Plan 2017. The Site is located within the Ebbsfleet to Stone Priority Area. Policy CS4 of the Core Strategy refers to this area and with regards to cultural heritage notes that:

‘*The archaeological potential of parts of the Ebbsfleet Valley should be assessed prior to development through a desk-top study, and investigated via fieldwork, where the desk-top study indicates this will be necessary, or through an archaeological watching brief. The approach to any finds of significance will be determined through an Archaeological Strategy or Framework, agreed in partnership with KCC.*

Where there is an approved archaeological strategy as part of an extant planning consent, this will take precedence over this part of the policy' (Dartford Borough Council Core Strategy 2011, 39).

4.2.17 The Development Policies Plan was adopted by Dartford Borough Council on 17 July 2017 and sets out the main planning policies that the Local Planning Authority will use to assess planning applications. The Plan replaces the remaining parts of the 1995 Borough Local Plan. Policies DP12 and DP13 concern cultural heritage and the historic environment.

4.2.18 Policy DP12: Historic Environment Strategy states that:

'1. Development should contribute to the conservation and enjoyment of the Borough's historic environment. The Local Planning Authority will work with developers on strategies to realise this in the context of site heritage opportunities and constraints.

2. Where heritage may be at risk, landowners will be expected to work proactively with the Local Planning Authority in bringing forward proposals to preserve or enhance these assets, to facilitate their successful rehabilitation and seek their viable reuse consistent with their heritage value and special interest.

3. Development proposals which may affect the significance of heritage assets (both designated and non-designated) or their setting should demonstrate how these assets will be protected, conserved or enhanced as appropriate. Proposals should aim to reflect and interpret the historic character of a site and conserve its most significant historical and/or architectural aspects.

4. A heritage statement should accompany all planning applications affecting heritage assets. On archaeological sites, a desk-based assessment will be required as a minimum. Applications affecting designated heritage assets will be assessed under Policy DP13. Applications affecting non-designated assets will be assessed against the criteria below.

Non-Designated Heritage Assets

5. The Borough's non-designated heritage assets include:

a) Archaeological sites, including sites holding an interest as defined in the NPPF;

b) Applicable sites within Areas of Special Character, as defined on the Policies Map;

c) Sites with significant industrial heritage;

d) Land with historic landscape character;

e) Historic open space, parks and gardens.

6. Development proposals affecting non-designated heritage assets should establish the asset's significance. Development should conserve or enhance those aspects that have been identified as significant and, where possible, should seek to better reveal an asset's significance.

7. In determining planning applications affecting non-designated assets, the effect of the proposal on the asset's significance will be taken into account. A balanced judgement will be taken having regard to the significance of the heritage asset and the scale of any harm or loss of significance. Development resulting in a total loss of significance will not normally be permitted.'

4.2.19 Policy DP13: Designated Heritage Assets states that:

'1. Designated heritage assets are an irreplaceable resource and should be conserved in a manner appropriate to their significance. A heritage statement should establish the significance of the heritage asset in order to enable the assessment the impact of a development proposal (sic) Any harm or loss will require clear and convincing justification.

2. In determining planning applications, the Local Planning Authority will pay close regard to: a) the significance of the heritage asset; b) the desirability of maintaining and, where possible, enhancing significance; and c) the desirability of ensuring viable uses are found for heritage assets, consistent with their conservation.

3. Where a proposal will lead to substantial harm or total loss of significance, permission will be refused unless it can be clearly demonstrated that the development is necessary for substantial public benefits to be achieved that will outweigh the harm or loss.

4. Where a proposal will lead to less than substantial harm, this will be weighed against the public benefits of the proposal.

5. Development proposals affecting statutorily listed buildings should have special regard to the desirability of preserving the building or its setting. Loss of or harm to a statutorily listed building or its setting will only be permitted in exceptional circumstances in line with clauses 3 and 4 above.

6. Development proposals affecting a conservation area should pay special attention to the desirability of preserving or enhancing the character or appearance of that area. Proposals that would result in harm or loss of significance will be determined in line with clauses 3 and 4 above.

7. The demolition of any building in a conservation area will only be permitted where it is clear that it will not adversely affect the character and appearance of the area.

8. Development proposals affecting Scheduled Monuments will only be permitted where they clearly conserve the asset or enhance its significance. Proposals resulting in loss or harm will only be permitted on a wholly exceptional basis and in line with clauses 3 and 4 above.'

4.2.20 The Gravesham Local Plan Core Strategy in September 2014. Policy CS 20 of the Core Strategy relates to the heritage and built environment and is relevant to this assessment:

Policy CS20: Heritage and the Historic Environment

'The Council will accord a high priority towards the preservation, protection and enhancement of its heritage and historic environment as a non-renewable resource, central to the regeneration of the area and the reinforcement of sense of place. Particular attention in this regard will be focused on those heritage assets most at risk through neglect, decay or other threats. Securing viable, sustainable and appropriate futures for such assets at risk will need to be reconciled with the sensitivity to change that many present.

Proposals and initiatives will be supported which preserve and, where appropriate, enhance the significance of the Borough's heritage assets, their setting where it contributes to the significance of the asset and their interpretation and enjoyment, especially where these contribute to the distinct identity of the Borough. These include:

- *Gravesend Town Centre, its development as a heritage riverside town, and its • setting;*
- *The Borough's urban and rural conservation areas; and •*

- *Surviving built features and archaeology relating to the Borough's maritime, • military, industrial and transport history.*

When considering the impact of a proposed development on a designated heritage asset, the weight that will be given to the asset's conservation value will be commensurate with the importance and significance of the asset. For non-designated assets, decisions will have regard to the scale of any harm or loss and the significance of the heritage asset.

5 ARCHAEOLOGICAL & HISTORICAL EVIDENCE

5.1 Report Structure

5.1.1 Each heritage asset referred to in the text is listed in the Gazetteers in Appendices 2 and 3. The Gazetteer includes information regarding the type, period, HER number and where applicable the NHLE number, designation, and other descriptive information, as derived from the consulted sources.

5.1.2 All heritage assets within the Site referred to in the text are plotted on Figures 2, 2.1 and 2.2 using the assigned HER Nos. The Site location is shown outlined in red. Heritage assets located outside of the Site but within the 500m Study Area are shown on Figures 3.1-3.3.

5.1.3 The Study Area includes all known heritage assets within 500m of the Site boundary. The aim of this is to identify predicted impacts upon known remains and also to help predict whether any similar hitherto unknown archaeological remains are likely to survive within the development footprint.

5.1.4 All sources consulted during the assessment, including publications, archived records, photographic and cartographic evidence, are listed amongst the References in Section 8.

5.2 Undated Evidence

5.2.1 In the eastern area of the Site a series of cropmarks have been attributed to a possible field system (MKE77177), however these cropmarks have not been dated and may relate to agricultural activities from the Roman period onwards.

5.3 Pleistocene Prehistoric Evidence (pre 1000BP)

5.3.1 The Ebbsfleet Valley and its environs has been a key area for Palaeolithic research for over a hundred years. The Ebbsfleet valley is well known for its wealth of Palaeolithic archaeological remains, discovered during quarrying, primarily for chalk, undertaken since the late 19th century and more recent archaeological works undertaken advance of the construction of the Channel Tunnel Rail Link (CTRL), also known as High Speed 1 (HS1). Extensive geoarchaeological investigations undertaken by Wenban Smith (2013, Chapter 4) following the discovery of the Clactonian elephant butchery site (the Ebbsfleet elephant) have resulted in detailed research into the formation of Pleistocene deposits in the vicinity of the Site. To date there have been no geotechnical works associated with the proposed development. However, the BGS record numerous historic borehole investigations within the Site. A review of these borehole records alongside previous geoarchaeological/geotechnical investigations conducted in the Study Area (See Figure 4.3) including the results of test pit and boreholes excavated at Northfleet West electricity substation plot north of the Site, (Figure 4.3; EKE 14064; EKE 14065; MoLA 2011); test pits and boreholes excavated in Springhead Quarter (EKE 14071) and Wenban-Smith's detailed geoarchaeological landscape assessment undertaken in association with the Ebbsfleet elephant Site (EKE 10404; Wenban Smith 2013) have been used to assess the potential for Pleistocene sediments and associated Palaeolithic potential within the Site.

Lower Palaeolithic

5.3.2 The Ebbsfleet Valley is incised through a local landscape dominated by Thames sequences of the Boyn Hill/Orsett Heath gravel of the major Hoxnian interglacial, associated with Marine Isotope Stage (MIS) 11. The deposits consist of a sequence of predominantly fluvial silt, sand and gravel units laid down by the early Thames c. 400,000 BP. The Boyn Hill/Orsett Heath formation is internationally recognised for its Lower Palaeolithic remains; it trends east to west parallel to the present-day course of the Lower Thames and is present at Swanscombe to the north of the Site. Lower Palaeolithic sites nearby within the Swanscombe terrace outcrop of the Boyn closest to the Site include Swan Valley Community School (Wenban-Smith & Bridgland 2001) Eastern Quarry B (Wessex Archaeology 2006) and Southfleet Road Widening (Wessex 2011); all located north of the Site on deposits previously mapped as Tertiary Thanet Sand (BGS 1998). At all three sites, fluvial gravels have produced handaxes and debitage comparable to material from the Swanscombe gravels of the Boyn formation. Discovery of this material has extended the known southern limit of the Thames channel of MIS 11 significantly further south than that shown on geological mapping. Wenban Smith (2013, 108) has mapped the known extent of the Boyn/Hill Orsett Heath formation and shows it to extend to within 700m of the northernmost elements of the Site (Southfleet Road).

5.3.3 No *in situ* Lower Palaeolithic artefacts or deposits are known from within the Site although a total of 20 Lower Palaeolithic sites are known within the 500m Study Area. These primarily comprise finds of Lower Palaeolithic material including hand axes, lithic debitage and mega faunal remains and are concentrated in the north east of the Study Area near Swanscombe. Henry Stopes collection of Palaeolithic material from the 1890s includes two handaxes and nine flakes discovered from Treadwell's Hop Ground approximately 100m north of the Site in the vicinity of Southfleet Road (Wenban Smith 2013). The oldest sediments recorded to date within the Ebbsfleet Valley are those at the Southfleet Road elephant butchery site (MKE43400; EKE 10413) c250m north of the Site where a partial skeleton of an extinct straight-tusked elephant *Palaeoloxodon antiquu*s was discovered at an elevation of 29m AOD in advance of works associated with HS1. The elephant remains were found associated with more than 30 Palaeolithic handaxes, five cores, 11 flake-tools and more than 120 pieces of flint debitage (Wenban-Smith et al 2006). The exceptionally high degree of artefact refitting and their presence in the same narrow band of sediment as the elephant bones indicate that the lithic remains represent on-the-spot knapping and discard (Wenban Smith 2013, 457). The lithic and faunal remains and were found to be part of a deeper sequence containing artefactual and palaeo-environmental evidence revealing a complex sequence of Middle Pleistocene sediments comprising eight sedimentary phases of Middle Pleistocene date. The identified Middle Pleistocene sediments have a high chalk content, and by association a high nodular flint content, fundamental to the abundant lithic knapping remains found at the elephant site. Flint nodules would probably have been exposed both in the west side of the valley floor, and also in colluvial/ slopewash fans slumping down the valley sides towards the valley floor, providing a ready source of flint raw material (Wenban Smith 2013). This ready supply of raw materials would thus have made the immediate environs of the Site an attractive locale for early hominins.

5.3.4 Wenban Smith (2013) has undertaken detailed assessment of the Pleistocene sediment sequence at the Southfleet Road site with comparison to borehole records logged by the BGS and with reference to archaeological and geoarchaeological investigations in the vicinity of the Southfleet Road elephant site. These records have allowed the creation of a series of representative transects showing lithostratigraphic deposits running from west to east through the elephant site and the Ebbsfleet Valley (Wenban Smith 2013, Figures 4.35-4.36). The transect shows that to the north west of the Site, the

Thanet Sand bedrock generally occurs at an elevation above that of the most elevated parts of the Site (25m OD), at above 30m OD, but that the surface of the sand dips steeply eastwards below 20m OD at the elephant site, dropping further to the east to a level of 14m OD in the Springhead Quarter. The nearest available BGS records for the Site at this location are derived from a test pit excavated in 1997 from an elevation of 21.3m OD adjacent to the west roundabout (TQ67SW692) c375m south of the elephant site. The test pit revealed deposits of made ground to 2m underlain by sand head deposits to 4m at which depth the test pit was terminated. Identification of sandy head deposits is indicative that Thanet Sands in the immediate vicinity of the Site are located at around 19m OD and thus at similar levels to those found at the Southfleet Road elephant site. However, no indication of overlying Pleistocene deposits was found within the test pit.

5.3.5 Monitoring of geotechnical investigations (EKE 14064; EKE 14065) by Museum of London Archaeology within the Northfleet West substation site north of the A2 located both north and west of the Site established that deposits across the majority of the area comprised colluvial sands and silts down to a depth of approximately 3m under which Thanet Sand deposits were encountered. It was established that Pleistocene deposits were absent from much of the area. Six possible areas of Palaeolithic potential were identified although the majority of the area was classed as of little or no Palaeolithic potential (MoLA 2010-2011). An archaeological watching brief was undertaken by Oxford Archaeology in 2014 during excavations to remove the former interceptors at the substation site. The main compound, located north of the A2, was found to be within an area of low potential characterised by the presence of pre-Quaternary, Tertiary deposits (Thanet Sand) directly underlying modern made ground and plough soil. This area was subsequently removed from the watching brief. The removal of Interceptor E which was located further north (approximately 250m north west of the Site) was subject to a watching brief as it was located within an area classified as of low potential characterised by the presence of thick colluvial sediments underlying plough soil and varying thickness of made ground. It was thought that any Palaeolithic sediments within this area would be reworked from older sediments. The watching brief uncovered no archaeological evidence or evidence for Middle Pleistocene deposits, although later Holocene colluvial deposits (see below) were uncovered (Oxford Archaeology 2014).

5.3.6 BGS borehole logs taken from between the east and west roundabouts reveal a more complex stratigraphy than seen to the north comprising sandy alluvial clays to a depth of around 6m below ground level after which the underlying chalk bedrock was found. There is thus no indication within these boreholes of the occurrence of the Ebbsfleet Gravels or deposits that could be attributed to the Middle Pleistocene although they represent only a very small sampling window. Archaeological investigation in the west of the Site around the Bean junction are comparatively few. BGS borehole records from this area generally reveal a topsoil up to 0.3m deep overlying sands of the Thanet Beds to a depth of between 3-6m overlying chalk bedrock deposits with no evidence for likely Middle Pleistocene deposits. A review of Lower Palaeolithic evidence within vicinity of the Site thus reveals that Lower Palaeolithic remains in the Study Area are thus primarily associated with the deposits of the Boyn Hill/Orsett Heath formation which generally occur at a base level above 20m AOD and north of the Site. Based on current evidence it is unlikely that Boyne Hill/ Orsett Heath formation extends as far south as the Site. The potential for encountering Lower Palaeolithic deposit across the majority of the Site is judged to be low (See Figure 9). It is recognised however that Pleistocene deposits within this area are complex and variable. Owing to its topographic situation on the upper western flank of the Ebbsfleet Valley, close proximity to the known extent of Middle Pleistocene sediments at similar topographic location and absence of detailed geotechnical records from north of the west roundabout, the possibility of encountering deposits of Lower Palaeolithic date in the most northerly part of the Site

along Southfleet Road cannot be discounted. A medium Potential for encountering Lower Palaeolithic remains in the north east of the site is thus identified (See Figure 9).

Middle and Upper Palaeolithic

5.3.7 Geoarchaeological studies undertaken by Wenban-Smith (2013) indicate that during the Middle Pleistocene a landslide blocked off the Ebbsfleet and diverted it into a new channel. This created an embayment east of the site that served as a sump, accumulating deposits through the late Middle and Late Pleistocene derived from deposition of fluvial sediments and colluvial/solifluction deposition down the sides of the Ebbsfleet Valley (Bridgland 1994). The Ebbsfleet Valley thus preserves detailed stratigraphic sequences not found elsewhere in the main Thames where later activity has removed these deposits. The sediments occur at lower elevations than the earlier Middle Pleistocene deposits of the Boyn Hill/Orsett Heath formation, and mostly date to the younger periods MIS 8 through to MIS 2 (250,000-10,000 BP). Isolated patches of these deposits still survive in places despite the history of quarrying and CTRL and Ebbsfleet International station development and have produced rich Palaeolithic and faunal remains, including prolific Levalloisian flint artefacts and some key fossiliferous locations for MIS 7. Particularly important locations include: the Baker's Hole Levallois site; the Northfleet Allotments site, and Ebbsfleet Channel Temperate Bed site (Wenban Smith 2013 18-20)

5.3.8 Archaeological investigations in the eastern area of the Site have uncovered; Palaeolithic flint artefacts, a collection of Upper Palaeolithic flint blades, cores and debitage; burnt and worked flint (EKE14074); and non-specific prehistoric material (EKE14676). An investigation in the western area of the Site uncovered a small collection of prehistoric finds (EKE8389).

5.3.9 Geoarchaeological investigation at the Northfleet West Substation due north of the A2 (EKE14065) revealed the majority of the investigation area to be devoid of Pleistocene deposits and to be underlain by Thanet Sand deposits. However, fieldwalking across the site encountered Palaeolithic flint flakes in the plough soil and a dry valley filled with colluvial deposits crossing the area from north west to south east was observed. Within the colluvial deposits a possibility of encountering reworked Palaeolithic remains was identified (MoLA 2010). At the south-eastern part of the Northfleet site and adjacent to the A2 (Site) colluvial deposits were seen to extend to 2.6m below the road surface and were considered of likely Holocene date matching with others encountered further to the north and east (Oxford Archaeology 2014). Although no archaeological remains were located within these colluvial deposits, their presence is indicative that such deposits may extend into the Site and may preserve reworked Palaeolithic material.

5.3.10 An Upper Palaeolithic knapping site (MKE20294) was uncovered in the eastern area of the Site during excavations for the line of the CTRL. A collection of unstratified struck flints, and blades of unknown, Mesolithic and Palaeolithic date were found. The flint assemblage albeit essentially redeposited in slopewash deposits, was in a relatively fresh condition and a number of refitting pieces suggesting it had not moved far from the original place of deposition, are an important addition to the corpus of regional evidence late Glacial to Early Holocene transition (Wenban-Smith et al 2015). In the wider area Burchell's investigations revealed evidence of rare late Upper Palaeolithic activity at Springhead in the form of a Long Blade assemblage (Burchell 1957).

