

HERITAGE STATEMENT

Land East of Downend Road, Portchester

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Portchester
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EXECUTIVE SUMMARY

- A Heritage Statement has been prepared to accompany any planning application at land to the east of Downend Road, Portchester, Hampshire.
- A Desk-Based Assessment was produced for the study site in 2016 and a moderate to high archaeological potential was recognised for the Palaeolithic and Roman periods. Subsequently, a suite of intrusive and non-intrusive Geo-Archaeological works have been undertaken at the site to determine the nature and significance of any archaeological remains/deposits at the site.
- The results of the Geo-Archaeological works have shown that the eastern area of the study site contains a Pleistocene sequence of deposits, similar to the one at the Red Barns site to the east, located at a similar OD height, and is therefore likely to be considered as a non-designated heritage asset of national significance.
- Pleistocene deposits that have the potential to contain regionally and locally significant Palaeolithic information were also encountered at the study site.
- The study site is proposed for residential development with associated infrastructure, access and landscaping.
- As a result of the Geo-Archaeological works potential development impacts on nationally important non-designated heritage assets have been mitigated in design. The development proposal for the site has been redesigned and configured to ensure no impacts within the identified area of archaeological sensitivity and significance (GPZ5). This part of the site is to be retained as an open area with below ground impacts limited to landscaping.
- Further mitigation measures are proposed at the study site following the granting of outline consent to ensure any impacts on deposits of a lesser significance are suitably recorded.
- Through consultation with HCC, advice from Palaeolithic experts and mitigation in design, the scheme has sought to facilitate development of the site whilst conserving remains considered of national significance. Through a mix of preservation in-situ and preservation by record the wider archaeological works on lower significance deposits are expected to enhance our understanding of the Palaeolithic and may add important contextual information to existing nationally important sites such as Red Barns.
- Historic England have also been engaged in pre-application discussions with relation to the potential impact on highly-graded designated heritage assets, via new development within their settings. It has been confirmed that, while the proposed development has the potential to impact on one Grade I listed building (which is also scheduled) and two Grade II* listed buildings (one of which is also scheduled) any impacts will remain low in magnitude. As such any potential harm will remain less than substantial and, specifically, at the lowest end of this spectrum.

Contents

EXECUTIVE SUMMARY	3
1 INTRODUCTION AND SCOPE OF STUDY	1
2 PLANNING BACKGROUND AND DEVELOPMENT PLAN FRAMEWORK.....	2
National Planning Policy	2
Local Planning Policy	3
Relevant National and Local Designations	5
3 GEOLOGY AND TOPOGRAPHY	7
Topography	7
Geology	7
4 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND WITH ASSESSMENT OF SIGNIFICANCE	9
Timescales used in this report.....	9
Introduction	9
Archaeological Evidence	9
DESIGNATED HERITAGE ASSETS	11
Assessment of Significance	11
5 SITE CONDITIONS, THE PROPOSED DEVELOPMENT & REVIEW OF POTENTIAL DEVELOPMENT IMPACTS ON HERITAGE ASSETS	17
Site Conditions	17
Proposed Development.....	17
Potential Development Impacts on Designated Heritage Assets.....	17
Review of Potential Development Impacts on Non-designated Assets	18
6 SUMMARY AND CONCLUSIONS	19

Figures

Figure 1: Site Location

Figure 2: Initial Development Proposal

Figure 3: Revised Landscape Parameter Plan

Figure 4: Plan of Palaeolithic Test Pitting and Geoarchaeological Potential Zones

Figure 5: Geoarchaeological Potential Zone 5 Overlaid onto Proposed Parameter Plan

Appendices

Appendix A	Land East of Downend Road, Portchester, Hampshire, Archaeological Desk-Based Assessment (CgMs 2016)
Appendix B	Land East of Downend Road, Portchester, Hampshire, Geophysical Survey Report (GSB 2017)
Appendix C	Archaeology South East, 2020 Winnham Farm, Land East of Downend Road, Portchester, Hampshire. Report on the Phase 2 and Phase 3 Geoarchaeological Investigation.

1 INTRODUCTION AND SCOPE OF STUDY

- 1.1 This Heritage Statement has been prepared by Manca Petric, James Archer and Thomas Copp and edited by Matthew Smith of RPS Heritage on behalf of Miller Homes.
- 1.2 The subject of this assessment is land to the east of Downend Road, Portchester, Hampshire. The study site is centred at SU 60361 06326 and measures 20.39ha (Fig. 1). The study site is bounded by agricultural fields to the north, and the Southampton to Portsmouth railway line to the south. The east and west boundaries are irregular and partially formed by open space, before giving way to post-war housing to the east and Downend Road to the west.
- 1.3 A Desk-Based Assessment was produced for the study site in 2016 and a moderate to high archaeological potential was recognised for the Palaeolithic and Roman periods. Subsequently, a Geophysical Survey and a programme of Geo-archaeological test pitting was undertaken at the site to determine the nature and significance of any archaeological remains at the site.
- 1.4 Hampshire County Council, who advise Fareham Borough Council on archaeological matters, have been consulted throughout the pre-application process and have been involved in discussions regarding the protection of archaeological resources throughout the development process. It has been requested that a Heritage Statement summarising the survey results, consultations to date and steps moving forward accompanies any planning application.
- 1.5 This Heritage Statement must be read in conjunction with the supporting documentation (Appendices A to C) which sets out the archaeological and heritage background to the site, the process in which the current conclusions have been reached and presents the results of archaeological evaluations so far undertaken at the site.
- 1.6 This report sets out the significance of the archaeological assets at the site, assesses the potential impact of the proposed development on archaeological resources and outlines the sustainable preservation (either in situ or where acceptable by record) of these resources.

2 PLANNING BACKGROUND AND DEVELOPMENT PLAN FRAMEWORK

- 2.1 National legislation regarding archaeology, including scheduled monuments, is contained in the Ancient Monuments and Archaeological Areas Act 1979, amended by the National Heritage Act 1983 and 2002, and updated in April 2014.
- 2.2 The relevant legislation relating to listed buildings is contained in the Planning (Listed Buildings and Conservation Areas) Act, 1990. Section 66(1) states that where a proposed development has the potential to affect a listed building, the decision maker should have '*special regard*' to the desirability to preserve the listed building or its setting.
- 2.3 In March 2012, the government published the National Planning Policy Framework (NPPF), which was most recently revised in Feb 2019. The NPPF is supported by the National Planning Practice Guidance (NPPG), which was published online 6th March 2014 and has since been periodically updated.
- 2.4 The NPPF and NPPG are additionally supported by three Good Practice Advice (GPA) documents published by Historic England: GPA 1: The Historic Environment in Local Plans; GPA 2: Managing Significance in Decision-Taking in the Historic Environment (both published March 2015). The second edition of GPA3: The Setting of Heritage Assets was published in December 2017.

National Planning Policy

- 2.5 Section 16 of the NPPF, entitled 'Conserving and Enhancing the Historic Environment' provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets. Overall, the objectives of Section 16 of the NPPF can be summarised as seeking the:
- Delivery of sustainable development;
 - Understanding the wider social, cultural, economic and environmental benefits brought by the conservation of the historic environment;
 - Conservation of England's heritage assets in a manner appropriate to their significance; and
 - Recognition that heritage makes a contribution towards our knowledge and understanding of the past.
- 2.6 Section 16 of the NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term. Paragraph 189 states that planning decisions should be based on the significance of the heritage asset and that level of detail supplied by an applicant should be proportionate to the importance of the asset and should be no more than sufficient to review the potential impact of the proposal upon the significance of that asset.
- 2.7 *Heritage Assets* are defined in Annex 2 of the NPPF as: a building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. It includes designated heritage assets and assets identified by the local planning authority (including local listing).
- 2.8 Annex 2 also defines *Archaeological Interest* as a heritage asset which holds, or potentially holds, evidence of past human activity worthy of expert investigation at some point.
- 2.9 A *Nationally Important Designated Heritage Asset* comprises a: World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.

- 2.10 *Significance* is defined as: The value of a heritage asset to this and future generations because of its heritage interest. This interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.
- 2.11 *Setting of a heritage asset* is defined as: The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.
- 2.12 In short, government policy provides a framework which:
- Protects nationally important designated Heritage Assets;
 - Protects the settings of such designations;
 - In appropriate circumstances seeks adequate information (from desk based assessment and field evaluation where necessary) to enable informed decisions;
 - Provides for the excavation and investigation of sites not significant enough to merit *in-situ* preservation.
- 2.13 The NPPG reiterates that the conservation of heritage assets in a manner appropriate to their significance is a core planning principle, requiring a flexible and thoughtful approach. Furthermore, it highlights that neglect and decay of heritage assets is best addressed through ensuring they remain in active use that is consistent with their conservation. Importantly, the guidance states that if complete, or partial loss of a heritage asset is justified, the aim should then be to capture and record the evidence of the asset's significance and make the interpretation publicly available. Key elements of the guidance relate to assessing harm. An important consideration should be whether the proposed works adversely affect a key element of the heritage asset's special architectural or historic interest. Additionally, it is the degree of harm, rather than the scale of development, that is to be assessed. The level of 'substantial harm' is considered to be a high bar that may not arise in many cases. Essentially, whether a proposal causes substantial harm will be a judgment for the decision taker, having regard to the circumstances of the case and the NPPF. Importantly, harm may arise from works to the asset or from development within its setting. Setting is defined as the surroundings in which an asset is experienced and may be more extensive than the curtilage. A thorough assessment of the impact of proposals upon setting needs to take into account, and be proportionate to, the significance of the heritage asset and the degree to which proposed changes enhance or detract from that significance and the ability to appreciate it.
- 2.14 In considering any planning application for development, the planning authority will be mindful of the framework set by government policy, in this instance the NPPF, by current Development Plan Policy and by other material considerations.

Local Planning Policy

Fareham Borough

- 2.15 The site is located within Fareham Borough, which adopted its Core Strategy in 2011. That document contains the following relevant policy:

CS6

The Development Strategy Development will be focussed in:

Fareham (Policy CS7), the Western Wards & Whiteley (Policy CS9), Portchester, Stubbington & Hill Head and Titchfield (Policy CS11);

Land at the Strategic Development Locations to the North of Fareham (Policy CS13) and Fareham Town Centre; (Policy CS8);

Land at the Strategic Development Allocations at the former Coldeast Hospital (Policy CS10) and Daedalus Airfield (Policy CS12).

In identifying land for development, the priority will be for the reuse of previously developed land, within the defined urban settlement boundaries including their review through the Site Allocations and Development Management DPD, taking into consideration biodiversity / potential community value, the character, accessibility, infrastructure and services of the settlement and impacts on both the historic and natural environment. Opportunities will be taken to achieve environmental enhancement where possible...

- 2.16 Fareham adopted its Development Sites and Policies document in June 2015 which contains the following policy relevant to heritage within the Borough:

POLICY DSP5: PROTECTING AND ENHANCING THE HISTORIC ENVIRONMENT

DESIGNATED AND NON-DESIGNATED HERITAGE ASSETS ARE AN IRREPLACEABLE RESOURCE THAT WILL BE CONSERVED IN A MANNER APPROPRIATE TO THEIR SIGNIFICANCE, TO BE ENJOYED FOR THEIR CONTRIBUTION TO THE QUALITY OF LIFE OF THIS AND FUTURE GENERATIONS. THE WIDER SOCIAL, CULTURAL, ECONOMIC AND ENVIRONMENTAL BENEFITS OF THEIR CONSERVATION WILL ALSO BE TAKEN INTO ACCOUNT IN DECISION MAKING.

DEVELOPMENT AFFECTING ALL HERITAGE ASSETS SHOULD HAVE REGARD TO RELEVANT GUIDANCE, INCLUDING (BUT NOT LIMITED TO) THE DESIGN SUPPLEMENTARY PLANNING DOCUMENT.

PROPOSALS THAT PROVIDE VIABLE FUTURE USES FOR HERITAGE ASSETS, THAT ARE CONSISTENT WITH THEIR CONSERVATION, WILL BE SUPPORTED.

IN CONSIDERING THE IMPACT OF PROPOSALS THAT AFFECT THE BOROUGH'S DESIGNATED HERITAGE ASSETS, THE COUNCIL WILL GIVE GREAT WEIGHT TO THEIR CONSERVATION (INCLUDING THOSE THAT ARE MOST AT RISK THROUGH NEGLECT, DECAY, OR OTHER THREATS). HARM OR LOSS WILL REQUIRE CLEAR AND CONVINCING JUSTIFICATION IN ACCORDANCE WITH NATIONAL GUIDANCE. SUBSTANTIAL HARM OR LOSS TO A HERITAGE ASSET WILL ONLY BE PERMITTED IN EXCEPTIONAL CIRCUMSTANCES.

LISTED BUILDINGS WILL BE CONSERVED BY:

- A) SUPPORTING PROPOSALS THAT SUSTAIN AND WHERE APPROPRIATE ENHANCE THEIR HERITAGE SIGNIFICANCE;**
- B) REFUSING TO PERMIT DEMOLITION, CHANGES OF USE, OR PROPOSED ADDITIONS AND/OR ALTERATIONS THAT WOULD UNACCEPTABLY HARM THE BUILDING, ITS SETTING OR ANY FEATURES OF SPECIAL ARCHITECTURAL OR HISTORIC INTEREST WHICH IT POSSESS;**
- C) ENSURING THAT DEVELOPMENT DOES NOT HARM, AND IF DESIRABLE, ENHANCES THEIR SETTINGS.**

DEVELOPMENT AFFECTING A CONSERVATION AREA WILL BE PERMITTED WHERE IT PRESERVES OR ENHANCES ITS CHARACTER, SETTING AND APPEARANCE, AND

- A) TAKES ACCOUNT OF THE RELEVANT CONSERVATION AREA CHARACTER APPRAISAL AND MANAGEMENT STRATEGY;**
- B) DOES NOT INVOLVE THE LOSS OF IMPORTANT FEATURES OF AN INDIVIDUAL BUILDING THAT CONTRIBUTE TO CHARACTER AND APPEARANCE OF THE CONSERVATION AREA AND/OR ITS SETTING;**
- C) ITS FORM, BULK, SCALE, HEIGHT, MASSING, ALIGNMENT, PROPORTION, MATERIAL, BUILDING FORM AND USE ARE APPROPRIATE, INCLUDING HAVING REGARD TO THE SURROUNDING BUILDINGS, SPACES AND VIEWS; AND**

- D) IT DOES NOT INVOLVE THE DEMOLITION OR PARTIAL DEMOLITION OF A BUILDING OR STRUCTURE THAT POSITIVELY CONTRIBUTES TO THE AREA, WITHOUT CLEAR AND CONVINCING JUSTIFICATION.**

THE COUNCIL WILL CONSERVE SCHEDULED MONUMENTS, AND ARCHAEOLOGICAL SITES THAT ARE DEMONSTRABLY OF NATIONAL SIGNIFICANCE, BY SUPPORTING PROPOSALS THAT SUSTAIN AND WHERE APPROPRIATE ENHANCE THEIR HERITAGE SIGNIFICANCE. PROPOSALS THAT UNACCEPTABLY HARM THEIR HERITAGE SIGNIFICANCE, INCLUDING THEIR SETTING, WILL NOT BE PERMITTED.

NON-DESIGNATED HERITAGE ASSETS INCLUDING LOCALLY LISTED BUILDINGS, HISTORIC PARKS AND GARDENS, AND SITES OF ARCHAEOLOGICAL IMPORTANCE WILL BE PROTECTED FROM DEVELOPMENT THAT WOULD UNACCEPTABLY HARM THEIR ARCHITECTURAL AND HISTORIC INTEREST, AND/OR SETTING TAKING ACCOUNT OF THEIR SIGNIFICANCE.

- 2.17 Fareham Borough is currently producing a draft new Local Plan to 2036, which was available for public consultation January to March 2020. The most recent draft plan contains the following relevant draft policy:

Policy D3: Historic Environment

All development must conserve, preserve or enhance the quality of the Borough's heritage assets, including archaeological sites, in a manner appropriate to their significance.

Development proposals which would affect designated or non-designated heritage assets, including where these are located within or adjacent to a Conservation Area, will be permitted where:

a) They are accompanied by a Heritage Statement, which provides sufficient detail and is proportionate to the proposal and demonstrates:

1. A thorough understanding of the heritage asset affects and its setting, the distinctive local character; and

2. How the proposal impacts on the asset's significance; and

3. In order of preference how any harm to the asset will be avoided, minimised or mitigated; and

4. Details are provided on the scale, materials, adaptability, use, enclosure, relationships with adjacent assets, definition of spaces and streets, alignments, active frontages and setting; and

5. It does not lead to substantial harm to, or loss of, a designated heritage asset.

b) They ensure that extensions and/or alterations respect the historic form, setting, fabric and any other aspects that contribute to the significance of the heritage asset; and

c) They conserve or enhance the use of appropriate materials, design and detailing; and

d) They retain the significance and character of historic buildings when considering alternative uses and make sensitive use of redundant historic assets.

Relevant National and Local Designations

- 2.18 In terms of designated heritage assets as defined above in the NPPF no World Heritage Site, Historic Battlefield or Historic Wreck designations lie within, or in immediate proximity, to the site.

- 2.19 Four designated heritage assets lie within the study area. Fort Nelson (Scheduled Monument SM1001860 and a Listed Building) lies c.450m north from the study site, World War II Heavy Anti-aircraft gunsite (P12) at Monument Farm, (Scheduled Monument SM1020960) lies c.750m north-west from the study site, Fort Southwick (Scheduled Monument 1003802; 1001808 and a Listed Building), lies c.2km to the north-east of the study site and Portchester Castle (Scheduled Monument 1015698 and a Listed Building) lies c.2.2km to the south-east of the study site.

3 GEOLOGY AND TOPOGRAPHY

Topography

- 3.1 The study site lies circa 1km east of the centre of Fareham and circa 2-3 km north west of the core of Portchester. The site is bounded by the M27 to the north, the A27 to the west, Downend Road to the east, and the Southampton to Portsmouth railway line to the south.
- 3.2 The site is located on sloping ground, overlooking the Wallington River to the west and sloping up to high ground occupied by Fort Nelson c.600m to the north east at c.85m Above Ordnance Datum (AOD).
- 3.3 The area of high ground associated with Fort Nelson represents a narrow area of high ground that extends westwards as far as the Farlington Redoubt c.8.5km to the east. A number of further defensive historic forts have been constructed along this area. The study site is located on the lower slopes of the far south west tip of this area of high ground, with the north east corner of the site located at a height of circa 40-45m AOD, sloping down to circa 15m AOD at the site's western tip.
- 3.4 No watercourses or naturally occurring bodies of surface water are located within the study site. The Wallington River is located c.220m to the west.

Geology

British Geological Survey

- 3.5 As shown on British Geological Survey Online (2016) the study site is located within the Newhaven, Spetisbury and Portsdown Chalk Formation. Superficial deposits of Head – clay, silt, sand and gravel are recorded in the southern part of the study site.
- 3.6 The sequence recorded across the northern area of site marked as 'Chalk' is modern ground/plough soil overlying clay and silt deposits that sit on solid chalk. The table below shows levels at which topsoil, weathered chalk / calcareous Head and solid chalk deposits were encountered across the study site.

Deposit	Below Ground Level (BGL) at which deposit encountered	Thickness of deposit
Topsoil	0m BGL	0.15m -0.20m
Weathered Chalk / some calcareous Head	0.15m BGL – 0.20m BGL	0.10m – 1.10m
Solid Chalk	0.3m BGL – 1.25	N/A

- 3.7 Table 1 – Sequence of deposits within the northern area of study site (ASE 2017).

- 3.8 The sequence recorded across the southern area of site is marked as 'Head Deposits' and 'Colluvium' and comprises topsoil, colluvium, Head deposits and Fluvial Sand and Gravel. Solid chalk was not encountered in any of the test pits.

Deposit	Below Ground Level (BGL) at which deposit encountered	Thickness of deposit
Topsoil	0m BGL	0.20m -0.30m

Colluvium	0.2m BGL	0.15m - 1.60m
Head deposits	0.35m BGL – 0.6m BGL	2.2m - 3.50m
Fluvial sand and gravel	2.5m - 4.00m	2.3m – N/A

3.9 Table 2 – Sequence of deposits within the southern area of study site (ASE 2017).

3.10 The central area of the site is characterised by Decalcified Head deposits overlying Calcareous Head deposits containing soil horizons. Alluvial deposits were observed in TP22 and Solid Tufa was recorded in TP3. The sequence is marked as 'Calcareous Head deposits with Palaeosols' on Fig. 5.

Deposit	Below Ground Level (BGL) at which deposit encountered	Thickness of deposit
Topsoil	0m BGL	0.2m – 0.4m
Colluvium	0.3m BGL	0.3m
Decalcified Head Deposits	0.2m BGL - 0.6m BGL	0.1m – 1.5m
Calcareous Head deposits	0.3m BGL - 1.1m BGL	1.6m – 4.1m
Alluvium	2.2m BGL	0.7m
Brickearth	2.9m BGL - 3.8m BGL	1.6m - N/A
Solid tufa	4.1m BGL	N/A

3.11 Table 3 – Sequence of deposits within the central area of study site (ASE 2017).

Previous Archaeological Work

3.12 Archaeological work undertaken on the study site has comprised a series of Palaeolithic test pitting to evaluate the underlying geological sequence (ASE 2017, ASE 2020 and see Appendix C). The work characterised geoarchaeological potential zones (GPZ) which are shown in Appendix C. Each GPZ is characterised as follows:

- GPZ1: Weathered Solid Upper Chalk at depths between 0.2m and 0.5 below ground level (bgl). This zone is located at and higher than c.30-35m Above Ordnance Datum (AOD) and is likely to correlate with the northern area of the study site, in the area of the site similarly above c.30-35m AOD.
- GPZ2: Fluvial Terrace, Head Deposits over Sands and Gravel. This zone is generally located below a height of c.20-25m AOD and is likely to correlate within the far south western part of the study site only, which represents the lowest area of the study site.
- GPZ3: Head Deposits overlying deeply buried alluvium (2.5m bgl). This zone is located on the lower slopes below GPZ1 up to a height of c.30-35m AOD and is likely to correlate with the southern area of the study site up to a similar topographic height.
- GPZ4/5: Calcareous Head with Palaeosols. A broad zone characterised by variably preserved calcareous head deposits with palaeosols within GPZ4, with good preservation within GPZ5. This sequence was recorded c.400m east of the study site and appeared similar in character to deposits identified at the significant Palaeolithic site known as 'Red Barns', located c.1km to the east of the study site. However, this sequence did not extend to the western boundary of the Land East of Downend Road site and is therefore not thought to extend west towards the study site (ASE pers. Comm.).

4 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND WITH ASSESSMENT OF SIGNIFICANCE

Timescales used in this report

Prehistoric

Palaeolithic	900,000 -	12,000 BC
Mesolithic	12,000 -	4,000 BC
Neolithic	4,000 -	2,500 BC
Bronze Age (including Chalcolithic)	2,500 -	800 BC
Iron Age	800 -	AD 43

Historic

Roman	AD 43 -	410
Saxon/Early Medieval	AD 410 -	1066
Medieval	AD 1066 -	1485
Post Medieval	AD 1486 -	1799
Modern	AD 1800 -	Present

Introduction

- 4.1 This chapter reviews the available archaeological evidence for the study site and the archaeological/historical background of the study site and surrounding area, and, in accordance with NPPF, considers the potential for any as yet to be discovered archaeological evidence on the study site prior to any assessment of any later development or below ground impacts.

Archaeological Evidence

- 4.2 A Desk Based Assessment was undertaken for the study site in 2016 (Appendix A). The study site was considered to have a moderate to high theoretical potential for Palaeolithic and Roman evidence, a moderate theoretical potential for Mesolithic, Bronze Age and Iron Age evidence, a low to moderate theoretical potential for Neolithic evidence, and a low theoretical potential for Early Medieval, Medieval and Post-Medieval evidence with the exception of possible field boundaries.
- 4.3 The moderate to high archaeological potential for the Palaeolithic was mainly due to the vicinity of the Red Barns site c.100m to the east of the study site where nationally significant Palaeolithic remains were discovered in 1973 during deep excavations for a housing development. Over 10,000 artefacts were recovered from a layer of grey loam underlying cemented breccia and they were dated to between 425,000 BP and 200,000 BP (Wenban-Smith 2000).
- 4.4 A geophysical survey of the study site was undertaken in late 2016 (Appendix B) and recorded linear anomalies corresponding to field divisions on an 1868-69 Ordnance Survey map, evidence of ridge and furrow cultivation and a possible palaeochannel crossing the study site in an E-W direction.
- 4.5 The Phase 1 Geoarchaeological Evaluation (ASE 2017) comprised 23 Geoarchaeological Test Pits excavated using a 14 tonne mechanical excavator to the limit of the machine (c.4m) or until deposits with perceived high potential or significant archaeology were encountered.

- 4.6 The Phase 1 works determined the presence of deposits, which appeared broadly equivalent to those recorded at Red Barns, with apparent Palaeolithic artefacts, deposits and preserved ancient landsurfaces.
- 4.7 Subsequently, an EM survey was carried out across all accessible areas of the site by Dr Martin Bates with the aim of mapping the sediment bodies and geomorphological features within the top 2, 4 and 6m. This was undertaken using a CMD Explorer which allows a rapid survey method to be adopted. In addition 4 ERT lines (Figure 2) were also undertaken by Dr Martin Bates across the site to constrain the suspected cliff line further (ASE 200).
- 4.8 The combined data indicated that a major geomorphological feature extended across the site in a broadly west/east direction. This is clearly seen in both the EM and ERT data and is considered to represent a buried cliff line above which are potentially buried marine, intertidal and terrestrial sediments.
- 4.9 The results gave confidence to the finding of the Phase 1 Geoarchaeological Evaluation in suggesting the northern half of the site had little to no Geoarchaeological potential outside of the margins of a small dry valley and the Pleistocene deposits on the site which lie to the south of the mapped cliff line are very likely to be part of those preserved at Red Barns and associated with the same geomorphological feature, the cliff line.
- 4.10 The Phase 2 works comprised 9 cable percussion boreholes and 22 Geoarchaeological Test Pits. These interventions combined with the Phase 1 results provided a sufficient sample to determine and broadly zone the presence, nature and broad distribution of Quaternary deposits. The Phase 2 works facilitated the production of a Geoarchaeological Priority Zone plan, but were not sufficient to test the zones with the highest potential for the presence of Palaeolithic archaeology.
- 4.11 The Phase 3 works comprised four long test pits sited to ground truth the position of the fossil cliff line and 55 standard Geoarchaeological Test Pits (GTP47-105). The interventions were placed to fill in gaps in test pit coverage within GPZ 4 and GPZ 5 to achieve approximately 30m sample intervals in these areas. There is no accepted standard sampling interval for identifying Palaeolithic sites in landscape contexts, but this interval was arrived at pragmatically on the basis of experience in other palaeolandscapes contexts. The locations of all test pits and the GPZ are shown on figure 4 of this report and the full results of this work shown in Appendix C.
- 4.12 The combined Phase 1, Phase 2 and Phase 3 Geoarchaeological investigations at Winnham Farm is concluded to have demonstrated that the site preserves deposits of probable Pleistocene age associated with an east-west fossil cliff line and possible raised beach deposits overlain by cold stage head deposits locally containing palaeosols.
- 4.13 The Holocene colluvium is considered to be less important, being of local significance for the later prehistoric period.
- 4.14 Through geophysical survey and ground truthing boreholes and test pits a clear east-west 'fossil cliff line' has been established to run across the site. Immediately in front of the cliff line, a zone has been identified where fresh flakes, core and tools consistent with Palaeolithic technology lie preserved at variable depths <2.5m below the ground surface (GPZ5) associated with, and as part of, an important sequence of datable deposits with associated palaeoenvironmental evidence (Section 8.0).
- 4.15 A wider zone preserving lower densities of artefacts, palaeoenvironmental remains within palaeosols at sometimes greater depths has been mapped (GPZ4 and GPZ3), as has a further zone (GPZ2) containing higher energy river terrace deposits. GPZ1, to the north of the site lies to the north of the fossil cliff line is considered to have little or no potential for preserving Palaeolithic archaeology.

DESIGNATED HERITAGE ASSETS

Introduction

- 4.16 A 1.5 kilometre search radius has been used to identify all designated heritage assets potentially affected by the proposed development. This search radius was chosen as a result of the topography of the study site and the potential for views from and to the study site into Portchester to the south. It has been identified that there are 9 listed buildings and two scheduled monuments within this search area. However the majority of these share no intervisibility, historical or functional association with the study site and have subsequently been discounted from further consideration.
- 4.17 In addition to those designated heritage assets identified above, following the walkover survey of the study site and surrounding area it has also been identified that the study site forms part of the setting of Portchester Castle, a Grade I listed building and scheduled monument. Consequently consideration is given to this heritage asset below. For the purposes of this report, the scheduled monument and listed building are considered together as a single heritage asset given their shared features, significance and setting. The same also applies to Fort Nelson, which is both listed and scheduled.
- 4.18 Following the site walkover survey an initial assessment was carried out which identified the heritage assets likely to be affected by the proposed development, together with potential design and mitigation measures that could be utilised to minimise any potential impacts to the surrounding built heritage assets. It should be noted that this initial assessment considered a larger site area than is the subject of the current application. The findings of this initial study are included in the Archaeology DBA (Appendix 3) and were the subject of pre-application discussions with Historic England. Following this initial assessment the scheduled Anti-aircraft Gunsite at Monument Farm and Fort Southwick (both scheduled and listed at Grade II*) have been discounted from further consideration with the proposed development considered to have no impact on their significance.
- 4.19 The following section expands on this initial assessment, with consideration given only to the contribution of the current study site area subject to this application, to the significance of the relevant designated heritage assets. In accordance with the '5-step' process set out by Historic England, this section identifies the heritage assets potentially affected, their settings, and the contribution of their settings to their significance. Section 6.5 provides a detailed assessment of the likely impact on this significance arising from the proposed development.

Assessment of Significance

Portchester Castle

- 4.20 Portchester Castle is a Roman castle of third century origins, originally constructed to protect Portsmouth harbour. It is both scheduled and listed at Grade I. The Roman outer walls survive today and have subsequently been augmented by a Saxon hall (since demolished), a Norman tower and a number of Tudor structures. The growth of Portsmouth as a naval base in the Tudor period diminished the importance of Portchester Castle which, by the seventeenth century, had ceased to function as a fortification, becoming a prison instead. The Castle served this function during the major conflicts of the eighteenth century and the Napoleonic Wars, however it ceased to operate as such in 1814, before being abandoned by the military in 1819, ceasing all military uses of the Castle. It is now owned and run by English Heritage.

- 4.21 The Castle is a large and complex heritage asset comprising Roman walls, forming a large, square enclosed area; Medieval gateways; and a large square keep. Three storeys of the keep were constructed in 1160, with the addition of a fourth storey in the early thirteenth century. It now forms one of the landmark features of the Castle. Much of the Castle, including the boundary walls, is constructed from local flint or stone rubble. Ashlar is used in some areas, including the lower storey of the west gate. Red brick is used in some places, principally for later repairs and alterations.
- 4.22 The setting of the Castle is large and multi-faceted owing to its size and prominent location overlooking Portsmouth Harbour. This relationship with the Harbour is intrinsic to the setting, significance and original function of the Castle as a Roman fortification, constructed to defend the area from sea-based invasion. This location provides an understanding of why the building was originally constructed and how it relates to the surrounding landscape. Subsequently this location provides historical illustrative value in demonstrating why the fortification was built here, with the interaction between the land and sea central to the significance of the Castle. The prominence of the fortification in approach from the sea also contributes to the significance of the heritage asset through demonstrating the size and scale of the fortifications which would have proved a challenge for any invasionary force.
- 4.23 As noted in the listing citation the Castle also shares group value with the Grade I listed Church of St Mary (located within the fortified area but excluded from the scheduling) which was constructed in the twelfth century when Henry I established a small priory. It demonstrates the gradual transformation of the Castle, which included both military features and more domestic features, allowing a settlement to develop firstly within, and latterly, outside of the Castle walls.
- 4.24 Outside of the fortified area, the Norman keep is an important landmark, with partial views permitted from within parts of Portchester, emphasising the connection between the fortification and the settlement that later developed alongside it, primarily from the twelfth century. These views also reflect the aesthetic value of the building, in particular its landmark status.
- 4.25 Views are also available from further afield given the topography which slopes steeply up from Portchester to the north, permitting views from Portsdown Hills and the surrounding land. This includes the provision of views from within the study site where limited, glimpsed views are provided of the upper stage of the keep, including its crenellations. These views are heavily filtered by intervening vegetation but do allow for an experience of the building as a defensive structure, with the views to the harbour beyond reinforcing its location and function.
- 4.26 Return views of the study site are also available from the top of the tower, with the northern extent of the study site visible beyond the vegetation lining the railway line. The post-war residential development to the south of the railway line and to the east of the study site are visible in this view, with the study site seen as a small slither of undeveloped land, with further agricultural land beyond. The large agricultural building within the study site is also partly visible within this view. The distance and extent of surrounding post-war residential development means that these views make no contribution to the significance of the heritage asset.
- 4.27 Sequential views which take in the study site and the nearby Fort Nelson are also available. The Castle was defunct by the time of the construction of the Palmerston Forts and, therefore, there is no direct functional association between the listed building and these nineteenth-century forts. The presence of the Castle does, however, provide a story of the continual fortification and defence of

Portsmouth and the surrounding area over millennia, reflecting its strategic and military importance in the defence of Britain. The study site plays a peripheral role in supporting this and is not considered to contribute to the significance of Portchester Castle in this sense. Overall the Site makes only a limited contribution to the significance of the building at present through permitting some partial views of the uppermost elements of the keep.

- 4.28 Portchester Castle is a heritage asset of the highest significance, with this significance drawn from the outstanding evidential and historical illustrative values of the heritage asset as a relatively intact Roman fortification, with subsequent phases of development, settlement and fortification visible from the tenth to the nineteenth centuries. The heritage asset also possesses aesthetic value and historical associative value. The setting of the heritage asset, in particular its dominant position overlooking Portsmouth Harbour, strongly contributes to the significance of the heritage asset. The study site forms a small, relatively distant part of the heritage asset's setting and currently makes a limited contribution through permitting some partial views of the upper stage of the Castle's keep.

Fort Nelson

- 4.29 Fort Nelson is one of the Portsdown Hill Forts, popularly known as the Palmerston Forts or Palmerston's Follies, after the Prime Minister at the time of their construction. The forts were originally constructed to protect Portsmouth Harbour from inland invasion. Fort Nelson was commissioned in 1860 over fears of a possible invasion from Louis Napoleon, however this threat quickly diminished after the completion of the forts, with Fort Nelson, and the associated Palmerston Forts, never utilised. Fort Nelson is both scheduled and listed at Grade II*.
- 4.30 Fort Nelson is typical of the Portsdown Hill Forts, being a low-profile, polygonal structure which visually recedes into the surrounding hill. It is constructed principally from red brick, with the outer walls constructed from banded flint with red-brick arches. The building is now in use as the Royal Armouries Museum.
- 4.31 The setting of Fort Nelson is linked to its position on the ridgeline, above Portsmouth harbour, with the structure sharing a strong functional and visual setting with the other Palmerston Forts, notably Fort Southwick to the east. Fort Wallington to the west has been partially demolished and the M27 now prevents any intervisibility between the two. The relationship between the fortifications is integral to their significance, with each of them being positioned in this strategically important location to support one another in halting any inland invasionary force, which may have made land elsewhere before attacking Portsmouth, a vital military centre. The commanding views from the fortification, despite some intervening vegetation, along Downend Road, reinforce the historic role of the forts and their relationship with Portsmouth Harbour.
- 4.32 The land to the north is generally undeveloped and in agricultural use, which would have historically provided good visibility and a range of fire over this area to assist in halting any invasionary force. To the south the M27, coupled with the post-war expansion of Portchester, demonstrates a higher degree of development. However, this area is of lower strategic importance given the primary role of the fortification to prevent an invasion from inland.
- 4.33 Views of the building are permitted from within the study site where the roofline of the Fort is seen rising above the ridgeline and vegetation lining the M27. The angular form of the building's outer walls and the bastions are visible in these views, allowing for an appreciation and experience of the

building as a defensive fortification, likely linked with the harbour below. Beyond this there is no appreciation of the special interest of the building or, crucially, its association with the remaining Palmerston Forts. Return views are largely screened by intervening vegetation. Overall, therefore, the study site makes a minor contribution to the significance of Fort Nelson.

- 4.34 Fort Nelson is a heritage asset of the highest significance which is primarily derived from the historical illustrative value of the structure as an important part of the nineteenth-century defensive strategy. The setting of the structure, including its prominent position on the ridgeline and relationship with the other surviving Portsdown Hill Forts, also strongly contributes to this significance. The study site forms a small part of the extended setting of the structure, lying to the south of the structure, away from the principal field of fire. At present the study site allows for a limited understanding of the significance of the Fort, through the provision of partial views, and subsequently makes a minor contribution to its significance.

Nelson Monument

- 4.35 The Nelson Monument was erected in 1807 in tribute to Horatio Nelson shortly after his death during the Battle of Trafalgar in 1805. The Grade II* listed Monument is a simple obelisk of ashlar on a granite plinth, the total height of which rises to 120 feet. The location on Portsdown Hill was presumably deliberately chosen to allow the monument to be highly visible from the surrounding area, which includes Portsmouth and Portsmouth Harbour to the south, a highly-important naval port.
- 4.36 The function of the Monument is central to its significance, having been designed as a deliberately visible feature, set on a ridgeline above much of the surrounding land. It is a prominent feature on Portsdown Hill Road and now also shares intervisibility with the neighbouring Fort Nelson. Although there is no direct functional link between the two structures, the presence of the later Fort alongside the Monument helps to demonstrate the importance of military operations in the area.
- 4.37 Partial views of the Monument are permitted from the central and western parts of the study site, with these limited to the top of the Monument. Although these views are limited they present the tall obelisk rising above the neighbouring vegetation and allow for it to be experienced as an important monument likely, given its location, to be associated with the navy. Return views, except theoretically from the top of the monument, are not available with the study site making a minor contribution to the significance of the Monument by allowing for a partial experience of the heritage asset, whilst acknowledging that it forms a small part of the Monument's vast extended setting.
- 4.38 The Nelson Monument is a heritage asset of the highest significance, which is primarily derived from the historical interest of the structure as a monument to Horatio Nelson. The Monument also has communal value. Its setting is central to its significance, with the Monument having been designated to be visibly prominent, deliberately sited on a ridgeline with commanding views. The study site permits few, partial views of the Monument and currently makes a limited contribution to its overall significance.

Non-Designated Heritage Assets

- 4.39 The combined results of all phases of geoarchaeological investigation have shown the overall distribution, depth and nature of deposits within the Study Area, based on a sample interval down to 30m. From this it has been possible for the Geoarchaeologist to understand the Site in terms of its geomorphology and identify major stratigraphic units and suggest the possible context and agents of deposition in each case.
- 4.40 The result of the investigations has also provided a good range of high quality sediment samples from which depositional processes, palaeoenvironmental conditions and age could be determined for each major sedimentary units. Stone artefacts and ceramic fragments have also been recovered, which allow for consideration of Pleistocene and Holocene human landscape use at the site.
- 4.41 On Figure 4 the site is shown mapped onto a series of Geoarchaeological Potential Zones (GPZ) by the Geoarchaeologist. Each GPZ has a distinct sedimentary sequence and subsurface outcrop, consequently each should be considered differently in terms of archaeological/palaeoenvironmental significance and potential. The GPZs range from GPZ1 (Solid Chalk), which has virtually no palaeoenvironmental or archaeological potential at depth, and consequently no geoarchaeological implications for development, through to GPZ 5, which has demonstrated Palaeolithic archaeology preserved at a Palaeolandscape scale and at relatively shallow depths.

Each GPZ is listed and described below (taken from Appendix C):

GPZ 1: Weathered solid Upper Chalk at depths between 0.2 and 0.5m bgl.
Potential for surface archaeology and there is potential for GPZ5 to extend at little into the eastern margins of this zone. In terms of future designation or proposed development in this zone this likelihood should be considered.

Palaeoenvironmental Potential: Very Low
Archaeological Potential at depth: Very Low

GPZ 2: Fluvial Terrace: Decalcified/Calcareous Head over Sands & Gravel
Head Deposits overlying the fluvial terrace.

Palaeoenvironmental Potential: Moderate where calcareous
Archaeological Potential: Moderate for stone artefacts and mammalian fauna within sands and gravels

GPZ 3: Head Deposits. Decalcified Head Deposits, to the west contains material from older raised beach and overlies deeply buried 'alluvium'

Palaeoenvironmental Potential: Low increasing below 2.5m
Archaeological Potential: Low increasing below 2.5m

GPZ 4: Calcareous Head with Palaeosols (General)

A broad zone characterised by CHwP preserved variably to variable depths 1-3m bgl

Palaeoenvironmental Potential: Moderate to High.
Archaeological Potential: Moderate

GPZ 5: Calcareous Head with Palaeosols

Lying immediately in front of the former cliff line this is a zone with CHwP preserved well at shallow depths 0-1.4m bgl. It contains locally abundant concentration of sharp and possibly primary context stone artefacts assumed to be Palaeolithic

Palaeoenvironmental Potential: Moderate to High
Archaeological Potential: High potential to contain nationally significant remains

- 4.42 GPZ 5 comprises the area of highest Palaeolithic and palaeoenvironmental potential preserved within the stratigraphic unit identified as Calcareous Head with Palaeosols, sometimes occurring at very shallow depths (<1.0m). The zone, which comprises c.1.75ha, contains Palaeolithic artefacts within apparent Pleistocene sediments representing potential Pleistocene landsurfaces (palaeosols). On the basis of physical and lithological characteristics, it is considered highly likely that this zone is a continuation of the area of demonstrated Palaeolithic potential at Red Barns, 300m to the east of the site and of High/National significance.
- 4.43 GPZ 4 appears to be a continuation of the depositional sequence and landsurfaces seen in GPZ 5, possibly representing part of the same, broad palaeolandscape. However, decalcified deposits generally overlay the CHwP to greater depth in this zone and these have impacted upon the physical and possible chemical integrity of the CHwP. Artefacts densities were much lower and very patchy in this zone. Despite this a very well developed palaeosol was present throughout much of this zone which is considered to have a localised moderate archaeological potential and a Moderate/Regional Significance.
- 4.44 Work has progressed far enough in GPZ's 1, 2, and 3 to sufficiently demonstrate geoarchaeological potential. This can be characterised as very low (GPZ1), low but moderate to high at depths below 2.5m (GPZ 3) to low but moderate at depths below 2.5m (GPZ2) archaeological potential. Adequate samples have been recovered for subsequent analysis and dating from these zones. With the exception of localised deep developments which would significantly impact either the fluvial gravels or go below Head Deposits into the underlying 'alluvium' no further work is needed in these zones for Pleistocene Geoarchaeology and it is considered of Low/Local significance.

5 SITE CONDITIONS, THE PROPOSED DEVELOPMENT & REVIEW OF POTENTIAL DEVELOPMENT IMPACTS ON HERITAGE ASSETS

Site Conditions

- 5.1 The study site is bounded by agricultural fields to the north and the Southampton to Portsmouth railway line to the south. The east and west boundaries are irregularly and partially formed by open space, before giving way to post-war housing to the east and Downend Road to the west.

Proposed Development

- 5.2 The study site is proposed for residential development with associated infrastructure, access and landscaping. The original Proposed Layout for the site is shown on Figure 2 of this report.
- 5.3 Following the understanding of potentially nationally significant deposits within GPZ5 at the site the development proposals were redrawn with embedded mitigation to ensure the area of potential significance was left preserved in-situ. The revised Landscape Parameter Plan is shown as figure 3 within this report with the area of GPZ5 left as open space or undergoing no below ground impacts during development.

Potential Development Impacts on Designated Heritage Assets

- 5.4 The proposed development will result in changes within the extended settings of those designated heritage assets identified above. The potential impacts are set out below.

Portchester Castle

- 5.5 The proposed development will lead to the alteration of views both from and to the keep of Portchester Castle. Views to the Castle will be altered or reduced by the construction of housing, partially reducing the current ability to experience this heritage asset from within the study site and the land immediately to the north. However, the provision of open space and green corridors within the study site will help to maintain a number of views, with it being experienced against a foreground of post-war residential development, but maintaining its landmark status, much as it is experienced presently from the study site.
- 5.6 There will also be some changes in views from the Castle, with the proposed development taking the current extent of post-war development in this view slightly north beyond the railway line. This will serve to continue the trend of post-war expansion and will visually tie in with the existing development to the east, not fundamentally altering the current character of the listed building's setting or its contribution to significance. Together these changes will result in a negligible impact to the significance of Portchester Castle, equating to a low, barely perceptible, degree of less than substantial harm.

Fort Nelson

- 5.7 The proposed development will serve to partially or wholly block some views of the Fortification currently provided by the study site. However, this will be mitigated by the provision of open space and green corridors within the study site which will help to maintain a number of these views. In addition it should be noted that the study site is located to the south of the Fortification, away from the field of fire for which it was designed and built to overlook. Subsequently it is considered that, the proposed development will lead to a partial reduction in the experience of the heritage asset, however the limited nature of this experience and the peripheral role of the study site with regards to the functional setting of the heritage asset, means that the proposed development will result in a negligible impact to the significance of Fort Nelson.

Nelson Monument

- 5.8 There will be some minor alterations to the setting of the Monument arising from the construction of the proposed dwellings. However, the height of the Monument and its prominent position on the ridgeline of Portsdown Hill means that it will remain visible from within much of the study site, allowing for the heritage asset and its sole function to remain legible. This will mean that, despite some slight alteration or reduction in views of the Monument, the proposed development will have no impact on the significance of the Nelson Monument.

Review of Potential Development Impacts on Non-designated Assets

- 5.9 The widespread Geo-Archaeological test pitting has enabled identification of archaeologically sensitive zones within the site at a high degree of confidence.
- 5.10 The removal of GPZ5 from the impacts of development will prevent potentially nationally significant archaeological deposits being disturbed with the aim of preserving them in-situ. The proposed development however is considered too have the potential to impact upon as yet undiscovered non-designated archaeological assets of a likely local or regional significance.

Recommendations

- 5.11 Further archaeological mitigation work is recommended in advance of development. In a similar strategy to the Red Barns site this is likely to comprise works where deeper development impacts may reach the depths of potential Pleistocene deposits such as drainage. An assessment of impact can be undertaken following the granting of consent once information is available and a programme of work secured by Written Scheme of investigation prepared by a suitably qualified Geo-Arch/Palaeolithic specialist and submitted for approval to the LPA archaeological advisor.