5.3.11 The borehole logs from geotechnical works (EKE8329) conducted during improvement works around the B255 (Bean Road) and A2 junction in the western area of the Site in 1995 are recorded by the BGS. Borehole logs from the central part of the Site (TQ57SE404) show topsoil directly overlying Thanet Beds. In the west of the Site, borehole TQ57SE403 shows topsoil overlying sandy clay to 1.3m

below which laminated Thanet Sand deposits were observed. At the Bean overbridge (TQ57SE400), Thanet Beds were encountered directly below made ground at 2.7m.

5.3.12 The majority of the eastern part of the Site has been subject to previous investigation which has revealed colluvial and alluvial deposits surviving at depth. The CTRL studies identified a variety of deposits, which were rich in biological evidence and, owing to the burial of Pleistocene deposits by later Holocene deposits were well preserved. The depth and wider extent of the Upper Palaeolithic deposits protected by alluvium within the Ebbsfleet Valley is less well understood than earlier deposits and those on the steeper hill slopes primarily as a consequence of their burial beneath alluvial deposits not attractive from mineral extraction and thus subsequent protection from development. Important remains are often patchily distributed and their preservation can rely on the thickness of overlying deposits which in turn has been found to be highly variable (Wenban Smith et al 2010). Borehole logs held by the BGS undertaken in 1997 in advance of CTRL in the vicinity of the west roundabout (TQ67SW909) revealed a complex series of deposits underlying the topsoil comprising sandy flint gravels classed as 'made ground' to 2.2m below which sandy head deposits were encountered. Conversely borehole logs from a location adjacent to the south of the east roundabout (TQ67SW304) encountered Thanet Beds below made ground at a depth of 0.9m below ground level. The available borehole logs thus demonstrate considerable local variability in the depth and nature of deposits.

5.3.13 The eastern part of the Site occupies the lower valley slopes of the west side of the Ebbsfleet Valley and borehole records and archaeological investigations indicate potential survival of patches of sediments with Middle and Upper Palaeolithic potential in previously unexcavated areas in the east of the Site. It is considered likely that any such deposits would be confined to the east of the Site and would have a patchy distribution depending upon the extent of previous disturbance. Overall there is judged to be a medium potential for further remains of Late Middle to Upper Palaeolithic date to survive in areas not subject to previous archaeological investigations within the east of the Site.

5.4 Holocene Prehistoric Evidence

5.4.1 The relatively wide and sheltered tidal inlet of the Ebbsfleet that encouraged late Upper Palaeolithic and Mesolithic activity, may have had a knock-on effect, drawing attention to the spring at the head of the Ebbsfleet as being situated in a natural amphitheatre. This then became a focus for ritual deposition in later prehistoric times before growing into a major Iron Age and Romano-British ritual temple complex at Springhead in the east of the Site. Continuing deposition throughout the Holocene of silty alluvium and peat created a good environment for the survival of archaeological remains (Wenban Smith 2013) and well-preserved material has been excavated at Springhead within the Site as part of the CTRL project. The eastern part of the Site lies on the lower western slopes of the Ebbsfleet Valley above the deeper alluvial and colluvial deposits that infill it but has nevertheless been subject to colluvial deposition. Excavations at the nearby Springhead Quarter revealed stratified colluvium to be a chalk flecked brown yellow clay to silt deposit and containing some small to medium sub-rounded gravel and residual late glacial flintwork (Wenban Smith 2003). The colluvium seals features of Prehistoric and Roman dates and is thought to be a result of de-stabilisation of slopes during ploughing in the roman period (Wessex Archaeology 2004).

5.4.2 The Ebbsfleet Valley is well known as the location of the type-site of a form of Later Neolithic decorated pottery (Ebbsfleet Ware) and a Scheduled Neolithic site is 200m north of the Site (Neolithic sites near Ebbsfleet, NHLE No. 1004206). Neolithic activity in the Study Area generally consists of a background 'noise' of residual pottery and worked flint in the fill of later features and colluvial deposits. Where sites are present, they appear concentrated at the valley bottom rather than on the slopes, most likely a

bias of preservation produced by hillside erosion. However, three mint condition flakes and one piece of fire-cracked flint were present in the uppermost gravel at Springhead Quarter north east of the site on the east valley slopes and were interpreted as of later prehistoric, probably Neolithic age (Wessex 2004, 19) thus demonstrating Neolithic potential on the slopes of the Ebbsfleet Valley. Geotechnical investigations undertaken at the base of the valley at Springhead revealed a deposit of likely Neolithic or Bronze Age date sealed beneath 1.7m of colluvium (Wessex 1997).

5.4.3 Archaeological investigations in the eastern area of the Site have uncovered a number of pits and ditches in which were found ceramic fragments dating from the Bronze Age to the Roman period (EKE14061). The CTRL excavations at Springhead revealed limited evidence of Neolithic deposits and a more varied range of middle to late Bronze Age features, the latter including pits, field system ditches and burnt mounds and two ring-ditches. Early and middle Iron Age activity in the Study Area is relatively scarce although by the late Iron Age, however, Springhead was becoming established as a significant focus of activity. This developed into the major cult centre and associated settlement of *Vagniacae*.

5.4.4 The Roman site at *Vagniacae,* which was excavated as part of the CTRL, is thought to have originated on the site of an Iron Age religious area, which focused on eight natural pools (MKE99362-Wessex Archaeology, 2008). Indeed, it may be argued that the ritual use of the landscape began in the Middle Bronze Age with the construction of barrows next to the springs (Wenban Smith et al 2015). During works for the Channel Tunnel Rail Link, a late Iron Age enclosure (MKE99358) was also discovered. The enclosure (MKE99358) lies on a raised platform and was most likely still visible during the Roman period. Works in this area, also associated with the Channel Tunnel Rail Link, recorded features and finds of prehistoric date (EKE8575; EKE8581; EKE8576).

5.4.5 Although extensive aggregate extraction has taken place in the surrounding area and much of the Site has been disturbed by previous road and rail construction, patches of sediments with later prehistoric archaeological potential are likely to survive within the Site boundary. Geoarchaeological and geotechnical investigation within the Ebbsfleet valley have indicated that the ancient valley floor and lower valley sides are masked by deep colluvial deposits up to 2m thick at the base of the valley that have moved down the slope as a result of post-Roman ploughing. These colluvial deposits have buried the underlying valley alluvium which has been found to contain artefacts and features dating from the Palaeolithic through to the medieval period. The burying of such alluvial deposits beneath colluvium has allowed for the perseveration of archaeological materials and sediments in relatively good condition. Preservation of archaeological sediments within the east of the Site on the lower west facing slopes of the valley floor although not likely to be protected by quite such a depth of deposit as those further down the valley have been shown to be affected by colluvial deposition and would therefore be expected to be relatively well preserved. Archaeological remains are generally concentrated below 15m either side of the River Ebbsfleet and as such the eastern lower lying parts of the Site have the highest potential. Overall there if judged to be medium potential for preservation of later prehistoric material in previously undisturbed areas in the east of the Site and a low potential for later prehistoric remains to be present across the western and central areas of the Site.

5.5 Roman Evidence (AD 43 – AD 410)

5.5.1 The Site lies immediately north of the Scheduled Monument known as Springhead Roman Site (1005140). The Site is also is also crossed by Roman Watling Street (MKE4004, MKE20535) and includes a road junction between Watling Street and a branch road (MKE99389).

5.5.2 Historically the area around Springhead has been identified as an area for Roman potential with the known site of *Vagniacae*, or Springhead Roman Site (MKE1632) being located at the junction of Watling Street (MKE4004) and the Ebbsfleet Valley. First excavated in the 18th century, *Vagniacae* was known to be a major religious centre during the 1st and 2nd centuries AD and is located in the eastern area of the Site. Early investigations located a walled cemetery, a baths, burials, and a kiln (MKE1632). *Vagniacae* is considered to be of national importance due to its rich archaeological remains which include a mix of domestic, commercial, industrial and ritual evidence.

5.5.3 Watling Street (MKE4004) was historically thought to run east to west through the Scheduled Monument (1005140) and south of the Site, however later research found that it made a dog leg through the settlement of *Vagniacae* (MKE1632). The settlement (MKE1632) seems to follow the route of the road (MKE4004) and there is little evidence to suggest that the settlement area extends further than 100m north and south of Watling Street (Boyle et al, 1995:1). Evaluation trenches (EKE8568) laid across the known route of Watling Street (KME4004) in 2003 failed to find any trace of the road, although later ploughing may have damaged any remains. In the eastern section of the Site a northward running road and ditch (MKE20535) were found during geophysical survey and trial trenching in 1991-2 (EKE8908) and a further section of the road was encountered by Wessex Archaeology in 2005 (EWX9126). This road (MKE20535) connects to Watling Street (MKE4004).

5.5.4 During works for the A2 in the 1950s and 1960s, excavations by W.S Penn (EKE8919) found a complex of five temples, numerous buildings and a ditch. Within the Site, are two features uncovered during these mid-20th century investigations. The first is a length of Claudian ditch (MKE20566) which was originally interpreted as a military ditch, however later investigations in the area indicate that the ditch may be associated with Watling Street (MKE4004) or the ritual settlement (MKE1632). The second comprises a number of Roman features including buildings, shops, flint, a pit, clay floor and a kiln (MKE20569). These features were buried beneath the route of the A2.

5.5.5 In the eastern area of the Site a courtyard feature (MKE20564) was found during excavations of a gas trench on the northern edge of Watling Street (MKE4004). The feature (MKE20564) lies to the south of individual properties found later by Wessex Archaeology (see section 5.5.6). A cable trench excavated in 1992 (EKE8929) uncovered a Romano-British surface (MKE20537) in the vicinity of Watling Street (MKE4004). On the north-eastern boundary of the Site a group of chalk, brick earth and gravel pits (MKE20302) have been found and interpreted as possible sources for the building material for the Roman settlement. Roman building material and pottery was also recorded to the north-east of the Site during a geoarchaeological investigation in 2010 (EKE14065). Roman finds within the Site boundary include a bronze hackamore and shard of Samian ware (MKE1740); two collections of Roman pottery (MKE1649; MKE99981); and Roman artefacts recovered from the topsoil at Bluewater (EKE8389; EKE8338)

5.5.6 Wessex Archaeology conducted initial archaeological evaluation at *Vagniacae* (EKE8529) in 1997 in an attempt to define the north-western limits of the Roman settlement. These initial investigation works found that the Roman features including a road, ditches, wall footings, burials, post holes, pits and occupation deposits were concentrated towards the floor of the Ebbsfleet Valley. Stratified deposits were found to survive along the line of the Roman Road running north west to south east through the Springhead Nurseries. Further, more extensive, archaeological works were undertaken by Wessex Archaeology at *Vagniacae* from 2000 to 2003 in advance of the construction of the Channel Tunnel Rail Link (EKE8581; EKE8582; EKE16205; EKE11611; EKE8575; EKE8576). These excavations uncovered stratified remains from the late Iron Age through to the Roman period centred on eight ceremonial pools (MKE99362 –Wessex Archaeology, 2008). Within the Site boundary, Wessex

identified the following; eleven properties (MKE99407; MKE99409; MKE99410; MKE66424; MKE99403; MKE99402; MKE99401; MKE99400; MKE99397; & MKE99395); with surviving fence or property boundary lines (MKE99392); two Roman temples (MKE99355; MKE99370); a possible bath house (MKE99390); a road leading to a ritual pool (MKE99365); the remains of a 1st/2nd century aisled barn; the footings for a road side shrine and twelve coins (MKE99412); six early Roman burials (MKE99368); an early cenotaph (MKE99380) and a collection of Roman pottery and iron strap (MKE99967). Although *Vagniacae* had long been recognised as ritual site, these excavations uncovered abundant evidence for domestic, commercial and industrial activities demonstrating the richness of the archaeological site at *Vagniacae* and its potential to inform about daily life in the Roman period as well as the more readily appreciated ritual elements. Evidence for domestic Roman activities within the Site was strongly associated with the eleven properties within the Site boundary and included a bakery structure within Property 3 (MKE99400); domestic rubbish pits at Property 4 (MKE99401); brick earth quarries and domestic rubbish pits at Property 12 (MKE99410) and evidence for metalworking and a potential smithy at Property 10 (MKE99408). Roman inhumations were encountered within Properties 3 (MKE99400), 5 (MKE99402), 11 (MKE99409), and 12 (MKE99410).

5.5.7 A late 2nd century Roman stone temple 14m x 8m in size (MKE99355) was discovered beneath the eastbound A2 slip road within the Site during CTRL works. Coin evidence suggested that the temple was constructed in c. AD 180/190 and demolished a century or so later. The temple was aligned at right angles to Watling Street with the entrance facing south-east and was built in two phases of construction. The central part of the building may have been re-used after the main period of demolition. The walls survived to a height of c. 0.5m and consisted of flint nodules and chalk set in lime mortar. The entrance had a vestibule with four entrances. Evidence of tiled flooring, painted wall plaster (with green and red paint and now conserved in-situ), was found. A number of pits and postholes lay south of the temple and two hearths north of the fence that was itself north of the temple. In the corner of the temenos Eastern area enclosure was a neonatal burial inside a storage vessel and a possible second neonatal burial was close by. When the temple was demolished at the end of the 3rd century the tiled floor was removed and the plaster stripped before demolition. Much of the demolition rubble was used to create a platform in the middle of the temple and this seems to have remained in use, perhaps into the mid-4th century (based on coin evidence). Two more neonatal burials may have been found here. The temple site is the only area of the Springhead excavations where late 4th/early 5th century pottery was found and indicates that the temple may have remained a focus of activity even after the abandonment of the wider site. The temple was preserved in-situ below the new slip road at a shallow depth beneath shingle.

5.5.8 Previous archaeological works across the eastern area of the Site have thus discovered that this part of the Site was located within a Roman settlement and associated with the ritual area of *Vagniacae.* Occupation at Springhead appears to have diminished in scale by the mid-3rd century AD, although some activity including use of the aforementioned temple beneath the A2 slip road continued right up to the end of the 4th century. While it is acknowledged that some Roman remains may have been lost to post-medieval and modern ploughing, as well as historic road construction (EKE14059), excavated remains of the settlement were found to be in a good state of preservation. The late 2nd century Roman stone temple including associated conserved painted wall plaster are preserved in situ beneath the east bound A2 slip road. In addition, there are small areas within the eastern area of the Site boundary which are not recorded by the KCHER to have been subject to previous archaeological investigation (see Figure 3.2). In the western area of the Site previous works have found a limited amount of Roman material and it is possible that the field system identified from cropmark evidence (MKE 77177) (see Section 5.2) may be of Roman date. No previous excavations are recorded in the central area of the

Site; however since this area is some distance from the known extent of *Vagniacae,* Roman remains are likely to be less frequent. Throughout the Roman period, the entire Ebbsfleet valley bottom appears to have been utilised, with more limited activity on the valley slopes. Settlement activity expanded to the west, south and north of *Vagniacae*. Overall, there is judged to be a high potential for Roman archaeology to survive in the eastern area of the Site and a medium potential for Roman remains to be present across the western and central areas of the Site.

5.6 Early Medieval (AD 410 – AD 1066)

5.6.1 A large Anglo-Saxon Cemetery was recorded on the upper eastern slopes of the Ebbsfleet Valley during excavations at Springhead Quarter northeast of the Site although settlement itself seems to have been more dispersed. The cemetery dates 7th century and consisted of a total of 36 graves in two distinct groupings. Jewellery such as gold-and garnet buckles, of which a number were found, attested the high status of the cemetery.

5.6.2 More permanent settlement reappears in the late Saxon period, alongside the still-functioning route of Watling Street, the main link from London to Canterbury, in the form of a scatter of farmsteads. Two early medieval sunken houses or Grubenhäuser, MKE20303; MKE99929) have been found in the eastern area of the Site. Both Grubenhäuser, measured approximately 3.5m by 2.5m, with the remains of the features being indicated by post holes and pits. A quantity of contemporary pottery and domestic deposits were also encountered (MKE20303; MKE99929).

5.6.3 Anglo Saxon pottery was found during a strip, map and record exercise undertaken along the route of a planned water main (EKE14074). However only the southern end of the route enters into the Site boundary and the HER does not record where the pottery was encountered.

5.6.4 The presence of two early medieval Grubenhäuser, (MKE20294; MKE99929), and associated remains, indicate the presence of people in the area in the post–Roman period. Therefore, there is considered to be a medium potential for further archaeology of this period to survive within the Site.

5.7 Medieval Evidence (1066-AD 1500)

5.7.1 The Site is located between Swanscombe to the west and Northfleet to the east. Both of these settlements are recorded as large areas, in the county of Kent in the Domesday Book (1086), with Swanscombe being tenanted by the Bishop of Bayeux and Northfleet being owned by the Archbishop of Christ Church, Canterbury in 1086 (OpenDomesday, nd).

5.7.2 The western area of the Site is located between two Scheduled portions of the medieval boundary for Darenth Wood (1013378). Another two Scheduled portions, which protect the remains of the boundary, are located further to the west. Wood management at Darenth dates from the prehistoric period, and is still in practice, although the older examples of historic woodland management and coppicing survives better in the South West of England, than elsewhere in the UK. Excavations into the boundary found ceramic fragments dating from the 13th century, which concurs with the form of the boundary. Darenth Wood boundary (1013378) has been cut by historic and modern activity, most obviously by the A2 and by the A296.

5.7.3 Previous archaeological excavations in the Site have noted a lack of post Roman remains. The Site was most likely located in agricultural or open land between settlements in the medieval period therefore there is considered to be a low potential for archaeology of this date to survive within the Site.

5.8 Post-Medieval Evidence (AD 1500 – AD 1900)

5.8.1 Early historic maps are schematic in nature, although they can give some idea of settlement patterns. Maps by Blaeu in 1646 and Bowen in 1751 depict the Site in land between Northfleet and Swanscombe; however, these maps were not designed to show detail. Blatt's 1769 map of Sussex depicts the western portion of the Site located north of Bean and south of Swanscombe. The eastern area of the Site is located in *Darenth Wood*, which includes the Scheduled medieval boundary (1013378) and the southern portion of *Park Wood* would have been be located in the centre of the Site. The line of Watling Street (MKE4004) is indicated with a dashed line, through the centre of the Site and oriented NNW-SSE. Blatt (1769) illustrates the Site and its immediate surroundings located in open land, most likely agricultural in nature, and bounded by roads, connecting small villages. Carys's 1782 map is at a much larger scale and shows no further information about the Site.

5.8.2 An anonymous map, dated 1799, depicts the Site occupied by agricultural land crossed by roads. The eastern area of the Site is shown to be located in Darenth Wood (1013378) and the southern extension of *Swanscombe Park Wood* is drawn in the centre of the Site. In the wider area the villages of Bean, Betsham, Northwood Green and Southfleet are annotated. Similarly, these place names are record in 1837, although this map does not depict any further information about the Site.