6 SUMMARY AND CONCLUSIONS

- 6.1 A Heritage Statement has been prepared to accompany any planning application at land to the east of Downend Road, Portchester, Hampshire.
- 6.2 A Desk-Based Assessment was produced for the study site in 2016 and a moderate to high archaeological potential was recognised for the Palaeolithic and Roman periods. Subsequently, a suite of intrusive and non-intrusive Geo-Archaeological works have been undertaken at the site to determine the nature and significance of any archaeological remains/deposits at the site.
- 6.3 The results of the Geo-Archaeological works have shown that the eastern area of the study site contains a Pleistocene sequence of deposits, similar to the one at the Red Barns site to the east located at a similar OD height, and is therefore likely to be considered as a non-designated Palaeolithic heritage asset of national significance.
- 6.4 Pleistocene deposits that have the potential to contain regionally and locally significant Palaeolithic information were also encountered at the study site.
- 6.5 The study site is proposed for residential development with associated infrastructure, access and landscaping.
- 6.6 As a result of the Geo-Archaeological works potential development impacts on nationally important non-designated heritage assets have been mitigated in design. The development proposal for the site has been redesigned and configured to ensure no impacts within the identified area of archaeological sensitivity and significance (GPZ5). This part of the site is to be retained as an open area with below ground impacts limited to landscaping.
- 6.7 Further mitigation measures are proposed at the study site following the granting of outline consent to ensure any impacts on deposits of a lesser significance are suitably recorded.
- 6.8 Through consultation with HCC, advice from Palaeolithic experts and mitigation in design, the scheme has sought to facilitate development of the site whilst conserving remains considered of national significance. Through a mix of preservation in-situ and preservation by record the wider archaeological works on lower significance deposits are expected enhance our understanding of the Palaeolithic and may add important contextual information to existing nationally important sites such as Red Barns.
- 6.9 Historic England have also been engaged in pre-application discussions with relation to the potential impact on highly-graded designated heritage assets, via new development within their settings. It has been confirmed that, while the proposed development has the potential to impact on one Grade I listed building (which is also scheduled) and two Grade II* listed buildings (one of which is also scheduled) any impacts will remain low in magnitude. As such any potential harm will remain less than substantial and, specifically, at the lowest end of this spectrum.

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Cartographic

1759 Taylor Map of Hampshire

1791 Milne Map of Hampshire

1826 C&J Greenwood Map of Hampshire

1840 Fareham Tithe Map

1856 Ordnance Survey (1:10560)

1873 Ordnance Survey (1:10560)

1898 Ordnance Survey (1:10560)

1908 Ordnance Survey (1:10560)

1931 Ordnance Survey (1:10560)

1957 Ordnance Survey (1:10560)

1968 Ordnance Survey (1:10560)

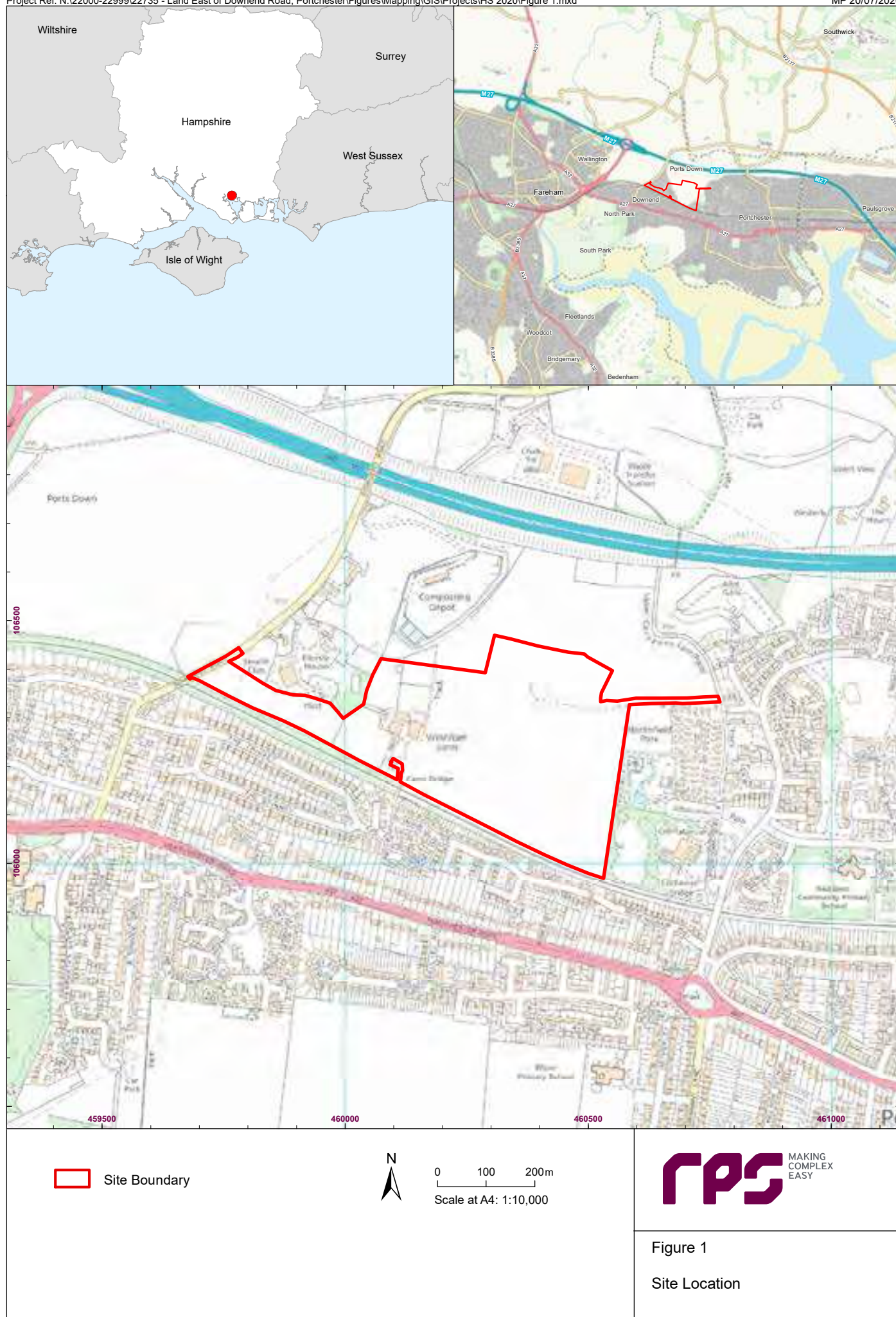
1978 Ordnance Survey (1:10000)

1999 Google Earth Image

2015 Google Earth Image

2019 Google Earth Image

FIGURES





0 50 100 150m
Scale at A4: 1:6,500



Figure 2

Initial Development Proposal



 Site Boundary

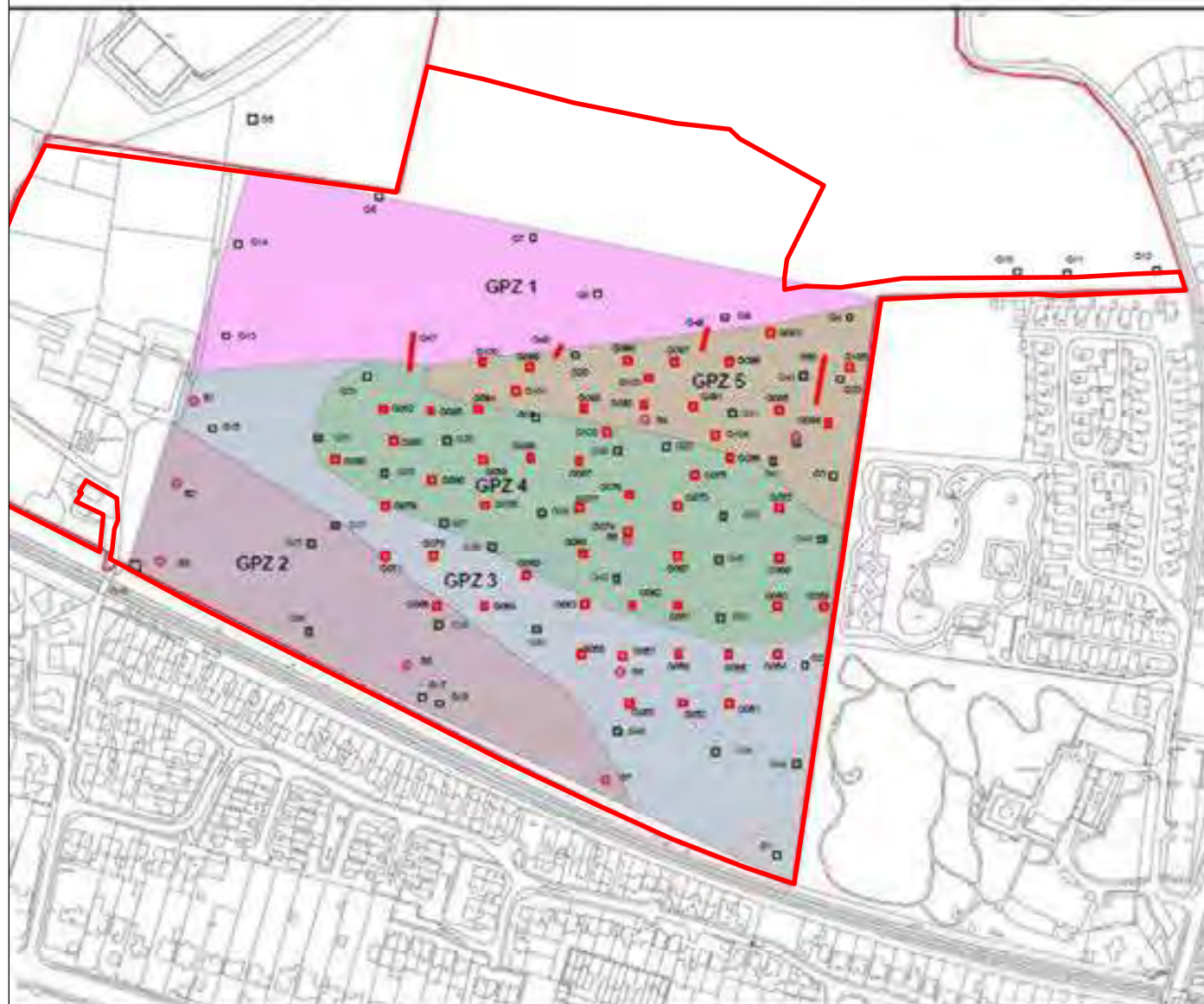


0 50 100 150m
Scale at A4: 1:6,500

rps MAKING
COMPLEX
EASY

Figure 3

Revised Landscape Parameter
Plan



 Site Boundary





0 25 50 75m
Scale at A4: 1:4,000

rps MAKING
COMPLEX
EASY

Figure 4

Plan of Palaeolithic Test Pitting and
Geoarchaeological Potential Zones



 Site Boundary
 GPZ 5



0 50 100 150m
 Scale at A4: 1:6,500

 **MAKING
COMPLEX
EASY**

Figure 5

Geoarchaeological Potential Zone 5
Overlaid onto Proposed Parameter
Plan

APPENDICES

Appendix A

Land East of Downend Road, Portchester, Hampshire, Archaeological Desk-Based Assessment (CGMS 2016)



ARCHAEOLOGICAL DESK BASED ASSESSMENT

Land East of Downend Road
Portchester
Hampshire

October 2016

Local Planning Authority:
Fareham Borough Council

Site centred at:
SU 60361 06326

Author:
Manca Petric MA PCI **fA**

Approved by:
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Report Status:
Draft

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CONTENTS

Executive Summary

- 1.0 Introduction and Scope of Study
- 2.0 Development Plan Framework
- 3.0 Geology and Topography
- 4.0 Archaeological and Historical Background,
with Assessment of Significance
- 5.0 Site Conditions, Proposed Development, Impact upon Heritage Assets and
Recommendations
- 6.0 Summary and Conclusions

Sources Consulted

LIST OF ILLUSTRATIONS

- Fig. 1 Site Location
- Fig. 2 1759 Taylor's Map
- Fig. 3 1791 Milne's Map
- Fig. 4 1840 Portchester and Fareham Tithe Maps
- Fig. 5 1868 Ordnance Survey
- Fig. 6 1898 Ordnance Survey
- Fig. 7 1910 Ordnance Survey
- Fig. 8 1932 Ordnance Survey
- Fig. 9 1962 Ordnance Survey
- Fig. 10 1978 Ordnance Survey
- Fig. 11 1999 Google Earth Image
- Fig. 12 2016 Google Earth Image
- Fig. 13 Proposed Development within Site Boundary
- Fig. 14 LiDAR data Plot
- Fig. 15 General Topography
- Fig. 16 Visibility of Scheduled Monuments from the Desk based study site

APPENDICES

Appendix 1	Palaeolithic and Mesolithic evidence (data from Hampshire, Portsmouth and Winchester HER)
Appendix 2	Late Prehistoric and Roman evidence (data from Hampshire, Portsmouth and Winchester HER)
Appendix 3	Early Medieval, Medieval and Post-Medieval evidence (data from Hampshire, Portsmouth and Winchester HER)

LIST OF PLATES

Plate 1	View of desk based study site taken from south-western boundary, facing north-east
Plate 2	View of desk based study site taken from western boundary, facing south-east
Plate 3	View of desk based study site taken from south-western boundary, facing north
Plate 4	View of desk based study site taken from north-western boundary, facing south
Plate 5	View of desk based study site taken from northern boundary, facing south
Plate 6	View of desk based study site taken from northern boundary, facing south
Plate 7	View of desk based study site taken from northern boundary, facing south-east
Plate 8	View of desk based study site taken from the eastern boundary, facing north-west
Plate 9	View of desk based study site taken from the eastern boundary, facing west
Plate 10	View of desk based study site taken from Fort Nelson (SM 1001860), facing south
Plate 11	View of desk based study site taken from Fort Nelson (SM 1001860), facing south
Plate 12	View of desk based study site taken from Portchester Castle (SM 1015698), facing north-west

EXECUTIVE SUMMARY

- Land East of Downend Road, Portchester, Hampshire has been assessed to consider the significance of any archaeological assets affected by potential residential development, and to identify any below-ground archaeological potential.
- Non designated archaeological assets are recorded within the boundaries of the desk based study site and designated heritage assets of national significance are located within the study area.
- The desk based study site is considered to have a moderate to high theoretical potential for Palaeolithic and Roman evidence, a moderate theoretical potential for Mesolithic, Bronze Age and Iron Age evidence, a low to moderate theoretical potential for Neolithic evidence, and a low theoretical potential for Early Medieval, Medieval and Post-Medieval evidence with the exception of possible field boundaries.
- A historic parish boundary between Portchester and Fareham is preserved on the desk based study site and is considered as a non-designated heritage asset. Its retention within any development proposals is recommended.
- Any as yet to be discovered Palaeolithic evidence, should it occur on the desk based study site, could be of regional or national significance. Any as yet to be discovered evidence related to the Roman Road, should it occur on the desk based study site, could be of regional significance. Any as yet to be discovered archaeological evidence from all other periods, if present, would probably be of local significance.
- The proposed development has a the potential to impact on any as yet to be discovered non-designated archaeological assets of potentially regional or national significance.
- Archaeological evaluation is recommended in advance of submitting any planning application to determine the presence and depth of any Palaeolithic sequences on the desk based study site and to further determine the overall archaeological interest of the desk based study site. This will enable the identification of any areas of potential constraint and inform the need for design, civil engineering or archaeological solutions.
- The desk based study site is also considered to make a minor or negligible contribution to the significance of designated heritage assets' significance. These are Fort Nelson, Fort Southwick, Portchester Castle and World War II Heavy Anti-aircraft gunsite (P12) at Monument Farm. It is suggested that that most northerly part of the desk based study site development be either restricted, using lower densities, or avoided all together to retain green open space and views to surrounding heritage assets.

1.0 INTRODUCTION AND SCOPE OF STUDY

- 1.1 This archaeological desk-based assessment has been prepared by Manca Petric and edited by Matthew Smith of CgMs Consulting on behalf of Miller Homes.
- 1.2 The subject of this assessment is land East of Downend Road, Portchester, Hampshire. The desk based study site is centred at SU 60361 06326 and measures approximately 27ha. The desk based study site is bounded by the M27 to the north, and the Southampton to Portsmouth railway line to the south. The east and west boundaries are irregular and partially formed by open space, before giving way to post-war housing to the east and Downend Road to the west.
- 1.3 In accordance with Government policy, National Planning Policy Framework (NPPF), this assessment draws together the available archaeological, historic, topographic and land-use information in order to clarify the significance of any archaeological assets on the site and to identify any archaeological interest on the site.
- 1.4 Additionally, in accordance with the 'Standard and Guidance for Archaeological Desk-Based Assessments' (Chartered Institute for Archaeologists 1999, revised 2014), the assessment comprises an examination of evidence held on the National Heritage List for England, the Hampshire, Winchester and Portsmouth Historic Environment Records (HER), considers the results of nearby archaeological investigations, incorporates published and unpublished material and charts historic land-use through a map regression exercise.
- 1.5 As a result, the assessment enables relevant parties to assess the significance of archaeological assets on and close to the site, assess the potential for any as yet to be discovered archaeological assets and thus enable the potential impacts on the significance of those assets to be identified, along with the need for design, civil engineering or archaeological solutions.

2.0 DEVELOPMENT PLAN FRAMEWORK

- 2.1 Legislation regarding archaeology, including scheduled ancient monuments, is contained in the Ancient Monuments and Archaeological Areas Act 1979, amended by the National Heritage Act 1983 and 2002.
- 2.2 In March 2012, the government published the National Planning Policy Framework (NPPF), which replaced previous national policy relating to heritage and archaeology (PPS5: Planning Policy Statement 5: Planning for the Historic Environment). The NPPF Planning Practice Guidance was published online 6th March 2014 (<http://planningguidance.planningportal.gov.uk>). The Planning Practice Guide issued in support of PPS5 is still valid however, and Historic England (formerly English Heritage) have provided documentation translating former PPS5 policy into its NPPF counterpart.
- 2.3 The Planning Practice Guide previously issued in support of PPS5, together with accompanying English Heritage documentation, was cancelled 25 March 2015, to be replaced by three Good Practice Advice (GPA) documents published by Historic England: GPA 1: The Historic Environment in Local Plans; GPA 2: Managing Significance in Decision-Taking in the Historic Environment, and GPA 3: The Setting of Heritage Assets.
- 2.4 Section 12 of the NPPF, entitled Conserving and Enhancing the Historic Environment provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets. Overall, the objectives of Section 12 of the NPPF can be summarised as seeking the:
- Delivery of sustainable development
 - Understanding the wider social, cultural, economic and environmental benefits brought by the conservation of the historic environment
 - Conservation of England's heritage assets in a manner appropriate to their significance, and
 - Recognition of the contribution that heritage assets make to our understanding of the past.
- 2.5 Section 12 of the NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term. Paragraph 128 states that planning decisions should be based on the significance of the heritage asset, and that level of detail supplied by an applicant should be proportionate to the importance of the asset and should be *no more than sufficient* to review the potential impact of the proposal upon the significance of that asset.

- 2.6 *Heritage Assets* are defined in Annex 2 of the NPPF as: a building, monument, site, place, area or landscape positively identified as having a degree of significance meriting consideration in planning decisions. They include designated heritage assets (as defined in the NPPF) and assets identified by the local planning authority during the process of decision-making or through the plan-making process.
- 2.7 Annex 2 also defines *Archaeological Interest* as a heritage asset which holds, or potentially could hold, evidence of past human activity worthy of expert investigation at some point. Heritage assets with archaeological interest are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them.
- 2.8 A *Designated Heritage Asset* comprises a: World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area.
- 2.9 *Significance* is defined as: The value of a heritage asset to this and future generations because of its heritage interest. This interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.
- 2.10 *Setting* is defined as: The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.
- 2.11 In short, government policy provides a framework which:
- Protects nationally important designated Heritage Assets (which include World Heritage Sites, Scheduled Ancient Monuments, Listed Buildings, Protected Wreck Sites, Registered Parks and Gardens, Registered Battlefields or Conservation Areas)
 - Protects the settings of such designations
 - In appropriate circumstances seeks adequate information (from desk based assessment and field evaluation where necessary) to enable informed decisions
 - Provides for the excavation and investigation of sites not significant enough to merit *in-situ* preservation.
- 2.12 The 2014 NPPF Planning Practice Guidance reiterates that the conservation of heritage assets in a manner appropriate to their significance is a core planning principle, requiring a flexible and thoughtful approach. Furthermore, it highlights that neglect and decay of heritage assets is best addressed through ensuring they remain in active use

that is consistent with their conservation. Importantly, the guidance states that if complete, or partial loss of a heritage asset is justified, the aim should then be to capture and record the evidence of the asset's significance, and make the interpretation publically available. Key elements of the guidance relate to assessing harm. An important consideration should be whether the proposed works adversely affect a key element of the heritage asset's special architectural or historic interest. Additionally, it is the degree of harm, rather than the scale of development, that is to be assessed. The level of 'substantial harm' is considered to be a high bar that may not arise in many cases. Essentially, whether a proposal causes substantial harm will be a judgment for the decision taker, having regard to the circumstances of the case and the NPPF. Importantly, harm may arise from works to the asset or from development within its setting. Setting is defined as the surroundings in which an asset is experienced, and may be more extensive than the curtilage. A thorough assessment of the impact of proposals upon setting needs to take into account, and be proportionate to, the significance of the heritage asset and the degree to which proposed changes enhance or detract from that significance and the ability to appreciate it.

- 2.13 In considering any planning application for development, the planning authority will be mindful of the framework set by government policy, in this instance the NPPF, by current Development Plan Policy and by other material considerations.
- 2.14 The adopted Fareham Local Plan (2015) contains the following policy regarding to the historic environment:

POLICY DSP5: PROTECTING AND ENHANCING THE HISTORIC ENVIRONMENT

DESIGNATED AND NON-DESIGNATED HERITAGE ASSETS ARE AN IRREPLACEABLE RESOURCE THAT WILL BE CONSERVED IN A MANNER APPROPRIATE TO THEIR SIGNIFICANCE, TO BE ENJOYED FOR THEIR CONTRIBUTION TO THE QUALITY OF LIFE OF THIS AND FUTURE GENERATIONS. THE WIDER SOCIAL, CULTURAL, ECONOMIC AND ENVIRONMENTAL BENEFITS OF THEIR CONSERVATION WILL ALSO BE TAKEN INTO ACCOUNT IN DECISION MAKING.

DEVELOPMENT AFFECTING ALL HERITAGE ASSETS SHOULD HAVE REGARD TO RELEVANT GUIDANCE, INCLUDING (BUT NOT LIMITED TO) THE DESIGN SUPPLEMENTARY PLANNING DOCUMENT.

PROPOSALS THAT PROVIDE VIABLE FUTURE USES FOR HERITAGE ASSETS, THAT ARE CONSISTENT WITH THEIR CONSERVATION, WILL BE SUPPORTED.

IN CONSIDERING THE IMPACT OF PROPOSALS THAT AFFECT THE BOROUGH'S DESIGNATED HERITAGE ASSETS, THE COUNCIL WILL GIVE GREAT WEIGHT TO THEIR CONSERVATION (INCLUDING THOSE THAT ARE MOST AT RISK THROUGH NEGLECT, DECAY, OR OTHER THREATS). HARM OR LOSS WILL REQUIRE CLEAR AND CONVINCING JUSTIFICATION IN ACCORDANCE WITH NATIONAL GUIDANCE. SUBSTANTIAL HARM OR LOSS TO A HERITAGE ASSET WILL ONLY BE PERMITTED IN EXCEPTIONAL CIRCUMSTANCES.

LISTED BUILDINGS WILL BE CONSERVED BY:

- A) SUPPORTING PROPOSALS THAT SUSTAIN AND WHERE APPROPRIATE ENHANCE THEIR HERITAGE SIGNIFICANCE;
- B) REFUSING TO PERMIT DEMOLITION, CHANGES OF USE, OR PROPOSED ADDITIONS AND/OR ALTERATIONS THAT WOULD UNACCEPTABLY HARM THE BUILDING, ITS SETTING OR ANY FEATURES OF SPECIAL ARCHITECTURAL OR HISTORIC INTEREST WHICH IT POSSESS;
- C) ENSURING THAT DEVELOPMENT DOES NOT HARM, AND IF DESIRABLE, ENHANCES THEIR SETTINGS.

DEVELOPMENT AFFECTING A CONSERVATION AREA WILL BE PERMITTED WHERE IT PRESERVES OR ENHANCES ITS CHARACTER, SETTING AND APPEARANCE, AND

- A) TAKES ACCOUNT OF THE RELEVANT CONSERVATION AREA CHARACTER APPRAISAL AND MANAGEMENT STRATEGY;
- B) DOES NOT INVOLVE THE LOSS OF IMPORTANT FEATURES OF AN INDIVIDUAL BUILDING THAT CONTRIBUTE TO CHARACTER AND APPEARANCE OF THE CONSERVATION AREA AND/OR ITS SETTING;
- C) ITS FORM, BULK, SCALE, HEIGHT, MASSING, ALIGNMENT, PROPORTION, MATERIAL, BUILDING FORM AND USE ARE APPROPRIATE, INCLUDING HAVING REGARD TO THE SURROUNDING BUILDINGS, SPACES AND VIEWS; AND
- D) IT DOES NOT INVOLVE THE DEMOLITION OR PARTIAL DEMOLITION OF A BUILDING OR STRUCTURE THAT POSITIVELY CONTRIBUTES TO THE AREA, WITHOUT CLEAR AND CONVINCING JUSTIFICATION.

THE COUNCIL WILL CONSERVE SCHEDULED MONUMENTS, AND ARCHAEOLOGICAL SITES THAT ARE DEMONSTRABLY OF NATIONAL SIGNIFICANCE, BY SUPPORTING PROPOSALS THAT SUSTAIN AND WHERE APPROPRIATE ENHANCE THEIR HERITAGE SIGNIFICANCE. PROPOSALS THAT UNACCEPTABLY HARM THEIR HERITAGE SIGNIFICANCE, INCLUDING THEIR SETTING, WILL NOT BE PERMITTED.

NON-DESIGNATED HERITAGE ASSETS INCLUDING LOCALLY LISTED BUILDINGS, HISTORIC PARKS AND GARDENS, AND SITES OF ARCHAEOLOGICAL IMPORTANCE WILL BE PROTECTED FROM DEVELOPMENT THAT WOULD UNACCEPTABLY HARM THEIR ARCHITECTURAL AND HISTORIC INTEREST, AND/OR SETTING TAKING ACCOUNT OF THEIR SIGNIFICANCE.

- 2.15 In terms of designated heritage assets as defined above in the NPPF, and as shown on Appendix 3, no World Heritage Site, Historic Battlefield or Historic Wreck designations lie within, or in immediate proximity, to the site.
- 2.16 Four designated heritage assets lie within the study area (Appendix 3). Fort Nelson (Scheduled Monument SM1001860 and a Listed Building) lies c.450m north from the desk based study site, World War II Heavy Anti-aircraft gunsite (P12) at Monument Farm, (Scheduled Monument SM1020960) lies c.750m north-west from the desk based study site, Fort Southwick (Scheduled Monument 1003802; 1001808 and a Listed Building), lies c.2km to the north-east of the desk based study site and Portchester Castle (Scheduled Monument 1015698 and a Listed Building) lies c.2.2km to the south-east of the desk based study site.

- 2.17 This desk-based assessment therefore aims to meet the national and local policy as set out above, by clarifying the archaeological potential of the desk based study site and the need or otherwise for further mitigation measures.

3.0 GEOLOGY AND TOPOGRAPHY

3.1 Geology

3.1.1 As shown on British Geological Survey Online (2016) the desk based study site is located within the Newhaven, Spetisbury and Portsdown Chalk Formation. Superficial deposits of Head – clay, silt, sand and gravel are recorded in the southern part of the desk based study site.

3.1.2 No geotechnical information is currently available for the desk based study site.

3.2 Topography

3.2.1 The desk based study site lies approx. 3.2km east of Fareham and approx. 1.2km north-west of the centre of Portchester. The desk based study site is bounded by the M27 to the north and the Southampton to Portsmouth railway line to the south. The east and west boundaries are irregularly and partially formed by open space, before giving way to post-war housing to the east and Downend Road to the west.

3.2.2 The desk based study site measures c.27ha in area and is in agricultural use. It slopes downwards from 55m OD in the north to c.15m OD to the south (Fig. 15).

3.2.3 No watercourses or naturally occurring bodies of surface water are located on the desk based study site. Wallington River lies c.2km west from the desk based study site.

3.2.4 A site walkover survey of the desk based study site was carried out during October 2016. Crops had been harvested and no archaeological features were observed (eg. ditches, earthworks, etc).

4.0 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND, WITH ASSESSMENT OF SIGNIFICANCE

4.1 Timescales used in this report:

Prehistoric

Palaeolithic	900,000 -	12,000 BC
Mesolithic	12,000 -	4,000 BC
Neolithic	4,000 -	1,800 BC
Bronze Age	1,800 -	600 BC
Iron Age	600 -	AD 43

Historic

Roman	AD 43 -	410
Anglo-Saxon/Early Medieval	AD 410 -	1066
Medieval	AD 1066 -	1485
Post Medieval	AD 1486 -	1749
Modern	AD 1750 -	Present

4.2 Introduction

4.2.1 This assessment is a consideration of evidence in the Hampshire Historic Environment Record (HHER), Portchester Historic Environment Record (PHER) and Winchester Hampshire Historic Environment Record (WHER) for a study area of 2km radius centered on the desk based study site for Early Prehistoric evidence (Appendix 1). A 1.5km radius centered on the desk based study site is considered for all other periods (Appendices 2 and 3) and a 3km radius centered on the desk based study site is considered for designated heritage assets (Appendix 3).

4.2.2 This chapter reviews existing archaeological evidence for the site and the archaeological/historical background of the general area and, in accordance with the NPPF, considers the potential for as yet undiscovered archaeological evidence on the site.

4.2.3 Chapter 5 subsequently considers the site conditions and whether the proposed development will impact the theoretical archaeological potential identified below.

4.3 Palaeolithic, Mesolithic (Appendix 1)

- 4.3.1 Raised beech deposits are recorded on the desk based study site (24537, 24538). Raised beach deposits in the area were first identified in 1872 at c.36.5m above sea level at the western end of Ports Down Hill in Down Coppice Gravel Pit (17832) c.60m north-west from the desk based study site (Fig. 5). The construction of the M27 motorway in 1972 to the north of the desk based study site led to further identification and investigation of these deposits in the area.
- 4.3.2 A Palaeolithic site at Red Barns, located c.100m to the east of the desk based study site (24267, 50753, 60552), was first documented in 1973 during deep excavations for a housing development. Excavations followed in 1974 and 1975. The majority of artefacts was recovered from a layer of grey loam underlying cemented breccia at c.30m OD. Over 10,000 artefacts dated to between 425,000 BP and 200,000 BP were recovered. The lithic technology at the site was dominated by the production of pointed plano-convex handaxes. Further excavation in the area followed in 1999 and the artefact-bearing horizons first discovered in 1973 was recorded in one of the three excavated test pits (Draper 1974; Weban-Smith 1999 and 2000).
- 4.3.3 Blades, axes, scrapers, lithic implements and microliths (20077, 20078, 20075, 20067) were recovered from Pleistocene deposits during the construction of the M27 c.700m north-west from the desk based study site and c.1100m north-west from the desk based study site (37312).
- 4.3.4 Other Palaeolithic findspots in the study area are focused to the south-west and south of the study area. Palaeolithic handaxes were recovered c.1200m south-west (20155), c.1000m south-west (20102, 20112), c.1150m south (31430) and c.1400m south-east (19269) from the desk based study site. Palaeolithic flint debitage was recorded c.950m south-west (31110), 800m south-west (31022) and 1500m south-west (20103) from the desk based study site. Palaeolithic nuclei and 'pot-boulers' were also recovered c.1200m south from the desk based study site (19327, 19284).
- 4.3.5 Wallington valley, located c.1500m west from the desk based study site, was occupied in the Mesolithic period. A Mesolithic seasonal camp was recorded c.1150m west from the desk based study site (20092). Hearths and flint artefacts were recovered.
- 4.3.6 The HHER shows further Mesolithic evidence in the study area. A Mesolithic blade was recorded c.1200m west from the desk based study site (20085), Mesolithic core, blades and flakes c.1000m south-west from the desk based study site (20111), Mesolithic flint scatter c. 1000m south-west (20106), a Mesolithic axe c.1600m south-west (20110),

Mesolithic flint debitage c.800m south from the desk based study site (30885), Mesolithic core c.1500m south-east from the desk based study site (24665), and Mesolithic flints c.1300m north (53372, MWC883), c.1600m north-east (24032, MWC4259) and c.1500m north from the desk based study site (38829).

4.3.7 Based on the available evidence, the desk based study site is considered to have a moderate to high potential for Palaeolithic evidence and a moderate potential for Mesolithic evidence. If present, Palaeolithic evidence would be expected in grey loam deposits underlying cemented breccia at some depth, and Mesolithic evidence would be expected as unstratified flint scatters in the topsoil.

4.4 Neolithic, Bronze Age and Iron Age (Appendix 2)

4.4.1 From around 4000 BC the mobile hunter-gathering economy of the Mesolithic gradually gave way to a more settled agriculture-based subsistence. The pace of woodland clearance to create arable and pasture-based agricultural land varied regionally and locally, depending on a wide variety of climatic, topographic, social and other factors. The trend was one of a slow, but gradually increasing pace of forest clearance.

4.4.2 A scatter of Early Neolithic finds was recorded c.850m south-west from the desk based study site (20107) and two Neolithic scrapers (20074) were recovered during salvage excavations during the construction of the M27 c.800m north-west from the desk based study site. A small assemblage of Neolithic residual lithic evidence (55402) was also recovered at Cams Hill c.550m south-west of the desk based study site.

4.4.3 By the 1st millennium, i.e. 1000 BC, the landscape was probably a mix of extensive tracts of open farmland, punctuated by earthwork burial and ceremonial monuments from distant generations, with settlements, ritual areas and defended locations reflecting an increasingly hierarchical society.

4.4.4 A truncated Middle Bronze Age Urn, possibly of globular form, was unearthed during topsoil removal in advance of the M27 construction c.250m east from the desk based study site (24503). The urn contained a cremated body and charcoal and was surrounded by a quantity of burnt flint (Soffe 1974).

4.4.5 A Late Bronze Age cremation burial was unearthed during earth moving in advance of the construction of the M27 c.60m north from the desk based study site (24499). The burial consisted of an inverted urn that contained soil and cremated bone. The urn was placed in a pit and may possibly have originally been covered by a cairn or mound. This

would account for both the collapse of the urn and the flint finds in the pit (Frazer Simpson 1972).

- 4.4.6 Middle Bronze Age pottery was recovered from three pits at Camms Hill c.560m south-west from the desk based study site (55402). These features appear to be of a ritual nature, probably relating to a funerary activity. The presence of Bronze Age funerary activity in the study area suggests a Bronze Age settlement in the vicinity (Eddisford 2000) that could be associated with a small Bronze Age pit that was recorded during a watching brief c. 1km south-west from the desk based study site (35857). The pit contained unworked burnt flint and Late Bronze Age pottery.
- 4.4.7 An Iron Age settlement site with associated stratified material was identified during rescue excavations prior the construction of M27 in 1972 c. 800m north-west from the desk based study site (20074). Ditches, gullies, possible building structures, pits, hearths, post-holes/ stakeholes and associated finds were recovered. Features and finds indicated the presence of a three-phase settlement with a mixed economy over the total period of the settlement - one of sheep rearing and arable farming. Pottery and metal work provide the only guide to the time span of the settlement which is tentatively placed at 5th-1st C BC (Soffe 1974).
- 4.4.8 A Late Iron Age settlement was excavated at Cams Hill, c.560m south-west from the desk based study site (55402). Evidence for the establishment of an agricultural enclosure system and associated structures and storage pits was recovered.
- 4.4.9 A possible Iron Age banjo enclosure was identified on aerial photographs c.350m east from the desk based study site (65246).
- 4.4.10 Findspots of Iron Age pottery were found c.750m north-east (24553) and c.1250m south (19328) from the desk based study site.
- 4.4.11 Iron Age coins were found c.250m south-east (24425), c.500m south-east (24426) and c.750m south-east (24427) from the desk based study site. These coins may have originated from a single deposit further north and later scattered downhill (PAS 2016).
- 4.4.12 The archaeological potential for the Neolithic period is considered to be low to moderate. If present, flint concentrations in topsoil are expected to be found. The archaeological potential for the Bronze and Iron Age periods is considered to be moderate. Funerary or settlement evidence could conceivably be present.

4.5 Roman (Appendix 2)

- 4.5.1 A Roman fort at Portchester was established c.2.5km south-east from the desk based study site in the late 3rd century AD as part of a system of coastal defences, now called the 'Saxon Shore Forts', intended to protect against Saxon raids from the continent (SM1015698). The archaeological evidence suggests a temporary settlement in the 1st century AD followed by a hiatus in occupation until the late 3rd century, when the fort was built. A Late Roman settlement was also established in what is now the centre of Fareham c.1250m south-west from the desk based study site (Eddisford 2000).
- 4.5.2 There is no known Roman road leading to Portchester or Fareham, but it has been hypothesized that the Winchester to Wickham road may have continued south to Fareham or most likely Portchester port (Margary 1955, 84). The possible Roman Road from Portchester to Wickham is projected as running through the northern part of the desk based study site in a SE - NW alignment. No such linear feature is visible on the available LiDAR data plot (Fig. 14).
- 4.5.3 A Roman farmstead was excavated c.1000m north-west from the desk based study site (20122). A cobbledyard, building material remains, pits, large quantities of pottery and other finds were recorded. The farmstead lies c.400m west of the projected Portchester to Wickham Roman Road.
- 4.5.4 Roman pottery was found during field walking c.750m north-east from the desk based study site (24554).
- 4.5.5 The settlement at Cams Hill (55402) located c.560m south-west from the desk based study site continued to be occupied in the Roman period. The site layout changed a little and was characterised by the re-cutting of the existing ditches and the formation of new boundaries. Much of the enclosure system went out of use by the Late Roman period. Storage and rubbish pits, and a sunken-featured building of a possible Germanic cultural influence, dated to the 4th century AD, were also recorded. The changes observed on site coincide with the introduction of coastal defences in the 3rd century AD, which would have had a huge impact on the economy of the area, creating demand for a wide range of goods and services.
- 4.5.6 The desk based study site is considered to have a moderate to high archaeological potential for the Roman period. Evidence of a Roman Road and field boundaries could be present.
- 4.6 Anglo-Saxon & Medieval (Appendix 3)

- 4.6.1 The Romano-British fort in Portchester was occupied throughout the Early Medieval period. The activity at Cams Hill c.550m south-west from the desk based study site is limited to a few post-holes dated to the Anglo-Saxon period and the location was probably abandoned shortly after the end of the Roman phase of occupation (55402). This is possibly due to the reduction of population in the area, combined with the need to move closer or within the Portchester castle as defence against maritime raiders (Eddisford 2000).
- 4.6.2 Fareham is mentioned in the 1066 Survey of Domesday as a village with 90 households, 20 ploughlands, 41 acres of meadow, 5 mills and one church (Open Domesday 2016).
- 4.6.3 The HER records medieval pottery scatters c.1km north from the desk based study site (24579, 24580), c.900m south-west (20151) and c.750m south-west from the desk based study site (30883, 30884). A Medieval farmstead was recorded c.950m south from the desk based study site (39239) and a Medieval coin was found c.250m north from the desk based study site (PAS 2016).
- 4.6.4 Overall, the desk based study site can be considered to have a low archaeological potential for the Medieval period. If archaeological remains are present on the desk based study site these are likely to be related to agricultural use or field boundaries.
- 4.7 Post Medieval and Modern (Including map regression exercise; Appendix 3)
- 4.7.1 Fareham served as a port in the Medieval and Post-Medieval periods and there were several quays along the western bank of the Wallington River. It was also a centre for brick and pottery making with several large brick works around the town.
- 4.7.2 In this period our understanding of settlement, land use and landscape utilisation is enhanced by cartographic and documentary sources which contribute additional detail to the HER.
- 4.7.3 The 1759 Taylor's Map (Fig. 2) shows the desk based study site in open landscape east of the village of Fareham, north-west of Portchester and south Ports Down Hill.
- 4.7.4 The 1791 Milne's Map (Fig. 3) shows a parish boundary running through the middle of the desk based study site and an area of woodland in the western part of the desk based study site.
- 4.7.5 The 1840 Portchester and Fareham Tithe Maps (Fig. 4) provide more detail than the earlier maps. The desk based study site is shown comprising of 13 parcels of land. The

majority of the desk based study site was arable land. The Apportionment does not provide the land use description for some of the plots (Table 1). A chalk pit is shown to the immediate west of the desk based study site's western boundary.

4.7.6 The following table provides an explanation of land use as described in the 1840 Portchester and Fareham Tithe Apportionments.

Plot no.	Description	Land Use
1744	Home Field	Arable
1745	N/A	N/A
1746	Part of 17 Acres	Arable
1747	Part of 17 Acres	Arable
1749	The 8 Acres	Arable
1750	N/A	N/A
1751	N/A	N/A
1752	N/A	N/A
181	Paddock	Arable
182	N/A	N/A
183	Lower Robins	Arable
184	Robins Copse	Wood
185	Mount Misery	Arable

Table 1 – 1840 Portchester and Fareham Tithe Apportionment

4.7.7 The 1868 Ordnance Survey (Fig. 5) shows a newly constructed railway along the southern border of the desk based study site. Robin Wood is shown in the north-western area of the desk based study site and an area of woodland is also visible in the western area of the desk based study site. A chalk pit is depicted in the central and north-eastern area of the desk based study site and further chalk pits are shown to the north-west of the desk based study site.

4.7.8 The 1898 Ordnance Survey (Fig. 6) shows an industrial development to the north-west of the desk based study site (Whiting Manufactory) and the abandonment of previous chalkpits on the desk based study site and to the north-west of the desk based study site's boundary. The 1910 Ordnance Survey (Fig. 7) and 1932 Ordnance Survey (Fig. 8) show the site in a similar form.

4.7.9 Woodland has disappeared from the western area of the desk based study site by 1962 (Fig. 9) and a series of farm buildings were constructed in the western and central area of the desk based study site. Further development of Winnham Farm is shown on the 1978 Ordnance Survey (Fig. 10).

4.7.10 The 1999 and 2016 Google Earth Images (Figs. 11 and 12) show the majority of the desk based study site under arable cultivation and the area west of Winnham Farm as a

meadow. A parish boundary visible in an early 19th century mapping is preserved on the desk based study site.

4.7.11 The LiDAR data plot available for the desk based study site shows old field boundaries in the north-eastern corner of the desk based study site. These boundaries are visible on the 1840 mapping and are recorded as cropmarks in Appendix 3.

4.7.12 Cropmarks visible in the southern part of the desk based study site (Appendix 3) could be old field boundaries. The curvilinear feature recorded as a cropmark in Appendix 3 in the north-western area of the desk based study site could be associated with chalk extraction in the area.

4.7.13 Based on the available evidence the desk based study site is considered to have a low potential for Post Medieval and Modern evidence. If below-ground archaeological remains are present they are likely to be related to land divisions or agricultural activity. Historic parish boundaries observed on the 19th century mapping have partially been preserved until present (Figures 4 and 12).

4.8 Designated Heritage Assets (Appendix 3)

Fort Nelson

4.8.1 Fort Nelson, a Scheduled Monument (1001860) is one of the Portsdown Hill Forts, popularly known as the Palmerston Forts or Palmerston's Follies, after the Prime Minister at the time of their construction, because the forts were never used for their original, intended function, namely to protect Portsmouth from inland invasion. Fort Nelson was commissioned in 1860 over fears of a possible invasion from Louis Napoleon, whose threat quickly diminished after the completion of the forts.

4.8.2 The setting of the building is linked to its position on the ridgeline, above Portsmouth harbour, with the building sharing a strong function and visual setting with those other Palmerston Forts, notably Fort Southwick to the east. Fort Wallington to the west has been partially demolished and the M27 prevents any intervisibility between the two. The relationship between the fortifications is integral to their significance, with each of them being positioned in this strategically important location to support one another in halting any inland invasionary force, which may have made land elsewhere before attacking Portsmouth, a vital military fort. The commanding views from the fortification, despite some intervening vegetation along Downend Road, reinforce the historic role of the forts and their relationship with Portsmouth Harbour.

Fort Southwick

- 4.8.3 Fort Southwick, a Scheduled Monument (1001808, 1003802) is one of a series of forts (Wallington (now demolished), Nelson, Southwick, Widley and Purbrook) along the chalk ridge of Portsdown Hill, built for the defence of Portsmouth against landward attack in the 1860s, and known as Palmerston's Folly.
- 4.8.4 The relationship between the fortifications is integral to their significance, with each of them being positioned in this strategically important location to support one another in halting any inland invasionary force, which may have made land elsewhere before attacking Portsmouth, a vital military fort. The commanding views from the fortification, despite some intervening vegetation along Portsdown Hill Road, reinforce the historic role of the forts and their relationship with Portsmouth Harbour.
- 4.8.5 The fort is currently used by a used car dealership and there are cars parked along the main entrance to the fort. This current use detracts from the ability to appreciate the aesthetic value of the building.

Portchester Castle

- 4.8.6 Portchester Castle, a Scheduled Monument (1015698) is a Roman castle of third century origins, originally constructed to protect Portsmouth harbour. The Roman outer walls survive today and have subsequently been augmented by a Saxon hall (since demolished), a Norman tower and a number of Tudor structures. The growth of Portsmouth as a naval base in the Tudor period diminished the importance of Portchester Castle which, by the seventeenth century, had ceased to function as a fortification, becoming a prison instead. The Castle served this function during the major conflicts of the eighteenth century and the Napoleonic Wars, however it ceased to operate as such in 1814, before being abandoned by the military in 1819, ceasing all military uses of the Castle. It is now owned and run by English Heritage.
- 4.8.7 The setting of the Castle is intrinsically linked with its prominent position overlooking Portsmouth harbour, while the building also shares group value with the Church of St Mary, as is noted in the listing description. This location provides an understanding of why the building was originally constructed and how it relates to the surrounding landscape.
- 4.8.8 Beyond this the Site allows for views of the Castle's Norman tower which is a landmark feature in long-distance views from within the Site and its surroundings. Although fuller

views can be obtained from the northern half of the Site, views above vegetation within the southern half of the Site are also permitted. The size and height of the tower, coupled with the crenellations atop the tower, allow for an experience of the building as a defensive structure, with the views to the harbour beyond reinforcing its location and function (Fig. 16).

World War II Heavy Anti-aircraft gunsite (P12) at Monument Farm

4.8.9 The World War II Heavy Anti-aircraft gunsite (P12) at Monument Farm is situated on the crest of a hill with views to Portsmouth, Southampton and the hinterland and lies about 700m north west of Fort Nelson, which was one of the key ammunition depots for anti-aircraft deployment in the area.