5.8.3 The first edition Ordnance Survey (OS) map (1872) (not shown) depicts the western area of the Site similarly to the 1799 map. Darenth Wood is located in the western area of the Site, with the village of Bean annotated to the south. The area is occupied by small woodlands, including *The Thrift*, and farmland. The centre area of the Site is illustrated as having been located in the southern area of *Swanscombe Park* and in open land crossed by Watling Street (MKE4004). In the eastern area of the Site, the historic projected route of Watling Street (MKE4004) is annotated along with the Site of a Roman town at Springhead. The eastern area is shown to be occupied by agricultural fields, with Park Corner, Winfield Bank and Pepper Hill annotated.

5.8.4 There is very little change shown within the Site by 1898 (See Figures 5.1-5.3). The Fawkham Junction and Gravesend branch railway (MKE44039) opened in 1886, as a five mile long, double track extension line. The route crossed the eastern area of the Site and is depicted on OS maps from 1898 to 1988. Swanscombe Park and Darenth Wood were cut back between 1872 and 1898 and they are shown to occupy much smaller areas on the 1898 map edition. Watercress beds (MK20241) are annotated on the 1898 OS map in the eastern area of the Site and were recorded by Wessex Archaeology in 2003. These features were known to have been located at Springhead since the early 19th century.

5.8.5 The post-medieval period saw growing exploitation of the Study Area, although not necessarily any significant increase in settlement density until the twentieth century. Small-scale chalk quarrying continued in patches along the Ebbsfleet Valley throughout the Post-Medieval period. At Springhead, the first watercress industry flourished in the nineteenth century and the remains of watercress beds were discovered during evaluation at Springhead (Wessex 1997). Watercress cultivation in the Ebbsfleet Valley continued until the 1930s when the springs dried up as a result of pumping operations further downstream. In the wider area 19th century industrial development of the cement works at Northfleet which produced 'Roman' cement in the early 19th century heavily influenced the development of the landscape immediately adjacent to the Site. The industry grew substantially when Portland cement was produced from 1843, after being patented by Joseph Aspidin in 1824. A substantial proportion of the Eastern Quarry was exploited for clay to supply as clay slurry to the cement works from around 1900.

5.8.6 The Site was located within agricultural and woodland in the post-medieval period. The lack of industrialisation and urbanisation of the area in the 18th and 19th centuries is most likely the reason for the good preservation of the Roman remains at *Vagniacae.* Previous archaeological investigations record a lack of post-medieval features on and immediately around the Site, although truncation by ploughing has been found (EKE5868). Therefore, there is judged to be a low potential for archaeological material of this period being encountered.

5.9 Modern Evidence (post 1900)

5.9.1 Chalk for the cement works was quarried at Bean quarry (which now houses the Bluewater shopping complex) west of the Site and the Eastern Quarry, north of the Site from 1900. Chalk extraction from the Eastern Quarry began in the 1930s and the seam was worked form the north. Subsequent excavation of chalk from the south of the quarry adjacent to the Site require the removal of large quantities of overlying Thanet Sand deposits which were subsequently re deposited in the previously excavated northern area of the quarry.

5.9.2 There are no changes recorded within the Site between 1898 and 1909. Part of the current A2 was constructed in the 1920's, and the OS map of 1946 (Figures 6.1 and 6.2) shows the route, which partially follows what was thought to be the route of Watling Street (MKE4004). This map illustrates the earthworks associated with Darenth Wood (1013378). The Site is shown to be rural in nature with The Thrift and Swanscombe Park still in existence. Springhead is annotated as the site of a Roman settlement in the eastern area of the Site. Archaeological investigations around the A2 in the 1920's revealed burials and a kiln (MKE1632) associated with *Vagniacae*.

5.9.3 While the OS map of 1962 does not illustrate any changes to the A2, the OS plan of 1967 shows the widened A2 as well as the construction of the Northfleet Grid substation immediately west of the eastern area of the Site. Swanscombe Park is shown to occupy to a smaller area in 1962 and 1967 than it did in 1946.

5.9.4 The western side of the A2, from the Bean Junction was constructed between 1967 and 1974. The area around the Site was exploited for industrial purposes in the 20th century, with a chalk pit and works being located to the north and the urban sprawl to the east and west of the Site illustrated by 1991. However other than the aforementioned road widening there are very few changes depicted on the Site between 1967 and 1991.

5.9.5 The Grade II Listed Swanscombe Cutting Footbridge (1119762) was constructed in 1964 to cross the A2 east of the A296. The footbridge (1119762) is annotated on mapping from 1974.

5.9.6 A Second World War air raid shelter (MKE1740) was located in the eastern area of Site between 1940 and 1945. It was designed to hold 54 people and was most likely constructed of rectangular brick and concrete. The air raid shelter had been removed by 1946 and it is recorded as destroyed on the KCHER.

5.9.7 The Fawkham Junction and Gravesend branch railway (MKE44039) closed as a passenger line in 1953 and remained open to goods trains until 1968, when the line was cut back to Southfleet. The line is drawn on maps until 1988, which suggests that although the line was out of use it was not immediately dismantled. The OS map of 1992 indicates that the line had been removed and the only remains of the railway were the earthen banks and sidings. In 2008 the Northfleet Cement Works was closed due to a shortage of chalk reserves at the Bean quarries which were also subsequently closed.

5.9.8 The A2 was constructed in the early 20th century and was subsequently widened. Further construction in the area was associated with the Channel Tunnel Rail Link. It is unlikely that an archaeological

remains associated with the Fawkham Junction and Gravesend branch railway (MKE44039) survive, since the Roman remains uncovered by Wessex Archaeology partially lie beneath its historic route. Thereby there is considered to be a low potential for modern remains to survive on the Site.

5.10 Previous Archaeological Investigations

5.10.1 The Roman settlement and ritual site of *Vagniacae* has been investigated from the 19th century onwards. Works associated with the A2 in the mid-20th century (EKE8919) opened a large area of the Roman site, not previously excavated. Investigations in the subsequent years were limited to small trenches for services, although these found Roman remains (see section 5.4.4). Extensive and intensive investigations have been undertaken in the last decade in the Ebbsfleet Valley by archaeological contractors (Wessex Archaeology & Oxford Archaeology) in advance of the construction of the Channel Tunnel Rail Link (CTRL) and its associated infrastructure developments. The archaeological requirements of the Channel Tunnel Rail Link necessitated the following works within the Site boundary: a geotechnical survey (EKE14724); field walking survey (EKE11611); watching briefs (EKE8576); strip, map and recording works (EKE8575) and evaluations (EKE8529; EKE8568; EKE8582; EKE8919).

5.10.2 A desk-based assessment to the immediate west of the eastern area concluded that there was high potential for archaeology to survive in the area (EKE14673). Another desk-based assessment which partially included a section of the eastern area of the Site and evaluated the potential for Palaeolithic remains to be present and concluded that the potential for encountering archaeology of this date varied across the study area (EKE14689).

5.10.3 A phase three geoarchaeological evaluation (EKE14065) was undertaken in 2010 immediately north west of the northern Site boundary of the eastern area of the Site. Remains from the Palaeolithic to the Roman period were encountered. Areas subject to previous geoarchaeological study are shown on Figure 4.3.

5.10.4 A watching brief at Springhead Service Station (EKE8398), on the A2, found no archaeological material.

5.10.5 Due to the works associated with the Channel Tunnel Rail Link, large areas of the eastern area of the Site have been investigated. However, only a small portion of the western area has been archaeologically assessed. Previous archaeological works suggest that further prehistoric and Roman remains may be present on the Site and if any remains are encountered they are likely to be in good condition.

5.11 Historic Landscape Character

5.11.1 As evident from the preceding paragraphs the A2 passes through a landscape of considerable time depth with buried deposits just north of the Site dating back to the Lower Palaeolithic around 400,000BP. Buried archaeological evidence from within the Site and surrounding Study Area although not visible within the landscape demonstrates continued exploitation of the landscape through the Palaeolithic and later prehistoric periods. The Roman influence on the landscape is more readily apparent with the line of the A2 following that of Roman Watling Street and demonstrating continued use of this key arterial west to east route throughout the historic period.

5.11.2 The Kent Historic Landscape Characterisation project (Croft et al 2001) identified five Historic Landscape Characterisation (HLC) types to be present within the Site. These are as follows, Field patterns (Type 1); Horticulture (Type 3); Woodland (Type 4); Settlements (Type 9); and Extractive and

other industry (Type 12). Historic Landscape Character information obtained from KHER is presented in Figures 8.1 and 8.2.

5.11.3 The Type 1 Field pattern character area is located in the east of the Site encompassing the east and west roundabouts. This part of the Site falls within the 'Medium regular with straight boundaries (parliamentary type enclosure) as shown on Figure 8.1. This type of field was typically created by 19th and 20th-century enclosure of low lying areas and includes enclosures whose boundaries have been straightened. This landscape character type is now dissected by the Channel Tunnel Rail Link and associated construction of the Ebbsfleet International Station and car parking. Extending south from the A2 across the Springhead Scheduled Monument is an area identified as 'Irregular Fields Bounded by Roads, Tracks and Paths'. This type is defined as generally occurring on chalk uplands - especially the dip slopes and has resulted from post-medieval informal enclosures. The roads and tracks are possibly old drove roads to and from the downlands although in this specific case Roman routes have also influenced landscape development. Also, within the 'Fields' type are the 'Prairie fields (19th century enclosure with extensive boundary loss)' in the west of the Site around the Bean Junction. These enclosures are generally very large with edge lengths often well over 1000m have generally been created by 20th-century boundary loss of 19th-century or earlier enclosures.

5.11.4 Within Type 3 Horticulture are Orchards south of the A2 in the central part of the Site identified by uniformity of tree size and spacing. Sandwiched between the Orchard landscape type is a Type 4 Woodland area classified as 'Other pre-1810 Woodland'. This woodland is identified as having been in existence since before 1801 and has not been subject to replanting and is not obviously assarted. Such areas suggest a long history of woodland cover, probably of relatively stable extent, and are often ancient woodlands. The majority of these woodland areas are located south of the Site although a small area in the central west of the site east of Bean junction extends into the Site boundary (Figure 8.2). The western extremity of the Site is area classified as 'Pre 19th century Coppices'. This is identified as woodland which has been coppiced since before 1801. Coppices are predominantly of one species, especially sweet chestnut but coppices of ash, hazel and oak also exist.

5.11.5 The Type 9 settlement area classified as 'scattered settlement with paddocks post 1800' is located in the west of the Site between the A2 and southern limit of the Eastern Quarry. This type comprises properties within a pattern of very small rectilinear field enclosures or gardens. In the centre of the Site between the Orchard and Woodland character areas is an area of 'Post 1810 settlement' which includes expansion associated with the settlement of Bean to the south west and Gravesend to the east of the Site.

5.11.6 Type 12 Character areas are located north of the site and include Active and disused Chalk areas and Industrial complexes and Factories. The high level of 20th century development, including large scale infrastructure such as the A2, and extensive areas of quarrying to the north of the road are currently dominant landscape features although largely shielded from visibility from the A2 by tree planting. At the south and west edges of the Eastern Quarry the steep chalk cliffs rise from the quarry floor towards the A2. In the east the landform rises from the quarry to meet Southfleet Road within an area now the focus for mixed use development. The quarrying has thus produced a dramatic landscape adjacent to the Site which will continue to change in coming years as the Eastern Quarry is redeveloped.

6 ASSESSMENT OF SIGNIFICANCE AND POTENTIAL

6.1 Known Remains

6.1.1 As established in Section 5.10 above, much of the Site has been subject to previous archaeological investigation. All known assets within the areas shown on Figures 3.1 and 3.2 to have been subject to strip and map and record or open area excavation have been recorded and removed. Heritage assets within these areas are 'preserved by record' and will thus not be subject to direct impacts from the proposed development. Known assets located within these previously fully excavated areas are therefore excluded from the significance assessment impact table below and are not considered further here.

6.1.2 Heritage assets within the Site and not subject to full previous investigation are noted in Table 1 below. Significance is assigned in line with the methodology set out in Appendix 1 of this report. The assessment of significance is made reference to the methodology set out in the DMRB.

Table 1: Significance of Heritage Assets within the Site

RECEPTOR NAME	HER REFERENCE	DESIGNATION	SIGNIFICANCE
Springhead Roman Site	MKE1632	Non-Designated	High
Springhead 2nd century Roman temple	MKE99355	Non-Designated	High
Watling Street	MKE 404	Non-Designated	Medium
Watling Street Junction	MKE20535	Non-Designated	Medium
Springhead Field System	MKE77177	Non-Designated	Medium
Springhead ritual pools	MKE99362	Non-Designated	Medium

6.1.3 A large part of the Springhead Roman settlement site is designated as a Scheduled Monument located southwest of the Site. The non-designated element of the Springhead Site extends west and north of the Scheduled area as shown on Figure 2.2. As discussed in Section 5.5, much of the non-designated site in the vicinity of the Site has been subject to previous archaeological investigation. However, elements of the settlement and ritual site are known to extend beneath the line of the current A2 carriageway and any such remains have the potential to be of High significance. Of particular relevance are the remains of a second century Roman temple (MKE99355) which was preserved in-situ below the new slip road at a shallow depth beneath shingle. The remains of the temple are of High significance.

6.1.4 The Roman Road known as Watling Street has been identified within the Site and clear evidence of the road surface and ditch have been recorded within the east of the Site (see MKE99389; Figure 2.2). Watling Street also passes through the west of the Site in the vicinity of the proposed widening of the northbound B255, Bean Lane north and Igtham Cottages roundabout. Any remains associated with the Roman Watling Street will have been partially disturbed during the construction of the existing A296 roundabout and the road is judged to be of Medium significance at this location.

6.1.5 Excavation at Springhead Nursery in 2002-2003 (ARC SHN02) found clear evidence of a junction of Roman Watling Street with a branch road to the north-west in the vicinity of the proposed widening and realignment of the eastbound slip east of the Ebbsfleet Junction. The road was found to be up to 7.5m wide with gravel metalling and roadside ditches flanked both Watling Street and the branch road

in places up to 8.5m from the road. The remains of the road are judged to be of Medium significance. The proposed widening of the eastbound slip and realignment of the Pepperhill Link Road are located in close proximity to the location of the springs (MKE99362) reflected in the name 'Springhead'. During the Roman period the springs fed a wide, shallow pool c. 20m-25m wide but increasing to c. 50m-60m wide at a distance of 100m downstream. The springs have been dry since the 1930s when quarrying led to a localised lowering of the water table. The springs and pool became a focus for ritual activity during the late Iron Age and Roman periods and evidence for ritual activity around the springs and pool has been found during previous investigations at the Site. The springs are judged to be of Medium significance.

6.1.6 Springhead Field System (MKE77177) forms part of a possible field system visible as a cropmark in on 1990 aerial photographs. The date of the field system is unknown. However, in view of the extensive prehistoric and Roman activity known in its immediate vicinity it is possible that it dates from an early period and as such has the potential to be of Medium significance.

6.1.7 A range of Historic Landscape Character types have been identified. The majority of these types are related to 19th century or later agriculture or industry and are of relatively common type. The Historic landscape in the vicinity of the Site has been much altered by recent large-scale development since the allocation of landscape types in 2001. Landscape Character 3 (Horticulture) 9 (Settlement) and 12 (Extractive and other industry) where they occur within or adjacent to the Site are generally judged to be of Low heritage value. Type 1 Sites are also judged of low value with the exception of the 'Irregular Fields Bounded by Roads, Tracks and Paths' located south of Watling Street (A2) in the east of the Site where they are associated with the Springhead Roman site and influence of the development of this important settlement on subsequent land use in the area and specifically the continued importance of the east to west A2 route. This landscape type is judged to be of Medium significance. The remains of pre1810 woodland and pre 19th century coppicing found in the centre and west of the Site respectively are also judged to be of Medium value owing to the preservation of early landscape features which reflect post-medieval and possibly earlier land management practices.

6.2 Potential Need for Mitigation

6.2.1 National planning policies and planning guidance contained within the National Planning Policy Framework (CLG 2012) and its accompanying Planning Practice Guide (CLG 2014), as well as the Dartford Borough Council Core Strategy Document (2011), Dartford Borough Council Development Policies Plan (2017) and Gravesham Local Plan Core Strategy (2014) outlined in Section 4.2 of this report, require a mitigation response that is designed take cognisance of the possible impacts upon heritage assets by a proposed development and avoid, minimise or offset any such impacts as appropriate.

6.2.2 The proposed finalised scheme will seek to avoid direct impacts upon known heritage assets during construction though careful siting of infrastructure and where appropriate fencing off of known heritage assets (e.g. the Grade II Listed Swanscombe Cutting Footbridge (1119762)). Although located beyond the Site boundary, the proximity of two Scheduled Monuments (Darenth Wood (1013378; Figure 2.1 and Springhead Roman Site (*Vagniacae*) (1005140; Figure 2.2) to the proposed works is noted. Scheduled Monuments are afforded statutory protection under the provisions of the Ancient Monuments and Archaeological Areas Act 1979. Any works within the boundary of the Scheduled Monuments would require Scheduled Monument Consent (SMC) from Historic England. The works which require SMC are comprehensively defined in the 1979 act and summarised as any works that result in demolition, destruction or damage, removal, repair, alteration or addition, flooding or tipping (AMAA 1979 Section 2(2)).

6.2.3 Six known heritage assets within the Site boundary have the potential to be impacted by the proposed development; Springhead Roman Site (MKE 1632), Springhead 2nd century Roman Temple (MKE99355) Watling Street Roman Road (MEK 404), Springhead Field System (MEK 77177) Watling Street Junction (MEK 99389) and Springhead springs (MEK99362). In addition, this assessment has found that the Site is located within an area known to be rich with archaeological remains dating from the Palaeolithic through until the post-medieval period.

6.2.4 The proposed enlargement of the east roundabout and associated widening of the east bound slip road have the potential to directly impact upon the preserved remains of the highly significant 2nd century Roman Temple. Consideration will therefore need to be given to how construction methods can ensure continued preservation of this site and prevent any inadvertent damage to it.

6.2.5 An assessment of previous geoarchaeological works in the area indicates that the Site likely lies south west of the Boyn Hill/Orsett Heath Formation and Ebbsfleet Gravel (see Wenban Smith 2013, 108). However, this assessment has also identified frequent local variation in drift geology and the possibility that Middle Pleistocene deposits extend further west and south than their current predicted extent cannot be ruled out. Consequently, ground-breaking works in the vicinity of the Site depending upon their depth have the potential to encounter Middle Pleistocene deposits and potentially associated Lower Palaeolithic remains. In addition, a medium potential for encountering Later Palaeolithic and Holocene prehistoric remains and a high potential for encountering Roman and early remains in the east of the Site has been identified. A review of geological borehole record and previous investigations indicates that in the west of the Site the Thanet Sand Formation and Cretaceous Chalk occur close to the surface and thus the potential for Pleistocene deposits in the west of the Site is considered low (See Figure 9).

6.2.6 In view of the known and suspected archaeological potential of the Site it is advised that a detailed programme of further archaeological works will be required in advance of the construction of each junction as well as areas of road widening outside the current highway boundary. In view of the extensive previous archaeological works undertaken within the Site further mitigation should be limited to areas where no previous intrusive investigations have been undertaken and where previous investigations have been limited in their extent.

6.2.7 Figures 3.1 and 3.2 map areas of previous archaeological investigation. Those areas shown in pink have been subject to strip map and record or open area excavation and as such can be considered to have no remaining archaeological potential and as such it is advised that no further work would be required within these areas. Areas shown in yellow have been subject to some level of previous investigation but may contain areas requiring further investigation. Within these areas which have been partially previously excavated, the level of previous investigation will need to be established and if necessary further investigation works undertaken. In view of the complexity and richness of the archaeology such work is likely to involve detailed geoarchaeological examination and appropriate sampling stratigraphy. Areas of previous geoarchaeological investigation are shown on Figure 4.3.

6.2.8 The exact scope and extent of any programme of archaeological works required will be assessed alongside potential impacts within the Environmental Statement and would also have to be agreed in advance by Dartford and Gravesham Borough Councils, as advised by the Kent County Council Heritage Conservation Group. The programme of works may include a programme of geoarchaeological investigation followed by archaeological evaluation by intrusive or non-intrusive means. Should deeply stratified deposits be encountered a detailed single context excavation strategy and programme of environmental sampling may be required. If significant archaeological remains were

encountered, then further archaeological fieldwork, post-excavation analysis and reporting, including publication, may also be required.

7 CONCLUSIONS

7.1 The proposed upgrade scheme is located within the very rich archaeological landscape of the Ebbsfleet Valley in North Kent and there are 41 known heritage assets within the Site. The majority of these assets date to the Roman period and were discovered during previous archaeological investigations within the east of the Site and associated with the settlement at *Vagniacae*. The majority of known heritage assets have been recorded through excavation and have thus been removed from the Site. This assessment has identified six known remaining heritage assets within the Site; Springhead Roman Site (MKE1632), Springhead 2nd Century Roman Temple (MKE99355) Watling Street Roman Road (MKE404) Springhead Field System (MKE77177) Watling Street junction (MKE99389) and Springhead springs (MKE99362).

7.2 This assessment has found that the proposed scheme lies within an area known to contain extensive archaeological remains dating from the Lower Palaeolithic onwards and a further 554 heritage assets are known within the Study Area. This assessment has established that the north eastern part of the Site has a Medium potential for the preservation of Middle Pleistocene deposits which in turn have the potential to preserve Lower Palaeolithic remains. In addition, a medium potential for encountering Later Palaeolithic and Holocene prehistoric remains and a high potential for encountering Roman and early medieval remains in the east of the Site has been identified. Review of geological borehole records and previous investigations in the west part of the Site indicates that solid geology of the Thanet Sand Formation and Cretaceous Chalk occurs close to the surface and the potential for Pleistocene deposits in the west of the site is considered low. A low potential for later medieval, post medieval and modern remains has also been identified.

7.3 Construction of the proposed upgrade scheme has the potential to disturb, damage or destroy features or buried remains of cultural heritage interest. Other construction activities, such as vehicle movements, soil and overburden storage and landscaping also have the potential to cause direct permanent and irreversible effects on cultural heritage assets. In view of the known archaeological potential of the Site it is advised that a detailed programme of further archaeological works will be required in advance of the construction of each junction as well as areas of road widening outside the current highway boundary where no previous works have been undertaken. In view of the extensive previous archaeological works undertaken within the Site further mitigation should be limited to areas where no previous intrusive investigations have been undertaken and/or to where such investigations have been limited.

7.4 The exact scope and extent of any programme of archaeological works required would depend upon the conclusions of the Environmental Statement and would have to be agreed in advance by Dartford and Gravesham Borough Councils, as advised by the Kent County Council Heritage Conservation Group. The programme of works may include a programme of geoarchaeological investigation followed by an archaeological evaluation by intrusive or non-intrusive means. Should deeply stratified deposits be encountered a detailed single context excavation strategy and programme of environmental sampling may be required. If significant archaeological remains were encountered,

then further archaeological fieldwork, post-excavation analysis and reporting, including publication, may also be required.

7.5 A full impact assessment and detailed recommendations for additional archaeological assessment and mitigation will be presented in the Environmental Statement. An assessment of impacts upon the setting and character of heritage assets will be presented within the Environmental Statement.

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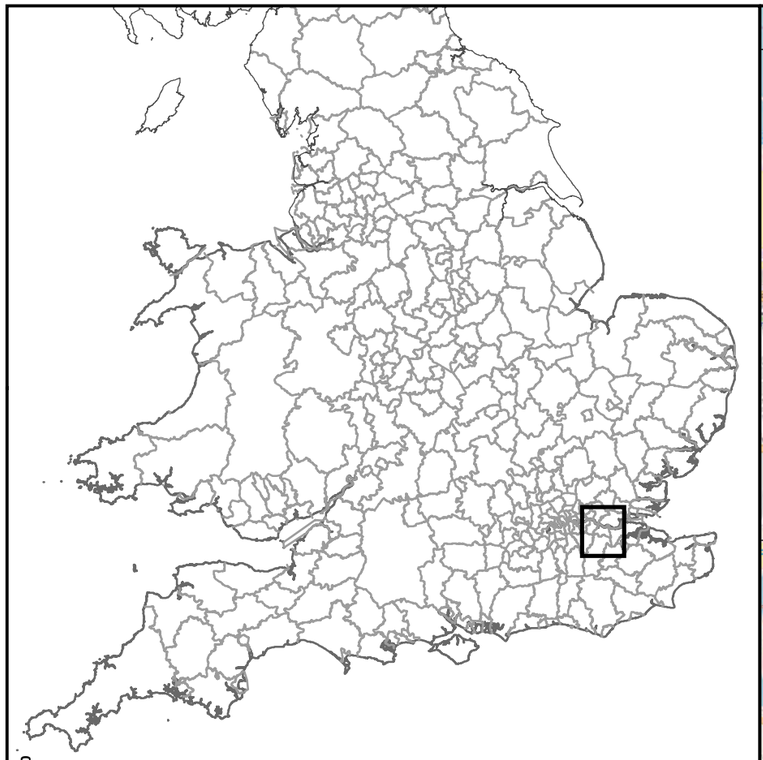

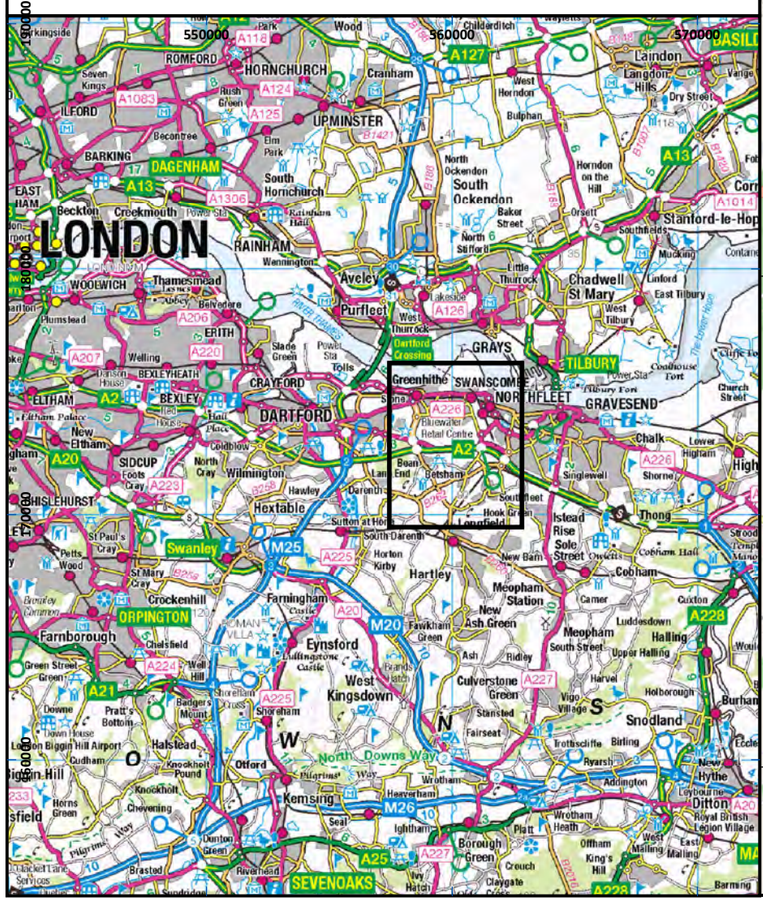

Figure	1

Site Location Map

Legend

Redline Boundary

FOR

Atkins

The Axis
10 Holliday Street
Birmingham
B1 1TF

Drawn/checked:	LB/SO
DWG no:	01/24069/DBA/01/01
AOC Project No.:	24069

AOC Archaeology Group

N

SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

1:25,000 @ A3

SCALE

0 1,000 m

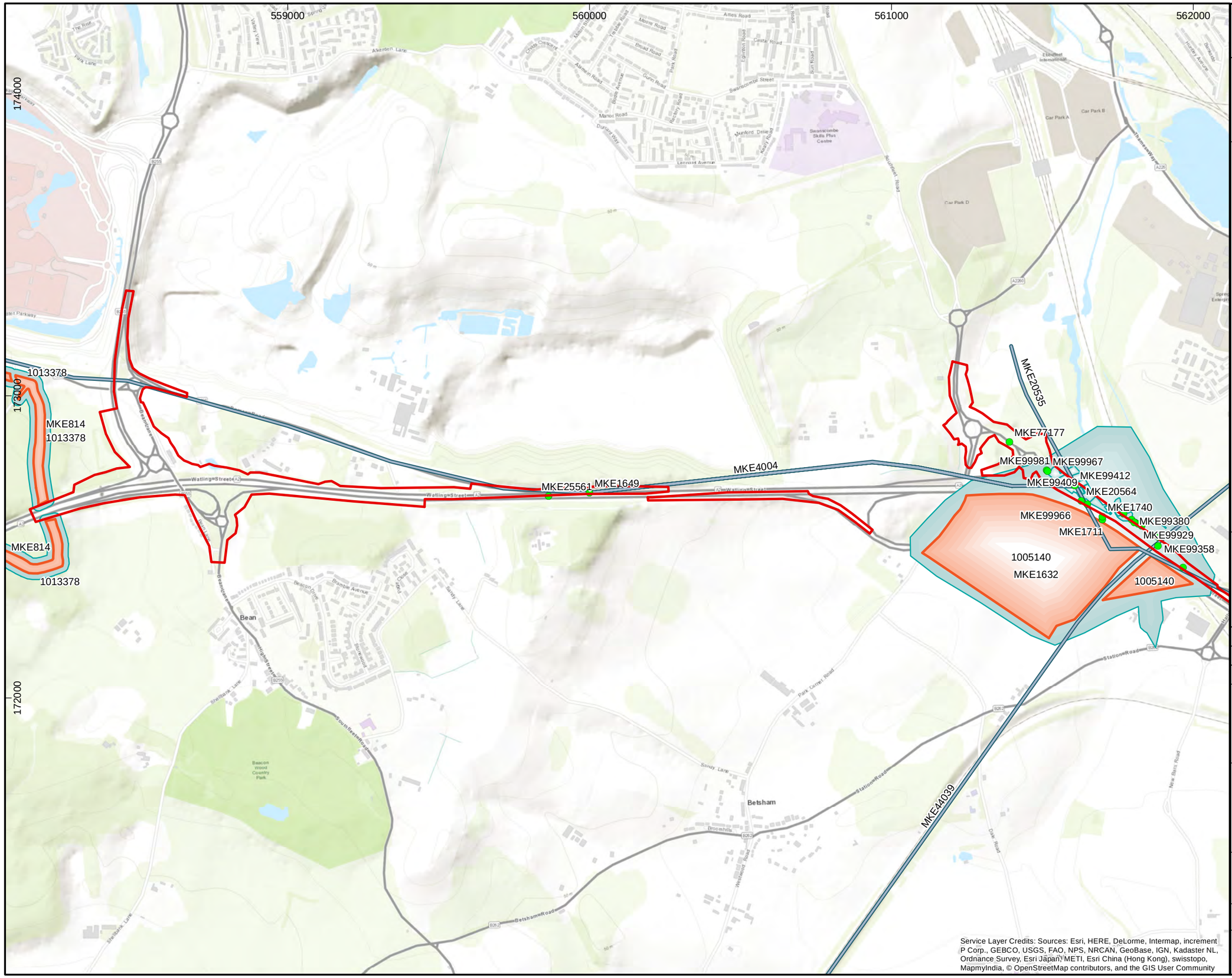

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Figure	2

Heritage Assets within the Site

Legend
- Redline Boundary
- Scheduled Monument
- Monument (point)
- Monument (line)
- Monument (poly)

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SYSTEM

Coordinate System: British National Grid
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Datum: OSGB 1936

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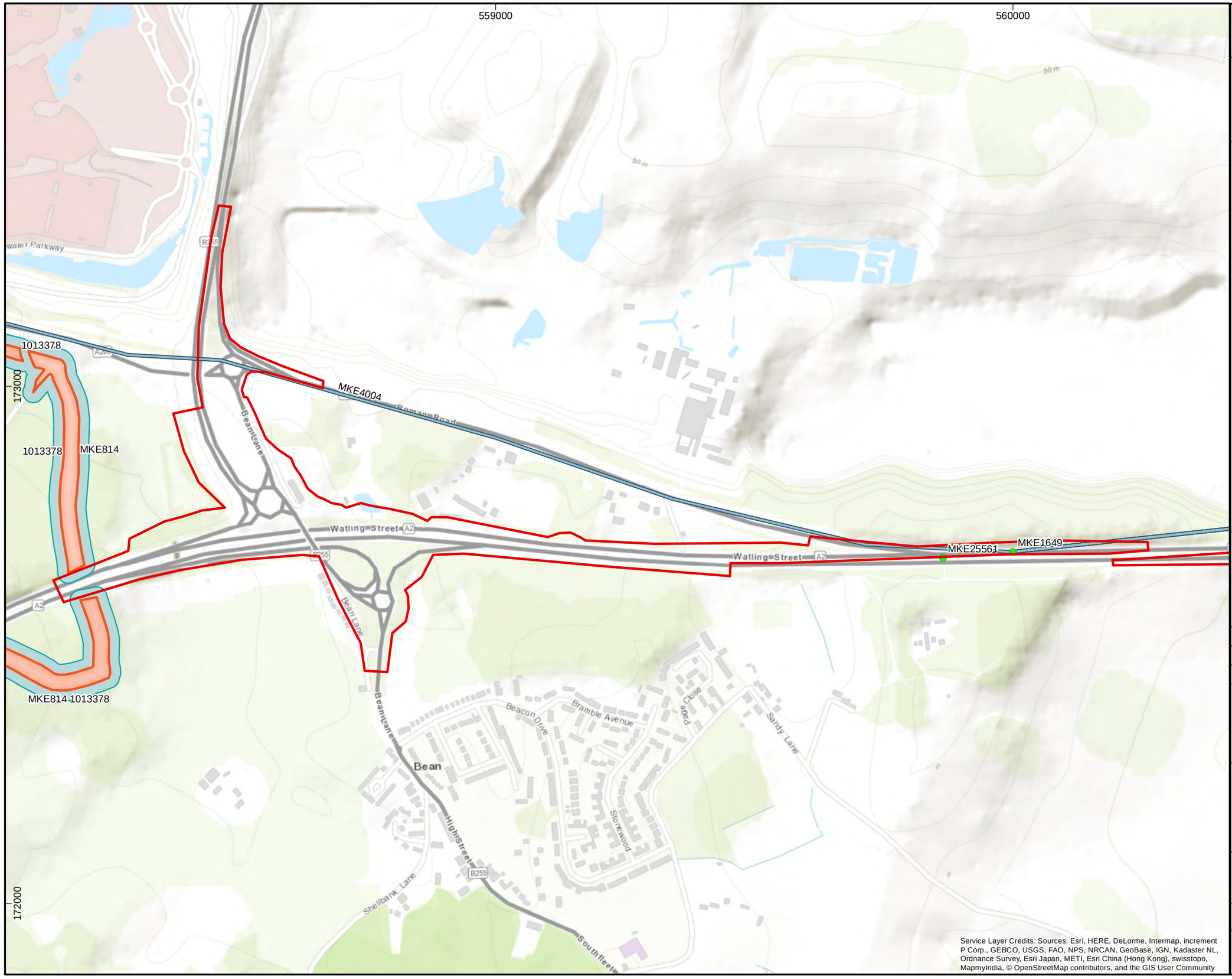

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Figure	2.1

Heritage Assets within the Site (west)

Legend
- Redline Boundary
- Scheduled Monument
- Monument (point)
- Monument (line)
- Monument (poly)

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SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