4.8.10 Its significance lies in its completeness as it is one of 60 surviving gun sites built during the World War II. It provides a unique picture of the organisation of defence on the south coast.

4.8.11 The significance of the Scheduled Monument also lies in its evidential value as the surviving remains represent at least two stages of development (early World War II and late World War II) and provide a rare insight into the development of Heavy Anti-aircraft batteries. The relationship between Fort Nelson and the Scheduled Monument adds to its significance.

4.9 Assessment of Significance

4.9.1 Existing national policy guidance for archaeology (the NPPF as referenced in section 2) enshrines the concept of the 'significance' of heritage assets. Significance as defined in the NPPF centres on the value of an archaeological or historic asset for its 'heritage interest' to this or future generations.

4.9.2 The Scheduled Monuments in the study area are considered to be of national significance.

4.9.3 No designated archaeological heritage assets as defined in the NPPF are recorded on the desk based study site. Non-designated archaeological heritage assets are recorded on the desk based study site.

4.9.4 The desk based study site is considered to have a moderate to high theoretical potential for Palaeolithic and Roman evidence, a moderate theoretical potential for Mesolithic, Bronze Age and Iron Age evidence, a low to moderate theoretical potential for Neolithic

evidence, and a low theoretical potential for Early Medieval, Medieval and Post-Medieval evidence with the exception of possible field boundaries.

- 4.9.5 Any as yet to be discovered Palaeolithic evidence, should it occur on the desk based study site, could be of regional to national significance. Any as yet to be discovered evidence related to the Roman Road, should it occur on the desk based study site, could be of regional significance. Any as yet to be discovered archaeological evidence from all other periods, if present, would probably be of local significance.

5.0 SITE CONDITIONS, THE PROPOSED DEVELOPMENT, IMPACT ON HERITAGE ASSETS AND RECOMMENDATIONS

5.1 Site Conditions

- 5.1.1 A site visit was undertaken in October 2016. The site comprises a large agricultural field, a meadow and a farm with associated buildings and an access road. The strip of land between Downend Road to the west and agricultural fields to the east is occupied by a meadow and an access road. Buildings associated with Winnham Farm are located in the south-western end of the desk based study site. The eastern and central area of the desk based study site is occupied by agricultural fields sloping southwards (Plates 1-9).
- 5.1.2 The desk based study site is bounded by the M27 to north and the Southampton to Portsmouth railway line to the south. The east and west boundaries are irregularly and partially formed by open space, before giving way to post-war housing to the east and Downend Road to the west.
- 5.1.3 The construction of the modern access road and buildings currently occupying the desk based study site will have had a severe, damaging impact on below-ground archaeological remains.
- 5.1.4 The past chalk extraction activities on the desk based study site will have had a severe, damaging impact on below-ground archaeological remains.
- 5.1.5 The past agricultural use of the desk based study site will have had a widespread, moderate archaeological impact upon archaeological remains.

5.2 The Proposed Development

- 5.2.1 The desk based study site measures approx. 27ha in total. The southern area of the desk based study site, which measures approx. 18ha, is intended for residential development with associated access roads, car parking and landscaping (Fig. 13).

5.3 Impact on Archaeological Assets

- 5.3.1 There are no designated archaeological heritage assets as defined in the NPPF recorded on the desk based study site.
- 5.3.2 Non designated heritage assets are recorded on the desk based study site.
- 5.3.3 The proposed development has the potential to impact on any as yet to be discovered non designated archaeological assets.

5.4 Recommendations

- 5.4.1 A geophysical survey followed by trial trenching and Palaeolithic test pit evaluation is recommended in advance of submitting any planning application to determine the presence and depth of any Palaeolithic sequences on the desk based study site and to determine the overall archaeological interest of the desk based study site. This will enable the identification of any areas of potential constraint and inform the need for design, civil engineering or archaeological solutions.

5.5 Impact on Designated Heritage Assets

Fort Nelson

- 5.5.1 There would be no direct impacts from the development of the desk based study site on the Scheduled Monument. Any impacts would therefore be solely related to the setting of the monument.
- 5.5.2 Views of the Scheduled Monument are permitted from within the desk based study site, notably from the southern half of the Site, where the roofline of the Fort is seen rising above the ridgeline and vegetation lining the M27 (Plate 3). The angular form of the building's outer walls and the bastions are visible in these views, allowing for an appreciation and experience of the building as a defensive fortification, likely linked with the harbour below. Beyond this there is no appreciation of the special interest of

the building or, crucially, its association with the remaining Palermston Forts. Return views are largely screened by intervening deciduous vegetation (Figure 16, Plates 10 and 11).

- 5.5.3 Overall, therefor, the desk based study site makes a minor contribution to the significance of Fort Nelson. The proposed development is considered to have a negligible/minor negative adverse impact on the asset's significance.

Fort Southwick

- 5.5.4 There would be no direct impacts from the development of the desk based study site on the Scheduled Monument. Any impacts would therefore be solely related to the setting of the monument.
- 5.5.5 The setting of the building is linked to its position on the ridgeline, above Portsmouth harbour, with the building sharing a strong function and visual setting with those other Palmerston Forts, notably Fort Nelson to the west.
- 5.5.6 There is no intervisibility permitted between the Site and the Scheduled Monument as the views are largely screened by intervening vegetation and topography. Overall, the desk based study site makes a negligible contribution to the significance of the Scheduled Monument and the proposed development is considered to have no impact on the asset's significance.

Portchester Castle

- 5.5.7 There would be no direct impacts from the development of the desk based study site on the Scheduled Monument. Any impacts would therefore be solely related to the setting of the Monument.
- 5.5.8 The setting of the Castle is intrinsically linked with its prominent position overlooking Portsmouth harbour, while the building also shares group value with the Church of St Mary, as is noted in the listing description. This location provides an understanding of why the building was originally constructed and how it relates to the surrounding landscape.
- 5.5.9 Beyond this the desk based study site allows for views of the Castle's Norman tower which is a landmark feature in long-distance views from within the Site and its surroundings (Plates 2, 7 and 12). Although fuller views can be obtained from the northern half of the Site, views above vegetation within the southern half of the Site

are also permitted. The size and height of the tower, coupled with the crenellations atop the tower, allow for an experience of the building as a defensive structure, with the views to the harbour beyond reinforcing its location and function.

- 5.5.10 Return views of the desk based study site are also available from the top of the Tower, with the northern half of the Site viewed as undeveloped land, stretching away from the peripheries of post-war Portchester (Figure 16). The distance and extent of neighbouring post-war development means that these views make little contribution to the significance of the building. Sequential views which take in the desk based study site and the nearby Fort Nelson are also available. The Castle was defunct by the time of the construction of the Palmerston Forts and, therefore, there is no direct functional association between the Scheduled Monument and these nineteenth-century forts. The presence of the Castle does, however, provide a story of the continual fortification and defence of Portsmouth and the surrounding area over millennia, reflecting its strategic and military importance in the defence of Britain. The desk based study site plays a peripheral role in supporting this and is not considered to contribute to the significance of Portchester Castle in this sense.
- 5.5.11 Overall the desk based study site makes a minor contribution to the significance of the Scheduled Monument at present through permitting some partial views of the building. The proposed development is considered to have a negligible/minor negative adverse impact on the asset's significance.

World War II Heavy Anti-aircraft gunsite (P12) at Monument Farm

- 5.5.12 There would be no direct impacts from the development of the desk based study site on the Scheduled Monument. Any impacts would therefore be solely related to the setting of the Monument.
- 5.5.13 There is no intervisibility permitted between the Site and the Scheduled Monument as the views are largely screened by intervening vegetation and topography. Overall, the desk based study site makes a negligible contribution to the significance of the Scheduled Monument and the proposed development is considered to have no impact on the asset's significance.

5.6 Recommendations

- 5.6.1 It is apparent from the assessment work undertaken that the northern half of the desk based study site (approximately that adjacent to the composting depot) is of a higher

level of sensitivity due to the views afforded from this part of the desk based study site and the return views, including those from Portchester Castle. Given the extent of post-war development already present to the south of the Site, coupled with the lower position of this and proximity to the railway line, this represents the least sensitive area of the desk based study site and it is likely that this could be developed without having undue harm to the surrounding built heritage assets. It is suggested that that most northerly part of the desk based study site development be either restricted, using lower densities, or avoided all together to retain green open space and views to surrounding heritage assets.

6.0 SUMMARY AND CONCLUSIONS

- 6.1 Land East of Downend Road, Portchester, Hampshire has been assessed to consider the significance of any archaeological assets affected by potential residential development, and to identify any below-ground archaeological potential.
- 6.2 Non designated archaeological assets are recorded within the boundaries of the desk based study site and designated heritage assets of national significance are located within the study area.
- 6.3 The desk based study site is considered to have a moderate to high theoretical potential for Palaeolithic and Roman evidence, a moderate theoretical potential for Mesolithic, Bronze Age and Iron Age evidence, a low to moderate theoretical potential for Neolithic evidence, and a low theoretical potential for Early Medieval, Medieval and Post-Medieval evidence with the exception of possible field boundaries.
- 6.4 A historic parish boundary between Portchester and Fareham is preserved on the desk based study site and is considered as a non-designated heritage asset. Its retention within any development proposals is recommended.
- 6.5 Any as yet to be discovered Palaeolithic evidence, should it occur on the desk based study site, could be of regional or national significance. Any as yet to be discovered evidence related to the Roman Road, should it occur on the desk based study site, could be of regional significance. Any as yet to be discovered archaeological evidence from all other periods, if present, would probably be of local significance.
- 6.6 The proposed development has a the potential to impact on any as yet to be discovered non-designated archaeological assets of potentially regional or national significance.
- 6.7 Archaeological evaluation is recommended in advance of submitting any planning application to determine the presence and depth of any Palaeolithic sequences on the desk based study site and to further determine the overall archaeological interest of the desk based study site. This will enable the identification of any areas of potential constraint and inform the need for design, civil engineering or archaeological solutions.
- 6.8 The desk based study site is also considered to make a minor or negligible contribution to the significance of designated heritage assets' significance. These are

Fort Nelson, Fort Southwick, Portchester Castle and World War II Heavy Anti-aircraft gunsite (P12) at Monument Farm. It is suggested that that most northerly part of the desk based study site development be either restricted, using lower densities, or avoided all together to retain green open space and views to surrounding heritage assets.

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Cartographic

1759 Taylor's Map

1791 Milne's Map

1840 Portchester and Fareham Tithe Map

1868 Ordnance Survey

1898 Ordnance Survey

1910 Ordnance Survey

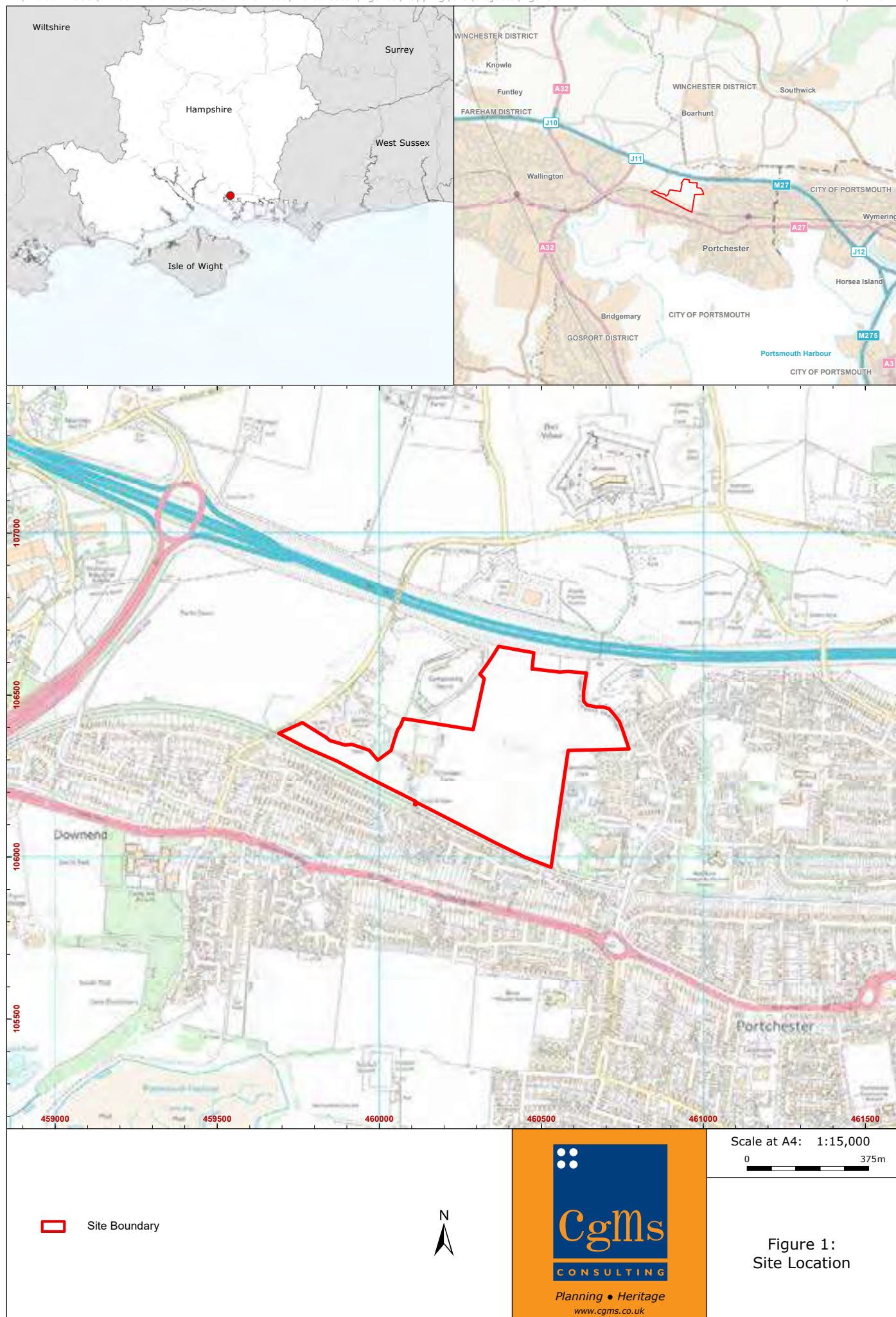
1932 Ordnance Survey

1962 Ordnance Survey

1978 Ordnance Survey

1999 Google Earth Image

2016 Google Earth Image





 Approximate Site Location




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Scale at A4: 1:25,000



Figure 2:
1759 Taylor's Map



 Approximate Site Location

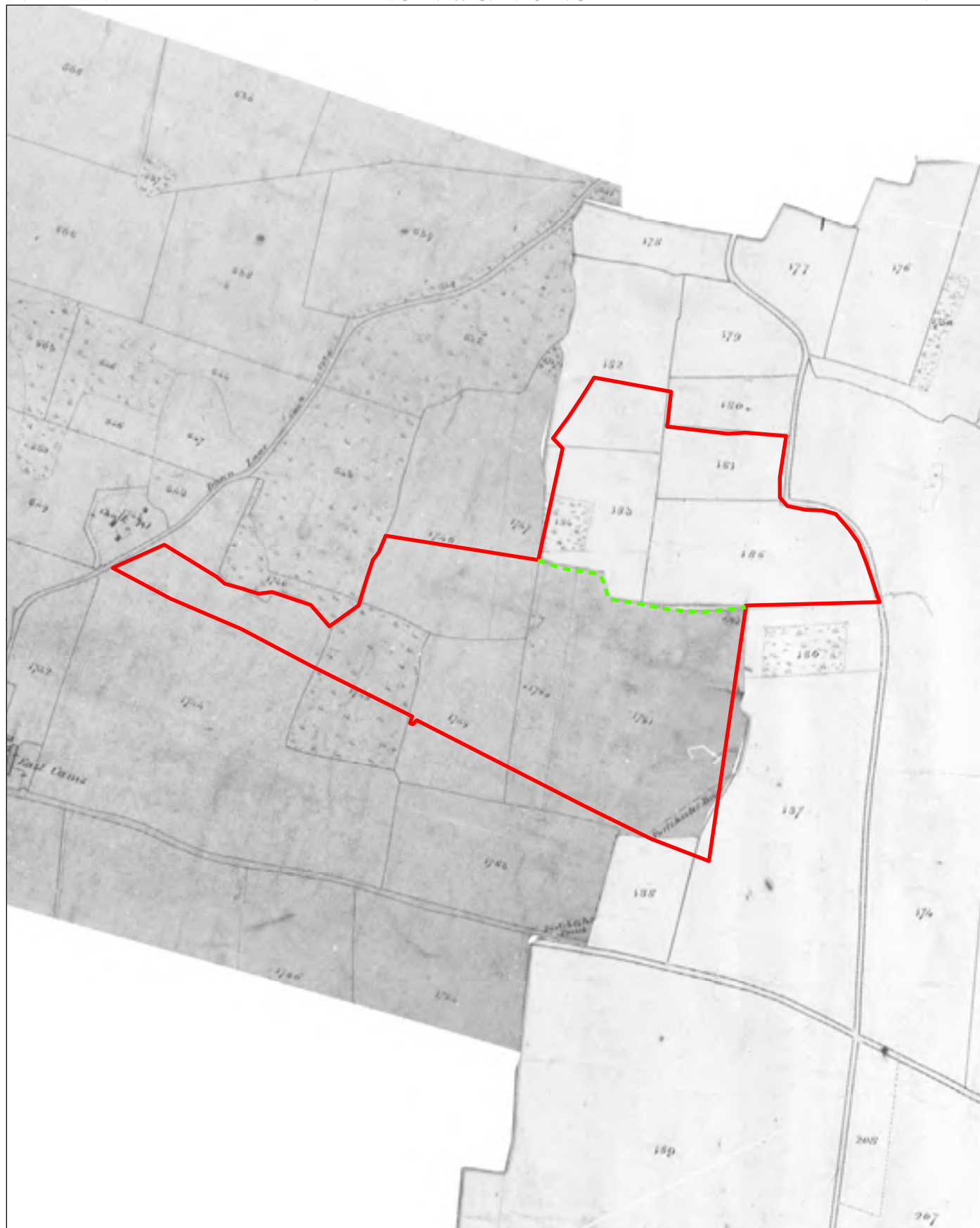


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Scale at A4: 1:25,000



Figure 3:
1791 Milne's Map



□ Site Boundary

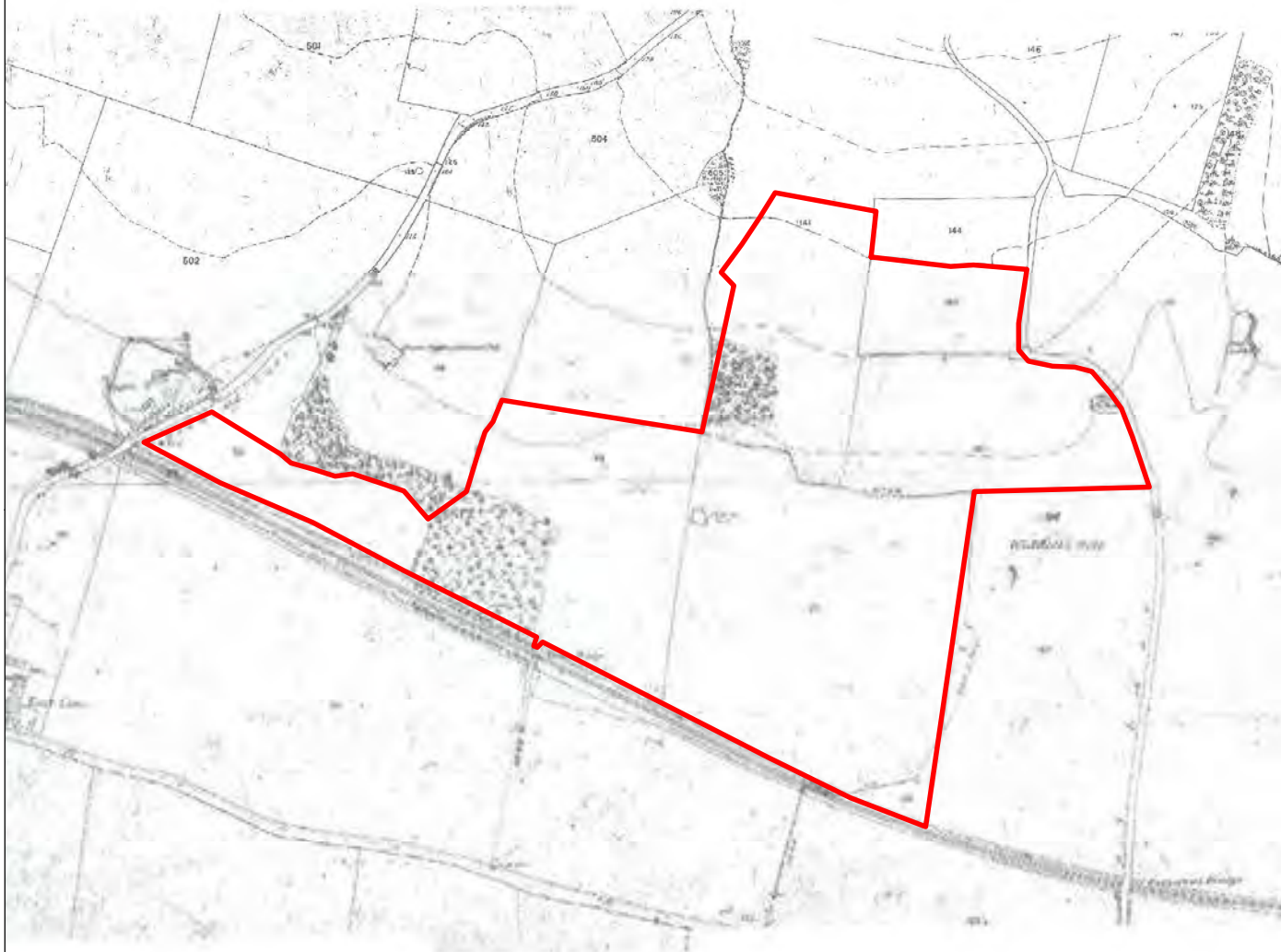
--- Portchester and Fareham Parish Boundary



Scale at A4: 1:7,500

0 225 m

Figure 4:
1840 Portchester and
Fareham Tithe Maps



 Site Boundary

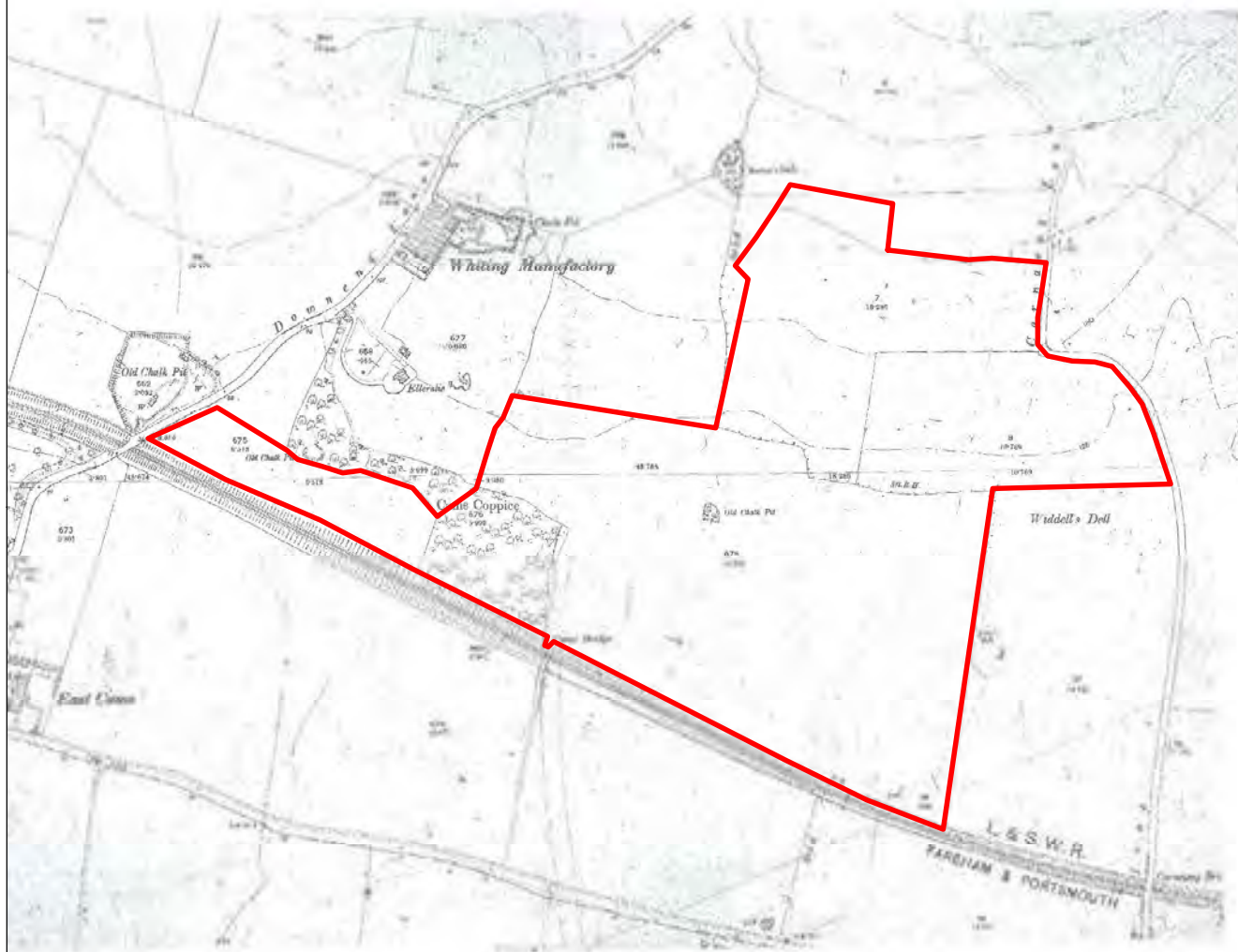


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Scale at A4: 1:7,500



Figure 5:
1868 Ordnance Survey



 Site Boundary

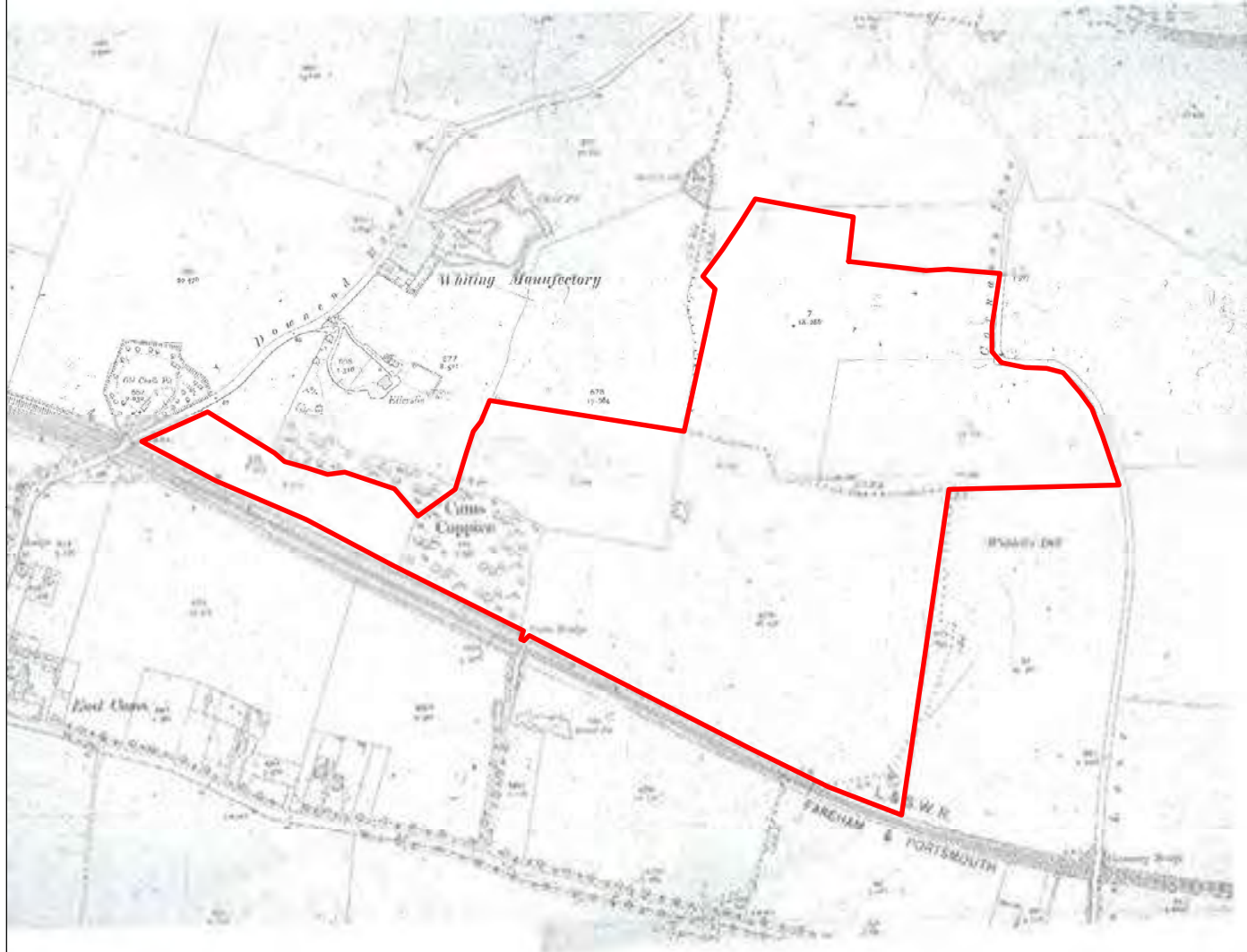


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Scale at A4: 1:7,500



Figure 6:
1898 Ordnance Survey



 Site Boundary

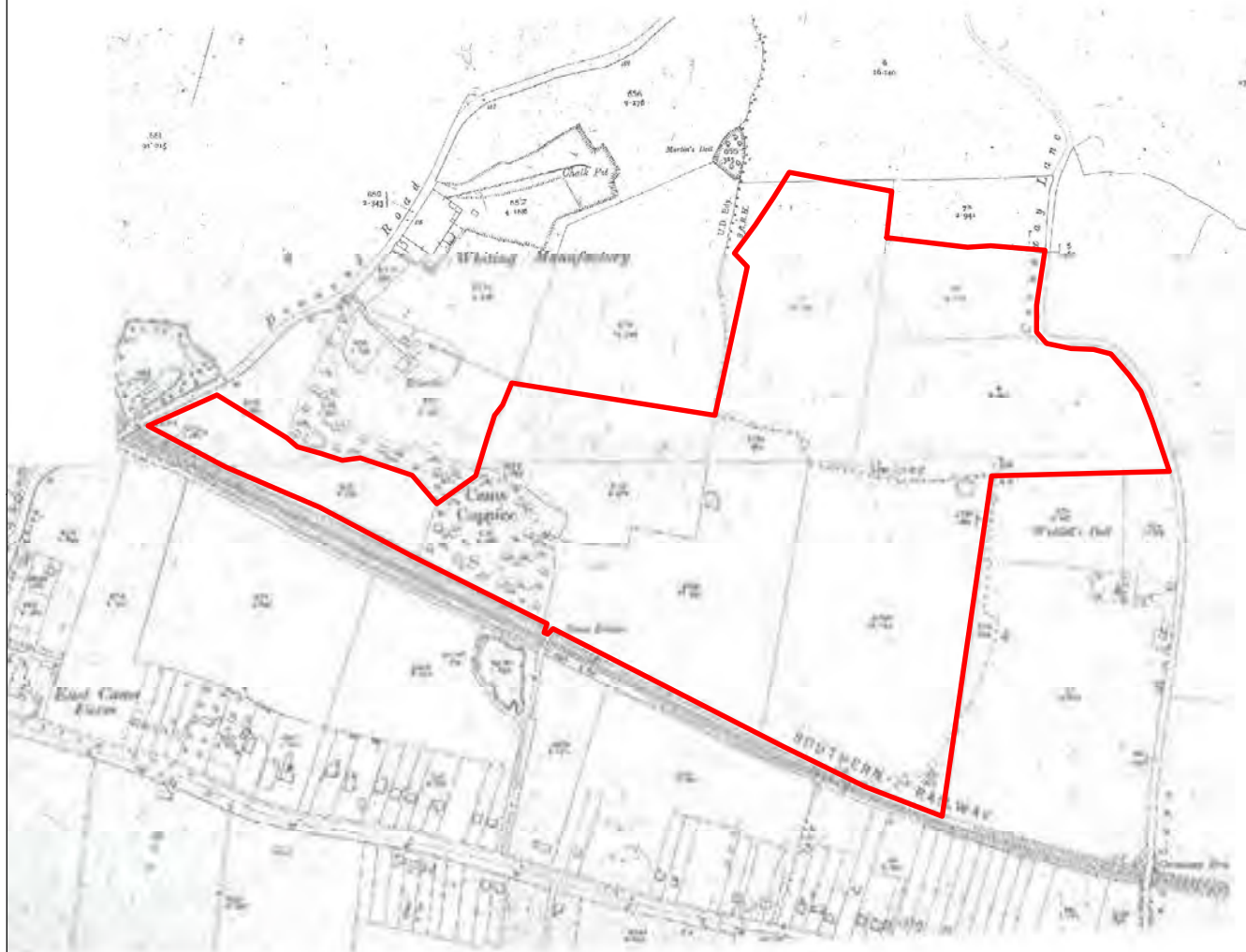


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Scale at A4: 1:7,500



Figure 7:
1910 Ordnance Survey



 Site Boundary

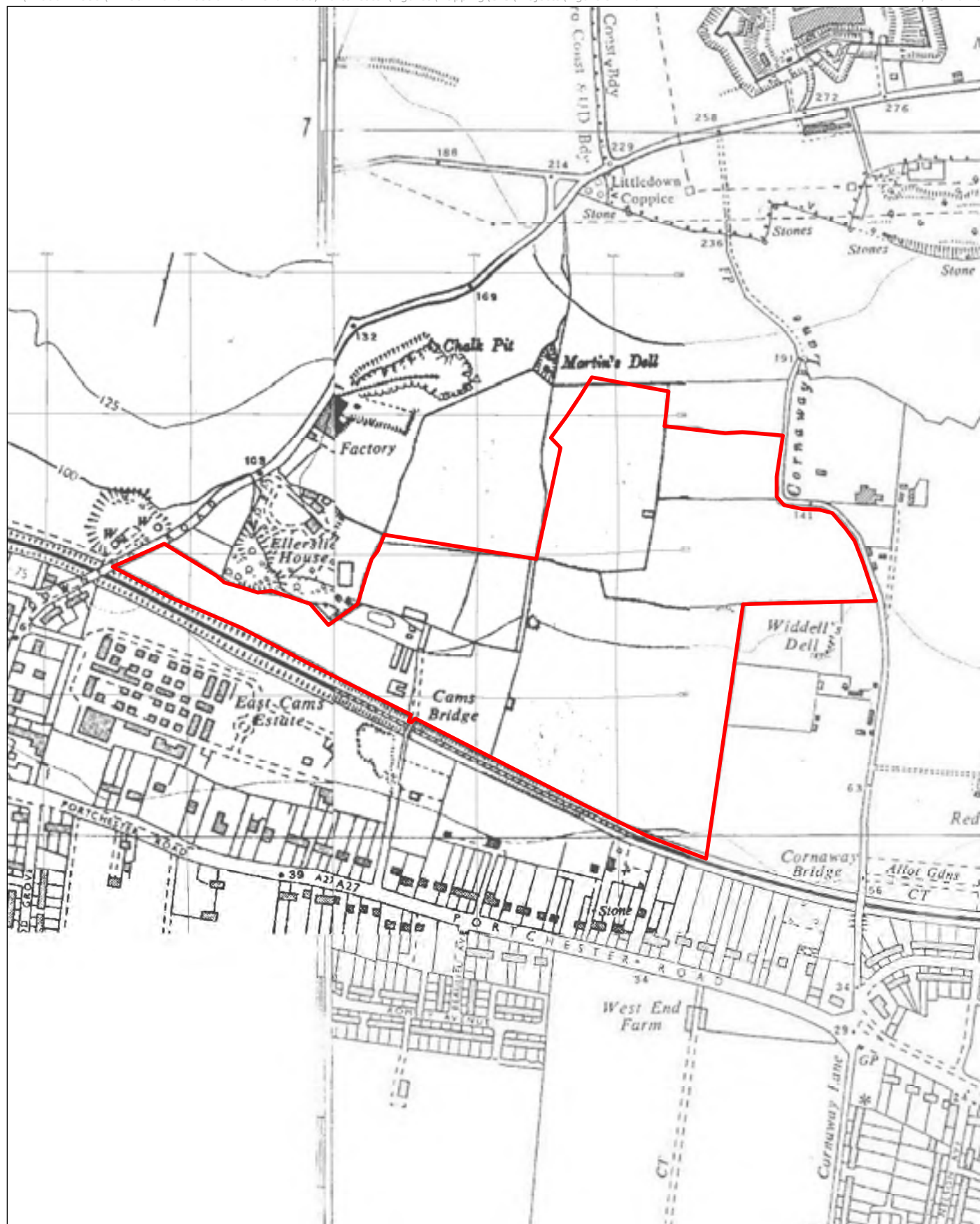


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Scale at A4: 1:7,500



Figure 8:
1932 Ordnance Survey



Site Boundary

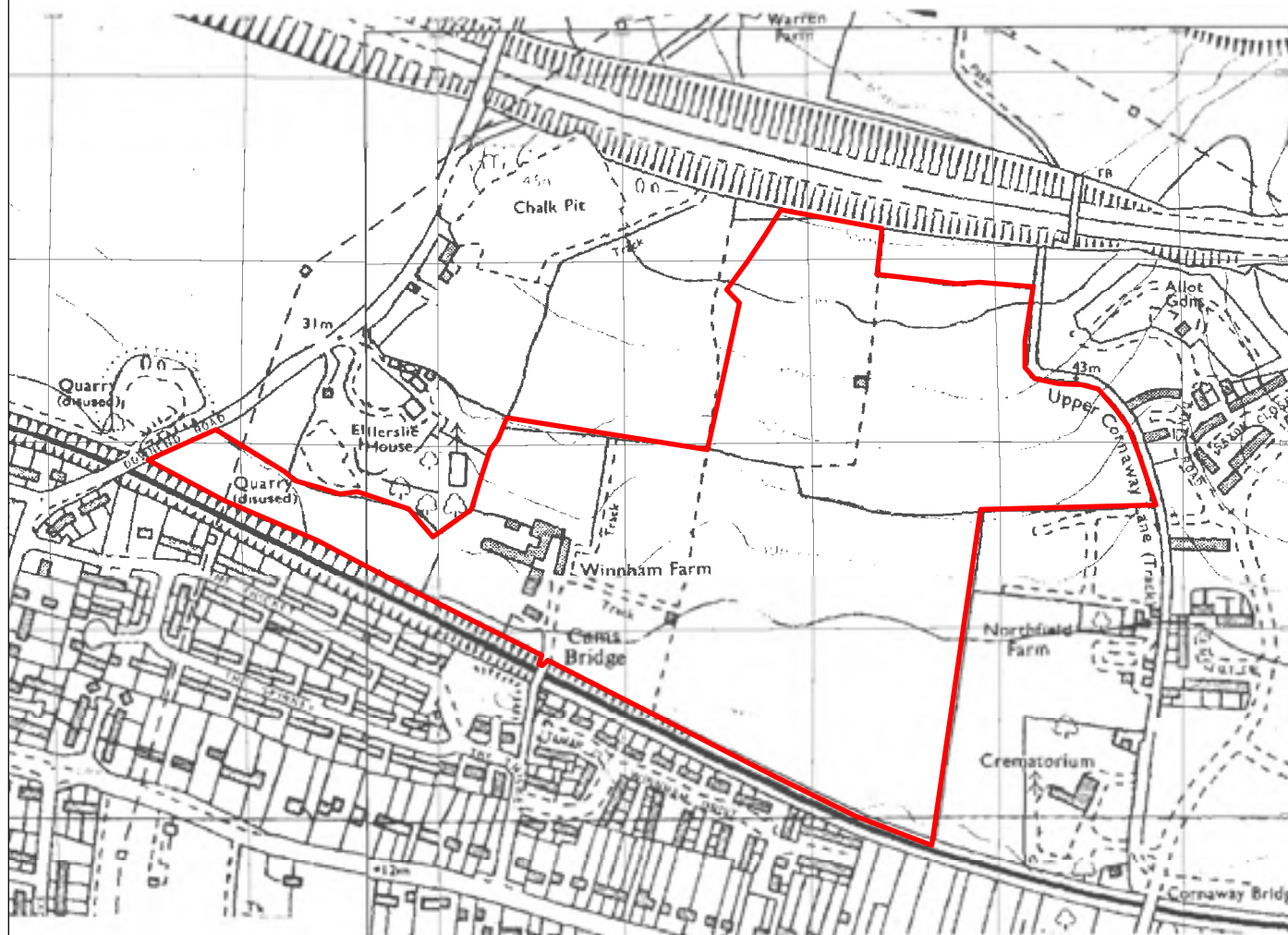


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Scale at A4: 1:7,500



Figure 9:
1962 Ordnance Survey



 Site Boundary



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Scale at A4: 1:7,500



Figure 10:
1978 Ordnance Survey



 Site Boundary



Scale at A4: 1:7,500



Figure 11:
1999 Google Earth
Image



□ Site Boundary

--- Historic Boundary of Potential Interest



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Scale at A4: 1:7,500



Figure 12:
2016 Google Earth
Image



 Site Boundary




Scale at A4: 1:6,500



Figure 13:
Proposed Development
within Site Boundary



 Site Boundary

LIDAR DATA
Data Type: DSM
Resolution: 1M
 Direction of Illumination



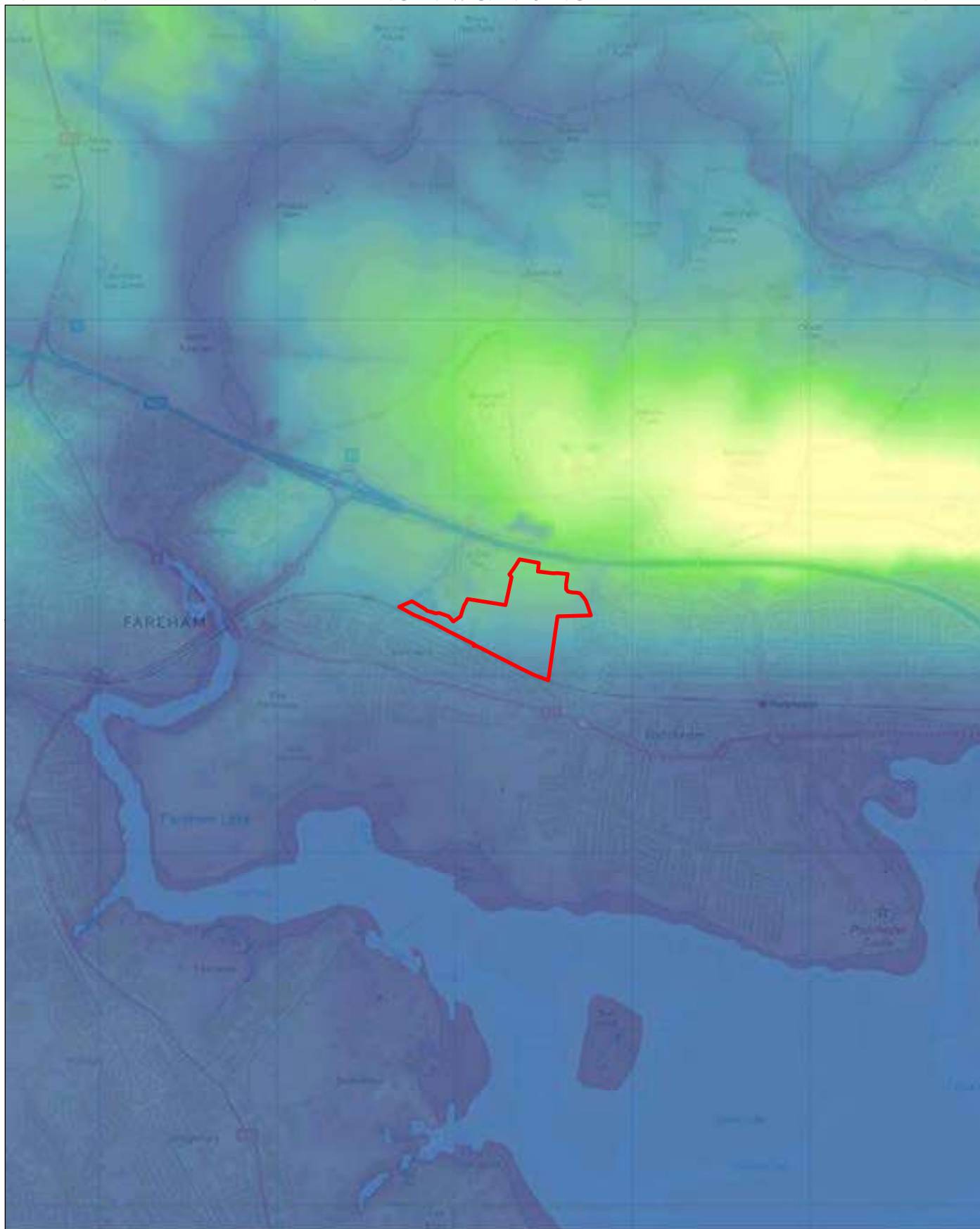

Scale at A3: 1:4,000


Figure 14:
LiDAR Data Plot



 Site Boundary

Elevation (m aOD)