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SCALE

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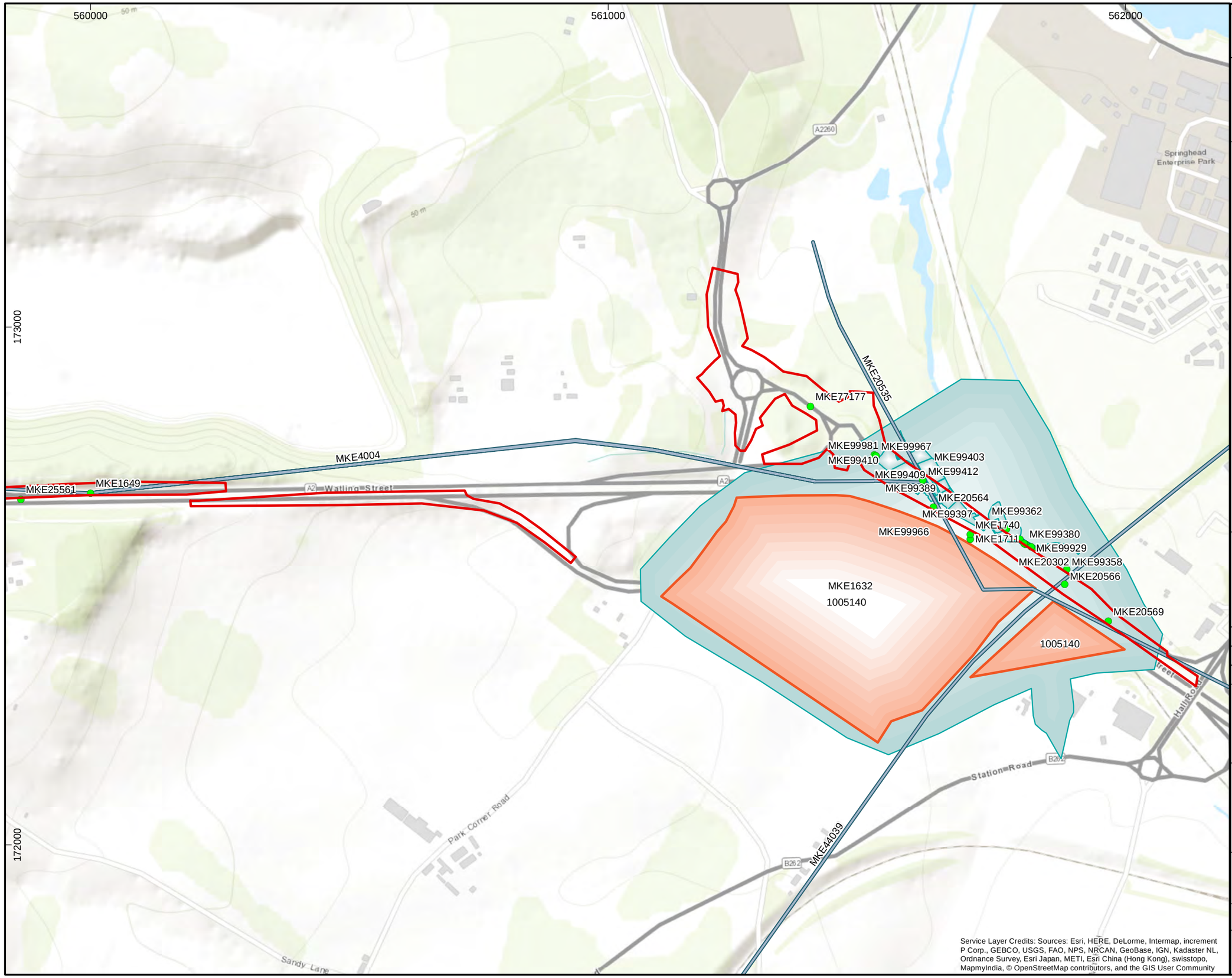

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Figure	2.2

Heritage Assets within the Site (west)

Legend
- Redline Boundary
- Scheduled Monument
- Monument (point)
- Monument (line)
- Monument (poly)

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SYSTEM

Coordinate System: British National Grid
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Datum: OSGB 1936

SCALE

1:7,000 @ A3

SCALE

0 250 m

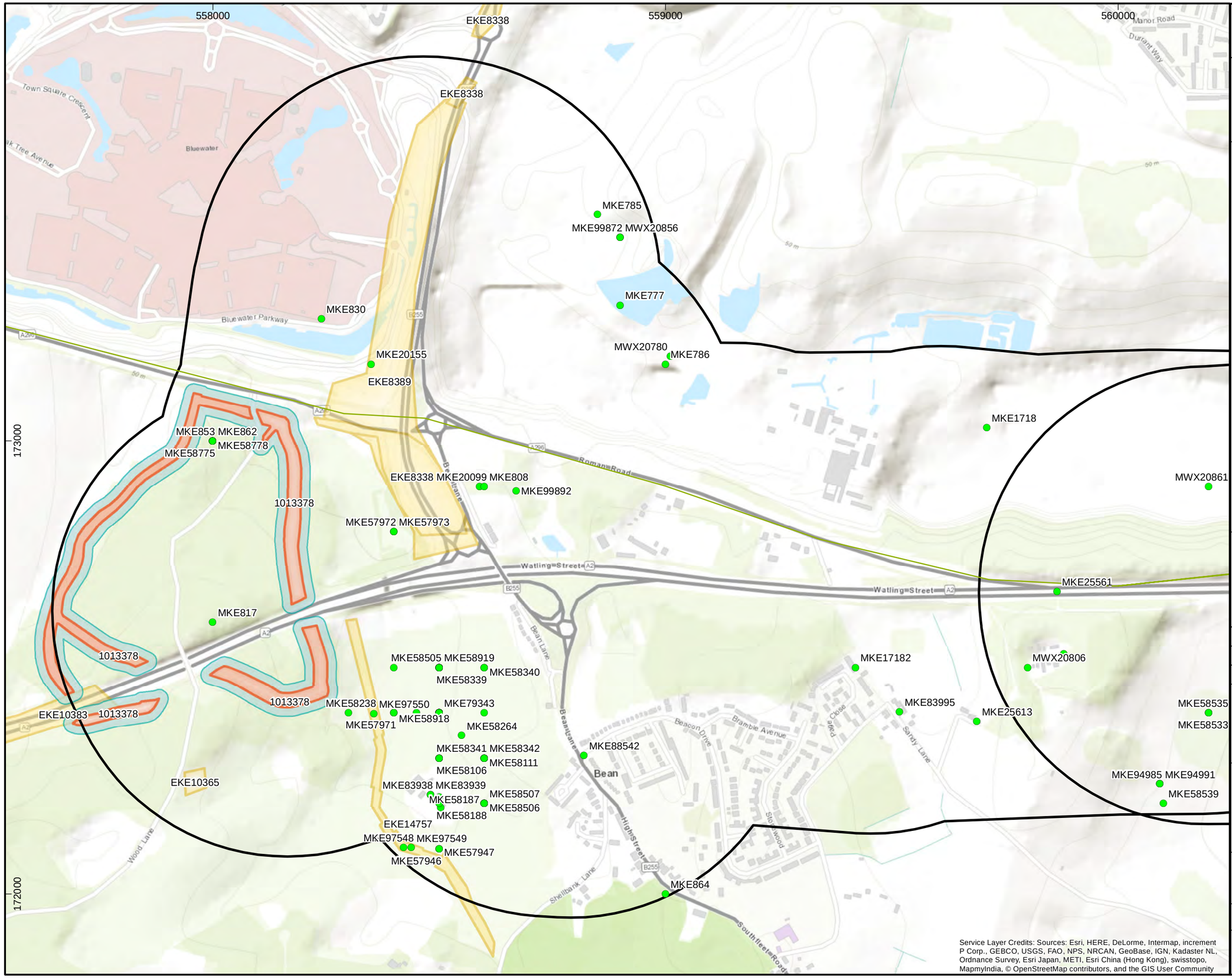

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Figure	3.1

Heritage Assets within 500m study area (west)

Legend
- Study Area
- Scheduled Monument
- Historic Park and Garden
- Event (point)
- Event (Line)
- Event (poly)
- Monument (point)
- Monument (poly)

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SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

1:8,000 @ A3

SCALE

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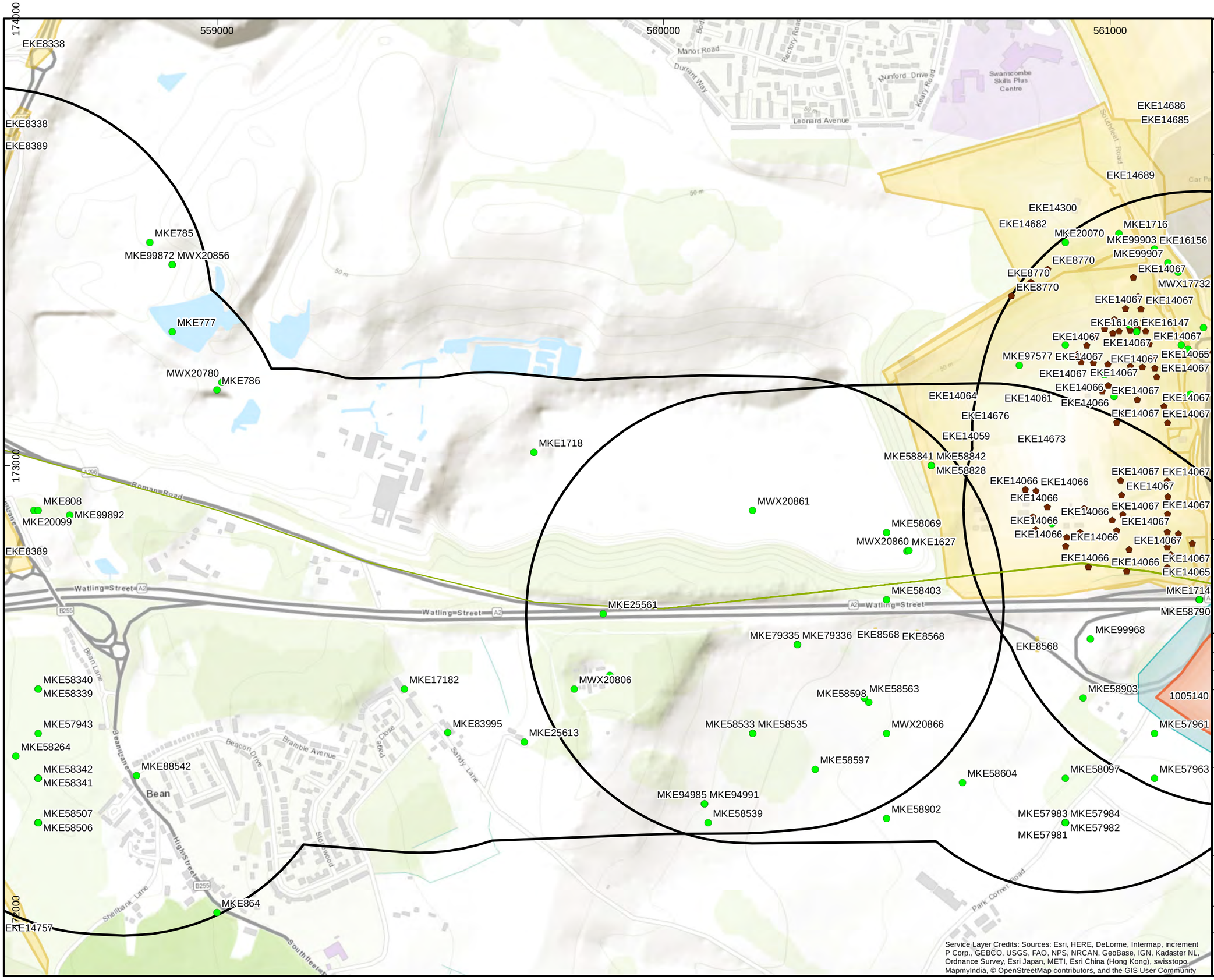

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Figure	3.2

Heritage Assets within 500m study area (centre)

Legend
- Study Area
- Scheduled Monument
- Historic Park and Garden
- Event (point)
- Event (Line)
- Event (poly)
- Monument (point)
- Monument (poly)

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Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

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SCALE

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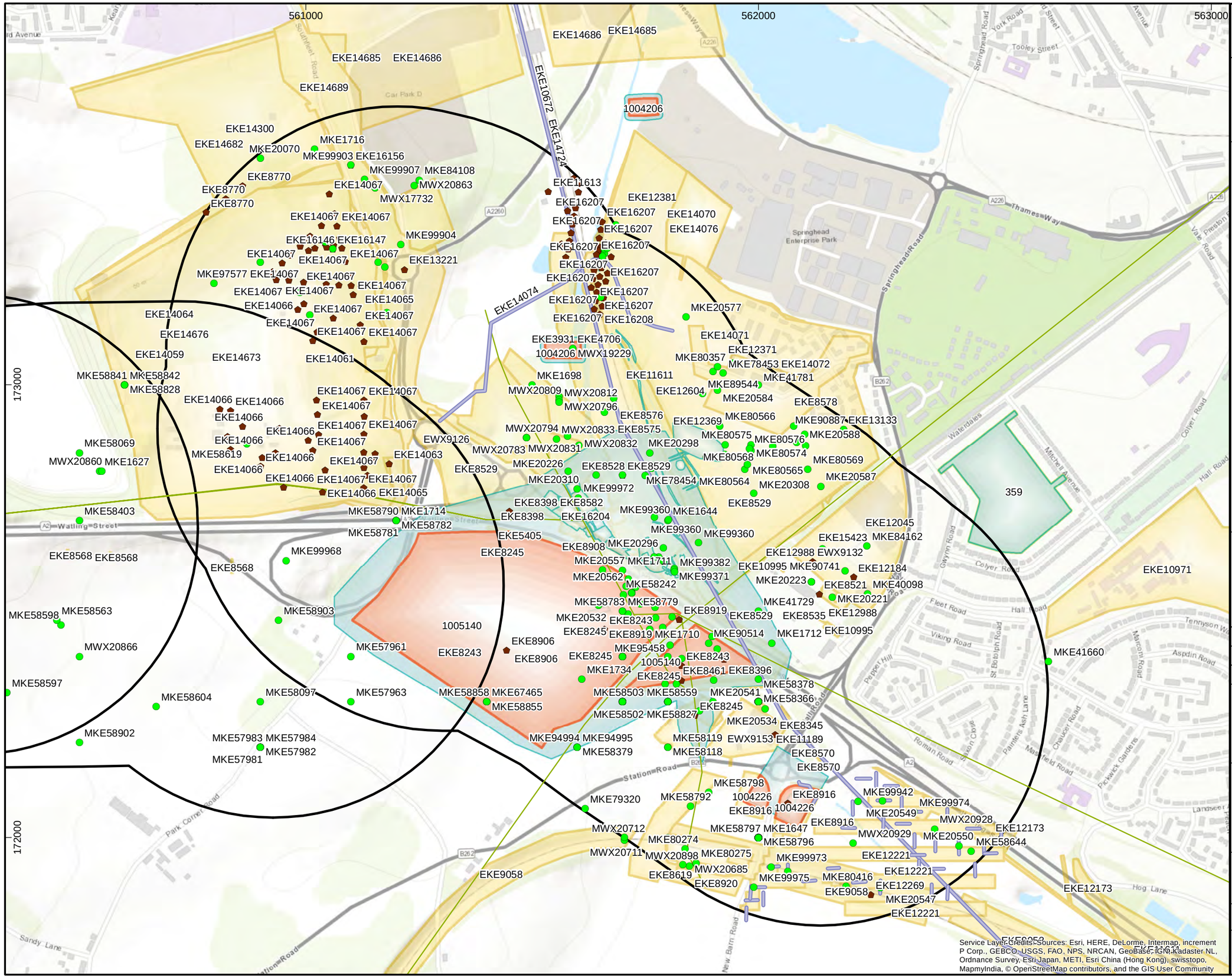

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Figure	3.3

Heritage Assets within 500m study area (east)

Legend
- Study Area
- Scheduled Monument
- Historic Park and Garden
- Event (point)
- Event (Line)
- Event (poly)
- Monument (point)
- Monument (poly)

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SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

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SCALE

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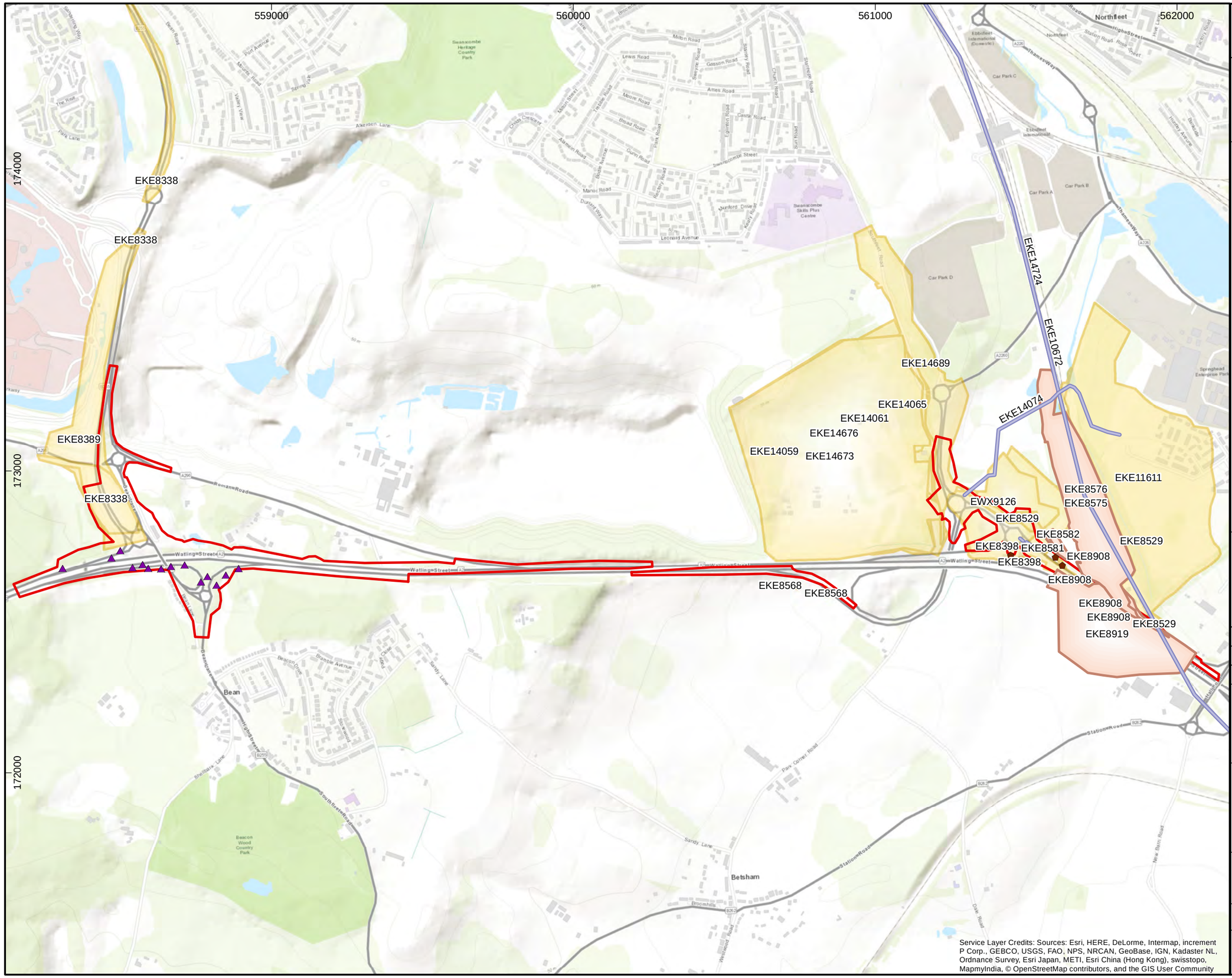

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Figure	4

Previous Investigations within the Site

Legend
- Redline Boundary
- Event (poly)
- Excavation or Strip, Map, Record Areas
- Event (point)
- EKE8329
- Event (line)

FOR

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DWG no:	01/24069/DBA/04/01
AOC Project No.:	24069

AOC Archaeology Group

N

SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

1:12,000 @ A3

SCALE

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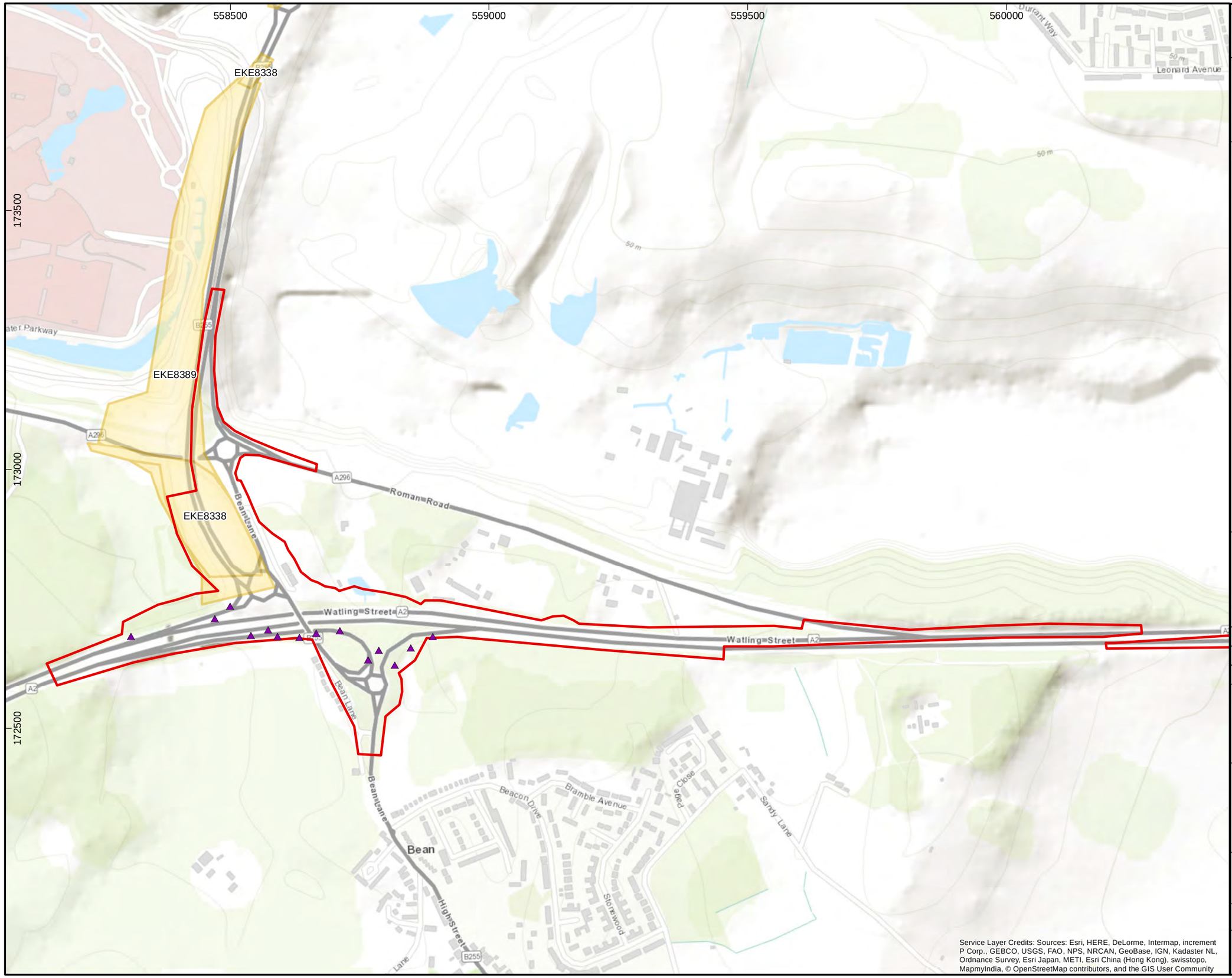

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Figure	4.1

Previous Investigations within the Site (west)

Legend
- Redline Boundary
- Event (poly)
- Excavation or Strip, Map, Record Areas
- Event (point)
- EKE8329
- Event (line)

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AOC Project No.:	24069

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SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

1:7,000 @ A3

SCALE

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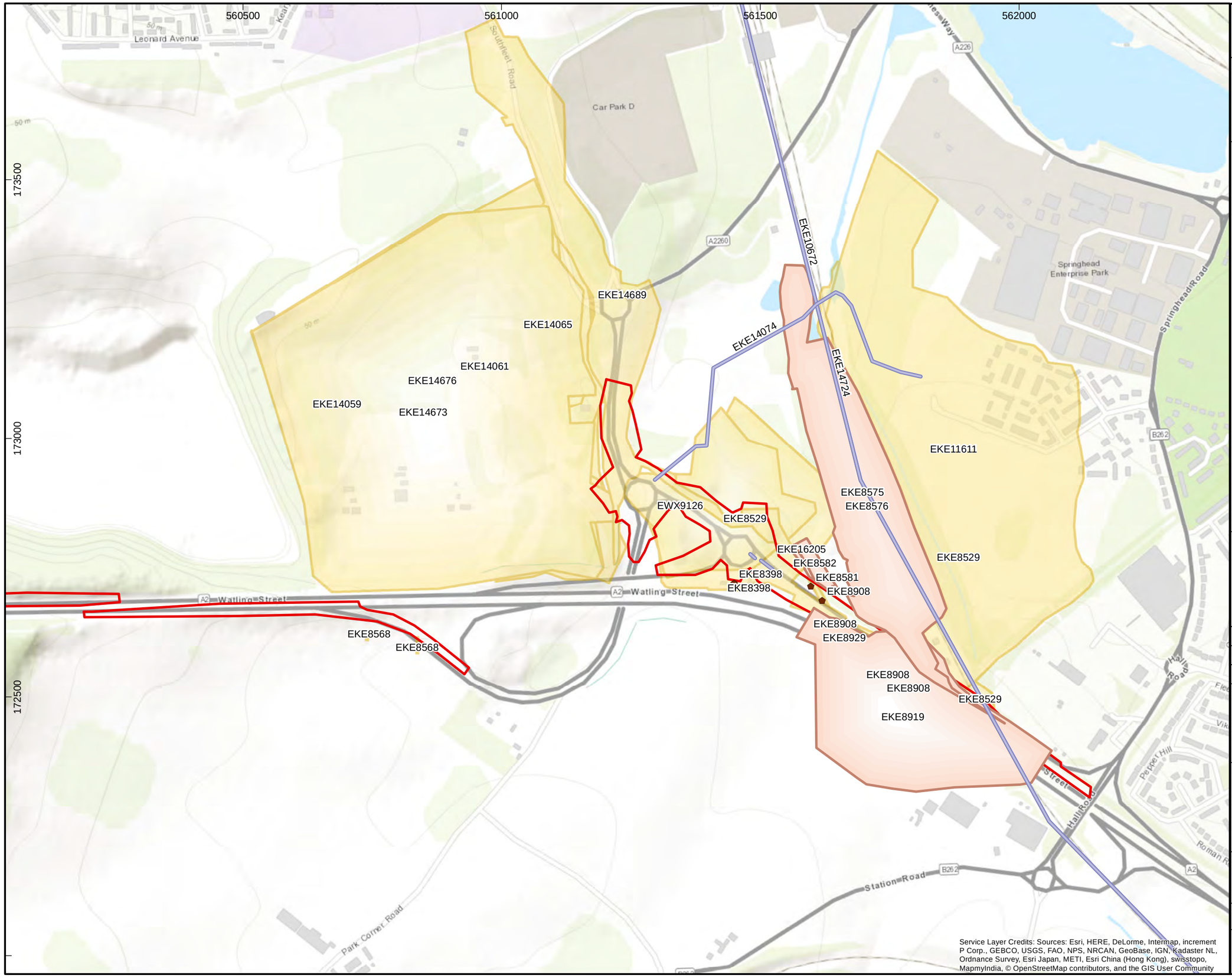

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Figure	4.2

Previous Investigations within the Site (east)

Legend
- Redline Boundary
- Event (poly)
- Excavation or Strip, Map, Record Areas
- Event (point)
- EKE8329
- Event (line)

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SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

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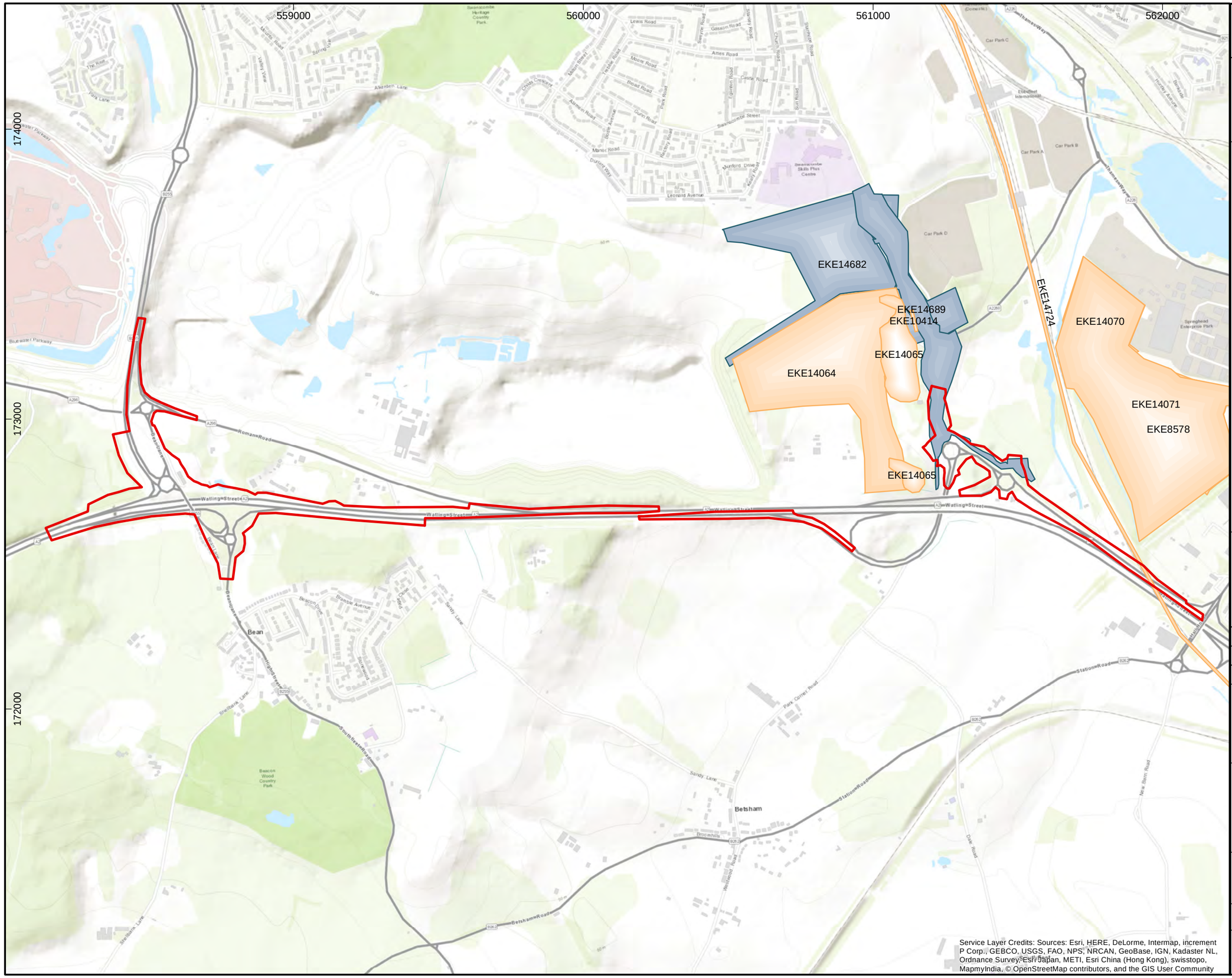

Figure	4.3

Areas subject to previous Geoarchaeological Study

Legend
- Redline Boundary
- Geoarchaeological Investigation
- Geoarchaeological Desk Based Assessment/ Deposit Model

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SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

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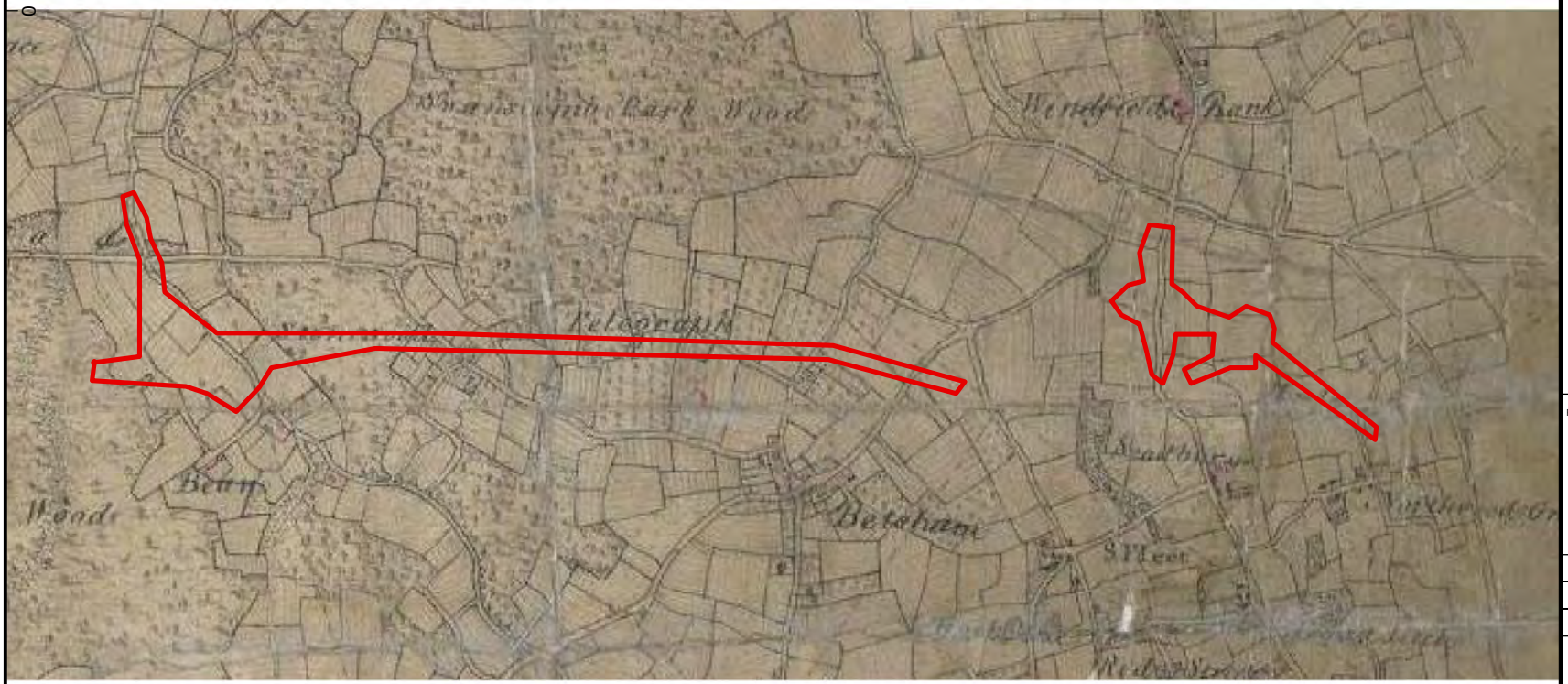

Figure	5

Extract from map by Anonymous, 1799

Legend

Approximate Site Location

FOR

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Birmingham
B1 1TF

Drawn/checked:	LB/SO
DWG no:	01/24069/DBA/05/01
AOC Project No.:	24069

AOC Archaeology Group

N

SCALE

Not To Scale

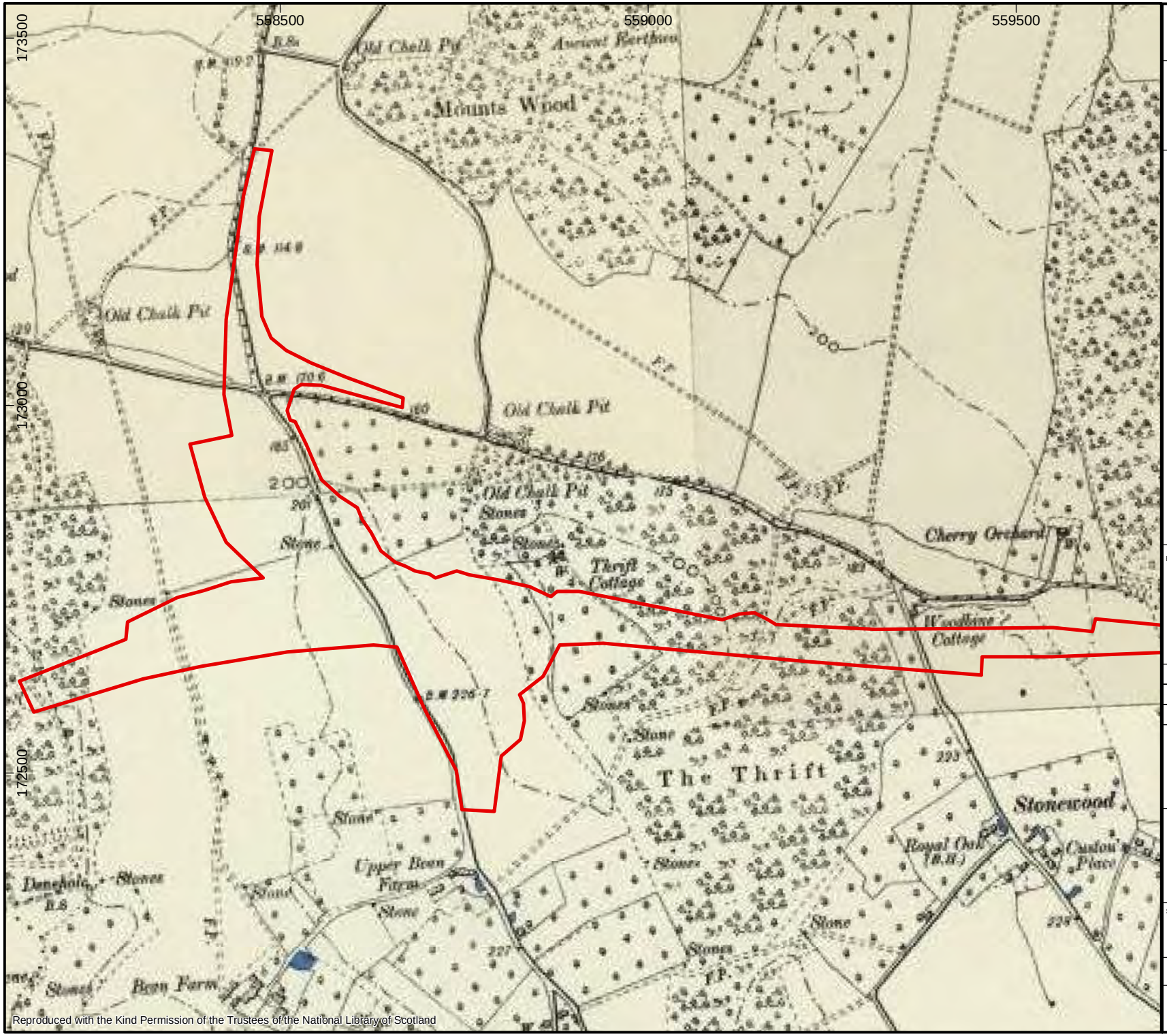

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Figure 6.1

Extract from Ordnance Survey, 1898 (west)