100+

0

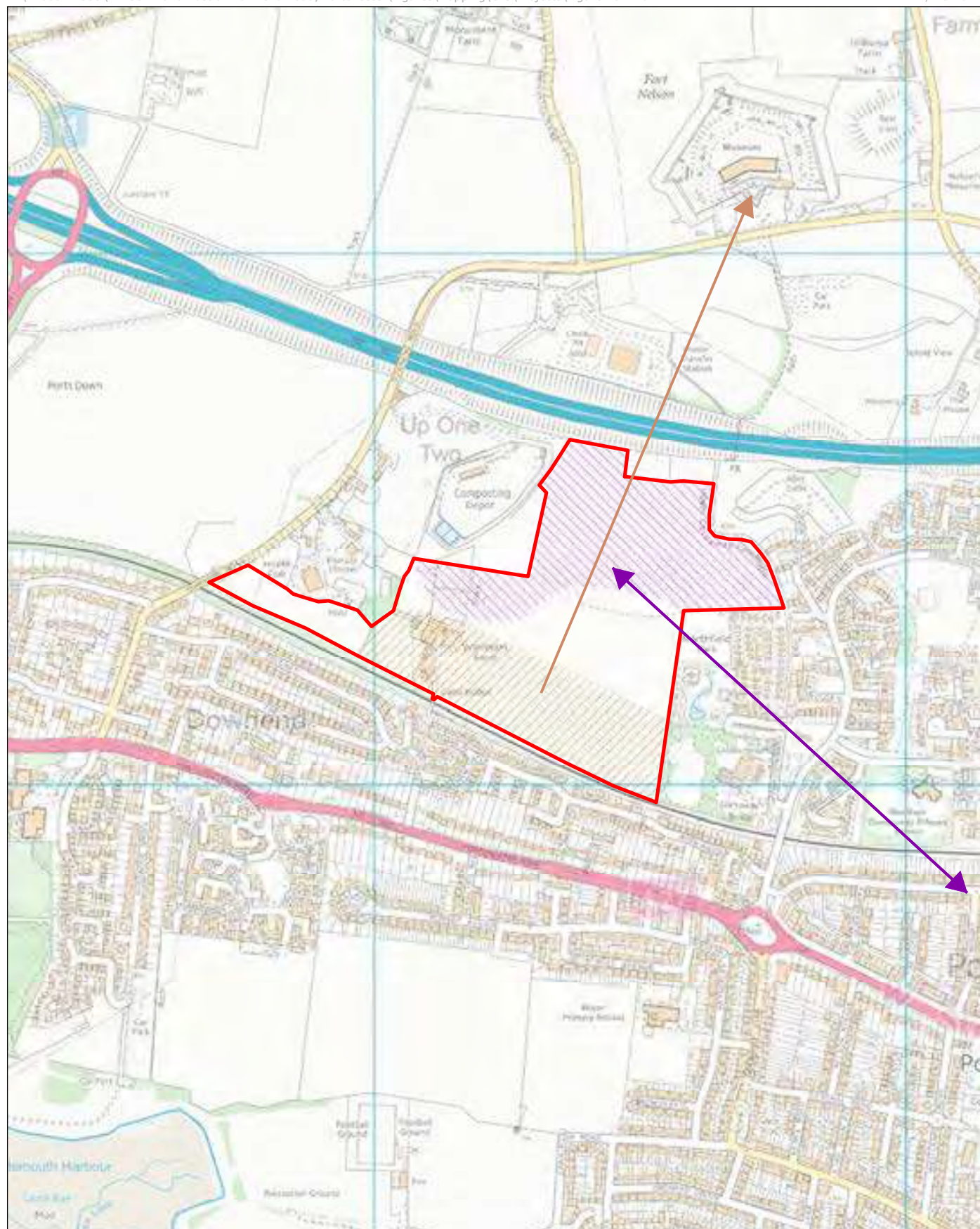


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Scale at A4: 1:30,000

0 600 m

Figure 15:
General Topography



 Site Boundary

Visibility
 Portchester Castle

Fort Nelson



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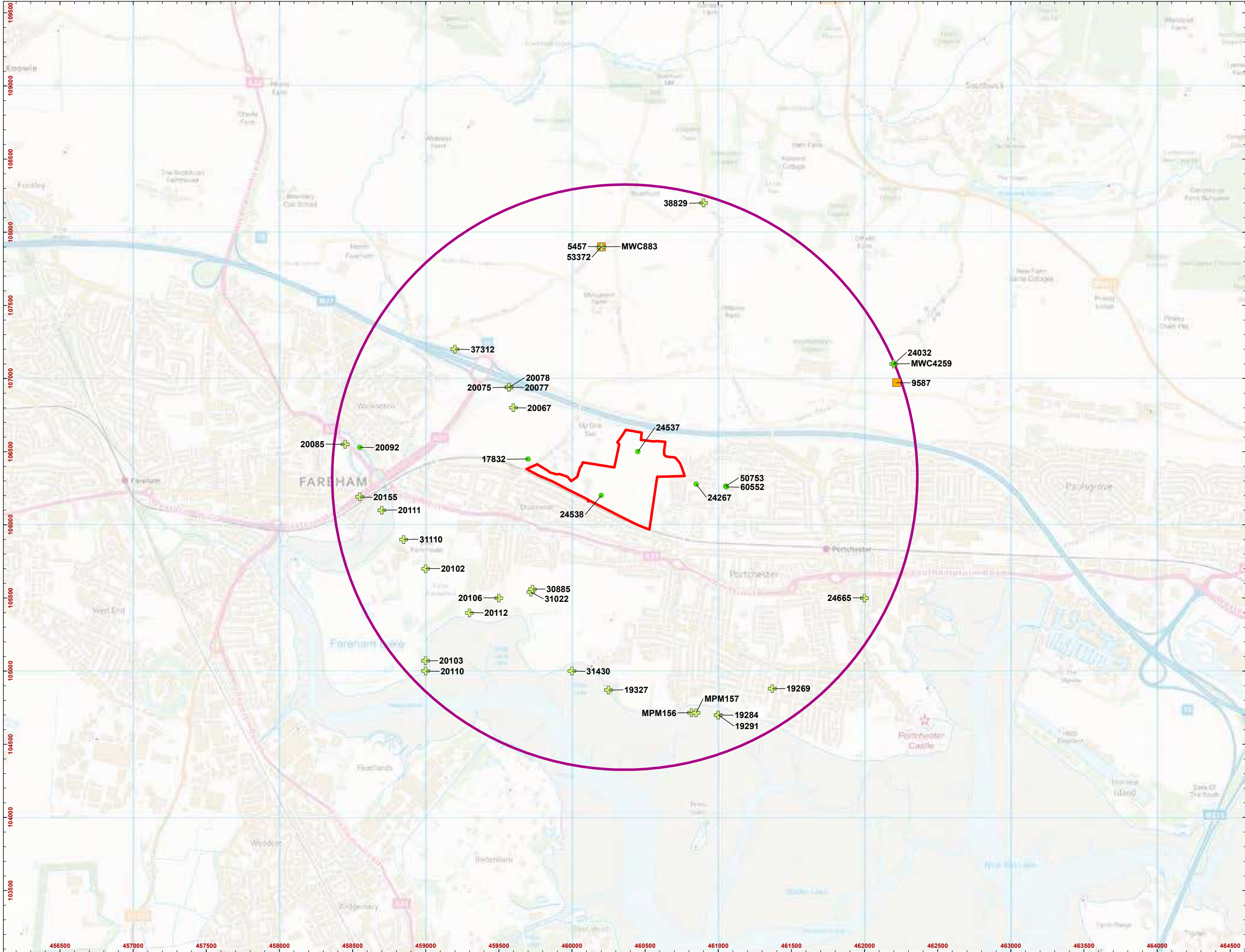
Scale at A4: 1:10,000

0 225 m

Figure 16:
 Visibility of Scheduled
 Monuments from the
 Desk based study site

Appendix 1:

Palaeolithic and Mesolithic (data from Hampshire, Portsmouth and Winchester HER)



- Site Boundary
- Search Radius 2km
- Non-Designated Assets:
- HER Record (Point)
 - Find Spot
 - Monument
- Previous Archaeological Work:
 - HER Event (Point)

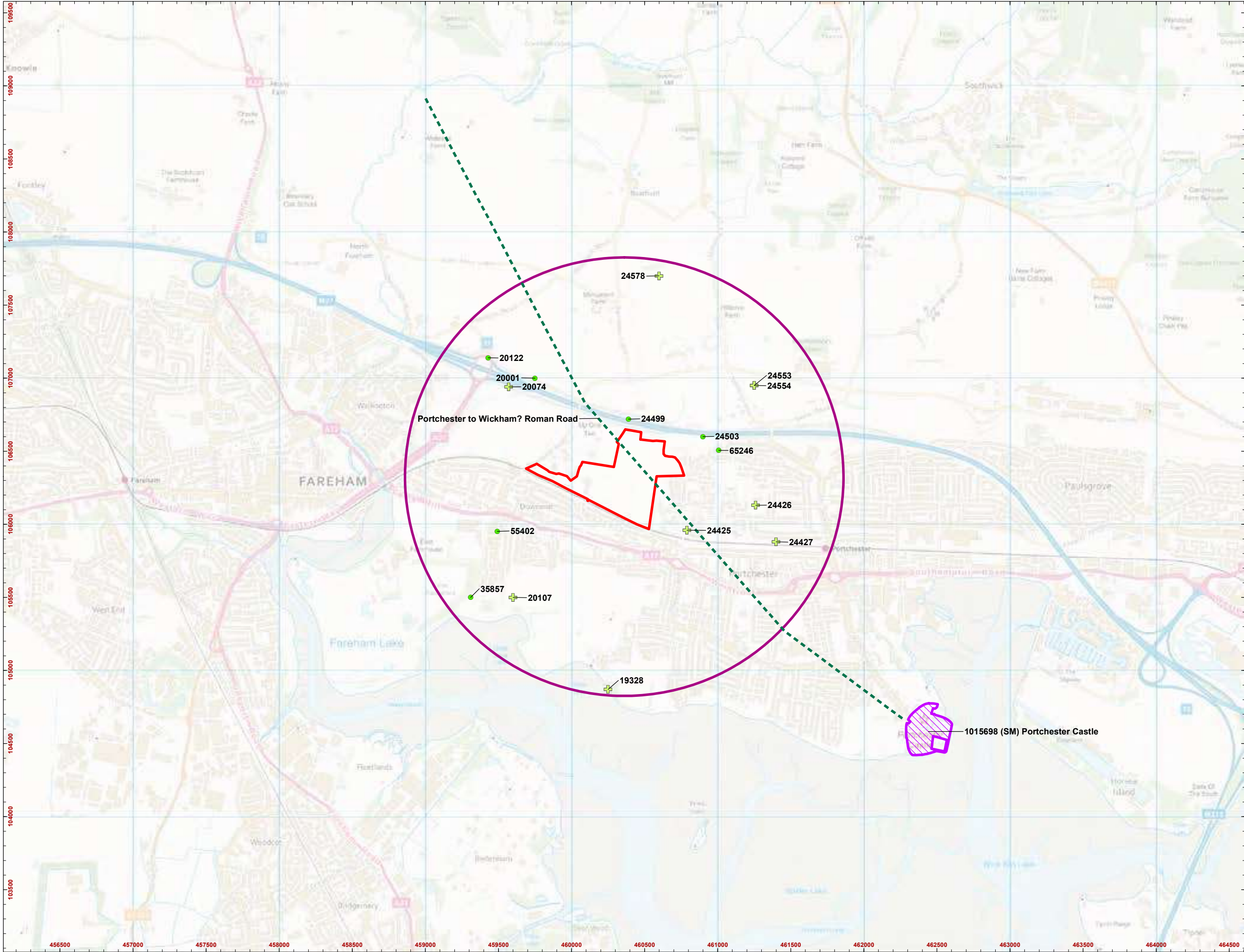


Scale at A3: 1:24,000
0 800m

Appendix 1:
Palaeolithic and
Mesolithic (data from
Hampshire, Portsmouth
and Winchester HER)

Appendix 2:

Late Prehistoric and Roman (data from Hampshire, Portsmouth and Winchester HER)



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- Site Boundary
- Search Radius 1.5km
- Designated Assets:
 - Scheduled Monument
- Non-Designated Assets:
 - HER Record (Point)
 - Find Spot
 - Monument
- Other Archaeological Records:
 - Roman Road

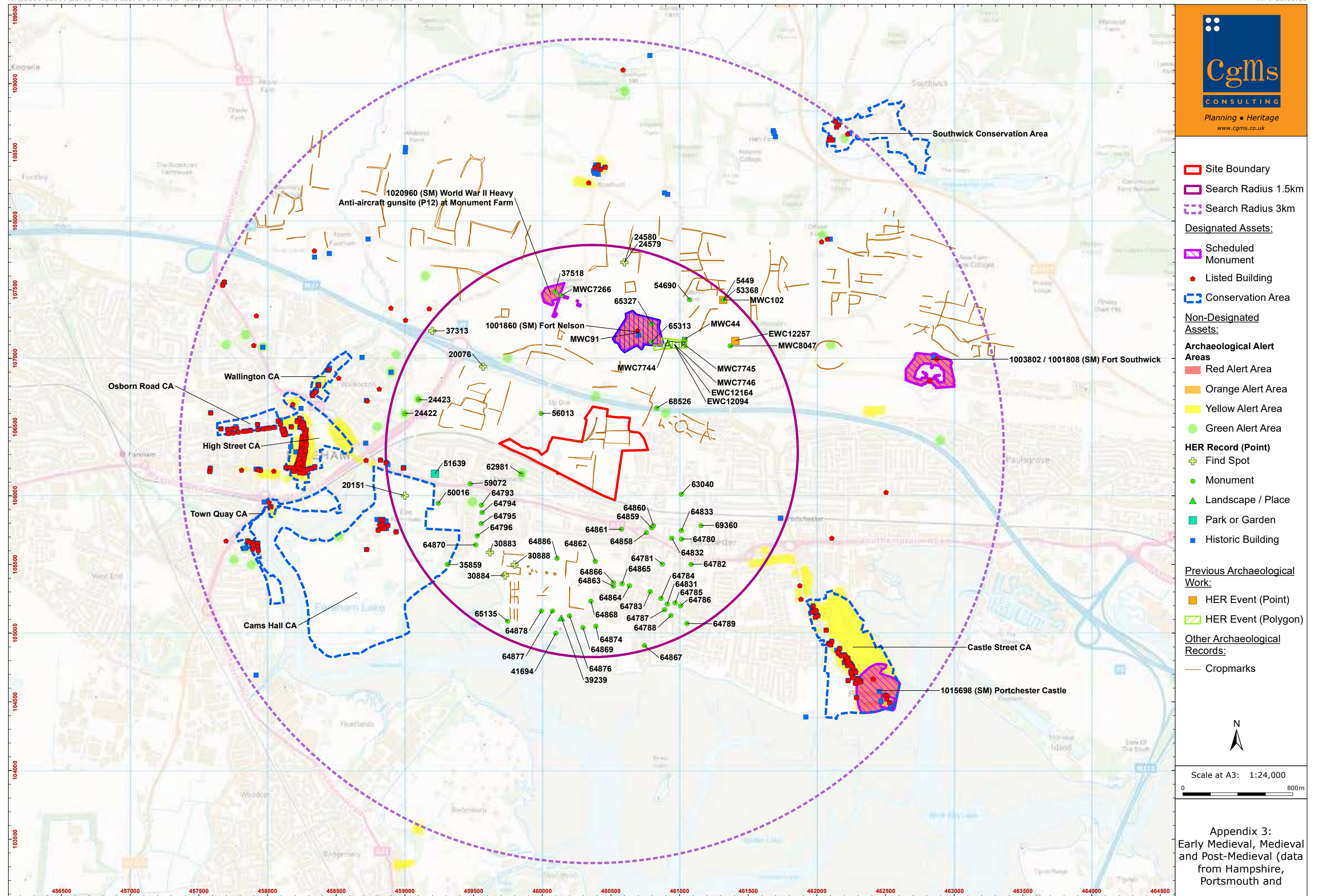


Scale at A3: 1:24,000
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Appendix 2:
Late Prehistoric and
Roman (data from
Hampshire, Portsmouth
and Winchester HER)

Appendix 3

Early Medieval, Medieval and Post-Medieval
(data from Hampshire, Portsmouth and Winchester HER)



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Scale at A3: 1:24,000

0 800m

Appendix 3:
Early Medieval, Medieval
and Post-Medieval (data
from Hampshire,
Portsmouth and



Plate 1: View of desk based study site taken from south-western boundary, facing north-east



Plate 2: View of desk based study site taken from western boundary, facing south-east



Plate 3: View of desk based study site taken from south-western boundary, facing north



Plate 4: View of desk based study site taken from north-western boundary, facing south



Plate 5: View of desk based study site taken from northern boundary, facing south



Plate 6: View of desk based study site taken from northern boundary, facing south



Plate 7: View of desk based study site taken from northern boundary, facing south-east



Plate 8: View of desk based study site taken from the eastern boundary, facing north-west



Plate 9: View of desk based study site taken from the eastern boundary, facing west



Plate 10: View of desk based study site taken from Fort Nelson (SM 1001860), facing south



Plate 11: View of desk based study site taken from Fort Nelson (SM 1001860), facing south



Plate 12: View of desk based study site taken from Portchester Castle (SM 1015698), facing north-west

Appendix B
**Land East of Downend Road, Portchester, Hampshire, Geophysical
Survey Report (GSB 2017)**

GEOPHYSICAL SURVEY REPORT G16112

Land East of Downend Road
Portchester
Hampshire

Client:

GSB
PROSPECTION Ltd

*Celebrating over 30 years
at the forefront of
Archaeological Geophysics*



On behalf Of%

' #Per Ho! es(

GEOPHYSICAL SURVEY REPORT

Project name: Land East of Downend Road, Portchester
Job ref: G16112
Client: CgMs Consulting
Survey dates: 5 – 9 December 2016
Report date: 4 January 2017
Field Co-ordinator: Rebecca Vickers BSc
Field team: David Stockwell BA, Rebecca Bowran BA
Report written by: Joe Perry BA
CAD illustrations by: Joe Perry BA, Tom Cockcroft MSc
Report approved by: Dr John Gater MCIfA FSA
Project Director: Dr John Gater MCIfA FSA
Version number and issue date: V1: 4 January 2017



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TABLE OF CONTENTS

1	SUMMARY OF RESULTS	1
2	INTRODUCTION	1
3	METHODS, DATA PROCESSING & PRESENTATION	2
4	RESULTS	3
5	DATA APPRAISAL & CONFIDENCE ASSESSMENT	3
6	CONCLUSION	3
7	REFERENCES	4

LIST OF FIGURES

Figure 1	1:50 000	Site Location Diagram
Figure 2	1:5000	Location of Survey Areas
Figure 3	1:5000	Magnetometer Survey (All Areas) – Greyscale Plots
Figure 4	1:5000	Magnetometer Survey (All Areas) – Interpretation
Figure 5	1:2500	Magnetometer Survey (Areas 1 - 3) – Greyscale Plots
Figure 6	1:2500	Magnetometer Survey (Areas 1 - 3) – Interpretation
Figure 7	1:2500	Magnetometer Survey (Areas 3 - 7) – Greyscale Plots / Interpretation

APPENDICES

Appendix A Technical Information: Magnetometer Survey Method

Appendix B Technical Information: Magnetic Theory

DIGITAL CONTENT (CD)

- Minimally Processed Greyscale Images and XY Trace Plots in DWG format
- DWG Viewer
- Digital Copies of Report Text and Figures (both PDF and native formats)

1 SUMMARY OF RESULTS

No anomalies of archaeological interest were detected. A number of weak trends of uncertain origin were identified, as well as old field boundaries and past agriculture regimes.

2 INTRODUCTION

2.1 Background synopsis

GSB Prospection Ltd. was commissioned to undertake a geophysical survey of an area proposed for residential development. This survey forms part of an archaeological investigation being undertaken by **CgMs Consulting** on behalf of **Miller Homes**.

2.2 Site Details

NGR / Postcode	SU 603 062 / PO16 8QF
Location	The site is approximately 1km northwest of Portchester town centre and 3km east of Fareham. It is bounded to the north by the M27 and the Southampton to Portsmouth railway line runs to the south.
HER/SMR	Hampshire
District	Fareham
Parish	Fareham (unparished)
Topography	The land slopes downwards from the north at c.55m OD to c.15m in the south.
Current Land Use	Agricultural
Soils	Unsurveyed - mostly urban and industrial areas (SSEW 1983).
Geology	Portsdown Chalk Formation – chalk. Spetisbury Chalk Member – chalk, Lewes Nodular Chalk Formation – Seaford Chalk Formation, Newhaven Chalk Formation. Culiver Chalk Formation – Superficial deposits – Head: Clay, Silt, Sand and Gravel (BGS 2017).
Archaeology	No known archaeology within application area. A possible Roman road running through the study area has been postulated (CgMs 2016).
Survey Methods	Detailed magnetometer survey (fluxgate gradiometer)
Study Area	27.2 ha

2.3 Aims and objectives

To locate and characterise any anomalies of possible archaeological interest within the study area.

3 METHODS, PROCESSING & PRESENTATION

3.1 Standards & Guidance

This report and all fieldwork have been conducted in accordance with the latest guidance documents issued by Historic England (EH 2008) (then English Heritage) and the Chartered Institute for Archaeologists (IfA 2002 & ClfA 2014).

3.2 Survey methods

Detailed magnetic survey was chosen as an efficient and effective method of locating archaeological anomalies.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1m	0.25m

More information regarding this technique is included in Appendix A

3.3 Data Processing

The following schedule shows the basic processing carried out on the data used in this report:

1. *De-stripe*
2. *De-stagger*

3.4 Presentation of results and interpretation

The presentation of the data for each site involves a greyscale plot of processed data. Magnetic anomalies have been identified, interpreted and plotted onto the 'Interpretation' drawings. The minimally processed data are provided as a greyscale image on the CD together with an XY trace plot in CAD format. A CAD viewer is also provided.

When interpreting the results several factors are taken into consideration, including the nature of archaeological features being investigated and the local conditions at the site (geology, pedology, topography etc.). Anomalies are categorised by their potential origin. Where responses can be related to very specific known features documented in other sources, this is done (for example: Abbey Wall, Roman Road). For the generic categories levels of confidence are indicated, for example: probable, or possible archaeology. The former is used for a confident interpretation, based on anomaly definition and/or other corroborative data such as cropmarks. Poor anomaly definition, a lack of clear patterns to the responses and an absence of other supporting data reduces confidence, hence the classification "possible".

4 RESULTS

- 4.1 No anomalies of archaeological interest were detected. No evidence of the postulated Roman road was identified.
- 4.2 A number of long, linear anomalies on varying orientations are visible in Area 1. All correspond with field divisions recorded on an 1868-69 Ordnance Survey map, and have therefore been assigned to the category *Former Field Boundary*.
- 4.3 Parallel linear responses are visible within the dataset. The broader, more widely spaced anomalies indicate past ridge and furrow cultivation.
- 4.4 Several weak trends were detected. No clear patterns are formed and their distribution suggests that they are of agricultural, possibly relatively recent, origin. They are therefore categorised as *Uncertain Origin*.
- 4.5 A band of weak, amorphous anomalies bisecting Area 2 from east to west is typical of responses due to natural soil effects, possibly a palaeochannel. However, the linear nature and the fact that the ridge and furrow cultivation seems to stop at the anomaly suggest that it could be an old boundary. As such, it has also been assigned to the category *Uncertain Origin*.
- 4.6 Small areas of magnetic disturbance were recorded in Areas 1 and 2. The small zone of disturbance in Area 1 may relate to the former field boundary. The zone of disturbance in Area 2 correlates with a former chalk pit, recorded on OS mapping.
- 4.7 Ferrous responses adjacent to boundaries are due to fences and gates. Smaller scale ferrous anomalies ("iron spikes") are present throughout the data and their form is best illustrated in the XY trace plots. These responses are characteristic of small pieces of ferrous debris in the topsoil and are commonly assigned a modern origin. The most prominent of these are highlighted on the interpretation diagram. Two ferrous features stand out from the rest of the data, the first being a large anomaly in the western part of Area 2 [1], which correlates with a chalk pit seen on historic mapping. The other anomaly [2] lies in the north-eastern edge of the survey area; this increased response is most likely magnetic material dumped as consolidation material.

5 DATA APPRAISAL & CONFIDENCE ASSESSMENT

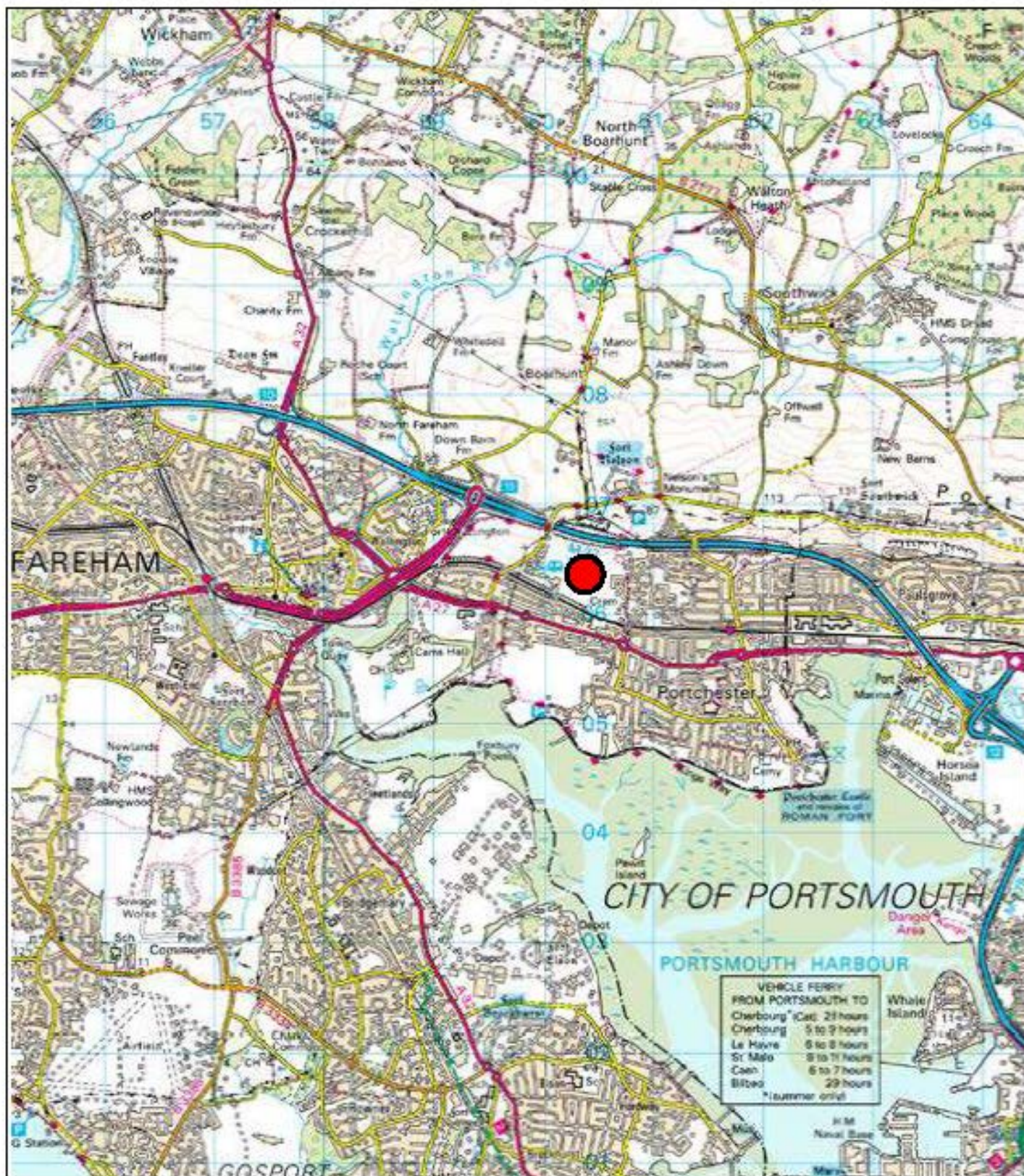
- 5.1 Historic England (then English Heritage) Guidelines (EH 2008) Table 4 states that the average magnetic response over chalk is good. This is confirmed as anomalies associated with ridge and furrow and former field boundaries have been detected.

6 CONCLUSION

- 6.1 The survey did not identify any anomalies of archaeological potential.
- 6.2 Former field boundaries were located and evidence of past ridge and furrow cultivation was identified.
- 6.3 A number of weak trends of uncertain origin were detected; they are likely to be due to agricultural or natural effects.
- 6.4 Small areas of magnetic disturbance were recorded.

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Site Location



Title:

Site Location Diagram

Client:

CgMs Consulting Ltd.

Project:

G16112
Land East of Downend Road
Portchester

GSB
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CONTRIBUTOR
7/2004
1/2004 ON
REVISION
10-2004

1/1 0 21328-1

1/1 0 21328-2

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Scale:

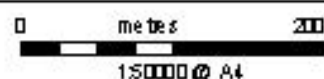
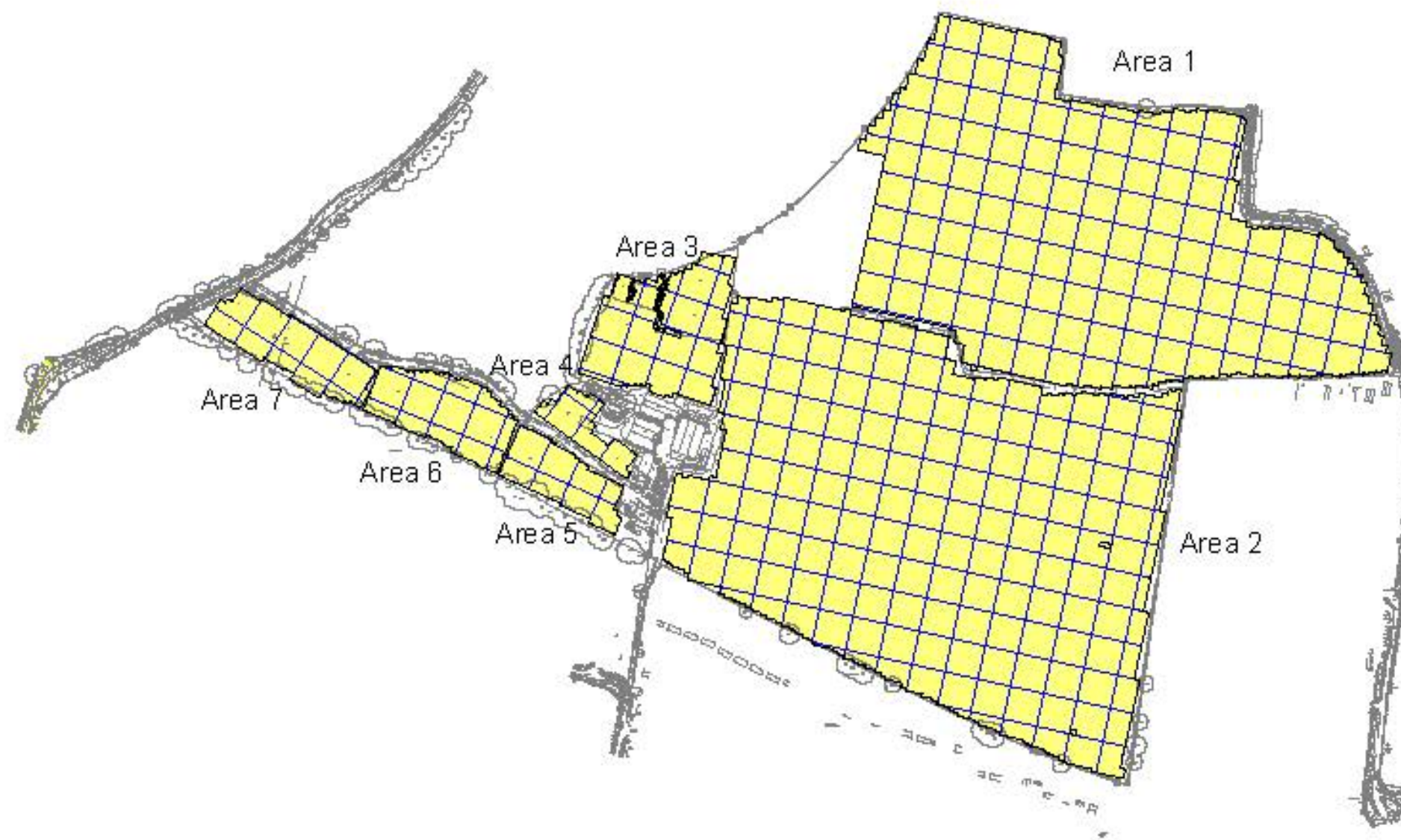


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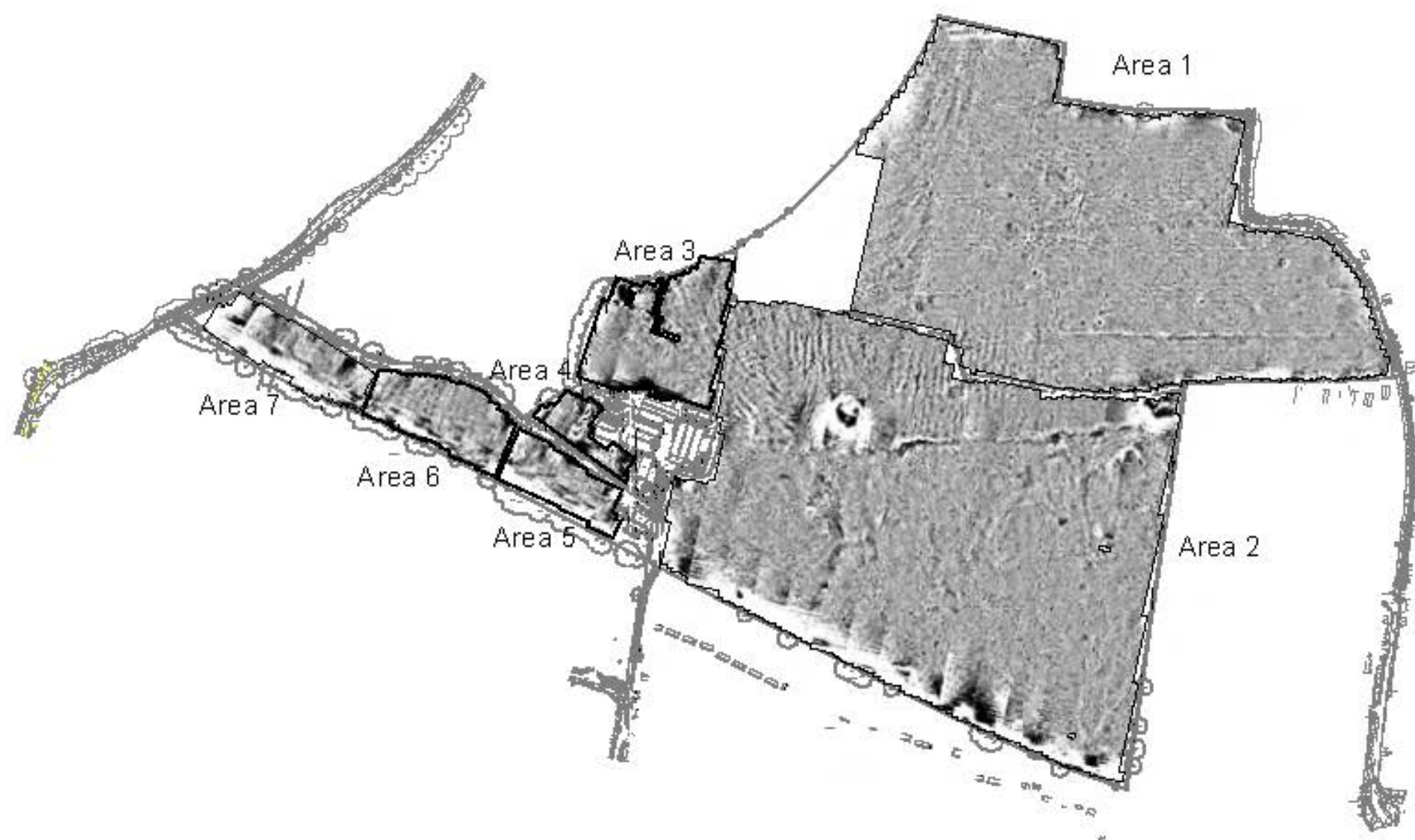
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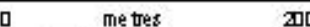
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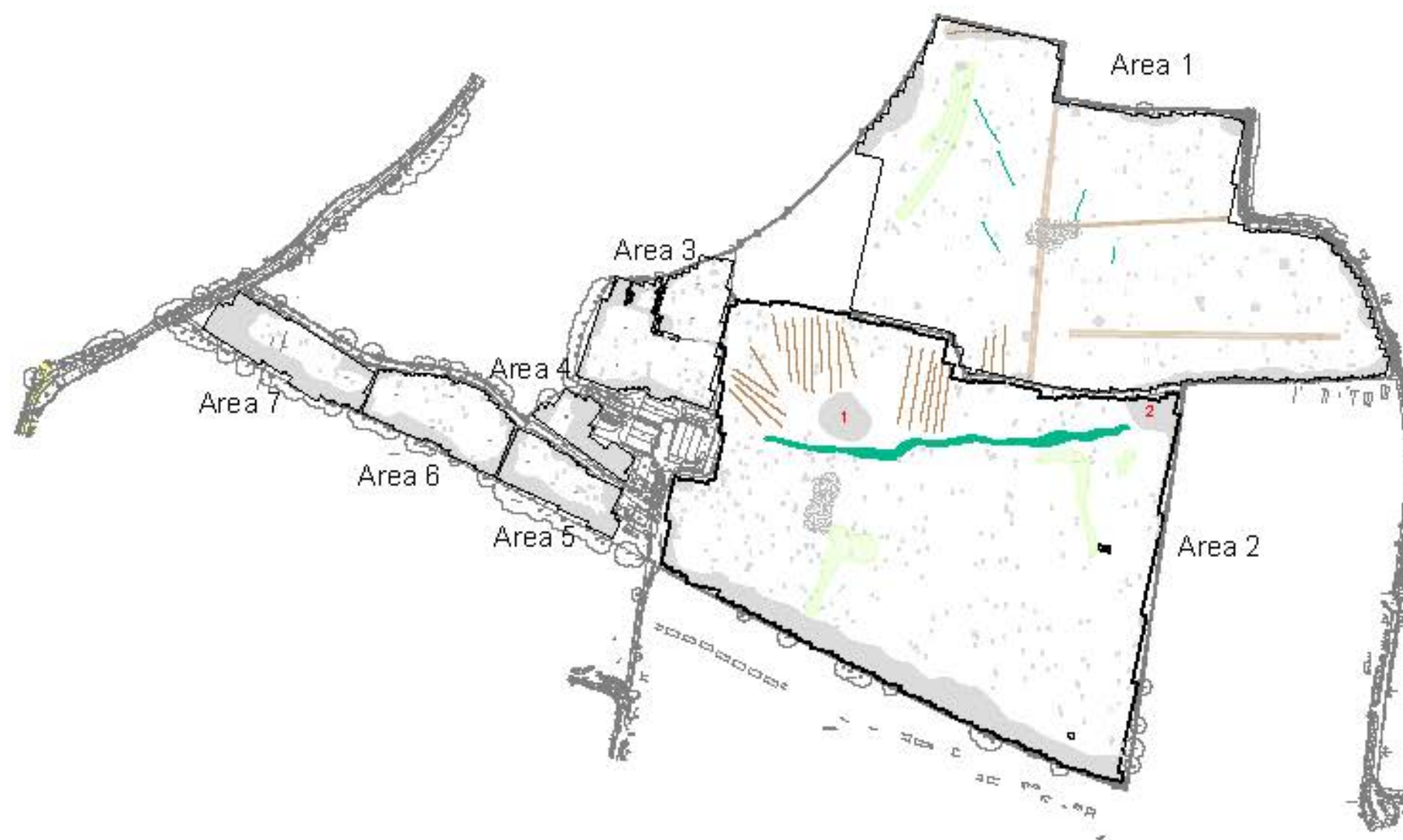
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Fig No:	2
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Project: G16112 Land East of Downend Road Portchester	
Scale:  1:5000 @ A3	Fig No: 3



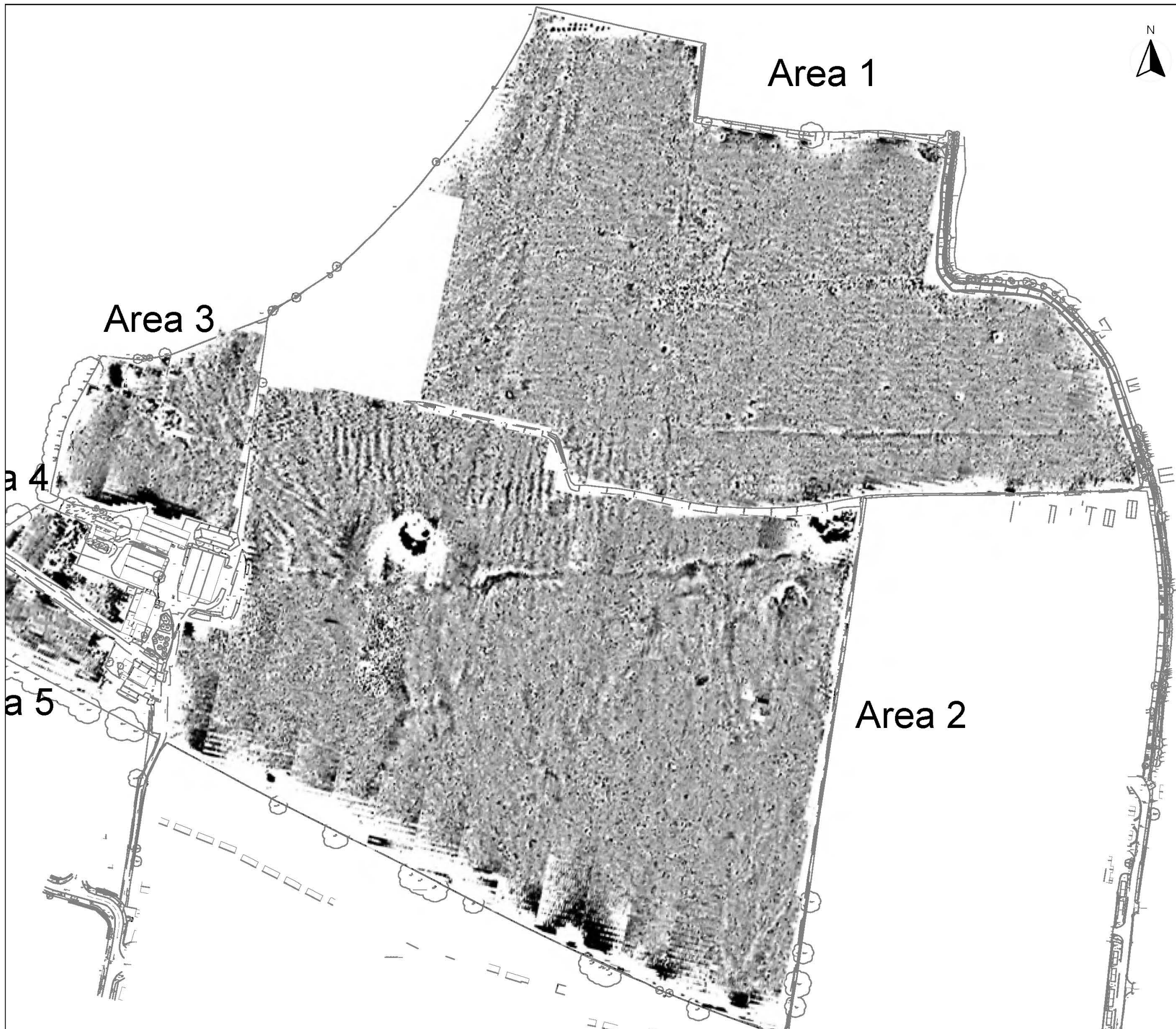
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|---|--|
|  Former Field Boundary - Mapped |  Magnetic Disturbance |
|  Ridge and Furrow |  Ferrous |
|  Uncertain Origin (discrete anomaly/trend) | |
|  Natural | |

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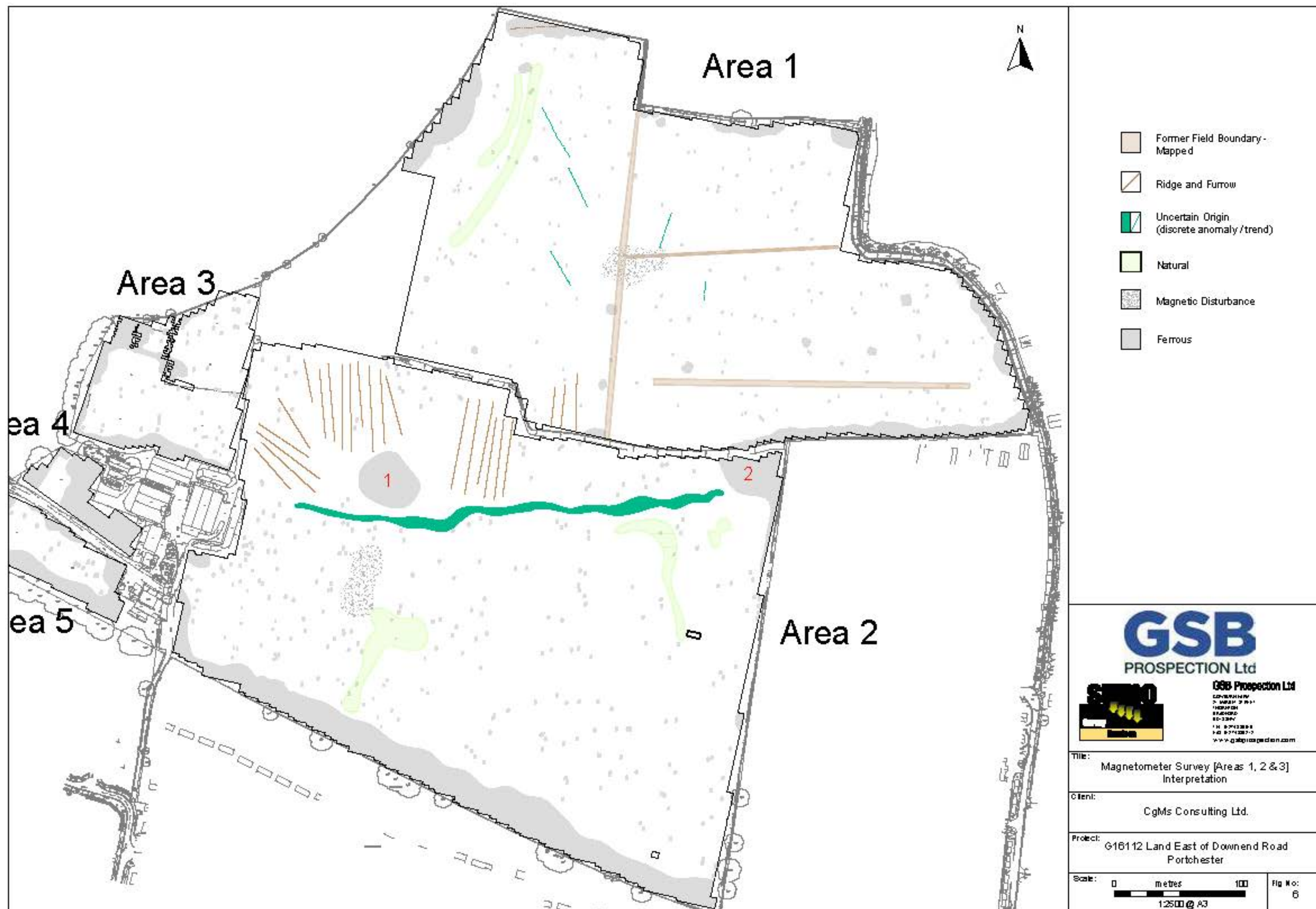
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Greyscale Plots

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Project: G16112 Land East of Downend Road
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Fig No: 5



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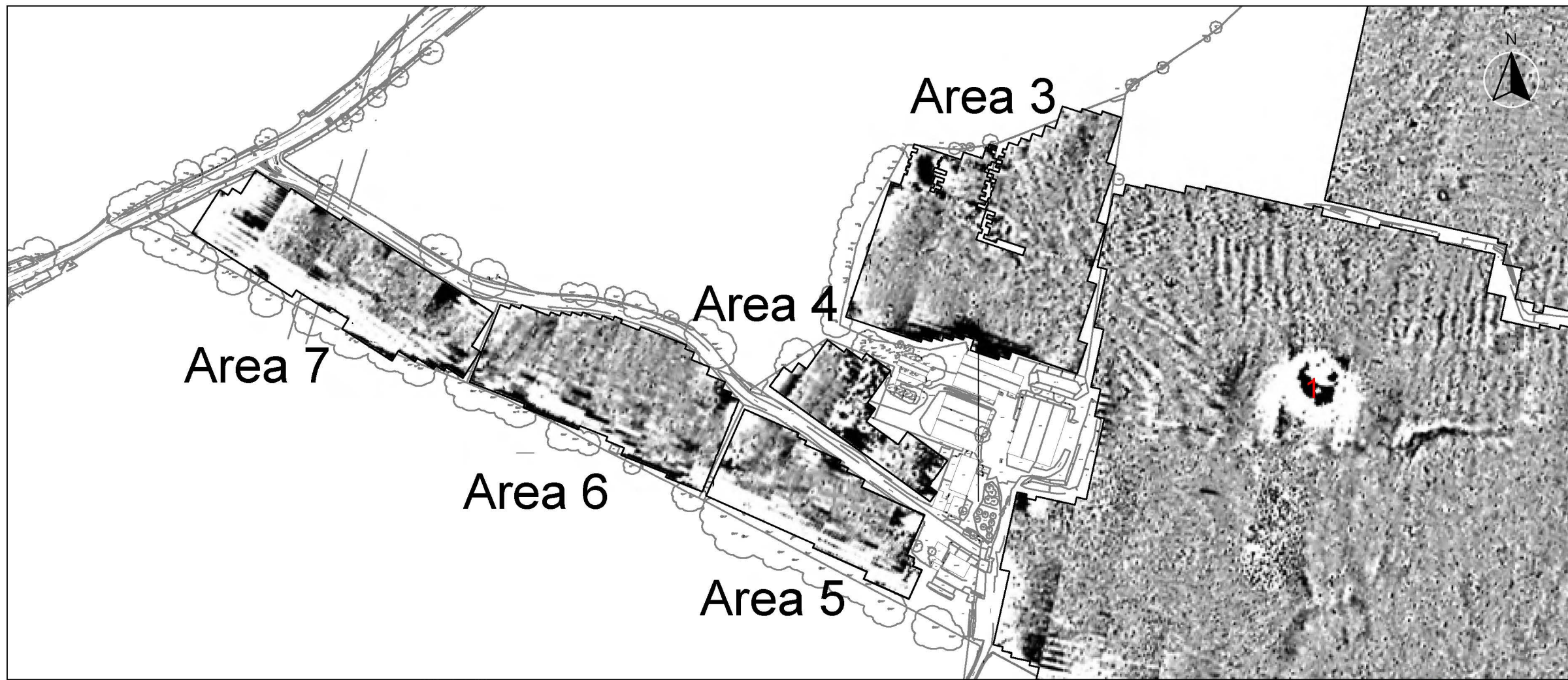
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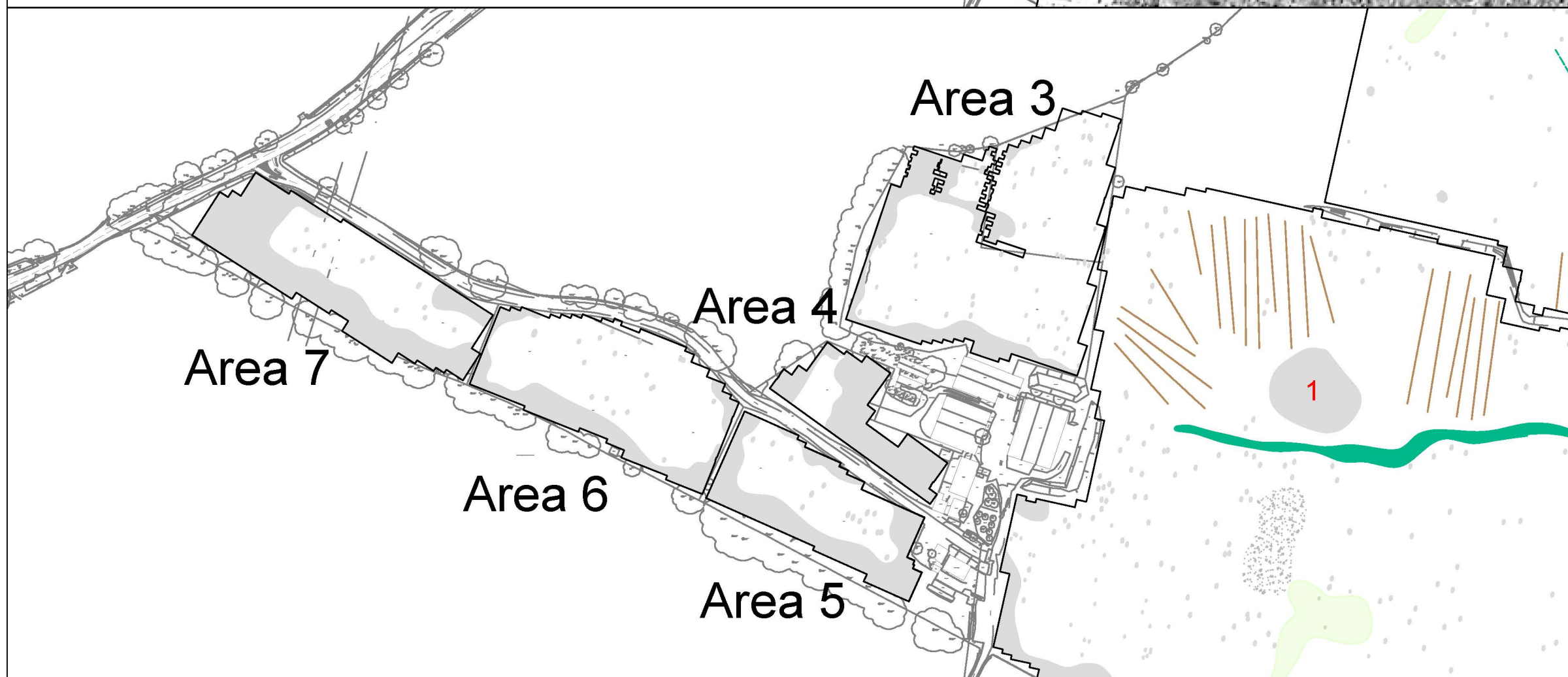
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Scale: 0 metres 100
1:2500 @ A3

Fig No: 6



- Former Field Boundary - Mapped
- Ridge and Furrow
- Uncertain Origin (discrete anomaly / trend)
- Natural
- Magnetic Disturbance
- Ferrous



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sumo
Survey Services

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Greyscale Plots / Interpretation

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Project: G16112 Land East of Downend Road,
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Scale: 0 metres 100

1:2500 @ A3

Fig No: 7

Appendix A - Technical Information: Magnetometer Survey Method

Grid Positioning

For hand held gradiometers the location of the survey grids has been plotted together with the referencing information. Grids were set out using a Trimble R8 Real Time Kinematic (RTK) VRS Now GNSS GPS system.

For CARTEASY^N collected data each data point had its position recorded using a Trimble R10 Real Time Kinematic (RTK) VRS Now GNSS GPS system. The geophysical survey area is georeferenced relative to the Ordnance Survey National Grid.

An RTK GPS (Real-time Kinematic Global Positioning System) can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. This results in an accuracy of around 0.01m.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1m	0.25m
Magnetometer	CartEasy ^N cart system (Bartington Grad 601 sensors)	0.75m	0.125m

Instrumentation: Bartington Grad601-2 / GSB CARTEASY^N Cart system

Both the Bartington and CARTEASY^N instruments operate in a gradiometer configuration which comprises fluxgate sensors mounted vertically, set 1.0m apart. The fluxgate gradiometer suppresses any diurnal or regional effects. The instruments are carried, or cart mounted, with the bottom sensor approximately 0.1-0.3m from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is measured in nanoTesla (nT). The sensitivity of the instrument can be adjusted; for most archaeological surveys the most sensitive range (0.1nT) is used. Generally, features up to 1m deep may be detected by this method, though strongly magnetic objects may be visible at greater depths. The Bartington instrument can collect two lines of data per traverse with gradiometer units mounted laterally with a separation of 1.0m. The CARTEASY^N system has four gradiometer units mounted at 0.75m intervals across its frame – rather than working in grids, the cart uses an on-board survey grade GNSS for positioning. The cart system allows for the collection of topographic data in addition to the magnetic field measurements.

The readings are logged consecutively into the data logger which in turn is daily down-loaded into a portable computer whilst on site. At the end of each site survey, data is transferred to the office for processing and presentation.

Data Processing

Zero Mean Traverse	This process sets the background mean of each traverse within each grid to zero. The operation removes striping effects and edge discontinuities over the whole of the data set.
Step Correction (Destagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.
Interpolation	When geophysical data are presented as a greyscale, each data point is represented as a small square. The resulting plot can sometimes have a 'blocky' appearance. The interpolation process calculates and inserts additional values between existing data points. The process can be carried out with points along a traverse (the x axis) and/or between traverses (the y axis) and results in a smoother greyscale image.

Display

XY Trace Plot	This involves a line representation of the data. Each successive row of data is equally incremented in the Y axis, to produce a stacked profile effect. This display may incorporate a hidden-line removal algorithm, which blocks out lines behind the major peaks and can aid interpretation. The advantages of this type of display are that it allows the full range of the data to be viewed and shows the shape of the individual anomalies. The display may also be changed by altering the horizontal viewing angle and the angle above the plane.
Greyscale Plot	This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly all values below the given range are represented by the minimum intensity shade.

Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall*, etc.) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

<i>Probable Archaeology</i>	This term is used when the form, nature and pattern of the response are clearly or very probably archaeological and /or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age.
<i>Possible Archaeology</i>	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
<i>Industrial / Burnt-Fired</i>	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
<i>Former Field Boundary (probable & possible)</i>	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. Possible denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary.
<i>Ridge & Furrow</i>	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases the response may be the result of more recent agricultural activity.
<i>Agriculture (ploughing)</i>	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
<i>Land Drain</i>	Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains will often lead and empty into larger diameter pipes and which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains.
<i>Natural</i>	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions.
<i>Magnetic Disturbance</i>	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present. They are presumed to be modern.
<i>Service</i>	Magnetically strong anomalies usually forming linear features indicative of ferrous pipes/cables. Sometimes other materials (e.g. pvc) cause weaker magnetic responses and can be identified from their uniform linearity crossing large expanses.
<i>Ferrous</i>	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.
<i>Uncertain Origin</i>	Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of <i>Possible Archaeology</i> and <i>Possible Natural</i> or (in the case of linear responses) <i>Possible Archaeology</i> and <i>Possible Agriculture</i> ; occasionally they are simply of an unusual form.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

Appendix B - Technical Information: Magnetic Theory

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock. Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.2 nanoTeslas (nT) in an overall field strength of 48,000nT, can be accurately detected.

Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in *magnetic susceptibility* and permanently magnetised *thermoremanent* material.

Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth's magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

Thermoremanence is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth's magnetic field on cooling. Thermoremanent archaeological features can include hearths and kilns and material such as brick and tile may be magnetised through the same process.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried field. The difference between the two sensors will relate to the strength of a magnetic field created by a buried feature, if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity, disturbance from modern services etc.



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Appendix C

Archaeology South East, 2020 Winnham Farm, Land East of Downend Road, Portchester, Hampshire. Report on the Phase 2 and Phase 3 Geoarchaeological Investigation

**Land East of Downend Road (Winnham Farm)
Porchester, Hampshire**

**Report on the Phase 2 and Phase 3
Geoarchaeological Investigation**

NGR: 460361 106326

**ASE Project no. 190776
ASE Report no: 2020083**

**Site Code: PLE 17
OASIS ID: archaeol6-372090**

**Prepared by Dr Matt Pope, with Letty Ingrey, Martin Bates
Karine Le Hégarat, Anna Doherty, Alice Dowsett
Dr Emily Johnson and Dr Matt Law**

**Land East of Downend Road (Winnham Farm)
Porchester, Hampshire**



**Report on the Phase 2 and Phase 3
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Karine Le Hégarat, Anna Doherty, Alice Dowsett
Dr Emily Johnson and Dr Matt Law**

Prepared by:	Matt Pope	Senior Geoarchaeologist	
Reviewed and approved by:	Dan Swift and Jon Sygrave	Project Manager	
Date of Issue:	April 2020		
Version:	3		

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Abstract

This report provides an account of Phases 2 and 3 of a Geoarchaeological Investigation carried out at Winnham Farm, Hampshire (NGR 60361 06326). The aim of the fieldwork was to build on the results of the Phase 1 Geoarchaeological Test Pitting (ASE 2017) and EM and ERT Geophysical Surveys (ASE 2019) to determine the presence, extent and significance of Palaeolithic archaeology and deposits with palaeoenvironmental potential.

A deep and complex sequence of Pleistocene sediments has now been characterized and mapped. While scientific dating and detailed palaeoenvironmental analysis of these sediments are needed to confirm the results, it appears that the site comprises part of a sequence of deposits associated with Raised Beaches, found across the Hampshire and Sussex coastal plain which includes Boxgrove, Norton Farm and Black Rock. An apparent marine cut platform with overlying brackish water sediments has been recorded underlying part of the site at a height consistent with the 420,000 year old Aldingbourne Raised Beach. Associated with this is a buried, steep c. 10m high chalk cliff line running east- west across the site, which is interpreted as part of this marine feature. The platform appears to be truncated by a later Pleistocene fluvial terrace from the former Solent river system, to the south.

Banked against the cliff is a deep sequence of apparent cold-stage chalk rubble and fine-grained deposits which, across one part of the site, preserve one or more paleosols. Close to the cliff this paleosol horizon appears to preserve a Palaeolithic locality in which artefact concentrations vary from ephemeral scatters to denser patches of material.

*Over 120 large, well preserved, flint artefacts, including cores and flake tools have been recovered from this deposit through systematic sieving of spoil. Provisionally, it is considered highly likely that these deposits form part of a zone of palaeolandscape-scale preservation in front of the cliff line and could well be a continuation of the Palaeolithic sites encountered at Red Barns 300m to the east. Given the quality of flint encountered in the rubble slopes, extraction activities by early human groups, possibly early *Homo neanderthalensis*, seem likely. The site has been zoned into areas of Geoarchaeological Potential in order to provide an indication of likely significance of the deposits across the site.*

Glossary

Calcrete/Breccia/Tufa: Deposits of calcium carbonate formed by slow moving or stationary bodies of hard water percolating through vegetation or sediment.

Cold Stage: A phase of planetary cooling, typically lasting tens of thousands of years, these periods see permafrost develop in southern Britain, with ice sheet advance across the north of the country. Cold stages contain short-lived periods of warm conditions when Britain was habitable by humans and vegetation developed on stable land surfaces. Sea levels dropped up to 150m during these periods. Characteristic cold stage fauna (woolly mammoth, woolly rhinoceros, reindeer, horse) are sometimes present.

Fluvial deposits: Gravels, sands and silts relating to flowing fresh water, in a river or stream.

Head Deposits: Sediments varying from gravels to fine clays which result from the effects of weathering of landsurfaces. Often comprising slope deposits formed under the freezing and thawing during cold climatic stages (**gelifluction**). Where the parent geology is rich in calcium carbonate (eg. Chalk or Limestone) these can retain the **calcareous** conditions necessary to preserve palaeoenvironmental remains such as molluscs, ostracods, small vertebrate remains and larger mammal bones. Overtime Head Deposits can lose their calcium carbonate and become **decalcified**, leading to a loss of sedimentary structure and palaeoenvironmental indicators.

Holocene Colluvium: Recent slope-wash deposits. Commonly formed through surface run-off of rainwater and mass sediment movement exacerbated by deforestation or agricultural activity.

Holocene Epoch: Around 11,000 years ago the planet entered a warm phase at the end of the last ice age. This period saw the spread and growth of forest in northern Europe and the transition from hunting gathering economies to farming.

Marine deposits: Gravels, sands and silts relating to the action of the sea.

Palaeolithic: The old stone age, the oldest phase of the archaeological record. Beginning around 3.3 million years ago in Africa and around 1 million years ago in northern Europe.

Palaeosol: A deposit indicating the formation of a soil on a slope or surface. Indicative of relatively warm stable conditions in which sediments stop accumulating and grassland or other vegetation begins to grow.

Pleistocene epoch: From 2.6 million years ago, the planet entered a phase of cooling but cyclical climatic conditions.

Quaternary: The most recent geological period comprising the Pleistocene epoch (2.6 million years ago to 11,500 years ago) and the Holocene Epoch (11,500 years ago to the present).

Warm Stage (Interglacials): A phase of planetary warming, typically lasting for around 10-15,000 years where the planet achieved temperatures, sea levels and ecologies similar to today.

CONTENTS

- 1.0 Introduction**
- 2.0 Archaeological Background**
- 3.0 Research Aims and Objectives**
- 4.0 Methodology**
- 5.0 Results**
- 6.0 The Finds**
- 7.0 The Environmental Samples**
- 8.0 Summary of Significance and Potential**
- 9.0 Consideration of Research Aims**
- 10.0 Conclusions**

Bibliography

Acknowledgements

- Appendix 1: Phase 1 Geoarchaeological Test Pit Logs**
- Appendix 2: Phase 2 Geoarchaeological Test Pit Logs**
- Appendix 3: Phase 3 Geoarchaeological Test Pit Logs**
- Appendix 4: Phase 2 Geoarchaeological Borehole Logs**
- Appendix 5: U100 Sample Logs from Boreholes BH03 and BH04**
- Appendix 6: Table of GTP Samples**

FIGURES

- Figure 1: Site location
Figure 2: Location of GTPs, CPBHs and ERT transects
Figure 3: Lidar Digital Terrain Model (DTM)
Figure 4: Topographic survey of Site
Figure 5: Conductivity survey results
Figure 6: All interventions in Study Area, viewed from south-east
Figure 7: N-S Transect 1 North-South strip logs facing east (far west of site)
Figure 8: N-S Transect 2 North-South strip logs facing east (mid-west of site)
Figure 9: N-S Transect 3 North-South strip logs facing south-east (mid site)
Figure 10: N-S Transect 4 North-South strip logs facing south-east (mid-east of site)
Figure 11: N-S Transect 5 North-South strip logs facing east (far east of site)
Figure 12: Map showing the extent and depth of Chalk Head with Palaeosols (CHwP)
Figure 13: Map showing modelled artefact density based on our sample
Figure 14: Map showing depth at which artefacts first encountered based on our sample
Figure 15: Photographs of Palaeolithic flint artefacts GTP 96
Figure 16: Photographs of Palaeolithic flint artefacts GTP 96
Figure 17: Photographs of Palaeolithic flint artefacts GTP 96
Figure 18: Photographs of Palaeolithic flint artefacts GTP 96
Figure 19: Photographs of Palaeolithic flint artefacts GTP 96
Figure 20: Photographs of Palaeolithic flint artefacts GTP 96
Figure 21: Photographs of Palaeolithic flint artefacts GTP 96
Figure 22: Photographs of Palaeolithic flint artefacts GTP 96
Figure 23: Photographs of Palaeolithic flint artefacts GTP 98
Figure 24: Photographs of Palaeolithic flint artefacts GTP 97 incl. Flake Tool.
Figure 25: Photographs of Palaeolithic flint artefacts associated with buried soil in GTP 80
Figure 26: Photographs of Palaeolithic flint artefacts GTP 48 and GTP 91
Figure 27: GTP and BH Map with Updated Geoarchaeological Potential Zones GPZ's
Figure 28: Photographs of Phase 2 Test Pits
Figure 29: Photographs of Phase 2 Test Pits
Figure 30: Photographs of Phase 3 Test Pits
Figure 31: Photographs of Phase 3 Test Pits
Figure 32: Photographs of Phase 3 Test Pits
Figure 33: Photographs of Phase 3 Test Pits
Figure 34: Photographs of Phase 3 Test Pits

TABLES

Table 1: Lithics from the geoarchaeological test pits and the plough soil surface

Table 2: Technological attributes – dorsal cortex

Table 3: Technological attributes – dorsal scars

Table 4: Technological attributes – butt category

Table 5: Micropalaeontology Summary

Table 6: Small Invertebrate Fauna: Contents of each sample

Table 7: Molluscan Fauna

1.0 INTRODUCTION

- 1.1 Archaeology South-East (ASE) was commissioned by RPS Consulting to undertake two further phases of geoarchaeological investigation comprising 9 cable percussion boreholes and 83 Geoarchaeological Test Pits (GTPs) at Land East of Downend Road (Winnham Farm), Portchester, Hampshire, hereafter 'the site' (centred on NGR 60361 06326 Figure 1). This report focuses on a subset of the Site, which we refer to as the Study Area (Figure 2).
- 1.2 The site measures c. 27ha, is bounded by the M27 to the north, the Southampton to Portsmouth railway line to the south and slopes downwards from 55m OD in the north to c.14m OD to the south. The east and west boundaries are irregular and partially formed by open space, before giving way to post-war housing to the east and Downend Road to the west.
- 1.3 The underlying solid geology of the site is mapped by the BGS as comprising Portsdown Chalk Formations, capped by superficial Head deposits of clay, silt, sand and gravel. Raised beach deposits have also been noted to the immediate west of the site at c. 36.5m OD and therefore may also be present across the site (BGS 2016). The site sits on the south face of the Portsdown Anticline, a prominent chalk ridge which rises from the Hampshire Coastal Plain behind Fareham and Portchester and 300m to the West of the Red Barns Palaeolithic site (ApSimon et al 1977; Gamble and ApSimon 1986; Wenban-Smith et al 2000; Wenban Smith 2000) (Figure 3).
- 1.4 A Desk Based Assessment (DBA) (CgMs 2016) demonstrated the site had a moderate to high potential for Palaeolithic and Roman archaeological remains, a moderate potential for Mesolithic, Bronze Age and Iron Age remains, a low to moderate potential for Neolithic remains, and a low potential for early medieval, medieval and post-medieval remains, apart from possible field boundaries.
- 1.5 An initial Geoarchaeological Evaluation was undertaken in April 2017, this comprised 23 Geoarchaeological Test Pits (ASE 2017). This was followed by a Geophysical survey undertaken by Dr Martin Bates in August 2019 (ASE 2019a). These phases of work broadly characterised the Quaternary deposits preserved at the site in terms of their palaeoenvironmental and Palaeolithic archaeological potential. The subsequent Phase 2 and 3 works built on these results in an iterative manner to further refine areas of potential.
- 1.6 A Written Scheme of Investigation (WSI) (ASE 2019b) was then developed for a Phase 2 Geoarchaeological Evaluation and further deposit modelling following consultation between ASE and RPS. The fieldwork for Phase 2 took place in October 2019. Following the Phase 2 works it was determined, in discussion with RPS, that further refinement of the sites potential was required. A WSI for Phase 3 fieldwork was produced (ASE 2020) and fieldwork took place through February to March 2020. All documents were produced in accordance with relevant Standards and Guidance of the Chartered Institute for Archaeologists (CIfA 2014) and duly submitted to RPS and HCC for approval ahead of the commencement of works.
- 1.7 This report covers the results of the Phase 2 and Phase 3 geoarchaeological evaluations. All work reported here follows guidelines set out in Management

of Research Projects in the Historic Environment (Historic England 2015).

2.0 ARCHAEOLOGICAL BACKGROUND AND PREVIOUS WORK

2.1 Desk Based Assessment

- 2.1.1 A Desk Based Assessment (DBA) (CgMs 2016), determined the potential of the site and, established the necessity for targeted geoarchaeological evaluation. A summary of the DBA and the previous fieldwork undertaken is given below.
- 2.1.2 Raised beach deposits are recorded on the study site (24537, 24538). These deposits were first identified in the area by Joseph Prestwich at c.36.5m above sea level at the western end of Portsdown Hill in Down Coppice Gravel Pit (17832), c.60m north-west of the site (Prestwich 1872; CgMs 2016, Fig. 5). The construction of the M27 motorway in 1972 to the north led to further identification and investigation of these deposits.
- 2.1.3 An internationally important Palaeolithic locality was identified at Red Barns, located c.300m to the east (24267, 50753, 60552). This was first documented in 1973 during deep excavations for a housing development. Excavations followed in 1974 and 1975 (Gamble and ApSimon 1986; Wenban-Smith 2000). The majority of artefacts were recovered from a layer of grey loam underlying cemented breccia at c.30m OD. Over 10,000 artefacts dated to between 425,000 BP and 200,000 BP were recovered. The lithic technology was dominated by the production of pointed plano-convex handaxes. Further unpublished excavations were carried out by Southampton University in 1999. In one of the test pits the same artefact-bearing horizon first discovered in 1973 was located (Wenban-Smith 2000). Other Palaeolithic findspots in the area are located c.1200m south-west (20155), c.1000m south-west (20102, 20112), c.1150m south (31430) and c.1400m south-east (19269) of the site. Palaeolithic flint debitage was also recorded c.950m south-west (31110), 800m south-west (31022) and 1500m south-west (20103).
- 2.1.4 The DBA also showed a rich Mesolithic record in the vicinity. Prehistoric stone artefacts including microliths (2007, 20078, 20075, 20067) were recovered from Quaternary deposits during the construction of the M27 c.700m and c.1100m north-west. (37312). 2.1.6 A Mesolithic site was recorded c.1150m to the west. 20092). A Mesolithic blade was recorded c.1200m west of the study site (20085), Mesolithic core, blades and flakes c.1000m south-west of the study site (20111), Mesolithic flint scatter c. 1000m southwest (20106), a Mesolithic axe c.1600m south-west (20110), Mesolithic flint débitage c.800m south of the study site (30885), Mesolithic core c.1500m south-east of the study site (24665), and Mesolithic flints c.1300m north (53372, MWC883), c.1600m north-east (24032, MWC4259) and c.1500m north of the study site (38829).

2.2 Phase 1 Geoarchaeological Evaluation (ASE 2017)

- 2.2.1 The Phase 1 works comprised 23 Geoarchaeological Test Pits excavated using a 14 tonne mechanical evacuator to the limit of the machine (c.4m) or until deposits with perceived high potential or significant archaeology were encountered.
- 2.2.2 The Phase 1 works determined the presence of deposits, which appeared broadly equivalent to those recorded at Red Barns, with apparent Palaeolithic artefacts, deposits and preserved ancient landsurfaces.
- 2.2.3 It was suspected that a former Pleistocene marine cliff and lower fluvial terraces were present on site and two further stages of fieldwork were recommended:
 - 1. *Geophysical survey combining Electrical Resistance Tomography (ERT) and Electro-Magnetometry (EM) to determine the presence and vertical/horizontal extent of any cliff lines, terraces and localised depositional environments.*
 - 2. *Boreholes and GTPs to build on the geophysics results to map the distribution of deposits and develop a Geoarchaeological Potential Zone map for the site.*

2.3 Geophysical Survey (ASE 2019)

- 2.3.1 Subsequently, an EM survey (Figure 5) was carried out across all accessible areas of the site by Dr Martin Bates with the aim of mapping the sediment bodies and geomorphological features within the top 2, 4 and 6m. This was undertaken using a CMD Explorer which allows a rapid survey method to be adopted. In addition 4 ERT lines (Figure 2) were also undertaken by Dr Martin Bates across the site to constrain the suspected cliff line further (ASE 2019).
- 2.3.2 The combined data indicated that a major geomorphological feature extended across the site in a broadly west/east direction. This is clearly seen in both the EM and ERT data and is considered to represent a buried cliff line above which are potentially buried marine, intertidal and terrestrial sediments (Figure 5).
- 2.3.3 The results gave confidence to the finding of the Phase 1 Geoarchaeological Evaluation in suggesting the northern half of the site had little to no Geoarchaeological potential outside of the margins of a small dry valley and the Pleistocene deposits on the site which lie to the south of the mapped cliff line are very likely to be part of those preserved at Red Barns and associated with the same geomorphological feature, the cliff line.

3.0 RESEARCH AIMS AND OBJECTIVES

3.1 Initial Aims

- 3.1.1 The broad aims of all phases of the investigation, in keeping with previous similar projects were:

RA1: To determine the presence or absence of archaeological remains on site

RA2: To assess the character, extent, preservation, significance, date and quality of any remains and deposits

RA3: To assess how they might be affected by the proposed development

RA4: establish the extent to which previous groundworks and/or other processes have affected archaeological deposits at the site

RA5: To assess what options should be considered for mitigation

3.2 Specific Aims Relating to Raised Beach Deposits and Palaeolithic Archaeology

- 3.2.1 The aims of the overall Geoarchaeological works are to:

- Establish the presence and broad extent of Quaternary Deposits within the study area.
- Establish the depth and broad archaeological/scientific potential of these deposits.
- Determine possible relationship of these deposits with those preserving significant Palaeolithic archaeology at the nearby Red Barns site.

- 3.2.2 The specific updated objectives of the Phase 2 Geoarchaeological Evaluation reported on here were:

- Through cable percussion survey and further geoarchaeological test pit evaluation develop a more detailed model of deposits to depth and recover intact u100 and bulk sediment samples.
- Use the deposit model to map and characterise the site in terms of a series of Geoarchaeological Potential Zones (GPZs). Each zone will be characterised in terms of nature of sedimentary sequence, preservation character with depth, archaeological and palaeoenvironmental potential and significance.
- Establish the likely relationship of deposits at the site with those recorded at Red Barns.
- Obtain samples to establish a chronological framework for the sedimentary sequence.

- Obtain samples which allow the reconstruction palaeoenvironmental signatures and climate change history through the sedimentary sequence.
- Determine evidence for prehistoric human activity at the site and characterise its nature and age.

3.2.2 The specific updated objectives of the Phase 3 Geoarchaeological Evaluation reported on here were:

- Through close interval test pit survey further constrain the limits of each GPZ Zone and determine, within the area of highest potential, GPZ 5, the presence and relative density of Palaeolithic artefacts.
- Through the location of up to two stepped test pits attempt to contextualise any significant archaeological signature through hand excavation and palaeoenvironmental/dating sampling.
- Further establish the likely relationship of deposits at the site with those recorded at Red Barns.
- Obtain further samples to establish a chronological framework for the sedimentary sequence.
- Obtain further samples which allow the reconstruction palaeoenvironmental signatures and climate change history through the sedimentary sequence.

4.0 METHODOLOGY

4.1 Scope of the Phase 2 and Phase 3 Geoarchaeological Evaluation

- 4.1.1 The Phase 2 works comprised 9 cable percussion boreholes and 22 Geoarchaeological Test Pits (Figure 2). These interventions combined with the Phase 1 results provided a sufficient sample to determine and broadly zone the presence, nature and broad distribution of Quaternary deposits. The Phase 2 works facilitated the production of a Geoarchaeological Priority Zone plan, but were not sufficient to test the zones with the highest potential for the presence of Palaeolithic archaeology (GPZ4 and 5, Figure 27).
- 4.1.2 The Phase 3 works comprised four long test pits sited to ground truth the position of the fossil cliff line and 55 standard Geoarchaeological Test Pits (GTP47-105). The interventions were placed to fill in gaps in test pit coverage within GPZ 4 and GPZ 5 to achieve approximately 30m sample intervals in these areas. There is no accepted standard sampling interval for identifying Palaeolithic sites in landscape contexts, but this interval was arrived at pragmatically on the basis of experience in other palaeolandscape contexts.
- 4.1.3 The location of each GTP and BH was logged using a differential GPS to sub-centimetre accuracy. An additional topographic survey, utilising both Differential GPS and drone, was undertaken to provide a robust and accurate Digital Surface Model for deposit modelling (Figure 4).
- 4.1.4 The observed sedimentary sequences for both the GTPs and BHs was recorded using a single standard classification system which recorded lithology, consistency, colour, coarse components, observed bedding structures and contacts with other units. The logs are presented in Appendices 1 to 4.
- 4.1.5 A Risk Assessment and Method Statement were produced prior to the commencement of the work. The location of each GTP and BH was checked for services through consultations with landowner, the checking of existing service plans and by use of a CAT.

4.2 The Cable Percussion Boreholes

- 4.2.1 The 9 cable percussions boreholes were undertaken by 2 geotechnical engineers from P.J. Drilling Limited using a standard 4m Dando CP Rig.
- 4.2.2 All 9 boreholes were directed and logged in their entirety by a Senior Geoarchaeologist (Dr Matt Pope).
- 4.2.3 The boreholes were generally excavated using a clay cutter. Where dry sand and gravels (BH 3, 6, 7) were encountered a shell augur and water was used. All were taken to the surface of the solid chalk where possible and then into the chalk until we had high confidence that the intact Upper Chalk had been reached.
- 4.2.4 Where deposits with palaeoenvironmental potential were encountered or anticipated, excavation proceeded through intact sleeved U100 samples. These provided isolated samples for most boreholes but, in the case of BH4

and BH9, long near-continuous sequences for dating and palaeoenvironmental profiling were recovered.

4.3 Geoarchaeological Test Pits (GTP) Excavation Methodology

- 4.3.1 The test pits were excavated using a 14 tonne, tracked mechanical excavator fitted with a smooth grading bucket. The test pits were excavated through undifferentiated topsoil and modern made ground in spits of no more than 0.10m with artefact recovery taking place every scrape until archaeological deposits were encountered or the top of the underlying solid geology was reached. All machining stopped if significant sedimentary units, such as beds of undisturbed breccia, or substantial archaeological material (stone artefacts) were encountered.
- 4.3.2 The sedimentary sequence was logged from the top of excavation. At least one full and representative section was drawn to a scale of 1:10. These logs were incorporated into the digital deposit model for the site. All deposits observed during the excavation of the test pits were recorded according to standard Archaeology South-East practice, in line with the Historic England Guidelines for Environmental Archaeology and Geoarchaeology (Historic England 2015a and b).
- 4.3.3 Within each test pit each spit and sedimentary unit was numbered separately. Samples (100 litres) from each Pleistocene sedimentary unit were, where possible, shaken through a 10mm mesh and an archaeologist with experience of identifying prehistoric artefacts retrieved these and coarse ecofacts. Where sedimentary units were divided into spits, samples were sieved from each spit if appropriate. Where sieving was not possible due to the nature of the sediment, excavation proceeded in shallow spits of 50mm or less following sedimentary units, as appropriate, and surfaces and excavated sediment was carefully inspected to check for Palaeolithic artefacts and other evidence.
- 4.3.4 Spoil from each spit was kept separately to allow correlation of artefacts to spits. Where deposits with potential for environmental and/or scientific analysis were noted, bulk samples were taken, from the spoil or the section (where safe to do so) for subsequent laboratory analysis. Small bulk samples were taken for potential analysis of clast content, particle size, micromorphology, pollen, mollusc, ostracod, micro-mammalian and other microfaunal remains, and for dating purposes as appropriate.
- 4.3.5 Samples are listed in Appendix 5.

4.4 Fieldwork constraints

- 4.4.1 The test pits in this phase were not stepped and so not entered below 1.2m. This meant that no detailed cleaning or sampling of the section was undertaken. No monolith or kubiena samples of the palaeosols could be taken from test pit but this was mitigated in part by intact u100 samples taken from the boreholes.

5.0 RESULTS

5.1 Introduction

- 5.1.1 This section details the combined observations based on all 105 GTPs and cable percussion boreholes undertaken in Phases 1, 2 and 3 of the evaluation. The detailed lithological logs are presented in Appendices 1-4 and these are to be referred to throughout.
- 5.1.2 Confidently grouping each observed lithological unit into provisional stratigraphic units should be the end of a process of lab-based lithological, palaeoenvironmental and dating analysis. However, taking an iterative and pragmatic approach to this project we have been happy to group our observed deposits into provisional stratigraphic units and these are described here in terms of their lithology, distribution, palaeoenvironmental potential and archaeological potential.
- 5.1.3 The deposits have been modelled within the Study Area using both Rockworks (Industry standard deposit-modelling software) and Surfer, (a powerful surface-modelling programme). The stratigraphic records are presented in total in Figure 6 and as N-S cross-sections in Figures 7-11.
- 5.1.2 It is important to note that these models are based on direct observation and, depending on the interval between observations varying degrees of certainty in terms of stratigraphic grouping and the extent of each deposit can be expected. With 105 carefully placed GTPs and boreholes at circa 30-100m intervals, depending on where in the site, there is an adequate sample from which to model the Quaternary geology and the surface of the underlying Upper Chalk surface geology.

5.2 Overall Distribution of Quaternary Deposits.

- 5.2.1 The combined Borehole and GTP records allow the Study Area to be broadly divided into three areas based on a north to south division (Figures 7-11). To the north sequences were recorded that went rapidly down onto solid chalk or contained relatively shallow colluvial sequences of Holocene age. In this zone there is minimal to zero potential for Quaternary sequences with significant palaeoenvironmental deposits and no potential to preserve Palaeolithic archaeology equivalent to the Red Barns locality. The possibility of isolated capture points such as sinkholes has also been virtually excluded on the basis of the geophysical survey (ASE 2019a)
- 5.2.2 In the central zone of the Study Area the GTPs, boreholes and geophysical survey all show the solid chalk surface falling away very rapidly to a depth in excess of 10m before conforming to a relatively flat platform. On the far west of the Study Area, this zone comprises Decalcified Head Deposits overlying an alluvial deposit at depth. Towards the east there is a more complex sedimentary system comprising thick Calcareous Head Deposits with one or more palaeosols overlying the alluvium and sands.
- 5.2.3 To the south west and south of the site an apparent lower platform can be observed. Lying on this platform are high-energy sands and gravels overlain by decalcified sands are present. These are clearly seen in Figures 7 and 9. Each of the Units introduced above are described below.

5.3 Stratigraphic Units Observed (Figures 6-11)

Solid Chalk

- 5.3.1 The underlying solid geology across the whole site is solid Upper Chalk. While the surface of the chalk was heavily contorted and fractured, it was clearly discernible due to the absence of clays and silts and angular as opposed to sub-rounded chalk fragments. Flint when encountered was fresh, black in colour and unrolled.
- 5.3.2 Flint, when encountered in the intact chalk, comprised large nodules 200-400mm in maximum dimension. The flint appears to be fine grained, free of inclusions and very suitable for artefact manufacture.

Fluvial Sands and Gravels

- 5.3.2 Medium to coarse sands with rounded to sub-rounded flint gravels were classified as being fluvial in origin on the basis of the relatively low degree of rounding of the non-Tertiary flint clasts, the well-sorted clast sizes and apparent cross-bedding structures observed in the GTP sections. The fluvial deposits were reached in the following locations, depths below ground levels and surface elevations. In all cases, except one, the Sands and Gravels were free-flowing and it was not possible to bottom through them. However in the case of GTP18 the underlying chalk was reached at 13.51m OD.

GTP2	4.5m bgl	15.26m OD
GTP16	3.6m bgl	18.15m OD
GTP18	3.0m bgl	15.41m OD
GTP28	2.1m bgl	18.76m OD
GTP30	1.8m bgl	18.92m OD
GTP36	1.2m bgl	18.72m OD
GTP37	2.8m bgl	21.10m OD
GTP64	2.9m bgl	18.30m OD
BH03	4.0m bgl	18.57m OD
BH07	4.0m bgl	11.97m OD
BH08	4.1m bgl	15.77m OD

- 5.3.3 In Test Pit 18 the base of the fluvial gravel was reached at 13.51m OD where the contact with the underlying chalk platform was revealed. This fluvial sequence is tentatively correlated with the 3rd Terrace of the River Solent on the basis of altitude. These fluvial deposits were only encountered towards the base of the slope of the site indicating accretion within a channel. The coarse resolution of the test pitting was unable to determine if other fluvial deposits relating to higher altitude river terraces are present to the northern area of the site.
- 5.3.3 These coarse-grained deposits (TP18 between 3-4.9m bgl, 15.41-13.51m OD, TP16 3.7-4.8mbgl, TP2 4-5.00m bgl, 15.76-14.76m OD chalk not reached) have the potential to contain Palaeolithic artefactual material and associated palaeoenvironmental/scientific and mammalian faunal evidence. These sediments are considered locally to regionally significant but are unlikely to undergo any impacts from the proposed residential development. Further palaeoenvironmental assessment would be required to adequately assess this potential. These deposits are often seen to be overlain by

decalcified sands and sandy head deposits grouped as **Sands** in the stratigraphic deposit model.

Head Deposits

- 5.3.4 Head Deposits (cold stage slope sediments) comprising fine-grained silt and clay Decalcified Brickearth, Calcareous Head, sometimes forming chalk pellet gravels and Decalcified Head comprising stiff clays and angular frost shattered flint were encountered across much of the southern half of the site (Figures 6 to 10). To the west the Head Deposits contained abundant heavily rolled flint cobbles of obvious marine origin. These cobbles are almost certainly derived from raised beach deposits recorded to the west and north-west of the site at Downend Pit and along the line of the M27 motorway. However, the marine gravels encountered at the site were incorporated into Head Deposits and are therefore in a later, secondary, depositional context. No intact raised beach deposits of any age were encountered and while this may represent a true absence of these deposits the test pits were too widely distributed to be definitive.
- 5.3.5 These deposits represent accumulations of fine-grained slope wash and periglacial gelifluction deposits resulting from the weathering of the cliff and the chalk rising to the north across the site. They are likely to span more than one climatic stage and so have the potential to include deposits relating to interglacial and interstadial slope stabilisation. The deposits recorded have the potential to preserve Palaeolithic artefactual material, associated palaeoenvironmental/scientific and, where calcareous, mammalian faunal evidence. The Head Deposits in general at the site are considered to be of local to regional significance and occur at between depths of 0.35m to >4.00m.

Intertidal, 'Alluvial' and Fine-Grained Calcareous Head Deposits

- 5.3.6 A green silty clay with varying degrees of iron staining and sandy laminations was encountered in test pits on the eastern part of the site and at depth in boreholes. Based on field observations and preliminary palaeoenvironmental assessment (See section 4) these deposits are interpreted as Intertidal Silts. Their position, at the base of the sequence resting on a flat chalk platform, and their similarity to deposits elsewhere on the West Sussex and Hampshire Coastal Plains, supports this. Towards the base of the Intertidal Silts a sandy facies is sometimes encountered. This has been referred to as Alluvial Sand in the stratigraphic deposit model. A stiff grey blue clay was encountered at the base of the sequence in the west of the site, this is currently described as Alluvium, however with palaeoenvironmental assessment may prove to correspond to the Intertidal Silts.
- 5.3.7 Preserved beneath the Chalk Head with Palaeosols (CHwP, see below) across much of mid-slope of the site were deposits of Fine-Grained Calcareous Head. These comprised of pale green-grey clays and silts containing a small amount <5% of chalk pellet gravel and frequent calcium carbonate concretions.

Calcareous Head with Palaeosols (CHwP)

- 5.3.8 Within the Head Deposits a set of bedded Calcareous Head With Palaeosols (CHwP) were encountered (Figures 6 -12), sometimes at relatively shallow depths towards the top of the slope: at 0.7m depth (22.82m OD) in Test Pit 3, at 1.25m (29.59m OD) in Test Pit 12, at 0.8m (27.89m OD) in Test Pit 19, at 1.7m (20.15m OD) in Test Pit 21, at 1.1m (27.13m OD) in Test Pit 22 and 0.3m (31.10m OD) in Test Pit 23.
- 5.3.9 The deposits were variable in nature but generally comprised calcareous silts and clays with varying proportions of fine chalk pellet gravels. What differentiated the CHwP from other Calcareous Head bodies was the presence of two features:
- i) One or more dark grey, dark brown or black possible 'palaeosol' (soil formation) horizons.
 - ii) The presence of blocks of calcrete/breccia suggesting redistribution of calcium carbonate and/or spring activity in the vicinity.

Within these deposits, a very well developed and preserved palaeosol was encountered south of the cliff line across the eastern part of the site. This was a dark greyish brown silty clay contained chalk pellet gravel and mollusc shells. In GTP3 a hard, intact bed of breccia was encountered at 4.0m depth (23.52m OD) at the base of a sequence of chalk pellet Head Deposits containing a molluscan fauna, at least one palaeosol and isolated patinated flint artefacts consistent with Palaeolithic stone tool manufacture. This locality was not investigated further as agreed with RPS Consulting and HCC.

Loam and Lower Palaeosol

- 5.3.10 Directly to the east of the dry valley and close to the cliff line deposits of Loam were encountered. This was a reddish-brown clay sand, generally stone free but with beds containing <5% chalk pellet gravel and possible ephemeral palaeosols. At the base of the Loam was an apparently well-developed palaeosol of dark brown clay with sand with Fe staining and associated flint artefacts.

Holocene Colluvium

- 5.3.11 The site contains two north-south orientated, dry valleys, one situated in the centre and another, large valley partially within the site at its north east margins. Both these valleys, and the base of the slope of the site in general, preserved a Holocene Colluvium containing prehistoric artefactual remains which included abraded pottery and struck flint.
- 5.3.12 Geophysics data indicating ridge and furrow on the slope may actually be picking up Pleistocene solifluction stripes, which were present below topsoil in this area. This colluvium contains palaeoenvironmental remains that may help to better characterise changes in land use throughout the later prehistoric period. They are considered of local significance.

6.0 THE FINDS

6.1 The Flint by Karine Le Hégarat and Matt Pope

6.1.1 A total of 158 pieces of struck flint weighing 10,408g and four unworked burnt lithics weighing 75g were recovered during the Phase 1 and Phase 3 geoarchaeological evaluations at Winnham Farm, Portchester. The flintwork recovered during the test pitting investigations is characterised by a production of flakes. A concentration representing a coherent assemblage was found in the area GPZ5, with most pieces displaying a great level of freshness.

6.1.2 Methodology

6.1.2.1 The pieces of struck flint were individually examined and classified using standard set of codes and morphological descriptions (Butler 2005, Ford 1987 and Inizan et al 1999). Basic technological details as well as further information regarding the condition of the artefacts (evidence of burning or breakage, degree of cortication and degree of edge damage) were recorded. Dating was attempted when possible. The assemblage was catalogued directly onto a Microsoft Excel spreadsheet. They are presented by test pit and category type in Table 1. Where possible, some preliminary technological attributes were recorded on the flakes recovered during Phase 3 investigation to check the level of consistency and if various techniques were used. (Artefacts are shown in Figure 15 -27)

6.1.3 Provenance

6.1.3.1 The 158 pieces of struck flint were recovered from 20 test pits, but the most substantial assemblage came from area GPZ5 where a total of 102 pieces were collected from eight test pits; GPT98, 22 pieces; GTP97, 16 pieces; GTP49, 4 pieces; GTP96, 40 pieces; GTP48, 6 pieces; GTP92, 3pieces; GTP91, 4 pieces and GTP84, 7 pieces.