Legend

Redline Boundary

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N

SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

1:7,000 @ A4

SCALE

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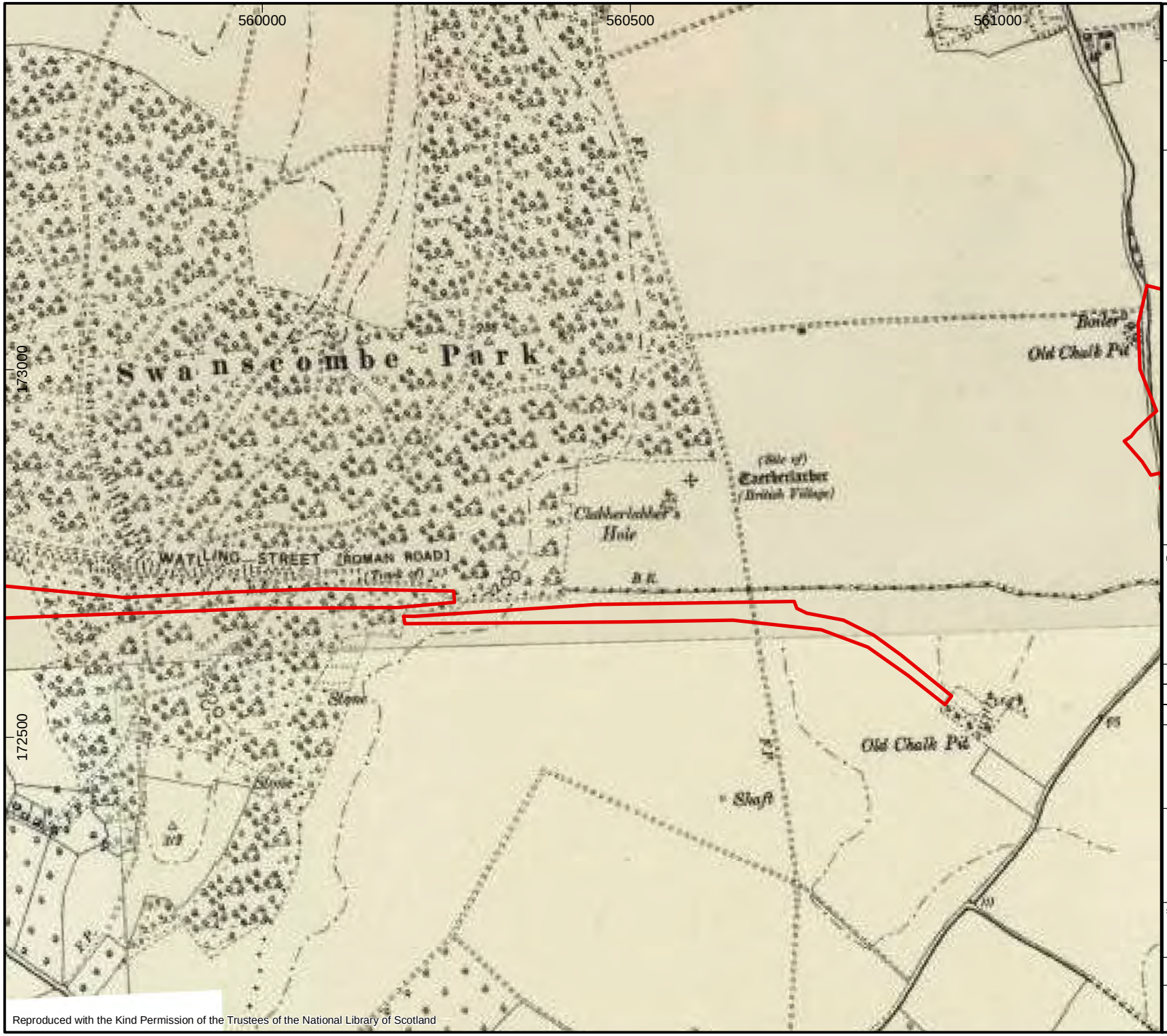

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Figure 6.2

Extract from Ordnance Survey, 1898 (centre)

Legend

Redline Boundary

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AOC Project No.:	24069

AOC Archaeology Group

N

SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

1:7,000 @ A4

SCALE

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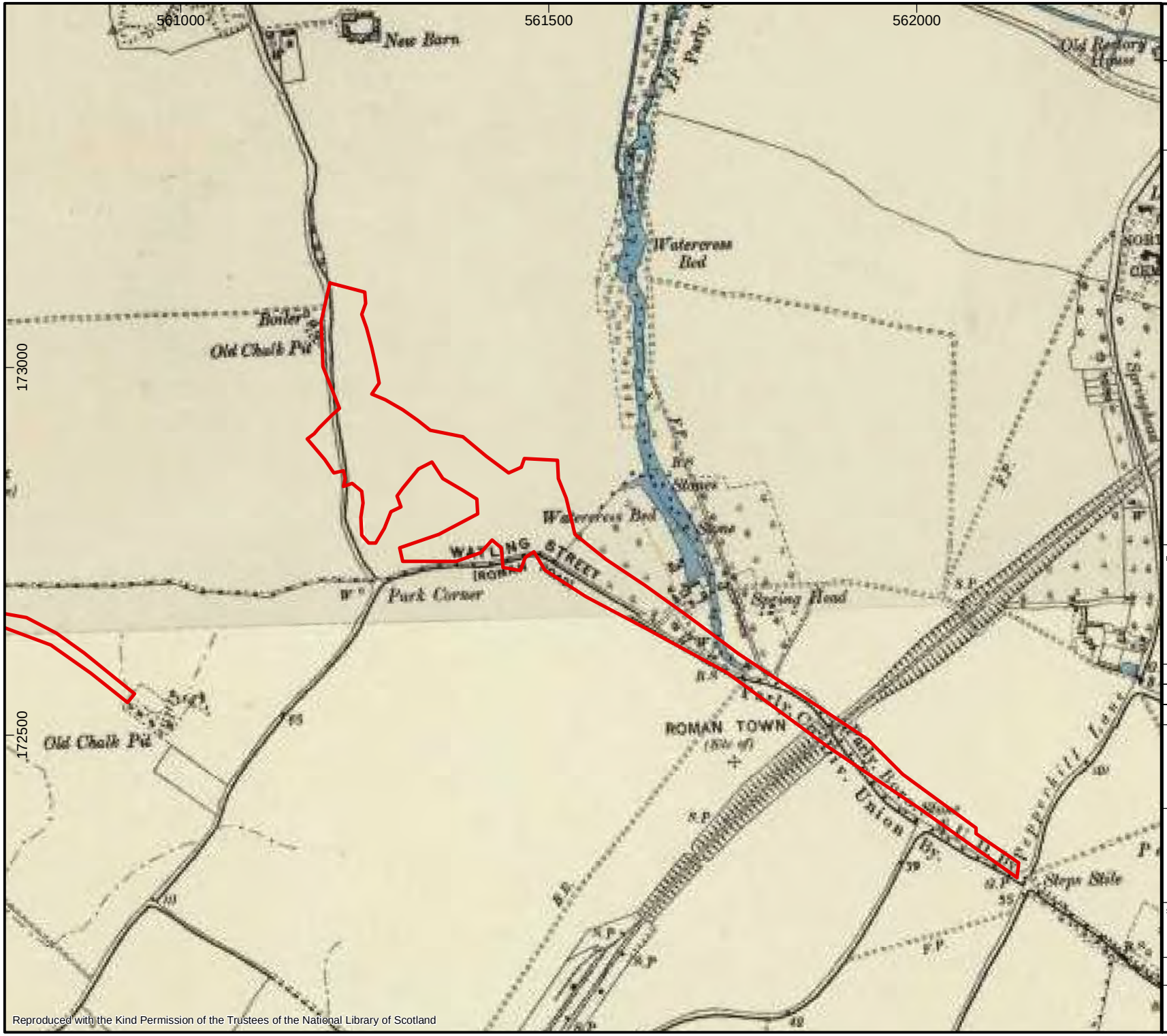

Figure 6.3

Extract from Ordnance Survey, 1898 (east)

Legend

Redline Boundary

FOR

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SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

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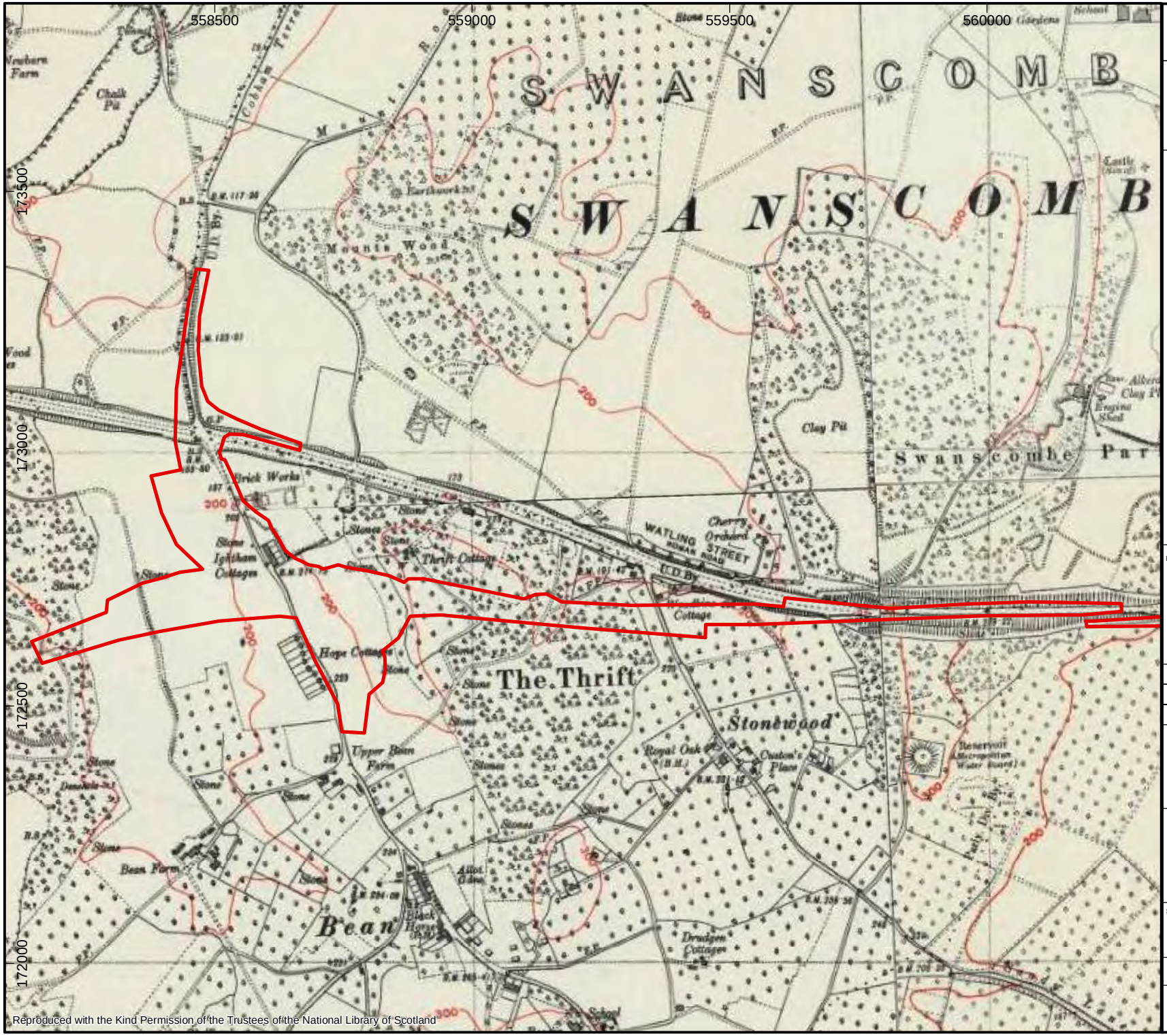

Figure 7.1

Extract from Ordnance Survey, 1946 (west)

Legend

Redline Boundary

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SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

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SCALE

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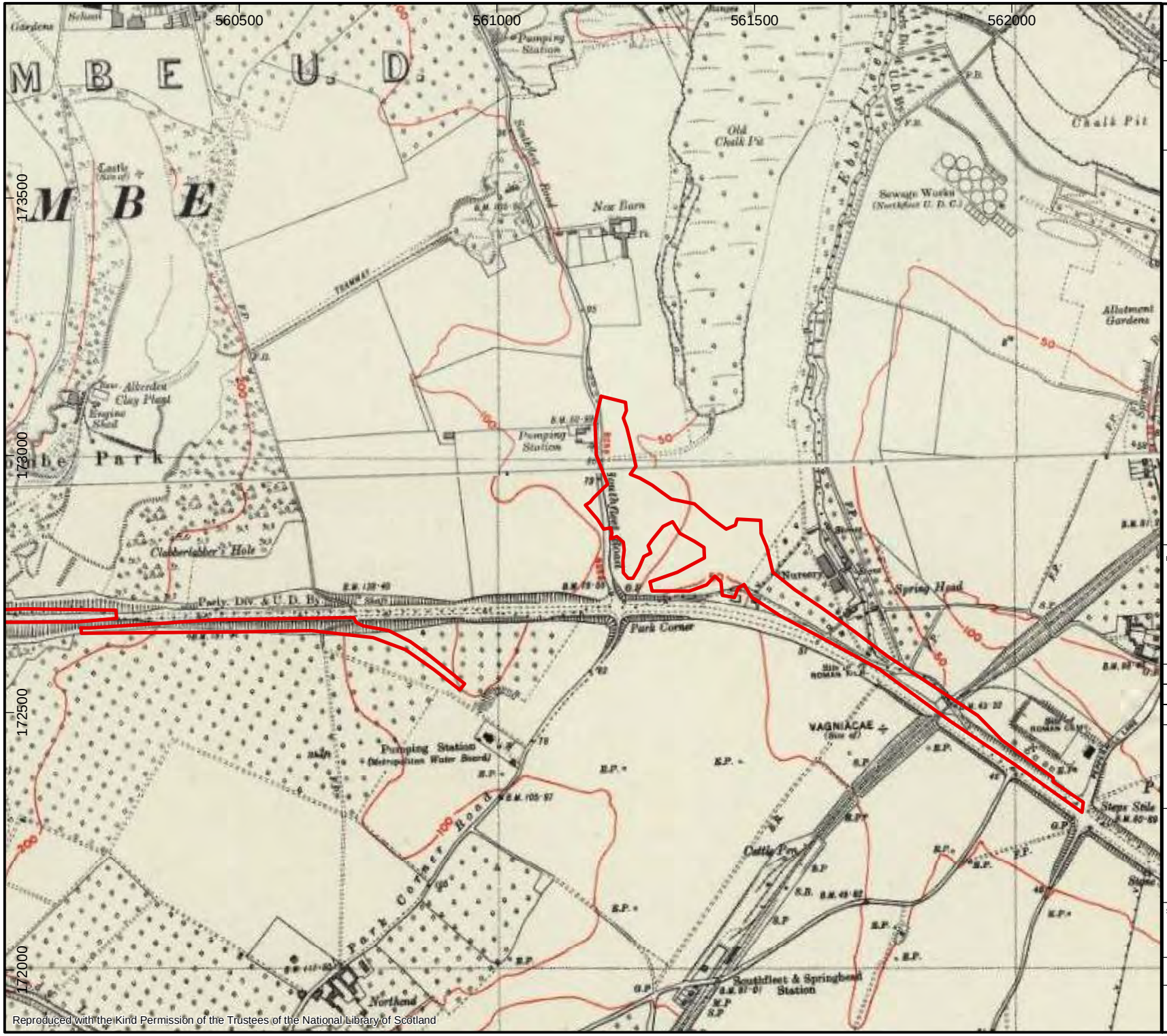

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Figure 7.2

Extract from Ordnance Survey, 1946 (east)

Legend

Redline Boundary

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AOC Archaeology Group

N

SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

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SCALE

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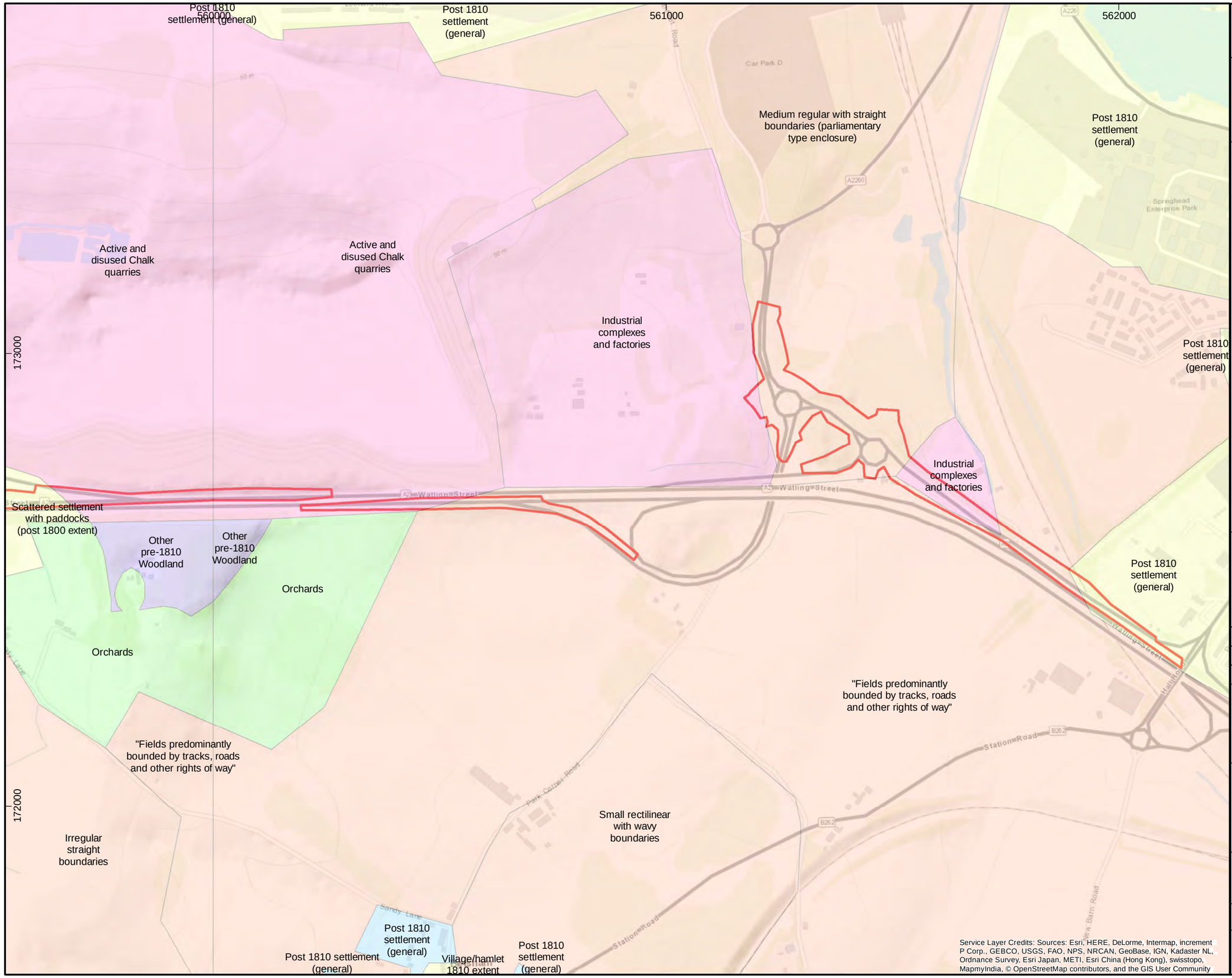

Figure	8.1

Historic Landscape Character Areas (Kent County Council HER) in relation to Site (east)

Legend

Redline Boundary

FOR

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AOC Project No.:	24069

AOC Archaeology Group

N

SYSTEM

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

1:8,000 @ A3

SCALE

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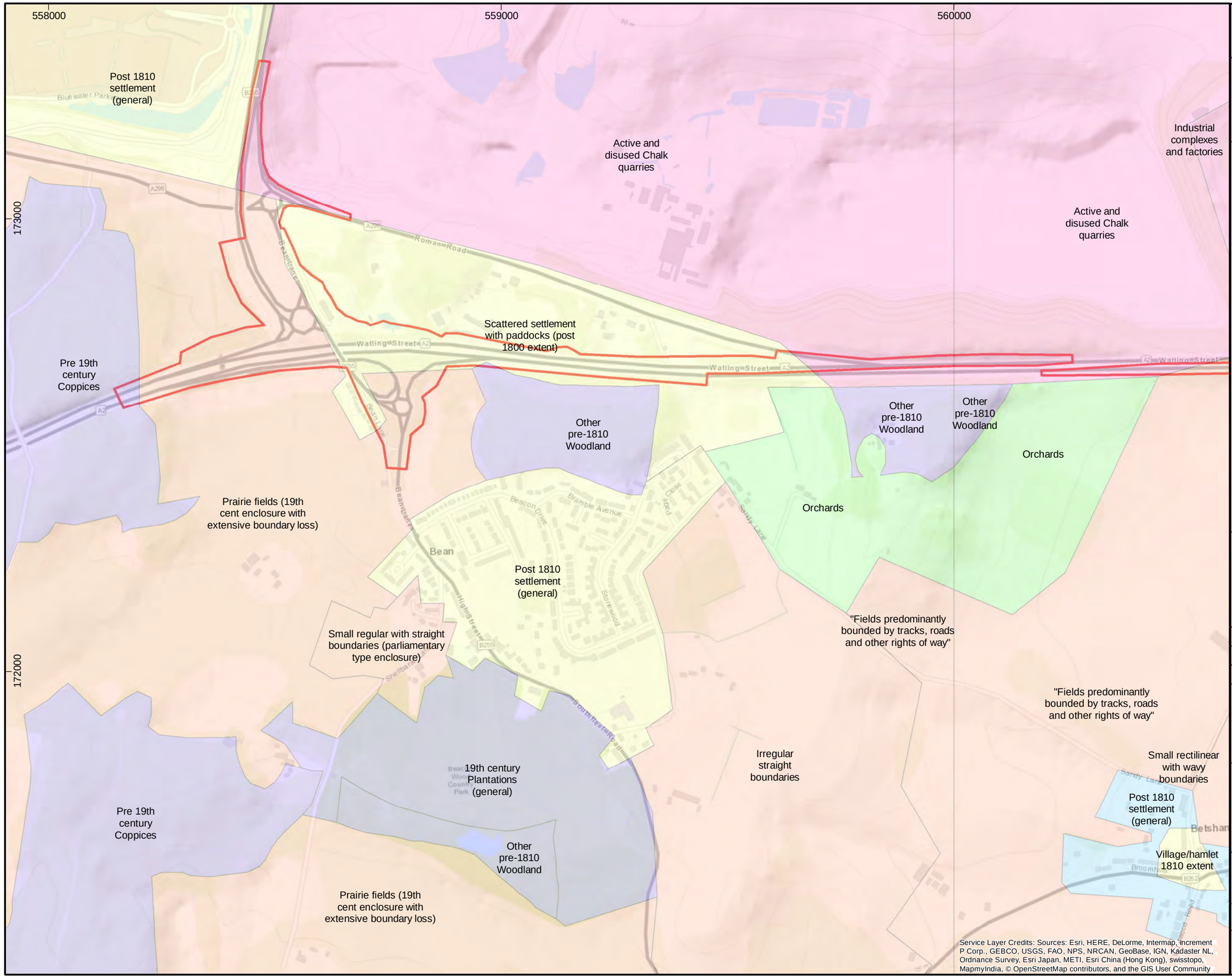

Figure	8.2

Historic Landscape Character Areas (Kent County Council HER) in relation to Site (west)

Legend

Redline Boundary

FOR

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SYSTEM

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Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

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SCALE

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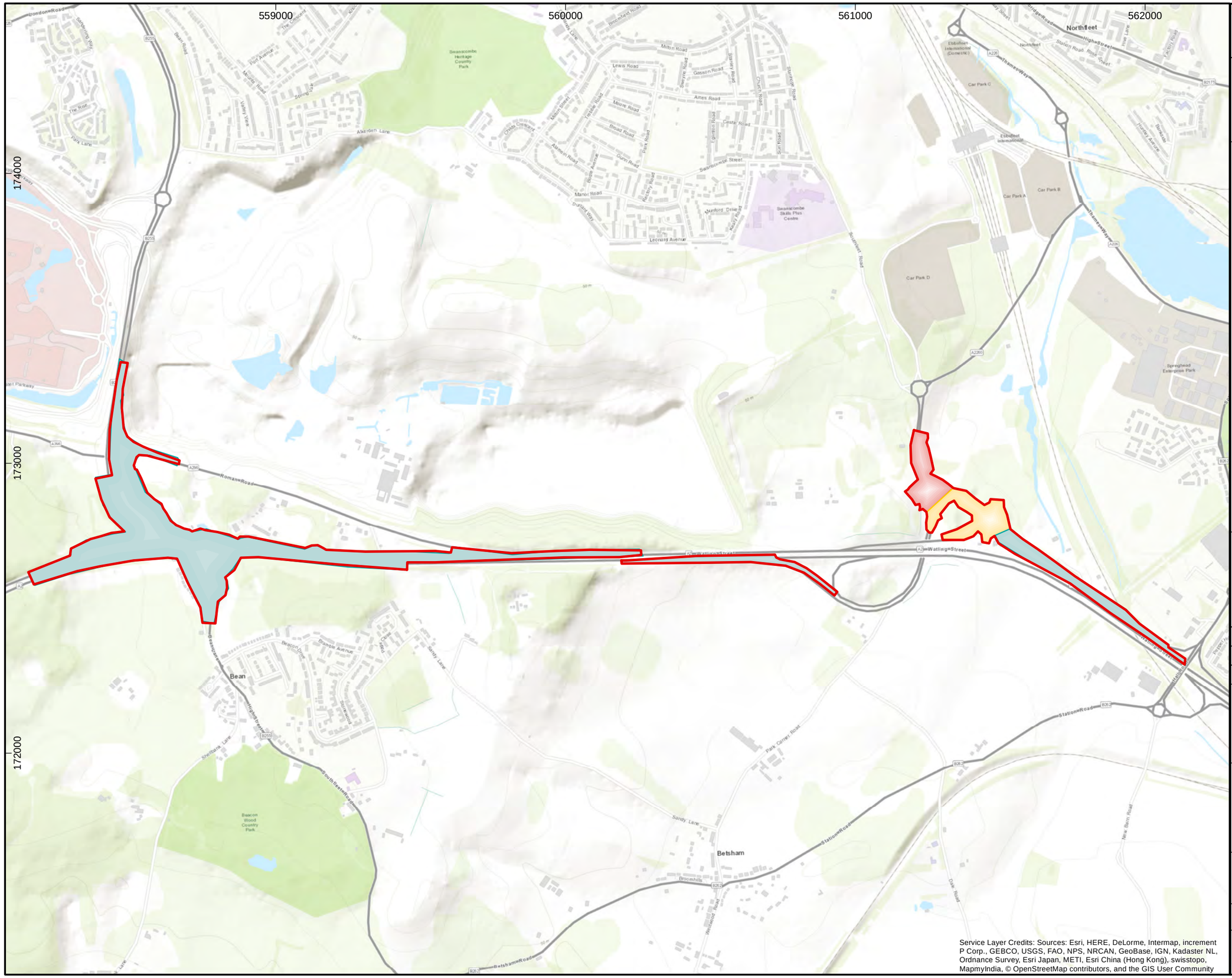

Figure	9

Potential for survival of Pleistocene Deposits within the Site

Legend
- Redline Boundary
- Low Pleistocene Potential
- Medium to Low Pleistocene Potential
- Medium Pleistocene Potential

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SYSTEM

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Projection: Transverse Mercator
Datum: OSGB 1936

SCALE

1:12,500 @ A3

SCALE

0 500m

Ordnance Survey. 1992. *OS Plan 1991-1992 1:10000*

APPENDICES

APPENDIX 1 ASSESSMENT SCOPE & CRITERIA

Scope of the Assessment

This report details the results of an archaeological and built heritage assessment and aims to identify and map the nature of the heritage resource within the Site. Where possible, the assessment will evaluate the likely impact from the proposed development scheme, upon the known and potential heritage resource.

This report will include recommendations for mitigation measures and / or further archaeological works; where the archaeological potential of the site warrants, or where additional information on the site is required.

Further works could include additional research, monitoring of geotechnical investigations, programmes of archaeological surveying and / or field evaluation. The results of any further studies can be used to inform the nature of any subsequent mitigation measures (if required), and provide advice upon the scope and design of the proposed development

The assessment has used the sources listed in the main text to identify and map Heritage Assets and other relevant find spots or evidence with the site and defined study area. Heritage Assets are defined in national planning guidance and can include designated assets (Scheduled Monuments, Listed Buildings etc.), standing, buried or submerged remains, historic buildings and structures, parks and gardens and areas, sites and landscapes - whether designated or not.

Assessment Criteria

The potential for surviving archaeological evidence of past activity within the site is expressed in the report as ranging between the scales of:

- High – The available evidence suggests a high likelihood for past activity within the site and a strong potential for archaeological evidence to survive intact or reasonably intact;
- Medium – The available evidence suggests a reasonable likelihood for past activity within the site and consequently there is a potential that archaeological evidence could survive.
- Low – The available evidence suggests archaeological evidence of activity is unlikely to survive within the site, although some minor land-use may have occurred.
- Uncertain - Insufficient information to assess.

Buried archaeological evidence is, by its very nature, an unknown quantity which can never be 100% identified during a desk-based assessment. The assessed potential is based on available evidence but the physical nature and extent of any archaeological resource surviving within the site cannot be confirmed without detailed information on the below ground deposits or results of on-site fieldwork.

Where known heritage assets are identified, the heritage significance of such assets is determined by reference to existing designations where available. For previously unidentified sites where no designation has been assigned, an estimate has been made of the likely historic, artistic or archaeological importance of that resource based on professional knowledge and judgement.

Adjustments to the classification (Table 1, below) are occasionally made, where appropriate; for some types of finds or sites where there is no consistent value and the importance may vary from local to national. Levels of importance for any such areas are generally assigned on an individual basis, based on professional judgement and advice.

TABLE 1: Assessing the Value of a Heritage Assets

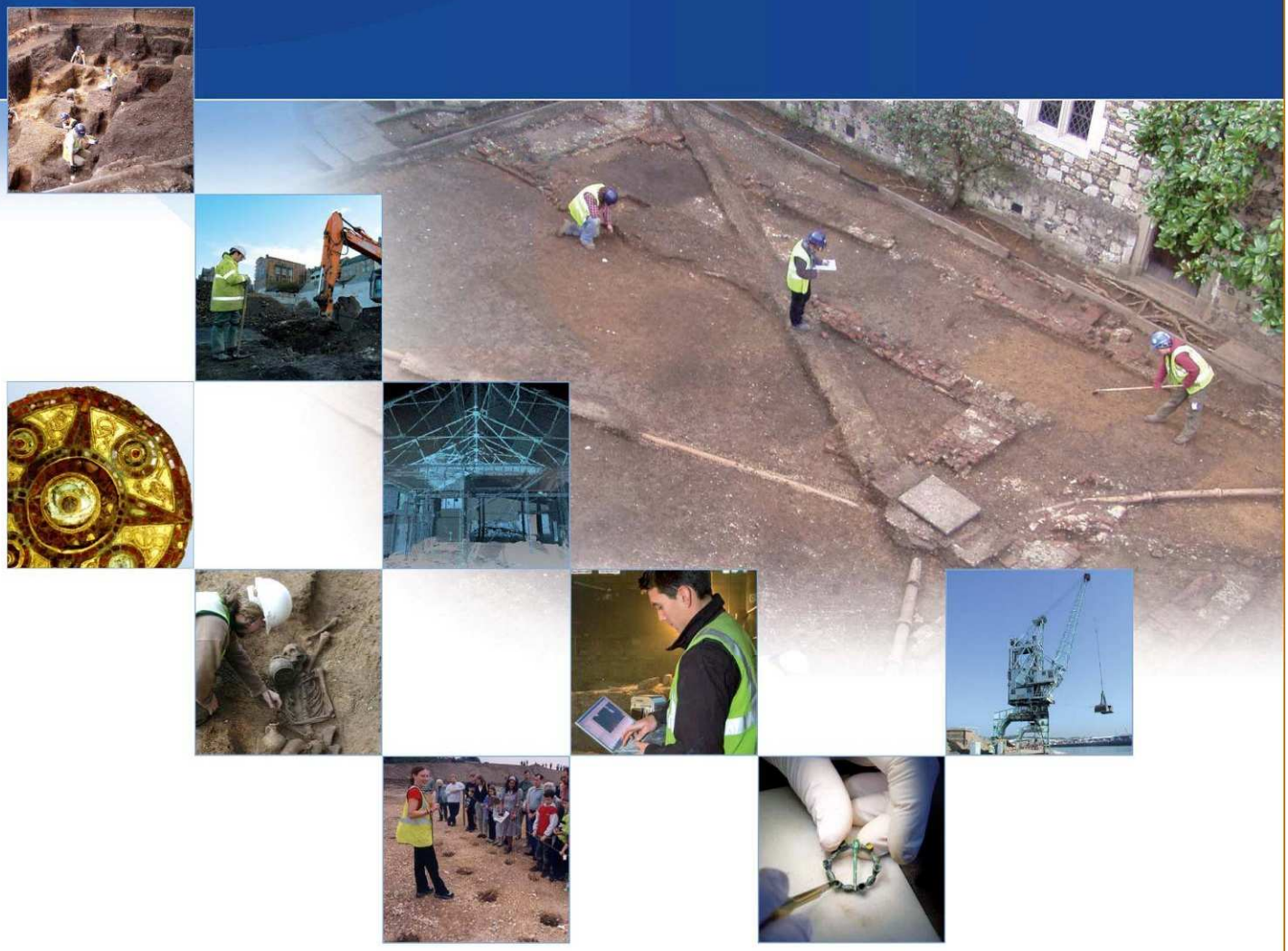
Value	Description	Example
Very High	Internationally important or significant heritage assets	World Heritage Sites, or buildings recognised as being of international importance.
High	Nationally important heritage assets generally recognised through designation as being of exceptional interest and value.	Grade I and II* Listed Buildings, Grade I and II* Registered Parks and Gardens, Scheduled Monuments, Protected Wreck Sites, Registered Historic Battlefields, Conservation Areas with notable concentrations of heritage assets and undesignated assets of national or international importance.
Medium	Nationally or regionally important heritage assets recognised as being of special interest, generally designated.	Grade II Listed Buildings, Grade II Registered Parks and Gardens, Conservation Areas and undesignated assets of regional or national importance, including archaeological remains, which relate to regional research objectives or can provide important information relating to particular historic events or trends that are of importance to the region.
Low	Assets that are of interest at a local level primarily for the contribution to the local historic environment.	Undesignated heritage assets such as locally listed buildings, undesignated archaeological sites, undesignated historic parks and gardens etc. Can also include degraded designated assets that no longer warrant designation.
Negligible	Elements of the historic environment which are of insufficient significance to merit consideration in planning decisions and hence be classed as heritage assets.	Undesignated features with very limited or no historic interest. Can also include highly degraded designated assets that no longer warrant designation.
Unknown	The importance of an asset has not been ascertained.	

APPENDIX 2: GAZETTEER OF HERITAGE ASSETS WITHIN THE SITE

In order to understand potential impacts on the archaeological resource, all heritage assets within the Site were identified. All designated and non-designated heritage assets recorded within the Site are summarised in the gazetteer below. The gazetteer has been obtained using information obtained from the Kent Historic Environment Record supplied by Atkins.

APPENDIX 3: GAZETTEER OF HERITAGE ASSETS WITHIN 500M STUDY AREA

In order to understand the nature of the surrounding archaeological resource, all heritage assets within 500m of the Site were identified. All designated and non-designated heritage assets recorded within the study area are summarised in the gazetteer below. The gazetteer has been obtained using information obtained from the Kent Historic Environment Record supplied by Atkins.



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