6.1.3.2 A total of 10 pieces were recovered from the dry valley top during Phase 1 investigation, and the 14 pieces of struck flint recovered from GPT83 in area GPZ4 were collected from the ploughsoil. But the remaining 134 flints were found between 0.4m and 2.9m below ground surface (see Table 1).

6.1.4 Raw material

6.1.4.1 The raw material used for the struck flints consisted exclusively of flint. Whilst 31 pieces were free from surface recortication, 127 pieces displayed various levels surface discoloration. Amongst those 20 pieces displayed incipient traces of light blue or light grey surface discolouration, and 107 pieces (or 82.3% of the total assemblage) were entirely recorticated white. Where the edge of the pieces that are recorticated white has recently been broken a mid to dark grey flint was commonly recorded. Whilst 80.3% of the entire assemblage was recorticated, in GPZ5 the level of recortication is higher representing 92.1% of the flints recovered in this area.

6.1.4.2 The cortex was commonly thin (1mm or less). It was mostly chalky and creamy in colour. Inclusions were occasionally recorded including the presence of small fossils or fossil casts, which could maybe used to confirm

the local origin (and/or age) of the flint. Concretions were also observed on the surfaces of the flints, together with tiny brown marks – some microplants visible with the hand lens. Whilst thermal fractures were recorded on site, areas of thermally fractured surfaces were only occasionally noticed on the struck flints. This suggests that the raw material was carefully selected.

6.1.5 Condition

6.1.5.1 Unsurprisingly, the 14 pieces recovered from the topsoil in GTP83 and the 10 pieces recovered from the top of the dry valley during Phase 1 exhibited extensive edge damage. This is in contrast with the remaining assemblage. Except for a flake from GTP64, a blade-like flake from GTP90 and most pieces recovered from the colluvium during Phase 1, that displayed some signs of weathering, the remaining pieces (c 115 pieces) were found in an un-weathered pristine condition or with only slight edge damage. Ridges on the dorsal face were also sharp. This suggests no or very limited post depositional transportation after burial.

6.1.5.2 A total of 75 pieces were recorded as broken. Given the level of recortication of the broken surface this represents a mixture of breaks that occurred in the past but also some more recent breaks that may have occurred during test pitting. It is interesting to note that the proportion of broken pieces in area GPZ5 is lower (32.3%) than the proportion of broken pieces when the total assemblage is considered (47.4%).

6.1.6 Technology

6.1.6.1 A large proportion of the assemblage consists of débitage products (Table 1). Amongst this group, unmodified flakes are the best represented (142 pieces). A blade and four blade-like flakes were present, but these lack traits indicating a blade-oriented technology such as parallel ridges and parallel edges.

6.1.6.2 The size of the flakes varied, but the assemblage comprised very large flakes especially in GTP96 and GTP97 with seven flakes weighing between 232g and 506g. No breadth and measurements were recorded at this stage, but numerous flakes appeared to be short and wide. Table 2 indicates that the flakes consist mostly of tertiary and secondary flakes, and the percentage of dorsal extent shows that the flakes were well worked with 62.6% of the pieces displaying 25% or less of cortical surface. The dorsal scars were mostly multidirectional (Table 3). Most pieces displayed plain (and sometimes thick and wide) butt (Table 4) with no platform edge preparation. Although not always clearly visible because of the high level of white surface recortication, points of impact were recorded on numerous butts. The small points were often complemented with ring cracks. The presence of plain unprepared butts with neat points of impact associated with ring cracks and the presence of pronounced bulbs of percussion and large ripples on the dorsal face towards the distal end indicate a direct stone percussion with interior impact. The presence of a silet fracture illustrates the use of strong force. Although most butts were recorded as plain or cortical, a small quantity of butts indicating some care in platform preparation were also recorded including 11 linear butts, two punctiform butts, and three butts displayed characteristics of faceted butts (Table 4).

6.1.6.3 The assemblage contained only two cores (a core on a flake and multiplatform flake core) and a tested nodule. The core on a flake weights 258g. It came from GTP96, unit 4. It consists of a thick flake with a plain butt that was used to remove small flakes on both the right and left lateral edges. The multiplatform flake core also derived from GTP96, unit 4. One side of the large core (1733g) was used to remove a wide flake (removal scar measures 117mm in width), and one side was used to remove several smaller flakes (removal scars measure up to 62mm in width). Two platforms are free from surface recortication. The tested nodule (2197g) came from GTP97, unit 4. A point of impact is clearly visible on one side of the nodule, and removals in another area indicate two stages of reduction (a removal to create a platform, then several removals using this platform to produce small flakes). Whilst the platform is dark grey flint, some removal scars are recorticated white.

6.1.6.4 A total of three modified pieces were found. A retouched flake was recovered from the dry valley top during Phase 1, and two modified pieces were found from GTP97, unit 4 (Figure 24). The latter consist of a retouched flake and a miscellaneous retouched piece. The retouched flake weights 118g. It displays a plain butt with a pronounced bulb of percussion. On the left, it exhibits an area of thermally fractured surface (also recorticated white), and on the right distal end it displays a small area with some direct semi-abrupt retouch. It may represent a fragmented racloir / scraper. The miscellaneous retouched piece weights 150g. It is crudely made, but it displays two alternate removals on one edge and some possible removals on another edge.

6.1.6.5 Four fragments of unworked burnt lithic weighing just 75g were recovered. They came from GTP96 unit 3, GTP84 unit 6 and GTP49 unit 5. Three of these fragments consisted of flint. They have been subject to different levels of heat.

6.1.7 Disposition: Considering Site Formation Processes

6.1.7.1 All artefacts were recovered from sieved samples taken at 0.1m intervals through targeted deposits. Answering questions about the degree to which the material is either in situ, in primary context or to what degree does it represent discrete episodes vs. palimpsest cannot be answered without directly hand excavation and multidisciplinary analysis. However on the basis of down hole observations, artefacts lying plat associated with diffuse palaeosols, and condition, fresh and unabraded, we feel there is high potential within both the CHwP and lower fine grained deposits for high resolution, primary-context artefact scatters.

6.1.8 Conclusion

6.1.8.1 The artefacts recovered during the geoarchaeological work at Winnham Farm, Portchester represents a small but significant assemblage. The Phase 1 investigation produced a small assemblage including two possible Palaeolithic flakes. These were found at depth in GTP3 and GTP23. But the most substantial assemblage came from area GPZ5. The overall fresh condition of the pieces indicates that most pieces were in their primary context or that they had been subject to negligible movement. The flintwork is characterised by flakes, with very few cores and modified pieces being represented. Most of the flakes were struck using a direct stone percussion. But the presence of thin removal scars on certain dorsal faces and the

recording of different butt types suggest that other techniques may have also been used. The site provided a source for the raw material, and it was used to produce flakes. Although some of the flakes were wide and large, preliminary recording of technological attribute indicates that the site was possibly not used during the initial reduction stage as primary and secondary decortication flakes were almost absent. More technological analyses would certainly contribute to our understanding of the exact function of the site during the Palaeolithic period.

6.1.8.2 The current assemblage is likely to form part of an extensive Palaeolithic spread in the local area. Excavations at Red Barns, directly to the east of the site, has produced a large quantity of Palaeolithic material (Wenban-Smith et al 2000, 227). The assemblage was revisited by Bolton (2015) in her study of simple prepared core in relation to the Levallois technique. Analyses of the artefacts from Red Barns demonstrated that the site was used to produce handaxes (a total of 24 tools was recovered) with some evidence for prepared core technology. The assemblage from Red Barns seems to contain more thermally damaged material than the current assemblage. It is currently impossible to determine if both sites are contemporary, but in broad terms there are technological similarities between the two assemblages which support the assumption that the Winnham Farm material is Palaeolithic and may form part of an extensive, relatively high-resolution archaeological locale.

Intervention	Test Pit No.	Unit	Depth (m bgl)	Flake	Blade and Blade-like-flake	Irregular waste	Core, tested nodule	Retouched piece	Total	Grand total per GTP / topsoil	Burnt lithic
Phase 1	GTP1	2		4		1			5	5	
Phase 1	GTP3	6	2.6 -	3					3	3	
Phase 1	GTP12	2	0.4 -	5	1				6	6	
Phase 1	GTP23	6	1.65 -	4					4	4	
Phase 1	dry valley top			9				1	10	10	
Phase 3	GTP48	6	?	6					6	6	
Phase 3	GTP49	5	1.0 -	3	1				4	4	2/65g
Phase 3	GTP64	4	2.0 -	1					1	1	
Phase 3	GTP78	4	1.5 -	1					1	1	
Phase 3	GTP80	6	2.9 -	3					3	3	
Phase 3	GTP82	5	2.6 -	2					2	4	
Phase 3	GTP82	6	2.8-2.9	2					2		
Phase 3	GTP83	Topsoil		14					14	14	
Phase 3	GTP84	6	2.3 -	3					3		
Phase 3	GTP84	6	2.45 -	1					1	7	
Phase 3	GTP84	6	2.5 -	2	1				3		1/5g
Phase 3	GTP91	3	1.5 -		1				1		
Phase 3	GTP91	4	1.7 -	1					1	4	
Phase 3	GTP91	5	1.9 -	1					1		

Intervention	Test Pit No.	Unit	Depth (m bgl)	Flake	Blade and Blade-like-flake	Irregular waste	Core, tested nodule	Retouched piece	Total	Grand total per GTP / topsoil	Burnt lithic
Phase 3	GTP91	5	2.0 -	1					1		
Phase 3	GTP92	4	1.6 -	1					1	3	
Phase 3	GTP92	6	2.8 -			2			2		
Phase 3	GTP96	3	1.4 -	2					2		
Phase 3	GTP96	3	1.5 -	2					2		1/5g
Phase 3	GTP96	4	1.6 -	4	1	1	1		7	40	
Phase 3	GTP96	4	1.7 -	2					2		
Phase 3	GTP96	4	1.8-1.9	25		1	1		27		
Phase 3	GTP97	3	1.1 -	1					1		
Phase 3	GTP97	4	1.0-2.3	3				1	4	16	
Phase 3	GTP97	4	1.4 -	6					6		
Phase 3	GTP97	4	1.7 -	2			1	1	4		
Phase 3	GTP97	4	1.0-2.3	1					1		
Phase 3	GTP98	5	2.5 -	5					5	22	
Phase 3	GTP98	6	2.1 -	1					1		
Phase 3	GTP98	6	2.4-2.7	11					11		
Phase 3	GTP98	6	2.7 -	5					5		
Phase 3	GTP100	6	2.5 -	2					2	2	
Phase 3	GTP103	7	2.7 -	3					3	3	
Total				142	5	5	3	3	158	158	4/75g

Table 1: Lithics from the geoarchaeological test pits and the plough soil surface

Dorsal extent	Data	GTP98	GTP97	GTP49	GTP96	Remaining test pits	Total test pits
0%	No %	6 40.0%	4 40.0%	1 33.3%	8 29.6%	2 16.7%	21 31.3%
1-25%	No %	6 40.0%	1 10.0%	1 33.3%	9 33.3%	4 33.3%	21 31.3%
26-49%	No %	1 6.7%	3 30.0%	1 33.3%	2 7.4%	4 33.3%	11 16.4%
50-74%	No %	2 13.3%	-	-	4 14.8%	1 8.3%	7 10.4%
75-99%	No %	-	2 20.0%	-	3 11.1%	1 8.3%	6 9.0%
100%	No %	-	-	-	1 3.7%	-	1 1.5%
Total No		15	10	3	27	12	67
Total %		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2: Technological attributes – extend of dorsal cortex

Dorsal scar	Data	GTP98	GTP97	GTP49	GTP96	Remaining test pits	Total test pits
Multidirection	No %	13 81.3%	5 62.5%	2 66.7%	24 72.7%	9 52.9%	53 68.8%
None	No %	- -	- -	- -	2 6.1%	-	2 2.6%
Parallel	No %	- -	- -	- -	1 3.0%	-	1 1.3%
Single	No %	- -	- -	- -	1 3.0%	-	1 1.3%
Unidirection	No %	3 18.8%	3 37.5%	1 33.3%	5 15.2%	8 47.1%	20 26.0%
Total No		16	8	3	33	17	77
Total %		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 3: Technological attributes – dorsal scars

Butt category	Data	GTP98	GTP97	GTP49	GTP96	Remaining test pits	Total test pits
Cortical	No %	1 5.6%	2 16.7%	-	3 10.0%	3 18.8%	9 11.4%
Plain	No %	8 44.4%	8 66.7%	1 33.3%	16 53.3%	7 43.8%	40 50.6%
>1 removal	No %	4 22.2%	2 16.7%	-	3 10.0%	1 6.3%	10 12.7%
Facetted	No %	1 5.6%	-	1 33.3%	1 3.3%	-	3 3.8%
Linear	No %	3 16.7%	-	-	4 13.3%	4 25.0%	11 13.9%
Punctiform	No %	1 5.6%	-	-	-	1 6.3%	2 2.5%
Other/Unclassified	No %	-	-	1 33.3%	3 10.0%	-	4 5.1%
Total No		18	12	3	30	16	79
Total %		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 4: Technological attributes – butt category

6.2 The Pottery by Anna Doherty

6.2.1 Two bodysherds of prehistoric pottery, weighing 6g, were recovered from TP17, context [003]. One is in a hand-made, low-fired fabric with common coarse rounded quartz of c.0.4-0.6mm, whilst the other has a similar coarse sandy matrix but also contains rare unsorted flint of 1-3mm. Taken together these sherds are probably likely to belong broadly to the Middle Iron Age though a slightly earlier or later date cannot be ruled out.

7.0 THE ENVIRONMENTAL SAMPLES

7.1 Summary

- 7.1.1 A very rapid overview assessment of grab samples was undertaken for key palaeoenvironmental indicators we might expect to find within these calcareous deposits. This was undertaken to provide a base level understanding of presence, character, depositional environment and climate.
- 7.1.2 In total, 105 bulk samples of up to 40 litres were recovered from the test pits where deposits suggested palaeoenvironmental/scientific potential. These samples provide scope for molluscan, microfaunal, palynological and dating assessment (Amino Acid Racemisation/C14).
- 7.1.2 In addition, 30 intact, windowless, u100 samples and catcher bulks were recovered from Boreholes 1- 9. Ten of these, from BH4, have been logged in Appendix 4. All samples are listed in Appendix 5.

7.2 Micropalaeontology by Alice Dowsett

- 7.2.1 Six samples, each weighing 200g, were placed in ceramic bowls and dried in an oven at 80°C. After drying, a small quantity of sodium carbonate was added to aid the breakdown of the clay fraction. The sediment was then immersed in hot water and left to soak for 4 hours. This was then washed through a 75 micron sieve with hand-hot water, the resulting residue being returned to the bowl for drying. Once dry the residues were sieved through a nest of >500µm, >250µm and >125µm sieves. Sediment from each fraction was then picked by placing a small amount of residue onto a tray and examining it under a binocular microscope. Contained material of potential environmental or biostratigraphic value was noted and listed in tabular form on a semi-quantitative basis.
- 7.2.2 Only one sample <59.1> was found to contain foraminifera and ostracods, which were moderately well preserved. The sample contained specimens of *Haynesina germanica* and *Elphidium williamsoni* which indicate a brackish, estuarine mudflat environment. The small size of the foraminifera, coupled with the lack of *Ammonia* suggest that these specimens originate from a cold climate. Within the same sample were several specimens of freshwater ostracod which require IDs. The presence of both freshwater ostracods and brackish foraminifera suggests that this sediment is reworked. This is also supported by the presence of earthworm granules (Canti 1998) and slug plates which are indicative of moist soils, rich in organic litter (Canti 2007).
- 7.2.3 Samples <72.1> and <92.1> also contain earthworm granules and slug plates in fairly high numbers, suggestive of a moist soil. <72.1> also contained several small fragments of fish bone which have been bagged. The fish bone appears to be undiagnostic. <96.1> contained occasional molluscs and may be representative of a soil.
- 7.2.4 Samples <80.1> and <98.1> did not preserve any diagnostic environmental material and are interpreted as being weathered/ barren. <98.1> did contain a very small piece of charcoal though it would be too small to species ID or date.

Sample	<59.1>	<72.1>	<80.1>	<92.1>	<96.1>	<98.1>
Depth (mbgl)		2.0m			1.8-1.9m	
Chalk	***	**		***	***	
Flint			*	*	*	*
Concretions	**	**	***			
Rhizo-concretions	**					
Sand						**
Quartz			*			*
Rooting						*
Whole molluscs	*	*			*	
Mollusc frags		*		**	*	
Earthworm granules	**	***		**		
Slug plates	*	*				
Fish bone (bagged)		*				
Very small charcoal						o
Freshwater ostracod frags	*					
Freshwater ostracods	*					
Brackish foraminifera (cold indicators)	**					
<59.1>	Cold climate estuarine mudflats, freshwater ostracods, earthworm granules/slug plates from moist soil					
<72.1>	Moist soil					
<80.1>	Barren/ weathered					
<92.1>	Moist soil					
<96.1>	Soil?					
<98.1>	Barren/ weathered					

Key: *** (abundant), ** (common), * (several), o (one specimen)

Table 5: Micropalaeontology Summary

7.3 Small Invertebrate Analysis by Emily Johnson

A small selection of samples taken for retention of small vertebrates were wet-sieved. The residues were dried and sorted, and any finds retained and bagged. No small vertebrates were recovered, but mollusc (shell) remains and charcoal was present. The residues were subsequently discarded.

Sample	Fraction	Finds
72.2 2.0m	>4mm	Shell
	2 – 4mm	Shell
	500µm – 2mm	Shell
	250µm – 500µm	0
80.1 2.9m	>4mm	0
	2 – 4mm	0
	500µm – 2mm	0
	250µm – 500µm	Charcoal
92.1 1.95m	>4mm	0
	2 – 4mm	Shell
	500µm – 2mm	Shell
	250µm – 500µm	0
96.1 1.8 – 1.9m	>4mm	0
	2 – 4mm	0
	500µm – 2mm	0
	250µm – 500µm	0

Table 6: Small Invertebrate Fauna: Contents of each sample

7.4 Molluscan Fauna by Dr Matt Law

Introduction and Methods

- 7.4.1 Six samples were presented for assessment, from a site at Portchester, Hampshire. The samples were taken from Pleistocene deposits excavated in test pits above a raised beach deposit close to a buried cliff line. Field recording suggested that molluscs were present in these deposits.
- 7.4.2 Samples were air dried and weighed before being washed gently through a 250µm mesh in warm water. The ensuing residues air dried and weighed, then sorted into fractions using a nest of sieves (4mm, 2mm, 1mm, 500µm, 250µm) before being scanned under a low power microscope.
- 7.4.3 Shells were identified to species level using a reference collection. Ecological information is derived from Evans (1972), Kerney and Cameron (1979), Kerney and (1999) Davies (2008). Nomenclature follows Anderson (2008).

Results and Discussion

- 7.4.4 In general, there were very few shells in the samples. Samples 80.1, 96.1 and 98.1 did not contain any shell. Shells were only present in other samples in numbers that are too low to permit any secure ecological interpretation. Shell preservation was largely moderate to poor, with some fragmentation and generally fragile shells. There were no indications of admixture with intrusive modern shells.
- 7.4.5 Sample 72.2 contained a small assemblage characteristic of an open, relatively dry grassy environment. Sparks (1953) notes that *Vallonia costata* is present in all types of Pleistocene deposits, from at least as early as the interglacial deposits at Swanscombe (Hoxnian interglacial, MIS 11). *Trochulus hispidus* is tolerant of quite a wide range of environments. Kerney (1963) reports that it occurs in quite a range of forms in the Late Glacial of south-east England. Although these appear to be site-specific, no environmental interpretation has been offered as a driver for the variation. The shells here are all of a relatively flat form. The *Pupilla muscorum* shells are apertural fragments only, which means it is not possible to determine if they are the taller form found in periglacial deposits (Kerney 1963; Keen 1987).
- 7.4.6 Sample 84.1 contained a similar assemblage to sample 72.2, although with the addition of the apex of one of the Clausiliidae, provisionally determined to be *Clausilia bidentata* based on its relatively small size, colouration and overall shape. *C. bidentata* is essentially a rupestral species, found living above the ground surface on rocks, logs and tree trunks, although it has also been found in tussocky grass.

Test pit	GTP72	GTP80	GTP84	GTP96	GTP98	GTP103
Sample	72.2	80.1	84.1	96.1	98.1	103.1
Depth (m bgl)	>2.0	>2.9m	>2.45m	1.8-1.9m	>2.6m	>2.55
Sample mass (g)	1126	1024	1654	961	1103	1504
Residue mass (g)	412.72	42.96	762.18	295.65	176.01	600.71
Geological component	Small-medium chalk pebbles, sub-angular - sub-rounded	Small-medium chalk pebbles, sub-angular - sub-rounded	Small-medium chalk pebbles, sub-angular - sub-rounded	Small-medium chalk pebbles, sub-angular - sub-rounded	Small - medium flint pebbles, angular-sub-angular	Small chalk pebbles, rounded to sub-rounded
		No snails		No snails	No snails	
<i>cf. Clausilia bidentata</i>			1			
<i>Cepaea hortensis</i> (O. F. Müller, 1774)			1			
<i>Cepaea/ Arianta</i> sp. (fragments)	1		1			
<i>Trochulus hispidus</i> (Linnaeus, 1758)	2					13
<i>Pupilla muscorum</i> (Linnaeus, 1758)	2					
<i>Vallonia costata</i> (O. F. Müller, 1774)			2			9

Table 7: Molluscan Fauna

8.0 SUMMARY OF SIGNIFICANCE AND POTENTIAL

- 8.1 The combined results of all phases of geoarchaeological investigation have adequately met the aims and objectives set out in Section 3.0 above. The results have shown the overall distribution, depth and nature of deposits within the Study Area, based on a sample interval down to 30m. From this it is possible to understand the Site in terms of its geomorphology and identify major stratigraphic units and suggest the possible context and agents of deposition in each case.
- 8.2 The result of the investigations have also provided a good range of high-quality sediment samples from which depositional processes, palaeoenvironmental conditions and age could be determined for each major sedimentary units. Stone artefacts and ceramic fragments have also been recovered, which allow for an initial consideration of Pleistocene and Holocene human landscape use at the site.
- 8.3 In Figure 27 the site is shown mapped into a series of Geoarchaeological Potential Zones. Each GPZ has a distinct sedimentary sequence and sub-surface outcrop, consequently each should be considered differently in terms of archaeological/palaeoenvironmental significance and potential. The GPZs range from GPZ1 (Solid Chalk), which has virtually no palaeoenvironmental or archaeological potential at depth, and consequently no geoarchaeological implications for development, through to GPZ 5, which has demonstrated Palaeolithic archaeology preserved at Palaeolandscape scale and at relatively shallow depths. The fine detail of these zones could be calibrated after further discussion of the criteria for defining the heritage asset itself.

Each GPZ is listed and described below:

GPZ 1: Weathered solid Upper Chalk at depths between 0.2 and 0.5m bgl.

Potential for surface archaeology and there is potential for GPZ5 to extend at little into the eastern margins of this zone. In terms of future designation or proposed development in this zone this likelihood should be considered.

Palaeoenvironmental Potential: Very Low

Archaeological Potential at depth: Very Low

GPZ 2: Fluvial Terrace: Decalcified/Calcareous Head over Sands & Gravel
Head Deposits overlying the fluvial terrace.

Palaeoenvironmental Potential: Moderate where calcareous

Archaeological Potential: Moderate for stone artefacts and mammalian fauna within sands and gravels

GPZ 3: Head Deposits. Decalcified Head Deposits, to the west contains material from older raised beach and overlies deeply buried 'alluvium'

Palaeoenvironmental Potential: Low except below 2.5m

Archaeological Potential: Low except below 2.5m

GPZ 4: Calcareous Head with Palaeosols (General)

A broad zone characterised by CHwP preserved variably to variable depths 1-3m bgl

Palaeoenvironmental Potential: Moderate to High.
Archaeological Potential: Moderate

GPZ 5: Calcareous Head with Palaeosols

Lying immediately in front of the former cliff line this is a zone with CHwP preserved well at shallow depths 0-1.4m bgl. It contains locally abundant concentration of sharp and possibly primary context stone artefacts assumed to be Palaeolithic

Palaeoenvironmental Potential: Moderate to High
Archaeological Potential: High potential to contain nationally significant remains

- 8.4 GPZ 5 comprises the area of highest Palaeolithic and palaeoenvironmental potential preserved within the stratigraphic unit identified as **Calcareous Head with Palaeosols**, sometimes occurring at very shallow depths (<1.0m). The zone, which comprises c.1.75ha, contains Palaeolithic artefacts within apparent Pleistocene sediments representing potential Pleistocene landsurfaces (palaeosols). On the basis of physical, lithological characteristics and it is considered highly likely that this zone is a continuation of the area of demonstrated Palaeolithic potential at Red Barns, 300m to the east of the site (Figures 12 - 14).
- 8.5 GPZ 4 appears to be a continuation of the depositional sequence and landsurfaces seen in GPZ 5, possibly representing part of the same, broad palaeolandscape. However, decalcified deposits generally overlay the CHwP to greater depth in this zone and these have impacted upon the physical and possible chemical integrity of the CHwP. Artefacts densities were much lower and very patchy in this zone. Despite this a very well developed palaeosol was present throughout much of this zone which we consider has localised moderate archaeological potential.
- 8.6 Work has progressed far enough in GPZ's 1, 2, and 3 to sufficiently demonstrate geoarchaeological potential. This can be characterised as very low (GPZ1), low but moderate to high at depths below 2.5m (GPZ 3) to low but moderate at depths below 2.5m (GPZ2) archaeological potential. Adequate samples have been recovered for subsequent analysis and dating from these zones. With the exception of localised deep developments which would significantly impact either the fluvial gravels or go below Head Deposits into the underlying 'alluvium' no further work is needed in these zones for Pleistocene Geoarchaeology. Such impacts could be mitigated by localised purposive fieldwork or monitoring.

9.0 CONSIDERATION OF RESEARCH AIMS

With the exception of the stepped test pits, all Phase 3 Research Objectives were met and the original Research Aims of the project can be considered

9.1 Original Research Aims

RA1: To determine the presence or absence of archaeological remains on site

The presence of a significant Palaeolithic locality has been established and constrained within the site

RA2: To assess the character, preservation, significance, date and quality of any remains and deposits

Samples has been taken to achieve this with the exception of the possibility of stepped test pit excavation.

RA3: To assess how they might be affected by the proposed development

Sufficient mapping has been undertaken to model the impact of any proposed development on the heritage asset.

RA4: To establish the extent to which previous groundworks and/or other processes have affected archaeological deposits at the site

With the exception of a former refuse pit on the north east corner of the study are the one field of the site appear unaffected by anything other than agricultural activities.

RA5: To assess what options should be considered for mitigation

There is enough understanding of the site to begin a discussion about options for mitigation of the identified heritage assets

10.0 CONCLUSIONS

- 10.1 The combined Phase 1, Phase 2 and Phase 3 Geoarchaeological investigations at Winnham Farm have demonstrated the site preserves deposits of probable Pleistocene age associated with an east-west fossil cliff line and possible raised beach deposits overlain by cold stage head deposits locally containing palaeosols.
- 10.2 The Holocene colluvium is considered to be less important, being of local significance for the later prehistoric period. This could be further evaluated/mitigated during the trial trenching phase through shallow test pitting. Localised concentrations of surface flint artefacts encountered during the Geoarchaeological evaluations may relate to late prehistoric activity on the site.
- 10.3 Through geophysical survey and ground truthing boreholes and test pits a clear east-west 'fossil cliff line' has been established to run across the site. This appears to be connected with a platform or bench cut into the chalk at a height of c.20m O.D. This is the defining paleogeographic landform and underpins much of the Pleistocene deposition. It is considered highly likely this landform is related to a former interglacial coastline. Provisionally it could be equated with the Aldingbourne Raised Beach on the basis of the altitude of the platform at c.20m O.D. (Bates et al. 1997; Bates et al. 2010). The marine origin of this feature is partially supported by the indicative presence of brackish (estuarine or intertidal) facies in the fine-grained Pleistocene sediments preserved immediately above the platform.
- 10.4 Immediately in front of the cliff line, a zone has been identified where fresh flakes, core and tools consistent with Palaeolithic technology lie preserved at variable depths <2.5m below the ground surface (GPZ5) associated with, and as part of, an important sequence of datable deposits with associated palaeo-environmental evidence (Section 8.0). GPZ5 is thought to be of national significance given its now proven palaeo-environmental and Palaeolithic importance.
- 10.5 A wider zone preserving lower densities of artefacts, palaeoenvironmental remains within palaeosols at sometimes greater depths has been mapped (GPZ4 and GPZ3), as has a further zone (GPZ2) containing higher energy river terrace deposits. GPZ1, to the north of the site lies to the north of the fossil cliff line and has little or no potential for preserving Palaeolithic archaeology as far as we know.
- 10.6 The Palaeolithic artefacts are thought to all be part of the same broad palaeo-landscape signature, and are considered highly likely to relate to the concentrations of Palaeolithic material found in an identical landscape context 300m to the east of the site at Red Barns. In terms of the NPPF it is considered these could all be considered part of the same heritage asset. The large size of the debitage, the presence of cores and the position close to a chalk cliff line on rubble deposits containing good quality flint is highly suggestive of raw material extraction activities. The presence of a single flake tool also hints at processing activities taking place.
- 10.7 We currently do not have a clear understanding of the age or precise technological affinities of the stone artefact assemblage but we are happy to

consider them highly likely to date to between 125,000 years ago and 420,000 years ago. They consequently could relate to the activities of either *Homo heidelbergensis* or *Homo neanderthelensis*.

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Appendix 1: Phase 1 Geoarchaeological Test Pit Logs

GTP1

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	14.3	Topsoil	Silty Sand, Light Yellowish Brown	20% sub-angular flint gravel 5-30mm	
2	0.3	14	Subsoil/Colluvium	Sandy Silt, Yellowish Brown	40% sub-angular flint gravel 5-30mm	
3	0.45	13.85	Head/Colluvium	Clay Silt with Sand, Yellowish Brown. Unconsolidated/loose in places.	75% angular flint gravel 5-100mm	
4	0.75	13.55	Decalcified head	Clay Silt with Sand, Reddish Brown Consolidated. At 1m seams of light yellow brown silt preserved in patches.	70% angular flint gravel 5-120mm	
5	1.45	12.85	Calcareous Head	Silt, Light Yellow Brown.	Chalk flecks 2-4mm	With solution pipes of [4] introduced from above.
6	2	12.3		Silt with chalk flecks 1-5mm, Light Yellow	Very occasional sub-angular flint 5-30mm	Sample d at 2.3m. Solution pipe of [4] continues to west.
7	2.8	11.5	Brickearth	Silty Clay, Yellow Brown		Calcrete noted.
8	3.3	11	Brickearth	Silty Clay, Yellowish	20% fine chalk and flint particles 2-4mm	Base of hole 4m

GTP2

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
	0	19.76	Topsoil			
1	0.3	19.46	Subsoil/Colluvium	Sandy Silt, Light reddish brown	20% angular flint 5-80mm	

2	0.5	19.26	Colluvium? Head/Brickearth	Silty Clay, Light reddish brown	10% angular frost-shattered flint 5-150mm. Stone free by 1m.	
3	1.2	18.56	Decalcified head gravel	Silty Clay, Light reddish brown. Firm and compact.	80-90% angular flint gravel 10-200mm	
4	1.8	17.96	Calcareous Head/Brickearth	Clay Silt, Light yellowish brown	10% fine chalk and flint 1-5mm	
5	2.8	16.96		Clay Silt, Light yellowish brown. Contains seams of light yellow clay sand <7>	Virtually stone free with fine CaCO ₃ deposits	
6	4	15.76	Calcareous head gravel	Light yellowish brown with chalk flecks	40% angular flint gravel 10-60mm	
7	4.5	15.26	Marine Sand?	Sand with chalk flecks, Light yellowish brown	Stone free.	Base of hole 5m.

GTP3

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	27.52	Topsoil			
2	0.3	27.22	Decalcified head gravel/Stony colluvium	Clay Silt, Reddish Brown	60% angular flint gravel 10-60mm	
3	0.7	26.82	Calcareous head gravel	Clay Silt, Yellow Brown. Solifluction stripes on surface. Complex bedding of calcareous brickearth and fine chalk pellet gravel.	20% angular flint gravel 20-100mm	
4	1.8	25.72		Beds of Yellow Brown and Pale Yellow Brown	Chalk pellet gravel	
5	2.05	25.47	Palaeosol?	Silty Clay with chalk flecks, Dark grey. Organic?		
6	2.2	25.32	Calcareous head	Silty clay with sand, Pale yellow brown	10% chalk pellets 1-5mm	Contained molluscs.
7	2.7	24.82		Silty Clay Sand, Pale yellow brown	Large blocks of tufa.	
8	3	24.52		Silty Clay, Grey Brown		Solid Tufa at 4.1m, base of hole.

GTP4

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
0	0	33.42	Made ground			Abandoned asbestos. Base of hole 2m.

GTP5

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	41.59	Ploughsoil	Silty Clay, Reddish Brown	Angular and beach gravel	
2	0.2	41.39	Made ground			From 1980s
3	1.2	40.39	Possible former land surface	Silty Clay, Dark Grey	Angular flint and chalk.	
4	1.7	39.89	Weathered chalk	Clay Silt, Pale Yellow	80% angular chalk gravel 20-60mm	
5	2	39.59	Solid chalk	Solid chalk with flint nodules in seams		Base of hole 2.4m

GTP6

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	36.84	Ploughsoil	Silty Clay, Reddish Brown	Angular and beach gravel	
2	0.2	36.64	Weathered chalk/Solifluction stripes	Clay Silt, Yellow brown	Angular flint fragments	Fills solifluction stripes at c.0.4m interval 165°S
3	0.6	36.24	Solid chalk			

GTP7

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	36.31	Ploughsoil			
2	0.2	36.11	Weathered Chalk			Shallow solifluction stripes 176°
3	0.3	36.01	Solid chalk	Solid chalk with nodular flint.		E-W linear exposed on south side of pit. No datable material visible on surface.

GTP8

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	34.21	Topsoil	Silty Clay, Dark Reddish Brown	Angular flint and chalk.	
2	0.15	34.06	Subsoil/ Decalcified head	Silty Clay, Reddish Brown	10% angular flint 10-20mm.	Fills solifluction stripes at 0.4m interval 189°
3	0.25	33.96	Weathered/ Cryoturbated Chalk	Clay Silt Matrix, Pale Yellow	90% angular chalk 20-60mm. Large flint nodules to 500mm.	Solifluction stripes continue to depth.
4	1.25	32.96	Solid chalk			Base of hole 1.35m

GTP9

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	33.64	Topsoil			
2	0.2	33.44	Weathered chalk			Solifluction stripes at 0.4m interval 180°
3	0.4	33.24	Solid chalk			Base of hole 0.6m

GTP10

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	35.89	Ploughsoil			
2	0.2	35.69		Silty Clay, Yellow Brown	20% angular chalk and flint 20-100mm	Filling solifluction stripes at 0.5m intervals 143°
3	0.5	35.39	Solid chalk			Base of hole.

GTP11

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	34.36	Ploughsoil			Remnants of solifluction stripes persist.
2	0.2	34.16	Weathered chalk/some calcareous head			
3	0.3	34.06	Solid chalk			Base of hole.

GTP12

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	30.84	Topsoil	Silty Clay, Dark Yellow Brown	Flint and chalk.	
2	0.35	30.49	Colluvium	Clay Silt, Reddish Brown	5% angular flint 5-40mm	
3	0.5	30.34	Colluvium	Clay Silt, Reddish Brown	70% angular flint 10-80mm	
4	0.8	30.04	Colluvium/ Decalcified Head	Silty Clay, Dark Reddish Brown	90% angular flint 10-300mm	
5	1.25	29.59	Calcareous head	Clay Silt, Pale Yellow	80% angular - sub-rounded chalk 10-40mm. 10% sub-angular flint 10-50mm	
6	1.8	29.04	Suspected Solid Chalk			Solid chalk suspected by machine driver. Base of hole.

GTP13

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	33.07	Topsoil	Dark Yellow Brown	Very large quantity - very rounded beach pebbles 10-130mm	
2	0.2	32.87		Silty Clay with Sand, Light Reddish Brown	30% very rounded flint cobbles 30-140mm, 10% angular flint 30-60mm	
3	0.5	32.57	Calcareous head gravel	Silt with Clay and Sand, Very light yellow brown	30% very rounded flint cobbles 30-200mm. 40% chalk pellets 1-5mm.	
4	1.5	31.57	Solid chalk			Base of hole

GTP14

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	35.95	Topsoil	Silty Clay, Yellow Brown	5% angular flint 10-40mm. No cobbles	
2	0.2	35.75	Decalcified Head/ Subsoil	Silty Clay with Sand, Light Reddish Brown	5% angular flint 10-30mm	

3	0.4	35.55		Calcareous Clay Silt, Pale Yellow	Angular chalk and flint	Fills solifluction stripes at 0.6m intervals 148°. Molluscs at 0.8m <16>.
4	1.15	34.8	Solid chalk			Base of hole.

GTP15

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	29.8	Topsoil	Dark Yellow Brown	Angular flint and occasional beach pebbles.	
2	0.3	29.5	Decalcified Head			
3	0.8	29	Brickearth	Silty Clay, Dark Reddish Brown	Occasional beach pebbles	
4	2.3	27.5		Silty Clay, Dark Yellow Brown	Very occasional sub-angular flint 10-30mm	
5	2.5	27.3		Sand, Yellow Brown	Very occasional angular flint 10-30mm	
6	2.7	27.1		Sand with Silt, Light Yellow Brown.	Stone free, but contains CaCO ₃ pellets.	
7	3.8	26		Compact Sand, Yellow	Stone free	Base of hole 4.9m

GTP16

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	21.75	Topsoil	Clay Silt, Reddish Brown	Angular and rounded cobbles noted	Mortar, CBM and Ferrous noted
2	0.3	21.45	Subsoil/ Colluvium	Clay Silt, Light Reddish Brown	10% sub-angular flint 10-30mm, rising to 50% in beds/patches. Rounded pebbles noted.	
3	0.6	21.15	Decalcified Head	Silty Clay, Firm, Light Orange Brown	Descreet patches of 80% sub-angular flint 10-40mm	Patches circular and might be remnant solifluction fractures, c0.5m wide.

3	1	20.75	Decalcified Head	Silty Clay, Firm, Light Orange Brown	As above with 70% sub-angular flint gravel 10-60mm	
3	1.5	20.25	Decalcified Head	Silty Clay, Firm, Light Orange Brown	As above with gravel filling solifluction stripes	Gravel filling N-S solifluction stripes.
4	1.6	20.15	Decalcified Brickearth	Silty Clay with Sand, Firm/Compact, Orange Brown	5% angular flint gravel 10-30mm. Beach pebbles noted.	
5	2.5	19.25	Decalcified Brickearth?	Silty Clay with Sand, Firm, Yellow brown	Beach pebbles noted	
6	3.7	18.05	Fluvial Gravel	Coarse Sand with Clay, Yellow Brown	95% rounded to sub-rounded flint gravel 10-50mm	
6	3.9	17.85	Fluvial Gravel	Coarse Sand with Clay, Yellow Brown	As above - sub-rounded flint gravel 10-110mm	
6	4.8	16.95	Fluvial Gravel	Coarse Sand, Brownish Yellow	90% sub-rounded flint gravel	Base of hole (collapsing).

GTP17

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	18.68	Topsoil	Clay Silt, Reddish Brown		
2	0.2	18.48	Colluvium	Clay Silt, Light Reddish Brown	10% sub-angular flint 10-30mm, rising to 50% in beds/patches	
3	0.4	18.28	Ditch cut and fill			Ditch - orientation 157°, pottery and charcoal noted in fill.
4	0.4	18.28		Silty Clay, Light Orange	80% angular flint gravel 10-40mm	

GTP18

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	18.41	Topsoil	Clay Silt, Reddish Brown		
2	0.2	18.21	Colluvium	Clay Silt, Light Reddish Brown	10% sub-angular flint 10-30mm, rising to 50% in beds/patches	

3	0.35	18.06		Silty Clay, Orange Brown	70% angular flint gravel 10-60mm	
4	0.6	17.81		Pinnacles of Clay Silt, Yellowish Brown	60% chalk pellet gravel 2-5mm. 70% angular flint gravel 10-40mm	By 1.1m solution pipes of [3] disappearing. Solid calcareous head by 1.3m.
5	1.8	16.61		Silt, very compact, dark yellowish brown	70% angular flint gravel 20-60mm	
6	3	15.41	Decalcified Brickearth?	Silt with Sand, Yellowish Brown		
7	3.5	14.91	Fluvial Gravel	Coarse Sand, Yellow Brown	80% round flint gravel 10-40mm	Tert? noted
8	4.9	13.51	Weathered Upper Chalk			Base of hole.

GTP19

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	28.69	Topsoil	Silty Clay, Light Yellow Brown	30% angular flint gravel 10-110mm	
2	0.3	28.39	Colluvial Subsoil		20% angular flint gravel 10-80mm	
3	0.4	28.29	Decalcified Head	Silty Clay, Firm, Dark Yellow Brown	30% angular flint gravel 20-60mm	Solifluction stripes into [4] 182°
4	0.8	27.89	Calcareous Head	Silt, Yellow Brown	20% angular flint gravel 10-30mm	
5	1.3	27.39	Calcareous Head	Chalk Pellet Gravel, Light Yellow Brown	10% angular flint gravel 10-50mm	Solifluction stripes persist 180°
6	2.1	26.59	Palaeosol?	Clay Silt, Dark Brown (Black Grey at contact)	20% chalk pellet 10-15mm	Down onto finely bedded chalk pellet gravel and yellow silt. C20mm beds - possible high resolution.
7	3.3	25.39		Silty Sand, Dark Brown	Stone free	
8	3.9	24.79		Silty Clay with Sand, Grey	5% angular flint gravel 10-30mm	
9	4.1	24.59	Calcareous Head	Clay Silt, Pale Yellow	90% chalk pellet gravel, 2-5mm	

10	4.3	24.39	Calcareous Head	Silt with Clay, Very Pale Yellow	20% chalk pellet gravel	Base of hole 4.9m
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GTP20

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0	31.45	Topsoil	Silty Clay, Light Yellow Brown	30% angular flint gravel 10-110mm	
2	0.3	31.15	Decalcified Head			Notes say same as TP13 [3], but that's calcareous head? Possibly same as TP13 [2]?. Intrudes into [3] 175°
3	0.5	30.95	Calcareous Head	Clay Silt, Yellow	20% angular chalk 2-5mm, 10% angular flint 10-40mm	
4	1.1	30.35	Solid chalk			Solifluction stripes on surface 172°

GTP21

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0		Topsoil	Silty Clay, Yellow Brown	40% angular flint 10-60mm. Beach pebbles noted	
2	0.2		Decalcified Head/Brickearth	Silty Clay, Reddish Brown	10% angular flint 10-40mm. Stone free by 0.3m	
3	1.7		Calcareous Head	Silt with Clay, Light Yellow Brown	5% chalk pellet gravel 2-5mm. Very occasional angular flint.	
4	2.1			Sand, Brownish Yellow	Stone free	
5	2.6			Clay Silt with Sand, Brown	Occasional chalk pellets	
6	3.4		Palaeosol?	Sandy Clay, Very Dark Brown	2% very occasional sub-rounded flint 5-40mm	
7	3.8			Sandy Clay, Reddish Brown	Very occasional sub-rounded flint 20-50mm	
8	4.6			Silty Clay with Sand, Pale Yellow	Stone free	Base of hole 5m.

GTP22

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0		Topsoil			
2	0.3		Colluvium			
3	0.6		Decalcified Head			Solifluction stripes at 1m.
4	1.1		Calcareous Head	Calcareous Head Gravel		
4.5	1.2		Brickearth	Clay Silt, Yellow Brown		
5	1.4		Palaeosol?	Clay Silt, Very Dark Brown	Stone Free	
6	1.6		Calcareous Head	Silty Clay, Light Grey Brown	60% chalk pellets	
7	1.8		Calcareous Head	Clay Silt, Light Grey Brown	40% chalk pellet gravel 2-5mm	
8	2			Silty Clay with Sand, Dark Grey Brown	1% chalk pellet gravel	
9	2.2		Alluvium	Stiff Clay, Dark Green Grey		
10	2.8			Stiff Clay, Green Grey, Fe mottle	Tufa nodules and fine CaCO ₃ particles	
11	2.9			Clay Silt with Sand, Pale Yellow	Stone free	
12	3.5			Clay Silt with Sand, Pale Yellow	5% CaCO ₃ nodules 20-40mm	
13	3.8			Silty Clay, Light Greenish Yellow, Fe mottle		
14	4.3			Stiff Clay, Bluish Yellow		

GTP23

Unit	Depth	OD	Strat	Description	Coarse Component	Notes
1	0		Topsoil			
2	0.2		Decalcified Head	Silty Clay, Reddish Brown		Filling solifluction stripes in below.
3	0.3		Calcareous Head	Clay Silt, Yellow Brown	80% chalk pellets 2-5mm. Very occasional flint nodules up to 200mm.	
4	0.8		Brickearth	Silt with Sand, Grey Brown. Firm and	Occasional chalk flecks.	

				compact.		
5	1.5		Calcareous Head	Silt, Pale Grey	80% chalk 10-30mm	
6	1.6		Palaeosol?	Silty Clay, Dark Grey		

Appendix 2: Phase 2 Geoarchaeological Test Pit Logs

GTP24

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	27.423	Topsoil			
1	0.2	27.223	Colluvium	Silty clay, reddish brown.	50% poorly sorted WR-A flint gravel 10-110mm	
2	0.4	27.023	Decalcified Head	Compact light yellowish brown silty clay with flint	60" WR-R flint gravel 10-140mm	
3	1.2	26.223	Decalcified Brickearth	Light yellowish brown silty clay	Virtually stone free	
4	2.2	25.223	Decalcified sand with palaeosols	Greenish yellow medium sand with dark brown clay laminations		Base of hole 2.4m

GTP25

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	23.712	Topsoil			
1	0.3	23.412	Colluvium	Light greyish brown silty clay	80% poorly sorted WR-A flint gravel 10-110mm	This colluvium is very distinctive with many beach pebbles and is paler and drier.
2	0.8	22.912	Decalcified Head	Firm light reddish brown	40% WR-A flint gravel 10-90mm	
3	1.6	22.112	Decalcified Brickearth	Stiff, reddish yellow	10% WR-A flint gravel 10-80mm. Beach pebbles still present	
4	2.4	21.312	Calcareous Head	Light yellowish brown clay silt	70% chalk pellet gravel 1.5m	
5	3	20.712	Decalcified sand with palaeosols			

GTP26

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	26.71	Topsoil			
1	0.2	26.51	Colluvium			

2	0.6	26.11	Decalcified Head	Firm, reddish brown	60% SA-A flint gravel 10-60mm	
3	0.7	26.01	Calcareous Head	Compact silty clay	10cm beds of alternating 80% chalk pellet gravel / 5% chalk pellet gravel - equivalent of palaeosols?	
4	2	24.71	Sand with chalk	Firm greenish yellow sand. Palaeosols noted	5% chalk pellet 1-20mm	
5	2.6	24.11	Sand with chalk	As above but palaeosols more frequent		

GTP27

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	23.584	Ploughsoil			
1	0.3	23.284	Colluvium	Dark reddish brown clay silt, compact	70% poorly sorted SA-A flint gravel 10-70mm	
2	0.7	22.884	Decalcified Head	Clay silt, reddish brown, compact. Solution contact-strip Mn layer	80% poorly sorted A flint gravel 10-200mm	
3	1.2	22.384	Calcareous Head	Light grey clay silt. Forming lenses with brickearth	80% chalk pellet gravel 1-5mm, 5 % A flint gravel 10-40mm	
4	2.2	21.384	Calcareous Brickearth	Firm clay silt, light yellowish brown	20% chalk pellet gravel	
5	2.5	21.084	Chalk pellet Gravel			Base of hole 3m

GTP28

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	20.861	Ploughsoil			
1	0.3	20.561	Colluvium	Firm clay silt, dark yellowish brown	80% poorly sorted A-SA flint gravel 10-80mm	
2	0.5	20.361	Decalcified Head	Firm silty clay, reddish brown	75% poorly sorted A-SA flint gravel 10-90mm	Could be colluvium. Solution contact
3	0.75	20.111	Calcareous Head	Firm clay silt, light yellowish brown	40% chalk pellet gravel 1-5mm. 30% poorly sorted A flint gravel 10-110mm	Decalcified head continues in solution

4	1.25	19.611	Decalcified Head	Compact reddish brown	60% poorly sorted SA-A flint gravel 20-90mm filling stripes, by 1.80m 0.45m stipes with Decalcified Brickearth	
5	2.1	18.761	Decalcified Sand	Greenish brown medium sand. Mn staining	Stone free	Could be dcalcified [30.5]?
	2.4	18.461		As above but greenish yellow	Calcrete nodules	
6	2.7	18.161	Fluvial Sand and Gravel	Loose, clast supported, coarse sand	95% well sorted rounded flint gravel 5-40mm	

GTP29

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	24.751	Topsoil			
1	0.2	24.551	Colluvium	Dark yellowish brown silty clay	40% poorly sorted SA-A flint 10-60mm	
2	0.4	24.351	Decalcified Head	Silty clay, reddish brown. Pockets of silty clay stone free Brickearth	80% poorly sorted SA-A flint 10-80mm	
3	1.2	23.551	Decalcified Brickearth	Silty clay, reddish brown. Mn layer at intersection (1.6m)	<5% SA flint gravel 10-60mm	
4	1.6	23.151	Calcareous Head	Clay silt, light yellowish brown	5% SA flint gravel 10-50mm. 80% chalk pellet gravel, Breccia noted	Base of hole 1.8m

GTP30

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	20.723	Ploughsoil			
1	0.3	20.423	Colluvium	Compact clay silt, dark yellowish brown	60% poorly sorted A-SA flint gravel 10-60mm	Thickens to SE 1m
2	0.75	19.973	Decalcified Head	Firm silty clay, reddish brown	60% moderately sorted A-SA flint gravel 10-50mm	Flint becomes patchier with depth. Gullies downslope
3	1.3	19.423	Calcareous Head	Soft, light yellow brown	70% chalk pellet gravel 1-5mm. 5% SA flint gravel 10-30mm	
4	1.5	19.223	Calcareous	Soft light yellowish brown	CaCO ₃ nodules	

			Brickearth	silt. Stripes of red		
5	1.8	18.923	Sand	Fine grained sand with brown stripes. Burrows?		

GTP31

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	29.665	Topsoil			
1	0.3	29.365	Colluvium	Silty clay dark yellow brown. Contains pockets of light yellow brown silty brickearth on east side	60% poorly sorted A-SA flint gravel 10-210mm	
2	0.5	29.165	Decalcified Head	Silty clay, dark yellow brown	70% poorly sorted A-SA flint 10-300mm	Fills linear stripes at contact with unit below.
3	1	28.665	Calcareous Head	Compact clay silt, light greyish brown	70% chalk pellet gravel 1-5mm. 10% A flint gravel 30-180mm	By 2m linear stripes have gone and is very compact. Maybe becciated? No palaeosols or breccia. Base of hole 2.5m

GTP32

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	25.443	Topsoil			
1	0.3	25.143	Colluvium	Clay silt, dark yellowish brown	60% poorly sorted A-SA flint gravel 20-60mm	
2	0.75	24.693	Decalcified Head	Clay silt, reddish brown	80% poorly sorted A-SA flint gravel 10-120mm	Fills stripes in unit below
3	1.2	24.243	Calcareous Head	Clay silt light yellow brown. Dark Mn staining at surface. Heavily eroded by gulley of decalcified	90% chalk pellet gravel 1-5mm. By 1.8m lumps of red deposited breccia present.	

				brickearth at base of [32/2]. By 1.8m palaeosols present		
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GTP33

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	21.568	Topsoil			
1	0.3	21.268	Colluvium	Silty clay, yellow brown.	60% poorly sorted SA-A flint gravel 10-80mm	
2	0.4	21.168	Decalcified Head	Silty clay, reddish brown	75% A-SA flint gravel 10-80mm	Filling stripes in unit below
3	1	20.568	Calcareous head	Clay silt. Contorted with pockets of sand	50% chalk pellet gravel 1-5mm. 5% A flint gravel 10-20mm	Contact 1.0-1.75m filling stripes, possible solution
4	2	19.568	Alluvium	Greenish grey silty clay	5% chalk pellet 5-10mm. Larger chalk up to 50mm noted	
5	2.2	19.368	Sand	Fine silty sand, brownish yellow. Contorted	Chalk flecks	
6	2.75	18.818	Chalk	Fractured. Dissolved	Large flints	Not proven

GTP34

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	16.817	Ploughsoil			
1	0.3	16.517	Colluvium	Silty clay, dark yellow brown. Firm	20% SA-SR flint gravel, poorly sorted, 10-80mm. Increasing to 60% by 0.5m	
2	0.5	16.317	Colluvium	Silty clay, dark yellow brown.	60% SA-A flint gravel, poorly sorted 10-90mm	Filling stripes or channels in unit below
3	0.9	15.917	Decalcified Head	Sandy clay, light reddish brown.	Pockets of up to 75% poorly sorted A flint gravel 10-70mm. 0.5m downslope stripes by 1m	
4	1.5	15.317	Decalcified Brickearth	Silty clay with sand, light reddish	10% poorly sorted A flint gravel 10-70mm. Very few stones by	

				brown.	1.9m	
	1.9	14.917		Dark brown clay with small chalk clasts. Palaeosol? Iron pan?		
5	1.95	14.867	Calcareous Head	Clay silt, light greyish brown	80% chalk pellet gravel, 5% SA-A flint gravel 10-50mm	Base of hole 2.10m

GTP35

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	24.999	Topsoil			
1	0.3	24.699	Colluvium	Dark yellowish brown clay silt	70% poorly sorted A-SA flint gravel 10-70mm	
2	0.5	24.499	Colluvium	Yellow brown silt	80% poorly sorted A-SA flint gravel 10-90mm	
3	0.8	24.199	Decalcified Head	Reddish brown silty clay	60% poorly sorted A-SA flint gravel 10-80mm	Sloping solution contact
4	1.05	23.949	Calcareous Head	Yellow brown clay silt	40% chalk pellet gravel 1-5mm. 10% SA flint gravel 10-30mm	
5	1.3	23.699	Calcareous Head with Palaeosols	Yellow brown clay silt	40% chalk pellet gravel 1-5mm. 10% SA flint gravel 10-30mm	Possibly disturbed
6	1.8	23.199	Alluvium	Stiff, greenish grey	5% chalk pellet gravel 1-5mm. 5% A flint gravel 10-60mm	
	2.1	22.899		Pale yellow clay silt	5% A chalk 1-10mm. CaCO ₃ calcretions - increase with depth	
	2.6	22.399		Greenish grey with Fe mottles		Base of hole 3.2m

GTP36

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	19.924	Ploughsoil			
1	0.3	19.624	Colluvium	Compact greyish brown silty clay	90% moderately sorted WR-A flint gravel 20-60mm	
2	0.6	19.324	Decalcified Head	Firm reddish brown silty clay. Sand at	80% moderately sorted WR-A flint 10-70mm	

				base		
3	1.2	18.724	Fluvial Sand and Gravel	Reddish brown medium sand with clay	95% well sorted rounded flint gravel 5-30mm	
	1.8	18.124		As above	As above but 99% flint gravel 20-60mm	Void opened on west face. Collapse. Base of hole 2m

GTP37

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	23.907	Topsoil			
1	0.2	23.707	Colluvium	Compact clay silt, greyish brown	90% moderately sorted WR-A flint gravel 20-80mm	
2	0.9	23.007	Decalcified Head	Firm clay silt, reddish brown	50% poorly sorted WR-A flint gravel 10-110mm	
	1.3	22.607			60% poorly sorted WR-A flint gravel 10-200mm	
	1.9	22.007			Up to 250mm rolled	Grades into unit below.
3	2.1	21.807	Decalcified Head	Compact silty clay, brownish red	10% poorly sorted WR-A flint gravel 10-40mm	Could be decalcified brickearth. Cuts into unit below in channel downslope
4	2.8	21.107	Sand	Soft. Medium sand with clay. Brownish red	<5% A-SR flint gravel 10-30mm	Base of hole 3.2m

GTP38

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	27.828	Ploughsoil			
1	0.2	27.628	Colluvium	Grey brown clay silt	40% SA-A flint gravel 10-60mm	
2	0.4	27.428	Decalcified Head	Red	80% SA-A flint gravel 20-40mm	
3	0.8	27.028	Calcareous Head	Firm clay silt	70% SA-A flint gravel 40-80mm	
4	1.3	26.528	Calcareous Head with Palaeosols	Reddish brown brickearth.	Breccia. 10% SA flint gravel 10-40mm	

				Dark laminations		
5	1.9	25.928	Calcareous Head with Palaeosols	Grey white clay silt. Bands of black Fe/Mn staining		Base of hole 2.2m

GTP39

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	23.32	Topsoil			
1	0.2	23.12	Colluvium			
2	0.45	22.87	Decalcified Head	Compact reddish brown clay silt.	80% SA-A poorly sorted flint gravel 10-80mm	Linear solution contact with below.
3	1.3	22.02	Calcareous Head	Compact yellow brown silt. Some mineral staining. Contorted palaeosol?	80% R-SA chalk 1-5mm	
4	1.8	21.52	Alluvium	Stiff silty clay. Olive green. Fe flecks and rootlets	Angular flint 10-15mm noted	
	2.6	20.72		As above with Fe and yellow mottles/flecks	Calcium carbonate	Base of hole 3.0m

GTP40

Unit	Depth	OD	Strat	Description	Coarse component
0	0	31.801	Topsoil		
1	0.2	31.601	Colluvium		
2	0.3	31.501	Calcareous Head		
3	0.5	31.301	Solid Chalk		

GTP41

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	28.064	Topsoil			
1	0.3	27.764	Colluvium	Dark yellow brown clay silt	60% SA-A flint gravel 10-80mm	

2	0.45	27.614	Decalcified Head	Compact. Reddish brown silty clay.	80% poorly sorted SA-A flint gravel 10-110mm	Solution slope downhill
3	0.8	27.264	Calcareous Head	Firm, yellow brown. Contorted combe rock	50% poorly sorted SA-A flint gravel 10-90mm	By 1.2m filling stripes in below
4	1.5	26.564	Calcareous Head with Palaeosols	Contorted. Finely bedded. Brownish yellow brickearth and greyish brown palaeosols	Chalk pellet gravel	
5	1.9	26.164	Sandy Head	Medium sand, greyish yellow. Frequent brown clay laminations - palaeosols?	5% chalk pellet gravel 1-10mm	
	2.4	25.664		Very clear flat bedded soils		
	2.5	25.564		Very dark well developed soils		

GTP42

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	22.667	Topsoil			
1	0.2	22.467	Colluvium	Dark yellow brown silty clay	40% SA-A flint gravel 10-60mm	
2	0.45	22.217	Decalcified Head	Firm reddish brown silty clay	60% SA-A flint gravel 10-100mm	Solution stripes at base
3	0.82	21.847	Calcareous Head	Yellow brown clay silt. Smears of contorted grey silt - remnants of palaeosol	60% chalk pellet gravel 1-15mm. 10% poorly sorted A flint gravel 20-120mm	
4	1.8	20.867	Calcareous Brickearth	Light greyish yellow silty clay	Chalk flecks. CaCO ₃ nodules	
	2.1	20.567			5% CaCO ₃	

5	2.4	20.267	Alluvium	Silty clay with sand. Fe stained, green grey. Possible palaeosols		Base of hole 2.6m
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GTP43

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	25.009	Topsoil			
1	0.2	24.809	Colluvium	Dark yellow brown silty clay	60% SA-A flint gravel 20-80mm	
2	0.4	24.609	Decalcified Head	Compact clay silt, reddish brown	80% SA-A flint gravel 10-60mm	
	1.3	23.709		Seams of clay silt brick earth	60% gravel	Solution contact
3	1.8	23.209	Calcareous Head	Clay silt, light reddish brown	90% chalk pellet gravels. 5% A flint gravel 10-30mm	
	2.3	22.709		Palaeosols present. Linear - contorted downslope		
	2.5	22.509			Fragments of CaCO ₃ up to 100mm, rolled edges	
4	2.8	22.209		Greenish grey silty sand. Soft	5% chalk pellet gravel 2-5mm	Base of hole 3.2m

GTP44

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	16.628	Topsoil			
1	0.2	16.428	Colluvium	Clay silt, compact, greyish brown. Loessy pockets at 0.45m	20% SA-A flint gravel 10-40mm	
2	0.45	16.178	Loess Head	Silty sand, soft, brownish yellow.		Filling pockets in unit below
3	0.8	15.828	Decalcified Head	Silty clay, reddish brown	80% poorly sorted SA-A flint gravel 10-75mm	
4	2	14.628	Decalcified Brickearth	Yellowish red clay silt. Mn staining	Virtually stone free	
5	2.3	14.328	Calcareous Head	Pale yellow silt. Layers of fine stone free silt	Frequent CaCO ₃ calcretions and small chalk pellets. Occasional A flint gravel	

GTP45

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	23.712	Topsoil			
1	0.25	23.462	Colluvium			
2	0.45	23.262	Decalcified Head	Compact reddish brown clay silt.	70% poorly sorted A-SA flint gravel 10-100mm	Contorted solution stripes at contact with unit below.
3	0.8	22.912	Calcareous Head	Compact light yellow brown clay silt. Seams of reddish brown clay brickeath - contorted. No palaeosols	40% chalk pellet gravel 1-5mm	
4	1.9	21.812	Calcareous Head	Firm, light yellow brown clay silt. Seams of silty brickearth c. 30mm. No palaeosols	80% chalk pellet gravel 2-20mm	
5	2.6	21.112	Calcareous Brickearth	Greyish white silt	<5% sorted A flint gravel 2-10mm. Very angular - frost shattered	
	3	20.712	Calcareous Brickearth with Palaeosols	Greyish white silt. Possible palaeosols - not very well developed	60% chalk pellet gravel 2-10mm. Angular flint 2-5mm noted	Base of hole 3.45m

GTP46

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	17.488	Topsoil			
1	0.1	17.388	Colluvium	Silty clay, dark yellow brown	50% SA-A flint gravel 10-60mm	
2	0.4	17.088	Decalcified Head	Silty clay, reddish brown	70% poorly sorted SA-A flint gravel 10-90mm	
3	1.2	16.288	Calcareous Head	Silt, brownish yellow.	60% chalk pellet gravel 2-8mm	
	1.75	15.738		Patterned ground		
	1.85	15.638	Calcareous Head	Fine sand with silt. @ 2.3m Brickearth with CaCO ₃ rootlets	10% chalk pellet gravel 1-4mm	
	3.8	13.688		As above but more		

				yellow and sandy		
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Appendix 3: Phase 3 Geoarchaeological Test Pit Logs

GTP47 North end on cliff

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	30.31708	Topsoil			
2	0.2	30.12	Colluvium	Brownish yellow silty clay	10% chalk pellet gravel 1-4mm. 15% FG 10-30mm SA-SR-R	
3	0.4	29.92	Chalky head	Pale yellow	Chalk with large flint cobbles	

GTP47 South end against cliff edge

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	28.52524	Topsoil			
2	0.2	28.33	Colluvium	Brownish yellow silty clay	10% chalk pellet gravel 1-4mm. 15% FG 10-30mm SA-SR-R	
3	0.7	27.83	Chalky head	Pale yellow	Chalk with large flint cobbles	
5	1.1	27.43	Head derived from raised beach	Pale greyish yellow clay silt	40% chalk pellet gravel 1-2mm. 40% flint gravel R-WR 10-150mm	Base of hole 2.7m

GTP48 North end on cliff

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	31.88988	Topsoil			
2	0.2	31.69	Colluvium	Brownish red silty clay	2% chalk pellet gravel. 5% A-SA flint gravel	
3	0.5	31.39	Chalky head	Pale brownish yellow clay silt	50% chalk pellet gravel 1-30mm. 10% flint gravel A-SA 10-40mm	
4	0.8	31.09	Weathered Chalk	Blocky chalk with solifluction stripes filled with unit above		
5	1.2	30.69	Chalk			

GTP48
South end against cliff edge

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	29.89315	Topsoil			
2	0.2	29.69	Colluvium	Brownish red silty clay	2% chalk pellet gravel. 5% A-SA flint gravel	
3	0.4	29.49	Chalky head	Pale brownish yellow clay silt	50% chalk pellet gravel 1-30mm. 10% flint gravel A-SA 10-40mm	
6	1.2	28.69	Fine grained calcareous Head	Very pale grey silty clay	60% fine chalk pellet gravel 1-3mm.	Base of hole 4.2m

GTP49
North end on cliff

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	33.23865	Topsoil			
2	0.2	33.04	Chalky head	Mid brownish yellow silty clay	30% chalk pellet gravel 2-40mm. 10% SA-A flint gravel	
3	0.6	32.64	Chalk			

GTP49
South end against cliff edge

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	31.17758	Topsoil			
2	0.2	30.98	Chalky head	Mid brownish yellow silty clay	30% chalk pellet gravel 2-40mm. 10% SA-A flint gravel	
4	0.6	30.58	Calcareous Head	Pale grey silty clay	60% chalk pellet gravel 1-20mm. Occ A flint gravel	Continues to base of hole at 3m

5	1.1	30.08	Palaeosol	Dark grey and discontinuous/ephemeral.		Present in unit above
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**GTP50
South end**

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	32.63341	Topsoil			
2	0.2	32.43	Chalky head	Greyish yellow clay silt	40% chalk pellet gravel. 10% A-SA flint gravel.	
3	0.4	32.23	Chalky head	Yellow brown silty clay	20% chalk pellet gravel. 5% A-SA flint gravel. More chalky with depth	
4	0.8	31.83	Calcareous Head	Pale yellowish grey	60% chalk pellet gravel 1-2mm. Tufa breccia noted. Occ A flint gravel	

**GTP50
North end**

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	30.64788	Topsoil			
2	0.2	30.45	Chalky head	Greyish yellow clay silt	40% chalk pellet gravel. 10% A-SA flint gravel.	
5	0.4	30.25	Calcareous Head	Brownish grey silty clay	40% chalk pellet gravel. V. large flint cobbles	
6	0.7	29.95	Calcareous Head	Very chalky white silty clay. Soft. Slopes down to the south	70% chalk pellet gravel 1-2mm	

GTP51

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	18.5067	Topsoil			
1	0.3		Colluvium	Brownish yellow clay silt	40% A flint gravel 10-30mm	
2	0.6		Decalcified Brickearth	Brownish yellow clay silt	Stone free	
3	0.9		Decalcified Head Gravel	Yellow brown silty clay. Very compact	80% SA flint gravel 10-60mm	Solution contact with unit below
4	2.2		Calcareous head	Pale greenish yellow silt	40% chalk pellet gravel 5-10mm. 10% A flint gravel 5-30mm	
5	2.5		Calcareous Head	Pale yellow brown clay silt	5% chalk pellet gravel. 5% A flint 10-30mm	Base of hole 3.0m

GTP52

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	18.5133	Topsoil			
1	0.2	18.31	Subsoil	Silty clay, grey brown	70% A flint gravel 10-30mm	
2	0.5	18.01	Decalcified Brickearth	Clay silt. Structureless	<5% A flint gravel 10-20mm	
3	0.8	17.71	Decalcified Head Gravel	Clay silt, reddish brown	80% SA-A flint gravel, poorly sorted, 10-60mm	
4	1.6	16.91	Calcareous Head	Very pale yellow brown silt with clay and sand	10% A flint gravel, poorly sorted, 10-20mm	
5	2.8	15.71	Calcareous Head	With rootlets. Yellow brown silty with clay and sand	Stone free	Base of hole 3.0m

GTP53

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	18.42601	Topsoil			
1	0.3	18.13	Stony Subsoil	Grey brown clay silt	70% poorly sorted SA flint gravel 10-30mm	
2	0.4	18.03	Decalcified Head	Clay silt, reddish brown	60% poorly sorted SA flint gravel 10-50mm. To 40% at 1.3m	
4	1.7	16.73	Calcareous Head	Clay, yellow brown	40% chalk pellet gravel 5-10mm	
5	1.9	16.53	Calcareous Head	Silty clay brownish yellow	5% chalk pellet gravel 2-5mm	
	2.5	15.93		As above with CaCO ₃ rootlets		Base of hole 3.2m

GTP54

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	20.31305	Topsoil			
1	0.3	20.01	Colluvium	Reddish brown silty clay	Up to 70% poorly sorted SA flint gravel 10-40mm	
2	0.9	19.41	Brickearth	Reddish yellow silty clay	10% poorly sorted SA flint 10-50mm	
3	1.3	19.01	Decalcified Head	Reddish brown	70% poorly sorted SA-A flint gravel 10-60mm. 40% at 2.0m	Solution contact with unit below
4	2.2	18.11	Calcareous Head	Pale yellow clay silt	Chalk pellet gravel. 5% A flint gravel 10-30mm	
	2.6	17.71	Calcareous Head	Yellow brown clay silt	Chalk pellet gravel. 5% A flint gravel 10-30mm	Base of hole 3.2m

GTP55

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	20.24775	Topsoil			
1	0.3	19.95	Subsoil/Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.5	19.75	Feature fill	Greyish brown silty clay. Filling E-W linear feature.		Hole photographed and abandoned due the presence of archaeological feature

GTP56

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	20.18687	Topsoil			
1	0.3	19.89	Subsoil/Colluvium	Greyish brown silty clay	80% poorly sorted SA flint gravel 10-60mm	
2	0.5	19.69	Decalcified Head Gravel	Reddish brown silty clay	60% poorly sorted SA-A flint 10-70mm	Solution contact with below. Linear. Downslope
3	1.1	19.09	Calcareous Head Gravel	Brownish yellow clay silt	40% sorted SR chalk pellet gravel 20mm. 10% poorly sorted A flint 10-40mm	
	2.2	17.99		As above	40% sorted R chalk 2-10mm. 20% poorly sorted A flint 10-100mm	
4	2.6	17.59	Calcareous Head (Brickearth)	Brownish yellow - greenish brown clay silt with	5% SR chalk 5-15mm. >5% SA flint 10-20mm. Includes	Base of hole 3.0m

				sand	patches of weathered chalk	
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GTP57

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	19.99445	Topsoil			
1	0.2	19.79	Colluvium	Silty clay, reddish brown	50% poorly sorted flint 10-40mm	
2	0.4	19.59	Decalcified Head	Silty clay, reddish brown	70% somewhat sorted SA flint gravel 10-80mm	
3	1.5	18.49	Calcareous Head	Yellow brown silty clay	10% R chalk 1-5mm	
4	2.4	17.59	Calcareous Head	Silty clay, yellow brown. CaCO3 rootlets	5% R chalk 1-5mm.	
5	3.1	16.89	Calcareous Head Gravel	Clay silt, pale yellow brown	60% SR-SA poorly sorted chalk 5-30mm. 10% SA flint, poorly sorted, 10-30mm	Base of hole 3.5m

GTP58

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	20.07693	Topsoil			
1	0.3	19.78	Subsoil/Colluvium	Silty clay, reddish brown	50% poorly sorted flint 10-40mm	
2	0.4	19.68	Decalcified Head	Silty clay, reddish brown	70% somewhat sorted SA flint gravel 10-80mm	
3	2.1	17.98	Calcareous head	Fine grained	10% R chalk 1-15mm	
4	2.4	17.68	Calcareous Head Gravel	Clay silt, pale yellow brown	60% SR-SA poorly sorted chalk 5-30mm. 10% SA flint, poorly sorted,	

					10-30mm	
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GTP59

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	22.13924	Topsoil			
2	0.2	21.94	Decalcified Head	Reddish brown	70% poorly sorted SA-A flint gravel 10-60mm. 40% at 2.0m	
3	1.8	20.34	Calcareous Head	Pale yellow clay silt	Chalk pellet gravel. 5% A flint gravel 10-30mm	
4	2.3	19.84	Green silts	Brownish green silty clay with sand. Fe staining		

GTP60

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	22.03782	Topsoil			
2	0.2	21.84	Colluvium	Reddish brown silty clay	Up to 70% poorly sorted SA flint gravel 10-40mm	
3	0.4	21.64	Decalcified Head	Reddish brown	70% poorly sorted SA-A flint gravel 10-60mm. 40% at 2.0m	
4	1.2	20.84	Intertidal Silts?	Stiff brownish green clay. Flecks if Fe and Mn staining	Virtually stone free	
5	2	20.04	Brickearth	Reddish yellow stiff silty clay.	30% soft tufa. Fr CaCO ₃ calcretions. Otherwise virtually stone free	

GTP61

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	21.93181	Topsoil			
1	0.2	21.73	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.4	21.53	Decalcified Head Gravel	Silty clay, reddish brown	70% somewhat sorted SA flint gravel 10-80mm	
3	1.1	20.83	Calcareous Head Gravel	Clay silt, yellow brown	40% sorted SR chalk 5-10mm. 5% SA flint 5-10mm	No palaeosol
4	2.2	19.73	Brickearth	Olive green		
5	2.6	19.33	Brickearth	Greenish yellow with CaCO ₃		Base of hole 3.0m

GTP62

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	21.75758	Topsoil			
1	0.3	21.46	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.4	21.36	Decalcified Head Gravel	Silty clay, reddish brown	70% somewhat sorted SA flint gravel 10-80mm	
3	1.1	20.66	Calcareous Head Brickearth	Clay silt, pale green-grey	CaCO ₃ at <5%	
	2	19.76		As above but clay with silt		
	2.4	19.36		As above with Fe stained bedding		
	2.6	19.16		Silty clay, compact. Yellow brown. Fe bedding	20% CaCO ₃ nodules	

GTP63

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	21.6633	Topsoil			
2	0.2	21.46	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
3	0.5	21.16	Decalcified Head	Silty clay, reddish brown	70% somewhat sorted SA flint gravel 10-80mm	
4	1.6	20.06		Greenish brown stiff clay. Mn staining	Stone free	
5	1.7	19.96	Calcareous Brickearth	Fine clay silt, pale grey with frequent Fe mottles/staining. Quite compact	Large CaCO ₃ calcretions. Otherwise virtually stone free	Base of hole 3.0m

GTP64

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	21.36237	Topsoil			
2	0.2	21.16	Subsoil/Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
3	0.4	20.96	Decalcified Head	Silty clay, reddish brown	70% somewhat sorted SA flint gravel 10-80mm	
4	1.9	19.46	Decalcified Brickearth	Reddish yellow clay silt with sand. Frequent Mn staining	Occ small A-SA flint gravel 1-5mm, 1%	
5	2.6	18.76	Sand	Medium sand, pale brownish yellow	3% 0.5-1mm chalk and flint gravel. Coarse component seems to be bedded	
6	3	18.36	Calcareous Head	Brownish grey clay silt	30% chalk pellet gravel	Base of hole 3.2m

					1-3mm. 30% flint gravel SA-SR 10-50mm	
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GTP65

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	21.2323	Topsoil			
2	0.2	21.03	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
3	0.4	20.83	Decalcified Head	Silty clay, reddish brown	70% somewhat sorted SA flint gravel 10-80mm	
4	0.7	20.53	Calcareous Head	Pale yellow brown silty clay	30% chalk pellet gravel. 30% flint gravel SA-SR-R 10-50mm	
5	1.5	19.73	Decalcified Brickearth	Fine yellowish red clay silt with sand. Frequent Mn staining	Virtually stone free with occasional stony beds	
6	2.9	18.33	Fluvial Sand	Medium sand, brownish yellow		
7	3	18.23	Fluvial Gravel	Coarse Sand with Clay, Yellow Brown	95% rounded to sub-rounded flint gravel 10-50mm	

GTP66

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	23.98224	Topsoil			
1	0.4	23.58	Subsoil/Colluvium	Reddish brown silty clay	Up to 70% poorly sorted SA flint gravel 10-40mm	
2	0.6	23.38	Decalcified Head Gravel	Silty clay, reddish brown	70% somewhat sorted SA flint gravel 10-80mm	
3	1.5	22.48	Calcareous Head	Pale yellow brown clay silt	30% sorted SR chalk 5-10mm. <5% sorted A flint	

					10-20mm	
4	2.2	21.78	Loam	Dark grey brown clay with sand. Compact. Bedded and Fe stained. Possible palaeosols. Finely bedded by 2.4m		
5	2.6	21.38	Alluvium	Light greenish brown clay with sand. Finely bedded. Iron stained	CaCO ₃ nodules	Base of hole 3.0m

GTP67

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	23.70828	Topsoil			
1	0.4	23.31	Subsoil/Colluvium	Reddish brown silty clay	Up to 70% poorly sorted SA flint gravel 10-40mm	
2	0.6	23.11	Decalcified Head	Silty clay, reddish brown	70% somewhat sorted SA flint gravel 10-80mm	Solution features in unit below. Contorted deep downhill stripes
3	1	22.71	Calcareous Head	Clay silt, yellow brown	40% sorted SR chalk 5-10mm. 5% SA flint 5-10mm	Strips disappear and complete cover of calcareous by 1.7m
4	1.9	21.81	Calcareous Head	Pale yellow brown clay silt. Bedded. Beds up to 0.3m thick and contorted as	Beds of up to 80% sorted SA-SR chalk 10-20mm.	

				stripes downhill		
5	2.1	21.61	Loam	Light yellow brown clay with sand. Greyish brown by 2.5m	CaCO3 calcretions abundant	Base of hole 3.0m

GTP68

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	23.46246	Topsoil			
1	0.3	23.16	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.6	22.86	Stony Colluvium	Reddish brown silty clay	Up to 70% poorly sorted SA flint gravel 10-40mm	
3	0.9	22.56	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA-A flint 10-60mm.	
	2	21.46		As above with increasing beds of Mn staining	30% poorly sorted A flint 10-50mm	
4	2.1	21.36	Calcareous Head	Silty clay with sand, pale yellow brown	10% poorly sorted SR chalk 1-5mm. <5% poorly sorted SA flint 5-10mm	Base of hole 3.0m

GTP69

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	22.43971	Topsoil			
1	0.3	22.14	Colluvium	Reddish brown silty clay	Up to 70% poorly sorted SA flint gravel 10-40mm	
2	0.5	21.94	Decalcified Head Gravel	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	

	1.3	21.14			>10% poorly sorted SA flint 10-30mm	
3	1.7	20.74	Calcareous Head	Pale yellow clay silt	80% sorted SR chalk 2-10mm	
4	2.3	20.14	Calcareous Head	Pale greenish yellow clay silt. Mn staining at base	>5% R-SR chalk 2-5mm	
5	2.7	19.74	Calcareous Head Gravel	Brownish yellow silty clay	70% poorly sorted SA-SR chalk 10-30mm. >5% SA flint 10-20mm	Base of hole 3.0m

GTP70

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	22.57026	Topsoil			
1	0.3	22.27	Colluvium	Silty clay, brownish yellow	60% poorly sorted SA flint 10-60mm	
2	0.6	21.97	Decalcified Head Gravel	Clay with silt, reddish brown. Mn staining at base -solution contact	70% poorly sorted SA-A flint 10-110mm	
3	1.7	20.87	Calcareous Head	Silty clay, pale yellow grey. Possible palaeosol at 2.1m	80% sorted SR chalk 1-15mm	
4	2.3	20.27	Calcareous Head	Olive grey silty clay. Fe staining. Bedded?	CaCO ₃ nodules	
5	2.7	19.87	Calcareous Head	As above with blue grey laminations	CaCO ₃ continues	Base of hole 3.0m

GTP71

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	22.20707	Topsoil			
1	0.3	21.91	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	

2	0.6	21.61	Decalcified Head Gravel	Silty clay, reddish brown. Compact	70% poorly sorted SA-R flint gravel 10-80mm. Contains beach pebbles	
3	1.5	20.71	Calcareous Head Brickearth	Olive grey silt clay. Mn staining	Silty clay	
4	1.6	20.61	Calcareous Head Brickearth	As above	20% poorly sorted SR chalk 1-30mm	
5	2.6	19.61	Loam	Olive grey clay with sand. Fe mottles	5% CaCO ₃ calcretions	Base of hole 3.1m

GTP72

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	26.06914	Topsoil			
1	0.3	25.77	Colluvium	Silty clay, brownish yellow	60% poorly sorted SA flint 10-60mm	
2	0.5	25.57	Decalcified Head	Soft clay, reddish brown	50% poorly sorted SA flint 10-70mm	Solution contact with unit below, downhill stripes
3	1	25.07	Calcareous Head	Yellow brown silt with clay	60% sorted SR chalk 10-20mm. 10% poorly sorted A flint 10-110mm	
4	1.8	24.27	Calcareous Head with Palaeosols	Dark grey brown silty clay. Thick bedded palaeosols	5% SR chalk 1-3mm	
5	2.2	23.87	Cemented Calcareous Head	Slabs of indurated silty clay 70% moderately sorted SR chalk 10-30mm. 10% poorly sorted SA-A flint 10-20mm		
6	2.7	23.37	Calcareous Head	Light greenish grey silty clay	10% sorted SR chalk 1-5mm	

	3	23.07		As above but paler		
	3.6	22.47		As above with Fe staining		Base of hole 4m (soily)

GTP73

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	25.68576	Topsoil			
1	0.3	25.39	Colluvium	Silty clay, brownish yellow	60% poorly sorted SA flint 10-60mm	
2	0.45	25.24	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	Linear solution contact with unit below
3	0.8	24.89	Calcareous Head	Light yellow brown clay silt. Bedded with brickearth involution stripes downhill	30% sorted SR chalk 1-10mm. 10% poorly sorted SA flint 10-30mm	
4	1.5	24.19	Calcareous Head	Pale grey brown silt	10% sorted SR chalk 1-10mm. 5% poorly sorted SA flint 10-30mm	
5	2.3	23.39	Calcareous Head	Pale grey brown chalk peelt gravel	50% sorted SR chalk 1-10mm	
6	2.9	22.79	Calcareous Head with Palaeosol	Grey brown 70mm thick		Base of hole 3.0m

GTP74

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	24.51475	Topsoil			
1	0.2	24.31	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.45	24.06	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	Solution contact with below. Linea with Mn oxide

3	1.6	22.91	Calcareous Head with Palaeosols	Very pale yellow clay silt with contorted beds of very dark grey silty clay	20% sorted SR chalk 1-5mm	
4	2.1	22.41	Calcareous Head	Very pale yellow clay silt	20% SR chalk 10-20mm. CaCO ₃	
5	2.5	22.01	Loam	Very pale greeny yellow clay with sand. Fe staining		Base of hole 2.8m. Waterstrike and unstable

GTP75

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	27.09835	Topsoil			
1	0.2	26.9	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.4	26.7	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
3	0.6	26.5	Calcareous Head	Pale yellow clay silt	70% poorly sorted SR chalk 10-30mm. 10% poorly sorted SA flint 10-30mm	
4	1.4	25.7	Calcareous Head with Palaeosols	Very contorted and thin		

GTP76

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	26.10393	Topsoil			
2	0.2	25.9	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
3	0.4	25.7	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint	Solution contact

					gravel 10-40mm	with below
4	0.6	25.5	Calcareous Head with Palaeosol	Chalk pellet gravel/Beige Brickearth/Palaeosol - involuted in stripes		
5	1.4	24.7	Calcareous Head with Palaeosol			
6	2	24.1	Calcareous head	Very pale grey silty clay	60% sorted SR chalk 2-10mm. No flint. Includes massive breccia slab 450x400mm	
7	2.2	23.9	Calcareous Head	Fine greenish grey clay silt	10% SR chalk 1-5mm. Fine beds of chalk pellet gravel	
	2.6	23.5	Calcareous Head	As above with Fe staining		
	3.2	22.9	Calcareous Head	Greenish grey	<5% chalk 1-3mm	

GTP77

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	25.22828	Topsoil			
1	0.3	24.92	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.6	24.62	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
3	1.2	24.02	Decalcified Brickearth	Silty clay, reddish brown. Mn flecks	Very occasional A flint	
4	2.5	22.72	Mn Layer	Silty clay, very dark grey-black. No organics	No chalk	
5	2.7	22.52	Calcareous Head (Fine)	Clay silt, grey brown	5% sorted SR chalk 2-5mm	
6	3	22.22	Calcareous Head (Fine)	Greenish grey clay silt	Chalk flecks	Possible solution

						feature. Base of hole 3.0m
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GTP78

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	24.62137	Topsoil			
1	0.2	24.42	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.3	24.32	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
3	0.5	24.12	Calcareous Head	Clay silt, light yellow brown	30% poorly sorted SR chalk 1-20mm. 30% poorly sorted SA flint 10-40mm	Linear involutions downhill
4	1.5	23.12	Calcareous Head	Clay silt, very light grey. Bedded by 2m with coarser and finer beds	20% sorted SR-R chalk 2-8mm. 10% poorly sorted A flint 10-30mm - frost shattered. Small CaCO ₃ nodules	
5	2.9	21.72	Palaeosol	Dark grey brown silty clay.		
6	3	21.62	Calcareous Head (Fine)	Greenish grey silty clay, with palaeosol at surface. Fe stained	>5% sorted SR chalk 1-5mm.	

GTP79

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	23.69414	Topsoil			
1	0.3	23.39	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	

2	0.7	22.99	Decalcified Head Gravel	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
3	1.5	22.19	Decalcified Brickearth	Brownish yellow silty clay	Stone free	
4	2.2	21.49	Mn Layer	Mn solution front. Dropping to West - NW. Possible solution hollow		
5	2.5	21.19	Calcareous Head (Fine)	Greenish gery silty clay with sand. Fe staining	>5% sorted SR chalk 1-5mm.	Possible solution hollow? Base of hole 3.0m

GTP80

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	26.25696	Topsoil			
1	0.2	26.07	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.4	25.87	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
3	0.7	25.57	Decalcified Brickearth	Dark yellow brown clay silt. Firm	Stone free	
4	1.2	25.07	Calcareous Head	Clay silt, yellow brown	10% sorted SR chalk 1-5mm	
5	2.2	24.07	Loam	Dark reddish brown medium sand with clay. By 2.7m very dark brown clay with medium sand		
6	2.9	23.37	Palaeosol	Very dark brown clay with sand. Blocky. Fe staining.	<5% poorly sorted A flint 2-40mm	
7	3.1	23.17	Calcareous Head	Light greenish yellow clay	<5% sorted SR chalk 1-5mm	Base of hole 3.2m

GTP81

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	26.0888	Topsoil			
1	0.3	25.789	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.6	25.489	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
3	1.7	24.389	Calcareous Head	Clay silt, yellow brown	30% poorly sorted chalk 1-5mm. <5% A flint 5-10mm	
4	2.1	23.989	Loam	Dark yellow brown clay with medium sand. More Mn stained by 2.2m	<5% sorted chalk 5-10mm	
5	2.9	23.189	Palaeosol	Very dark brown clay with sand. Blocky. Clear Fe layer	<5% poorly sorted A flint 2-40mm	Base of hole 3.0m

GTP82

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	27.39315	Topsoil			
1	0.2	27.19	Subsoil/Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.3	27.09	Decalcified Head Gravel	Dark reddish brown clay	60% SA flint 10-30mm. 20% poorly sorted WR flint 10-150mm. Contains large nodules and beach pebbles	
3	1.1	26.29	Decalcified Brickearth	Dark yellow brown clay silt. Firm	Stone free	
4	1.6	25.79	Sand	Brownish yellow medium sand	<5% SA flint gravel 5-20mm	
5	2.2	25.19	Loam	Brownish		

				yellow silty sand with clay		
6	2.7	24.69	Loam with Palaeosol	Dark yellow brown silty sand with clay. Lenses of dark grey brown silt. Clay palaeosol @ 2.9m		
7	3.1	24.29	Calcareous Head	Light yellow brown silty clay	40% sorted SR chalk 1-10mm. 20% poorly sorted R-SA flint 10-110mm	

GTP84

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	29.96636	Topsoil			
1	0.2	29.77	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.3	29.67	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
3	0.5	29.47	Calcareous Head	Clay silt, brownish yellow.	10% SR chalk 10-30mm. 5% SA flint 5-40mm	Filling solution stripes
4	1.1	28.87	Calcareous Head	Clay silt, very pale brown. Brickearth seams with sand by 1.4m	60% SR chalk 5-30mm	
5	1.6	28.37	Brickearth	Silty clay with sand, brownish yellow	Lense of 30% sorted SR chalk 2-10mm	
6	2.05	27.92	Palaeosol	Silty clay with sand	10% sorted SR chalk 2-5mm. <5% A flint 10-20mm	
	2.2	27.77		As above. Darker and more clayey		
	2.4	27.57		Brecciated and		

				paler		
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GTP85

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	30.15886	Topsoil			
1	0.25	29.91	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.4	29.76	Palaeosol	Light grey silt (Holocene)	20% sorted SR chalk 2-5mm	
3	0.6	29.56	Brickearth	Reddish brown clay with silt. Solifluction stripes downhill	<5% SR chalk 1-5mm	
4	0.8	29.36	Calcareous Head	Light yellow brown silt	60% SR chalk 2-4mm. 10% SA flint 10-30mm	
	1.2	28.96		As above	40% SA flint gravel 10-80mm	Sloping contact to unit below
5	1.3	28.86	Palaeosol	Light grey clay	10% chalk flecks. 10% tufa flecks. <10% A flint 10-30mm. Locally brecciated - forming dome in SW	
6	1.55	28.61	Calcareous Head	Very light grey silt.	80% chalk 2-5mm. 10% CaCO3 flecks. Contains large brecciated nodule	
7	2.5	27.66	Calcareous Head	Silt, yellow brown. Moist	80% SR chalk 10-30mm	Base of hole 3.0m

GTP86

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	27.8875	Topsoil			
2	0.2	27.69	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	

3	0.45	27.44	Decalcified Head Gravel	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
4	1.2	26.69	Decalcified Brickearth	Dark yellow brown clay silt. Firm	Stone free	
5	2	25.89	Palaeosol	Well developed as per others at this altitude. Very dark grey	5% chalk pellets	
6	2.1	25.79	Palaeosol	Grey silty clay	10% chalk pellets	
7	2.2	25.69	Brecciated Calcareous Head	Light greyish brown	70% chalk pellets. 10% A flint. Brecciated as discontinuous nodules	
8	2.7	25.19	Calcareous Head	Clay silt with sand	5% SR chalk 1-5mm. <5% SA flint 10-30mm	
	3	24.89		As above	Chalk pellets forming lenses	

GTP87

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	27.09981	Topsoil			
1	0.3	26.8	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.45	26.65	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
3	0.9	26.2	Contorted Calcareous Head	Solution contact with brickearth		
4	1.4	25.7	Loam	Brownish yellow fine sand with clay.	Lenses of 40% well sorted SR chalk 2-10mm	
5	1.9	25.2	Loam	Strong brownish yellow fine sand with silt	20% well sorted SR chalk 2-8mm. <5% poorly sorted A flint 10-40mm	
	2.2	24.9	Palaeosol	Identical to lower one in GTP88. Dark grey silty clay	2% chalk pellets	
		27.1	Palaeosol	Mid grey silty clay	5% chalk pellets	

6	2.5	24.6	Calcareous Head	Light yellow brown silt	70% sorted SR chalk 2-10mm. 5% SA flint 10-40mm. Heavily brecciated surface comprising discontinuous layer of nodules of cemented calcareous head	
7	2.8	24.3	Calcareous Head	As above but not cemented		Base of hole 3.0m

GTP88

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	26.93386	Topsoil			
1	0.2	26.73	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.4	26.53	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
3	1.2	25.73	Calcareous Head with Palaeosols	Contorted. Silty clay, very dark grey	60% chalk pellet gravel	Forming stripes downslope
4	1.4	25.53	Loam	Sand with clay, strong yellow brown		
5	1.7	25.23	Palaeosol	Very dark grey silty clay	20% chalk pellet gravel 1-5mm.	Shell noted
6	2	24.93	Calcareous Head	Pale yellow brown silty clay	40% SR chalk 5-10mm. 10% A flint 10-80mm	
	2.2	24.73	Breccia		Slabs of cemented CaCO ₃ gravel	
	2.4	24.53	Calcareous Head	As above		
7	2.6	24.33	Calcareous Head (fine)	Light yellow brown clay silt	10% sorted SR chalk 1-5mm	Base of hole 3.0m

GTP89

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	26.38923	Topsoil			
1	0.3	26.09	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.45	25.94	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
3	0.7	25.69	Calcareous Head	Light yellow brown clay silt	10% SR chalk 1-30mm. 30% SA poorly sorted flint 10-140mm	Following involuted stripes downhill
4	1.4	24.99	Calcareous Head with Palaeosols and Breccia	Dark grey palaeosol discontinuously preserved	Discontinuous brecciated chalk gravel.	
5	1.8	24.59	Calcareous Head with Palaeosol	Clay silt, greyish green. Diffuse palaeosol @ 2.6m	60% sorted SR chalk 5-10mm. <5% poorly sorted A flint 10-60mm	Base of hole 3.0m

GTP90

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	24.92336	Topsoil			
1	0.3	24.62	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
2	0.45	24.47	Calcareous Head	Clay silt, light yellow brown	60% poorly sorted SA-A flint 10-130mm	
3	1.4	23.52	Calcareous Head with Palaeosols	Light greyish brown clay. Bedded and contorted		
4	1.7	23.22	Calcareous Head	Contorted in stripes downhill. Clay silt, light greyish brown	40% sorted SR chalk 5-20mm. <5% poorly sorted A flint 10-40mm.	
	2.1	22.82		Light yellow brown	10% sorted SR chalk 5-20mm	

5	2.2	22.72	Sandy Head	Greyish green sand with clay. Some Fe staining	<10% SR chalk 1-5mm	
6	2.6	22.32	Alluvium	Greyish green with yellow mottles. Stiff clay with sand		Base of hole 3.0m

GTP91

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	29.93338	Topsoil	Dark yellow brown clay silt		
1	0.3	29.63	Decalcified Head	Dark reddish brown	60% poorly sorted SA flint 10-80mm	
2	0.5	29.43	Calcareous Head	Clay silt, yellow brown	40% SR chalk 10-30mm. 10% poorly sorted A flint 10-160mm	Filling involution stripes downhill
3	1	28.93	Calcareous Head	Light grey brown silt. Pale chalk head emerging between stripes at base. Stripes of [91.2] disappear by 1.4m	70% sorted SR chalk 5-20mm. 10% A flint 10-180mm	
4	1.6	28.33	Calcareous Head	Very pale grey clay silt	80% sorted SR chalk 1-4mm. <5% poorly sorted A flint 10-80mm	
5	1.8	28.13	Calcareous Head	Pale yellow brown silt with sand	60% sorted SR chalk 1-5mm. 10% poorly sorted A flint 10-110mm	
6	2.6	27.33	Calcareous Head	Pale yellow silt. Brecciated	70% sorted SR chalk 5-10mm. 20% poorly sorted A flint 10-200mm	
	3	26.93		Still bedded, no breccia		Base of hole 3.5m

GTP92

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	29.81939	Topsoil			
1	0.25	29.57	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.45	29.37	Upper Calcareous Head	Clay silt, yellow brown	10% poorly sorted. 20% poorly sorted SA flint 10-90mm	
3	1.4	28.42	Decalcified Head	Clay reddish brown	80% poorly sorted A flint 10-80mm	
4	1.7	28.12	Calcareous Head	Clay silt, light yellow brown	30% SR chalk 5-10mm. <5% A flint 5-120mm	
	1.9	27.92	Palaeosol	Silty clay with sand, mid grey. Absent at north, thickens to 0.3m depth to south	<5% chalk flecks 1-5mm. <5% A flint 10-30m	
5	2	27.82	Calcareous Head	Brecciated. Steeply dipping c.25°		
6	2.6	27.22	Calcareous Head	Silty clay, light grey, moist	80% SR chalk 1-20mm. <1% A flint 10-30mm. Brecciated into nodules	Base of hole 3.0m

GTP93

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	29.3843	Topsoil			
1	0.3	29.08	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.5	28.88	Decalcified Head	Silty clay, strong reddish brown	70% poorly sorted SA flint gravel 10-40mm	
3	0.7	28.68	Calcareous Head	Clay silt, light yellow brown	30% poorly sorted SR	

					chalk 2-10mm. 10% poorly sorted A flint 10-40mm	
4	1.5	27.88	Calcareous Head	Clay silt, light yellow brown	30% poorly sorted SR chalk 2-10mm. 30% poorly sorted A flint 10-400mm	
5	1.75	27.63	Loam	Mixed deposit of clay with medium sand. Reddish brown.	Stone free	Forming seams within unit below
6	1.9	27.48	Calcareous Head	Silt with sand, yellow brown	10% SR chalk 1-10mm. <5% poorly sorted A flint 10- 50mm	
7	2.1	27.28	Calcareous Brickearth	Silt, pale grey	<5% chalk 1- 10mm	
8	2.4	26.98	Palaeosol	Discontinuous. Grey silty clay	Chalk pellet gravel	
9	2.7	26.68	Calcareous Head	Silt. Pale greenish yellow	<5% SR chalk 1-4mm. No flint	
10	3.3	26.08	Loamy Head with Palaeosols	Silty sand, reddish brown. With palaeosols	Chalk flecks. <5% SA flint 100-250mm. CaCO ₃ flecks	Base of hole 3.5m

GTP94

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	28.40073	Topsoil			
2	0.3	28.1	Colluvium	Yellow brown silty clay	20% A-SA flint gravel 10- 40mm	Continues in solifluction in unit below
3	0.6	27.8	Calcareous Head	Pale brownish yellow clay silt	40% chalk pellet gravel 1- 10mm	
4	1.2	27.2	Calcareous Head	Pale greyish yellow clay silt	60% chalk pellet gravel 1- 5mm. Occasional A flint 10-50mm	
5	2.8	25.6	Loam	Fine sandy silt with clay, mid yellowish	5% chalk pellet gravel 1- 5mm	Base of hole 3m

				brown		
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GTP95

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	27.56596	Topsoil			
2	0.2	27.37	Colluvium	Dark greyish brown silty clay	30% SA-A flint gravel 20-50mm	
3	0.4	27.17	Decalcified Head	Brownish red silty clay	40% SA-A flint gravel 20-50mm	
4	1	26.57	Calcareous Head	Pale greyish yellow clay silt	40% chalk pellet gravel 1-5mm. Occasional A flint gravel 20-40mm	
5	2	25.57	Loam	Mid brownish yellow fine sandy silt with clay	Occasional bedsof 40% chalk pellet gravel 1-5mm	Grades into unit below
6	2.7	24.87	Loam (with Possible Palaeosols)	Fine sand with silt and clay. Mid brownish yellow, becoming darker with depth. Includes beds of fine brownish yellow pure sand - very finely laminated. Possible palaeosols. Shell fragments noted	Beds of 30% chalk pellet gravel 1-5mm. Otherwise virtually stone free	Base of hole 3.0m

GTP96

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	32.02489	Topsoil			

1	0.2	31.82	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.3	31.72	Calcareous Head	Clay silt, soft, yellow brown	40% sorted SR chalk 1-8mm	
3	0.9	31.12	Calcareous Head	Cliff collapse	60% sorted SA chalk 5-20mm. 20% poorly sorted A flint 10-350mm. Boulders	
4	1.6	30.42	Calcareous Head	Weakly bedded	80% poorly sorted SA chalk 5-20mm. 10% poorly sorted A flint 10-400mm	

GTP97

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	31.74826	Topsoil			
1	0.2	31.55	Subsoil	Clay silt, reddish brown		
2	0.4	31.35	Calcareous Head	Light reddish brown silt. Compact	30% A flint 10-40mm. 10% SA chalk 10-50mm. Large nodules	Filling solifluction stripes downhill
3	0.6	31.15	Calcareous Head	Light grey silt, very compact	80% SR chalk 5-10mm. 10% A flint 20-250mm	
4	1.4	30.35	Calcareous Head with Palaeosol	As above with thin grey laminations at south of trench		
5	1.9	29.85	Calcareous Head	Silt, light yellow brown	90% SA chalk 10-30mm. 5% poorly sorted A flint 10-250mm	Base of hole 3.0m

GTP98

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	31.65656	Topsoil			

1	0.3	31.36	Colluvium	Silty clay, reddish brown	40% poorly sorted SA flint 10-30mm	
2	0.6	31.06	Calcareous Head	Clay silt, light yellow brown	20% SR chalk 5-20mm. 5% SA flint 10-40mm	
3	1.6	30.06	Calcareous Head	Clay silt, whitish grey. Cliff collapse deposit	60% SA chalk 5-10mm. 30% poorly sorted A flint 10-500mm	Deposit is on cliff edge, cliff collapse, continuing below subsequent units.
4	1.9	29.76	Loam	Strong reddish brown sand with clay. Becoming clayey with depth. Looks decalcified, but below calcareous head	<5% A flint 10-30mm	
5	2.25	29.41	Palaeosol	Seam of dark grey clay. Thickens to south	Chalk. Ang flint	
6	2.6	29.06	Calcareous Head	Yellow grey silt	80% blocky chalk 10-30mm. 10% A flint 10-60mm. Partially brecciated	Cease at 2.8m due to artefacts

GTP99

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	30.7113	Topsoil			
2	0.3	30.41	Calcareous Head	Clay silt, pale grey/orange brown - solifluction stripes	60% chalk gravel. Some large flint cobbles	
3	1.1	29.61	Calcareous Head	Pale greyish yellow clay silt	50% chalk pellet gravel 1-5mm. 2% A flint gravel 10-	Base of hole 3.0m

					50mm. Occasional flint cobbles <100mm	
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GTP100
North end on cliff

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	30.16732	Topsoil			
2	0.3	29.87	Subsoil			
3	0	30.17	Weathered Chalk	Blocky chalk with flint cobbles and solifluction stripes		
4	0.6	29.57	Chalk	Solid chalk		

GTP100
South end against cliff edge

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	30.167	Topsoil			
2	0.3	29.87	Subsoil			
5	0.4	29.77	Calcareous Head	Pale grey with orange brown solifluction stripes	Large blocky chalk pieces and A-SA flint gravel	
6	1	29.17	Calcareous Head	Pale yellow grey clay silt	40% chalk pellet gravel 1-5mm. 2% A flint gravel	Base of hole 3.0m

GTP101

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	29.764	Topsoil			
2	0.2	29.56	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
3	0.4	29.36	Decalcified	Brownish red	20% SA-A flint	Solifluction

			Head	silty clay	gravel 10-50mm	stripes in unit below
4	0.8	28.96	Calcareous Head	Pale yellow brown clay silt	30% chalk pellet gravel 1-3mm. 20% A-SA flint 10-80mm	
5	1.2	28.56	Decalcified Head Gravel	Brownish red clay silt	70% SA-A flint gravel 10-80mm	
6	1.6	28.16	Brickearth	Brownish red clay silt	Stone free	
7	1.7	28.06	Calcareous Head (fine)	Yellow brown clay silt with sand	10% chalk 1-2mm. Rare SA flint gravel	
8	2.7	27.06	Palaeosol	Dark yellow brown clay silt. More calcareous and slightly brecciated towards base	10% chalk pellet gravel 1-5mm. Rare SA flint	
9	2.95	26.81	Calcareous Head (fine)	Soft clay silt with sand	5% chalk pellet gravel 1-5mm	Base of hole 3.0m

GTP102

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	28.626	Topsoil			
1	0.2	28.43	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.4	28.23	Decalcified Head	Brownish red silty clay	40% SA-A flint gravel 20-50mm	
3	1.2	27.43	Calcareous Head	Yellow clay silt	Chalk pellet gravel and A flint gravel	
4	1.7	26.93	Calcareous Head	White/pale grey clay silt	Chalk pellet gravel and A flint gravel	
5	1.8	26.83	Decalcified Brickearth	Dark yellow brown clay silt. Firm	Stone free	
6	2	26.63	Mn layer	Mn solution contact		
7	2.1	26.53	Calcareous Head with Palaeosol	Yellow brown with palaeosol	Chalk pellet gravel	

8	2.3	26.33	Breccia			
9	2.5	26.13	Calcareous Head	Yellow brown	Chalk pellet gravel	

GTP103

Unit	Depth	OD	Strat	Description	Coarse component	Notes
1	0	31.086	Topsoil			
2	0.3	30.79	Calcareous Head	Pale brownish yellow clay silt	30% chalk pellet gravel 1-5mm. 20% SA-A flint 10-80mm poorly sorted	
3	1.2	29.89	Loam	Reddish brown clayey sand. Mn staining. Possible palaeosols present	Beds of 30% chalk pellet gravel 1-3mm. Otherwise virtually stone free	
4	2	29.09	Palaeosol	Grey brown sandy silty clay. Molluscs noted. Brecciated at base	10% fine chalk pellet gravel	
5	2.35	28.74	Calcareous Head	Yellow grey clay silt. Brecciated by 2.6m	40% chalk pellet gravel 1-5mm	
6	2.7	28.39	Calcareous Head	Pale yellow grey clay silt	50% chalk pellet gravel 5-50mm	Base of hole 3.0m

GTP104

Unit	Depth	OD	Strat	Description	Coarse component	Notes
0	0	29	Topsoil			
1	0.2	28.8	Colluvium	Yellowish brown silty clay	20% poorly sorted SA flint gravel 10-40mm	
2	0.4	28.6	Brickearth			
3	0.6	28.4	Calcareous Head	Yellow brown. Forming solifluction stripes downhill	20% sorted R chalk 10-20mm	
4	1	28	Calcareous Head	White to grey	80% SA chalk 10-20mm. <5% A frost shattered flint 10-80mm	

	1.4	27.6	Palaeosol	On east side		
	1.7	27.3	Calcareous Head	White to grey	80% SA chalk 10-20mm. <5% A frost shattered flint 10-80mm	
	2.2	26.8	Palaeosols with Calcareous Head	Diffuse palaeosols	20% A flint	Base of hole 3.0m

Appendix 4: Phase 2 Borehole Logs

BH01

Unit	Depth	OD	Strat	Description	Coarse component	Sample	Notes
0	0	30.584	Ploughsoil	Compact clay silt	60% poorly sorted WR flint 5-80mm		
1	0.4	30.184	Brickearth	Firm clay silt, reddish brown. Decalcified	5% poorly sorted SA flint 10-20mm		
2	2	28.584	Brickearth	Soft, silt with with clay, strong yellow brown. Decalcified	Stone free		
	5.5	25.084		As above but more compact			
3	6	24.584	Head Gravel	Compact, sand with clay, yellow brown	Poorly sorted R-SA flint gravel 5-80mm	<0.1.1> Bulk @6.4m	Shell and water
4	6.6	23.984	Brickearth	Compact silt with sand, strong yellow brown	Stone free		
5	8.2	22.384	Alluvium	Stiff clay, grey blue		<01.2> Bulk	
6	8.8	21.784	Calcareous Brickearth	Soft, light yellow brown	2% SA flint 10-20mm	<01.3> Bulk	
7	10	20.584	Weathered Chalk		80% A chalk 10-20mm		

BH02

Unit	Depth	OD	Strat	Description	Coarse component	Sample	Notes
0	0	26.852	Ploughsoil	Compact yellow brown silty clay	60% poorly sorted WR-SA flint gravel 10-60mm		
1	0.4	26.452	Colluvium	Compact dark yellow brown silty clay.	50% poorly sorted WR-SA flint gravel 10-50mm		

2	1.2	25.652	Decalcified Head	Firm reddish brown clay	20% poorly sorted WR-SA flint gravel 10-40mm		
3	1.6	25.252	Loam	Plastic. Reddish yellow brown clay with sand	Stone free		
4	3.5	23.352	Decalcified Head	Plastic. Reddish yellow brown clay with sand	40% poorly sorted WR-SA flint gravel 5-40mm		
5	6.5	20.352	Calcareous Head	Plastic. Light greyish brown silty clay. Laminated	CaCO ₃ nodules. Stone free		
6	7.2	19.652	Calcareous Head	Plastic. Yellow brown clay silt	30% sorted SA chalk 5-20mm		
7	8	18.852	Calcareous Head/Weathered Chalk	As above	60% sorted SA chalk 5-40mm		
8	10	16.852	Weathered Chalk	Soft. Clayish. Yellow grey			
9	14	12.852	Solid Chalk	White dry blocky chalk			

BH03

Unit	Depth	OD	Strat	Description	Coarse component	Sample	Notes
0	0	22.57	Ploughsoil	Clay silt, compact, dark yellow brown	25% SR-SA flint gravel 10-30mm		
1	0.6	21.97	Colluvium	Clay silt, compact, dark yellow brown	15% R-SA flint 10-20mm		
2	1.1	21.47	Decalcified Head	Firm. Silty clay, dark yellow	15% poorly sorted R-SA flint gravel		

				brown	10-20mm		
3	1.6	20.97	Brickearth	Firm. Clay, light reddish brown	5% sorted R flint gravel 10-20mm		
4	4	18.57	Loam	Soft. Medium sand with clay	Stone free	<03.1>U100 4.0-4.45m	
5	4.4	18.17	Fluvial Sand and Gravel	Medium to coarse sand with clay	50% sorted R-SR flint 5-20mm		
	5	17.57		As above. Very compact		<03.2> Bulk	Refused at 5m

BH04

Unit	Depth	OD	Strat	Description	Coarse component	Sample	Notes
0	0	29.207	Ploughsoil	Firm clay silt, yellow brown	40% poorly sorted SA-A flint gravel 5-90mm		
1	0.4	28.807	Calcareous Head	Soft clay silt, yellow brown	50% sorted SA-SR chalk 5-10mm	<04.1> 1-1.45m U100	
		29.207				<04.2> 1.5-1.95m U100	
2	2	27.207	Loess with Palaeosols	Silt, calcareous, light yellow brown, Fe staining		<04.3> Bulk <04.4> 2.0-2.45m U100	
3	2.5	26.707	Calcareous Head	Silt, soft, greyish brown	20% well sorted SR chalk 1-5mm	<04.5> 2.5-2.95m U100	
	3	26.207		As above with bedding		<04.6> 3.0-3.45m U100	
4	3.5	25.707	Calcareous Head	Soft, cly silt	60% sorted SR chalk 1-	<04.7> 3.5-	

					4mm	3.95m U100	
		29.207				<04.8> 4.0- 4.45m U100	
		29.207				<04.9> 4.5- 4.95m U100	
		29.207				<04.10> 5.0- 5.45m U100	
		29.207				<04.11> 5.5- 5.95m U100	
		29.207				<04.12> 6.0- 6.45m U100	
5	7.4	21.807	Calcareous Alluvium	Stiff. Clay with silt, blue grey. Fe stained	Chalk flecks	<04.13> 7.5- 7.95m U100	
		29.207				<04.14> 8.0- 8.45m U100	
		29.207				<04.15> 8.5- 8.95m U100	
6	9	20.207	Sand. Compact silty sand, Fe stained			<04.16> 8.95-9.0 Bulk	
7	10	19.207	Chalk		Calcretions at contact	Bored to 15m	

BH05

Unit	Depth	OD	Strat	Description	Coarse component	Sample	Notes
0	0	24.195	Ploughsoil	Clay silt, very compact, dark yellow brown	60% SR-Sa flint gravel 10-60mm		
1	0.3	23.895	Colluvium	Clay silt, compact, dark yellow brown	50% SA-SR flint gravel		

					10-60mm		
2	1.5	22.695	Calcareous Head	Clay silt, yellow brown, soft	20% sorted SR-SA chalk 1-5mm	<05.1> 2.0m Bulk	
	2.2	21.995	Calcareous Head	Silt with clay, light yellow brown. Possible palaeosol	30% sorted SR-R chalk 1-6mm	<05.2> 2.5m Bulk	
3	2.6	21.595	Calcareous Brickearth/Alluvium	Silt, greyish brown, Fe staining	5% sorted SR chalk 1-6mm		
4	3.5	20.695	Calcareous Brickearth/Alluvium	Clay silt, greenish grey. Frequent Fe horizons/palaeosols	30% sorted SR chalk 2-6mm		
5	4.5	19.695	Alluvium	Clay silt, greenish grey. Fe staining. Intertidal?		<05.3>	
6	6	18.195	Chalk				To 11m

BH06

Unit	Depth	OD	Strat	Description	Coarse component	Sample	Notes
0	0	19.458	Topsoil				
1	0.4	19.058	Colluvium	Clay silt, compact, dark yellow brown	60% poorly sorted SA-A flint gravel 10-70mm		
2	1.8	17.658	Calcareous Head	Clay silt, firm, yellow brown	40% poorly sorted SA-SR flint and chalk 1-40mm. Chalk pellet gravel with flint		
3	3.5	15.958	Calcareous Head	Silt, soft, reddish brown	20% poorly sorted R-SR chalk and flint 1-30mm		
4	4.5	14.958	Chalk		Weathered angular chalk 10-30mm		Proved to 11m

BH07

Unit	Depth	OD	Strat	Description	Coarse component	Sample	Notes
0	0	15.927	Topsoil				
1	0.4	15.527	Colluvium	Clay silt, compact, dark yellow brown	70% poorly sorted SR-A flint 5-80mm		
2	2.1	13.827	Calcareous Head	Clay silt. Soft. Yellow brown	20% sorted SR-R chalk 2-5mm	<07.1> 2.5m	
3	4.7	11.227	Loam	Sand and clay, soft, dark yellow brown	20% poorly sorted SA-SR flint 10-20mm		
4	5.1	10.827	Sand	Compact, light yellow brown, medium sand	20% moderately sorted SR-R flint 10-30mm	<07.2>	Impenetrable at 5.5m

BH08

Unit	Depth	OD	Strat	Description	Coarse component	Sample	Notes
0	0	19.775	Topsoil				
1	0.4	19.375	Colluvium	Compact, yellow brown clay silt	60% poorly sorted SA flint gravel 5-80mm		
2	1.8	17.975	Brickearth	Firm, reddish brown silt with clay. Decalcified?	1% SR flint gravel 1-5mm		
3	2.7	17.075	Decalcified Head	Yellow brown silty clay	60% poorly sorted SA-SR flint 10-40mm		
4	4	15.775	Sand and Gravel	Compact, brownish yellow medium sand	50% sorted R-SA flint gravel 10-30mm	<08.1>	

BH09

Unit	Depth	OD	Strat	Description	Coarse component	Sample	Notes
0	0	29.241	Topsoil	Compact, light yellow brown silty clay	50% poorly sorted SA-SR flint 10-80mm		2 artefacts noted within 5m of BH
1	0.3	28.941	Colluvium	Compact, dark yellow brown silty clay	60% poorly sorted SA-A flint gravel 10-60mm		
2	1.2	28.041	Calcareous Head	Firm, yellow brown silt	20% sorted SR chalk 1-4mm. 10% flint 5-20mm		
3	1.5	27.741	Calcareous Brickearth	Silt, yellow brown. Rootlets	5% chalk 1-4mm	<09.1> 1.5-1.95m U100	
		29.241				<09.2> 2.0-2.45m U100	
		29.241				<09.3> 2.5-2.95m U100	
4	2.95	26.291	Palaeosol			<09.4> 3.0-3.45m U100	
5	3.4	25.841		Fine yellow silty sand		<09.5> 3.5-3.95m U100	
6	4	25.241	Calcareous Head with Palaeosols			<09.6> 4.0-4.45m U100	
		29.241				<09.7> 4.5-4.95m U100	
		29.241				<09.8> 5.0-5.45 U100	

Unit	Depth	OD	Strat	Description	Coarse component	Sample	Notes
7	5.5	23.741	Calcrete in Calcareous Gravel			<09.9> Bulk	
8	5.6	23.641	Calcareous Gravel			<09.10> 5.5- 5.95m U100	
		29.241				<09.11> 6.0- 6.45m U100	
9	6.5	22.741	Calcareous Brickearth	Pale grey green silt with clay	1% SR chalk 1-4mm	<09.12> 6.5- 6.95m U100	U100 7.0-7.5m failed
		29.241				<09.13> 7.5- 7.95m U100	
		29.241				<09.14> 8.0- 8.45m U100	
		29.241				<09.15> 8.5- 8.95m U100	
		29.241				<09.16> 9.0- 9.45m U100	
10	9.5	19.741	Alluvium	Soft grey clay		<09.17> Bulk	Not recovered in U100
11	10	19.241	Sand	Firm silty sand, light yellow. Fe mottles		<09.18> 10m Bulk	
		29.241				<09.19> 10.5m Bulk	
	11	18.241	Hard Calcrete?/Chalk?				
	11.5	17.741	Chalk				
	20	9.241	Chalk				Proved to 20m

Appendix 5: U100 Sample Logs from Boreholes BH03 and BH04

BH03

Sample	OD (m)	Depth (mbg)	Description	Coarse component	Notes
<03.01> 4.0-4.45m	18.57- 18.12	4.00-4.36	Sandy clay, mid yellowish red. Very Fe stained with frequent Mn flecks. Finely laminated	Occasional small A flint	
		4.36-4.41	Compact silty clay, yellowish red. Sandier laminations. Fr Mn flecks		
		4.41-4.45	Compact clay sand, reddish brown. Laminated	Occasional SA flint gravel 1-15mm <5%	

BH04

Sample	OD (m)	Depth (mbg)	Description	Coarse component	Notes
<04.01> 1.0-1.45m	28.21- 27.76	1.0-1.19	Missing		
		1.19-1.42	Brownish red silt	20% A-SA flint gravel 5-50mm. 20% chalk pellet gravel 1-3mm	
		1.42-1.45	Missing		
<04.02> 1.5-1.95	27.71- 27.26	1.50-1.56	Missing		
		1.56-1.69	Yellow red clay silt	90% SA-A flint gravel 5-50mm. 20% chalk pellet gravel.	Diffuse boundary with unit below
		1.69-1.75	Yellow brown silt with fine sand. With dark yellow brown stone free layer at 1.72-1.72m - possible land surface	10% chalky flecks. Otherwise stone free	
		1.75-1.84	Fine silty sand. Calcareous. Fe staining	30% CaCO ₃ calcretions 1-2mm	

Sample	OD (m)	Depth (mbg)	Description	Coarse component	Notes
		1.84-1.95	Clay silt, strong brownish red. Fe staining. Mn flecks. 1.93-1.95m is darker and more Mn stained - land surface?	Occasional CaCO ₃ calcretions <10mm	
<04.04> 2.0-2.45m	27.21-26.76	2.00-2.04	Yellow red clay silt	10% chalk pellet gravel 1-2mm	
		2.04-2.21	Reddish brown clay silt with sand. Quite dark and soily. Structureless	20% chalk pellet gravel 1-3mm. Rare small A flint gravel	
		2.21-2.30	Clay silt, yellow brown	40% chalk pellet gravel 1-3mm	
		2.30-2.43	Pale greyish yellow silt (loess?)	30% chalk pellet gravel 1-3mm. Otherwise stone free	
<04.05> 2.5-2.95m	26.71-26.26	2.50-2.60	Mixed - likely fallen in from above		
		2.60-2.87	Pale greyish yellow clay silt. 2.7-2.73m is less chalky and darker - possible palaeosol. More duffuse but also a possible palaeosol at 2.84-2.86m	30% chalk pellet gravel 1-4mm. Occasional A flint <30mm	
		2.87-2.95	Pale yellowish grey clay silt	20% chalk pellet gravel 1-3mm. Chunks of breccia >50mm present at 2.87-2.89m	
<04.06> 3.0-3.45m	26.21-25.76	3.00-3.09	Pale greyish yellow clay silt	10% SA chalk pellet gravel 2-10mm	
		3.09-3.17	As above	As above with large pieces c. 50mm of breccia	
		3.17-3.45	Pale greyish yellow clay silt. Darker layers - possible palaeosols at 3.21-3.26m and 2.34-2.37m	40% chalk pellet gravel 1-3mm	
<04.07> 3.5-3.95m	25.71-25.26	3.5-3.73	Pale greyish brown clay silt. Possible palaeosol at 3.61-3.64m	50% chalk pellet gravel 1-5mm	

Sample	OD (m)	Depth (mbg)	Description	Coarse component	Notes
		3.73-3.95	Dark yellowish brown clay silt. Mn flecks. Palaeosols?	5% chalk pellet gravel 1-2mm, otherwise stone free	
<04.08> 4.0-4.45m	25.21-24.76	4.00-4.06	Clay silt with sand. Mid brownish red. Soft	5% chalk pellet gravel 1-2mm	
		4.06-4.16	Clay silt with sand. Dark yellowish brown. Palaeosol?	5% chalk pellet gravel 1-2mm	Grades into unit below
		4.16-4.45	Pale reddish yellow clay silt. Slightly more soily at top, becomes paler with depth	40% chalk pellet gravel 1-5mm	
<04.09> 4.5-4.95m	24.71-24.26	4.50-4.95	Clay silt, pale yellowish brown. Darker siltier units with less chalk - possible palaeosols @ 4.7-4.75m, 4.83-4.84m, 4.88-4.90m	50% chalk pellet gravel SA-SR 0.5-10mm	
<04.10> 5.0-5.45m	24.21-23.76	5.00-5.06	Missing		
		5.06-5.11	Clay silt, pale yellowish brown with darker lenses. Soft. Possible palaeosols	20% chalk pellet gravel, SR, 1-5mm	
		5.11-5.26	Very pale grey silt with clay. Possible palaeosol @ 5.17-5.21m	70% well sorted chalk pellet gravel 1-4mm	Sharp contact with unit below
		5.26-5.32	Pale reddish grey clay silt. Palaeosol?	Largely stone free but 5% chalk pellet gravel towards base	
		5.32-5.45	Pale yellowish grey clay silt. Top 30mm is possible palaeosol	70% chalk pellet gravel	
<04.11> 5.5-5.95m	23.71-23.26	5.5-5.95	Pale yellow grey clay silt. Layers of siltier stone free sediment ~10mm thick. Some Fe staining	70% chalk pellet gravel, SR, 0.5-3mm	
<04.12> 6.0-6.45m	23.21-22.76	6.0-6.25	Very pale grey clay silt. Some stone free layers ~5mm thick	50% SR chalk pellet gravel 1-3mm	

Sample	OD (m)	Depth (mbg)	Description	Coarse component	Notes
		6.25-6.40	As above but slightly darker. Darker layers - possible palaeosols @ 6.26-6.28m and 6.34-6.39m	30% chalk pellet gravel 1-3mm	
		6.40-6.45	Missing		
<04.13> 7.5-7.95m	21.71-21.26	7.50-7.55	Pale grey clay silt	60% chalk pellet gravel 1-3mm	
		7.55-7.67	Compact silty clay, greenish grey with frequent Fe staining	110% chalk pellet gravel 1-2mm. Flint ~30mm noted at 7.65m	Very sharp contact with unit below
		7.67-7.95	Very stiff silty clay. Greysih green with frequent Fe staining. Some Mn flecks. Parts appear structured/laminated	Chalk c.20mm noted at 7.77m	
<04.14> 8.0-8.45m	21.21-20.76	8.00-8.45	Stiff silty clay, greenish grey. Frequent Fe staining. Flecks on Mn. Weak structure visible. Occasional more sandy laminations	Stone free	
<04.15> 8.5-8.95m	20.71-20.26	8.50-8.64	Missing		
		8.64-8.87	Greenish brown silty clay. Stiff and very compact. Occasional sandy laminations. Frequent Fe staining	Stone free	
		8.87-8.95	As above but wider sandy layers c. 10mm thick and frequent Mn flecks. Fe staining	Angular flint piece at 8.91m	
<04.17> 9.0-9.45m	20.21-19.76	9.00-9.20	Missing		
		9.20-9.32	Very compact silty clay with sandy laminations. Finely laminated. Fe staining. Occasional Mn flecks. Fe staining/iron pan at base	Occasional chalk pellet gravel, otherwise stone free	Very sharp contact with unit below
		9.32-9.45	Chalk		

Appendix 6: Table of GTP Samples

GTP/BH	Unit	Depth	Sample No.	Sample Type	Notes
GTP1	5		1	Bulk	
	6		2	Bulk	
	7		3	Bulk	
	8		4	Bulk	
GTP2	4		5	Bulk	
	5		6	Bulk	
	5		7	Bulk	
	7		8	Bulk	
GTP3	3		9	Bulk	
	5		10	Bulk	
	6		11	Bulk	
	7		12	Bulk	
	8		13	Bulk	
GTP12	3		15	Bulk	
GTP14	3		16	Bulk	
GTP15	4		17	Bulk	
	5		18	Bulk	
	6		19	Bulk	
	7		20	Bulk	
GTP16	5		21	Bulk	
	6		22	Bulk	
	6		23	Bulk	
GTP19	6		25	Bulk	
	7		26	Bulk	
	8		27	Bulk	
GTP21	4		28	Bulk	
	6		29	Bulk	
	8		30	Bulk	
GTP22	5		31	Bulk	
	7		32	Bulk	
	8		33	Bulk	
	9		34	Bulk	
	10		35	Bulk	
	11		36	Bulk	
	12		37	Bulk	
	14		38	Bulk	
GTP23	6		39	Bulk	
GTP27	3		27.1	Bulk	
GTP30	5		30.1	Bulk	
GTP35	6	2.6m	35.1	Bulk	

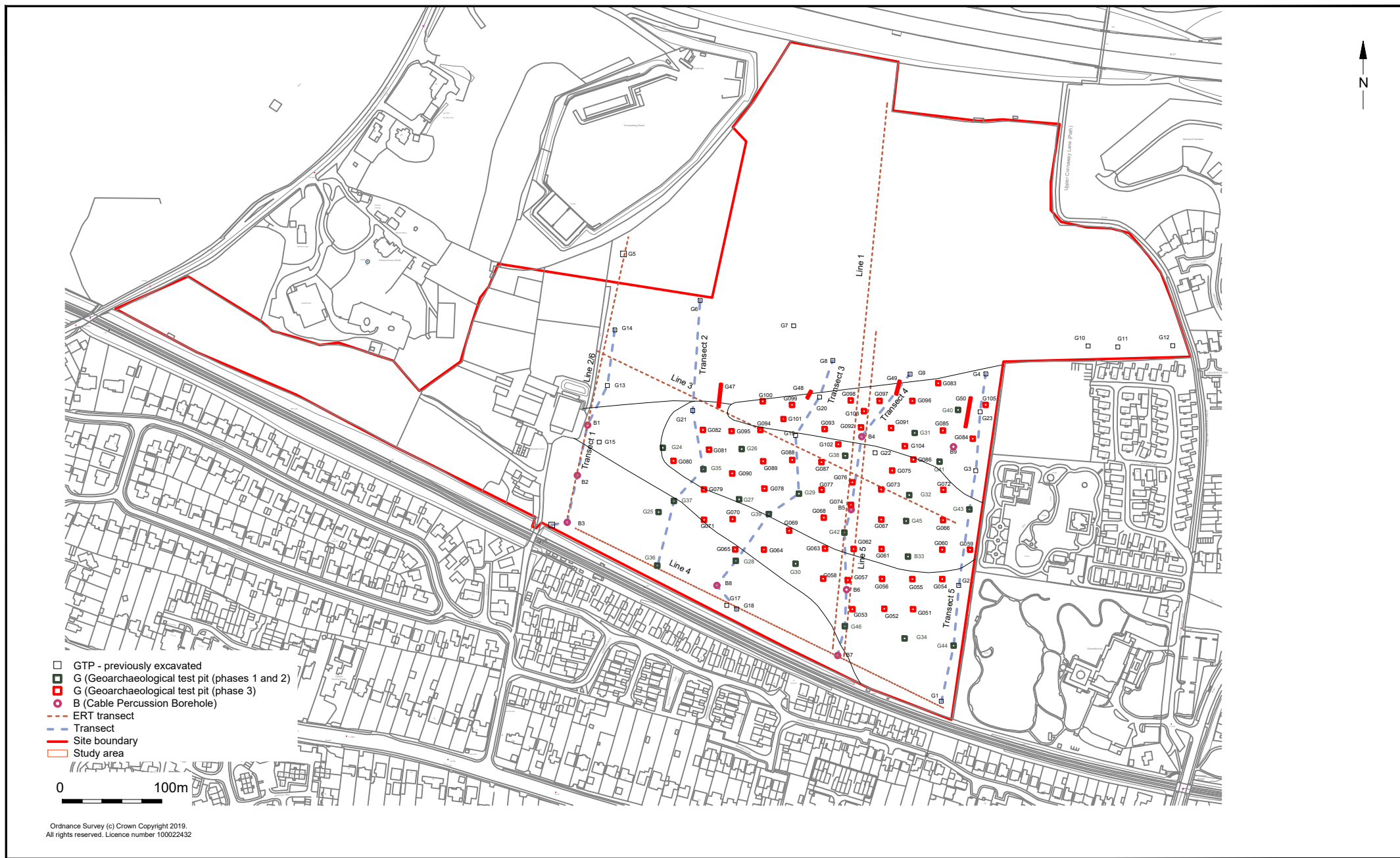
GTP41	5	2.5m	41.1	Bulk	
GTP59		2.3m	<59.1>	Bulk	Poss intertidal silts
GTP68		2.7m	<68.1>	Bulk	Molluscs noted
GTP72		2m	<72.1>	Bulk	Poss palaeosol
		2.1m	<72.2>	Bulk	Molluscs noted
		2.1m	<72.3>	Dating	Breccia sample
GTP80		2.9m	<80.1>	Bulk	Palaeosol? (Artefacts)
GTP81		3m	<81.1>	OSL	Palaeosol? (Artefacts)
GTP84		2.45m	<84.1>	Bulk	Palaeosol - molluscs noted
GTP92		1.95m	<92.1>	Bulk	Palaeosol
GTP95		3m	<95.1>	Bulk	Shell frags noted
GTP96		1.8-1.9m	<96.1>	Bulk	?
GTP98		2.6m	<98.1>	Bulk	Palaeosol
		2.5m	<98.2>	OSL	?
GTP103		2.55m	<103.1>	Bulk	Palaeosol - molluscs noted
BH01	3	6.4m	<01.1>	Bulk	
	5		<01.2>	Bulk	
	6		<01.3>	Bulk	
BH03	4	4.0-4.45m	<03.1>	U100	Split and recorded
	5	5m	<03.2>	Bulk	
BH04		1.0-1.45m	<04.1>	U100	Split and recorded
		1.5-1.95m	<04.2>	U100	Split and recorded
			<04.3>	Bulk	
		2.0-2.45m	<04.4>	U100	Split and recorded
		2.5-2.95m	<04.5>	U100	Split and recorded
		3.0-3.45m	<04.6>	U100	Split and recorded
		3.5-3.95m	<04.7>	U100	Split and recorded
		4.0-4.45m	<04.8>	U100	Split and recorded
		4.5-4.95m	<04.9>	U100	Split and recorded
		5.0-5.45m	<04.10>	U100	Split and recorded
		5.5-5.95m	<04.11>	U100	Split and recorded
		6.0-6.45m	<04.12>	U100	Split and recorded
		7.5-7.95m	<04.13>	U100	Split and recorded
		8.0-8.45m	<04.14>	U100	Split and recorded
		8.5-8.95m	<04.15>	U100	Split and recorded
		8.95-9.0m	<04.16>	Bulk	
BH05		2.0m	<05.1>	Bulk	
		2.5m	<05.2>	Bulk	
			<05.3>		
BH07		2.5m	<07.1>		
			<07.2>		
BH08			<08.1>		
BH09		1.5-1.95m	<09.1>	U100	

	2.0-2.45m	<09.2>	U100	
	2.5-2.95m	<09.3>	U100	
	3.0-3.45m	<09.4>	U100	
	3.5-3.95m	<09.5>	U100	
	4.0-4.45m	<09.6>	U100	
	4.5-4.95m	<09.7>	U100	
	5.0-5.45m	<09.8>	U100	
		<09.9>	Bulk	
	5.5-5.95m	<09.10>	U100	
	6.0-6.45m	<09.11>	U100	
	6.5-6.95m	<09.12>	U100	
	7.5-7.95m	<09.13>	U100	
	8.0-8.45m	<09.14>	U100	
	8.5-8.95m	<09.15>	U100	
	9.0-9.45m	<09.16>	U100	
		<09.17>	Bulk	
	10m	<09.18>	Bulk	
	10.5m	<09.19>	Bulk	



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Project Ref: 190776	March 2020	Site location	
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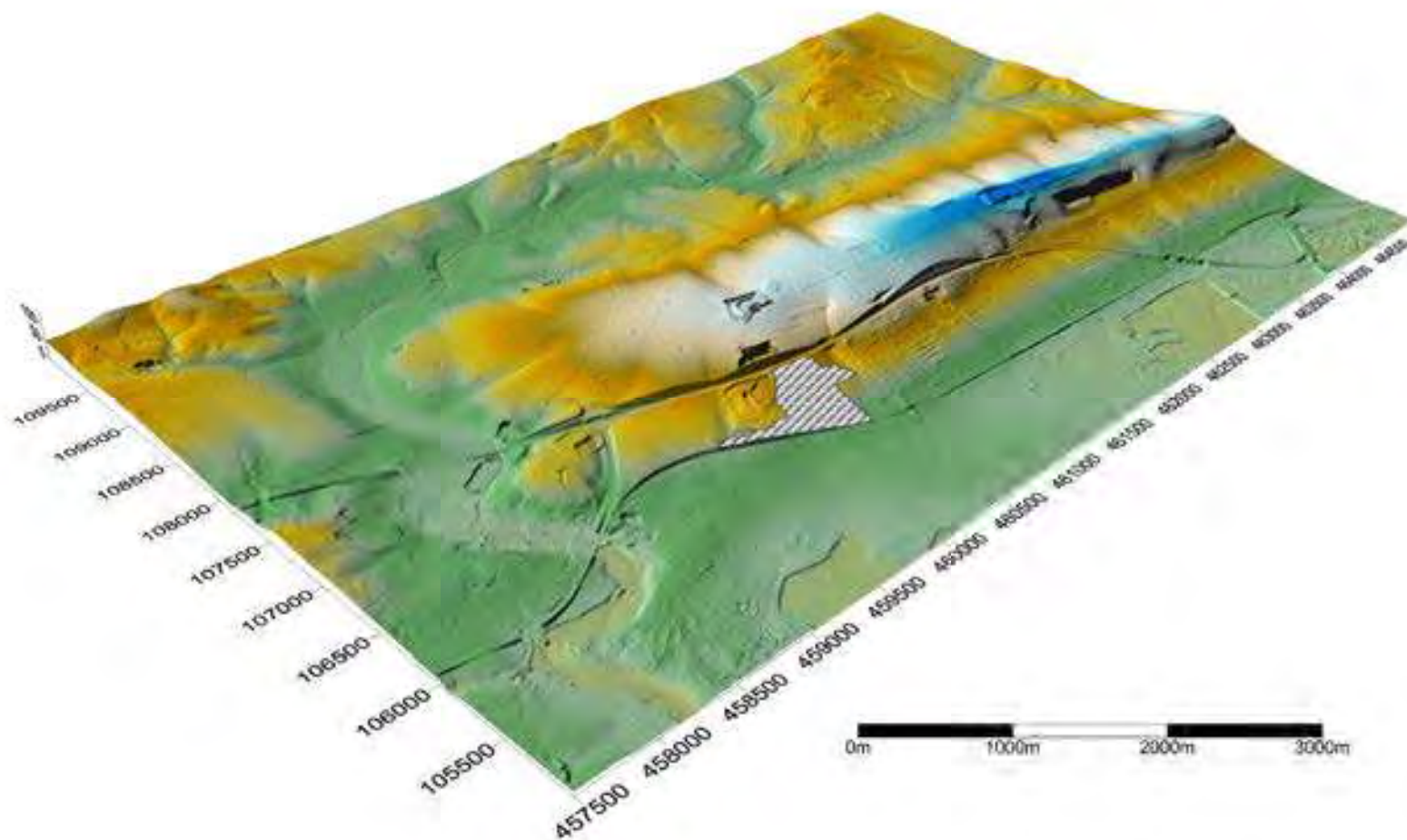
March 2020

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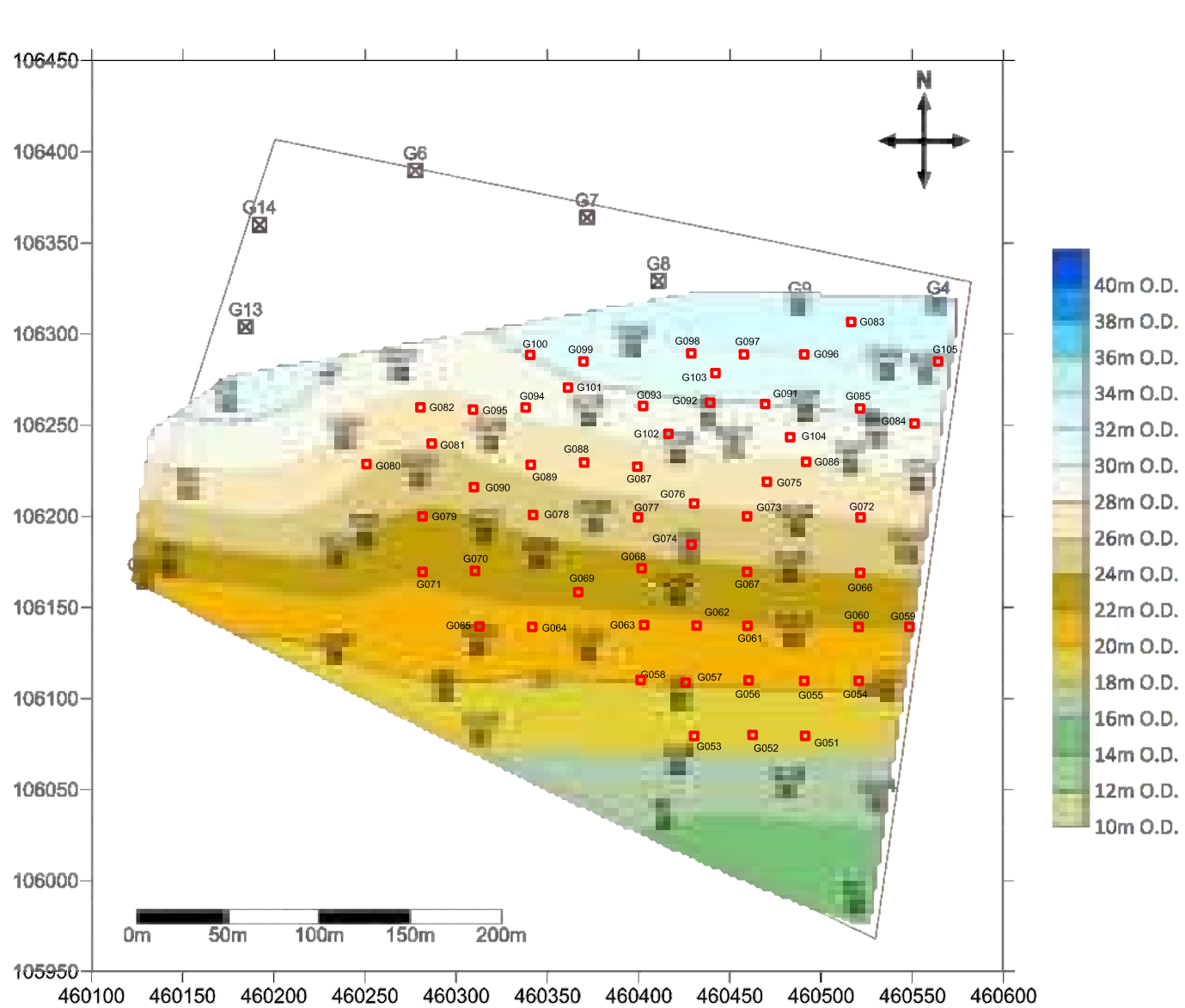
Land east of Downend Road, Portchester, Hampshire

Location of GTPs, CPBHs and ERT transects

Fig. 2



• Archaeology South-East		Land east of Downend Road, Portchester, Hampshire	Fig. 3
Project Ref: 190776	March 2020	Lidar Digital Terrain Model (DTM)	
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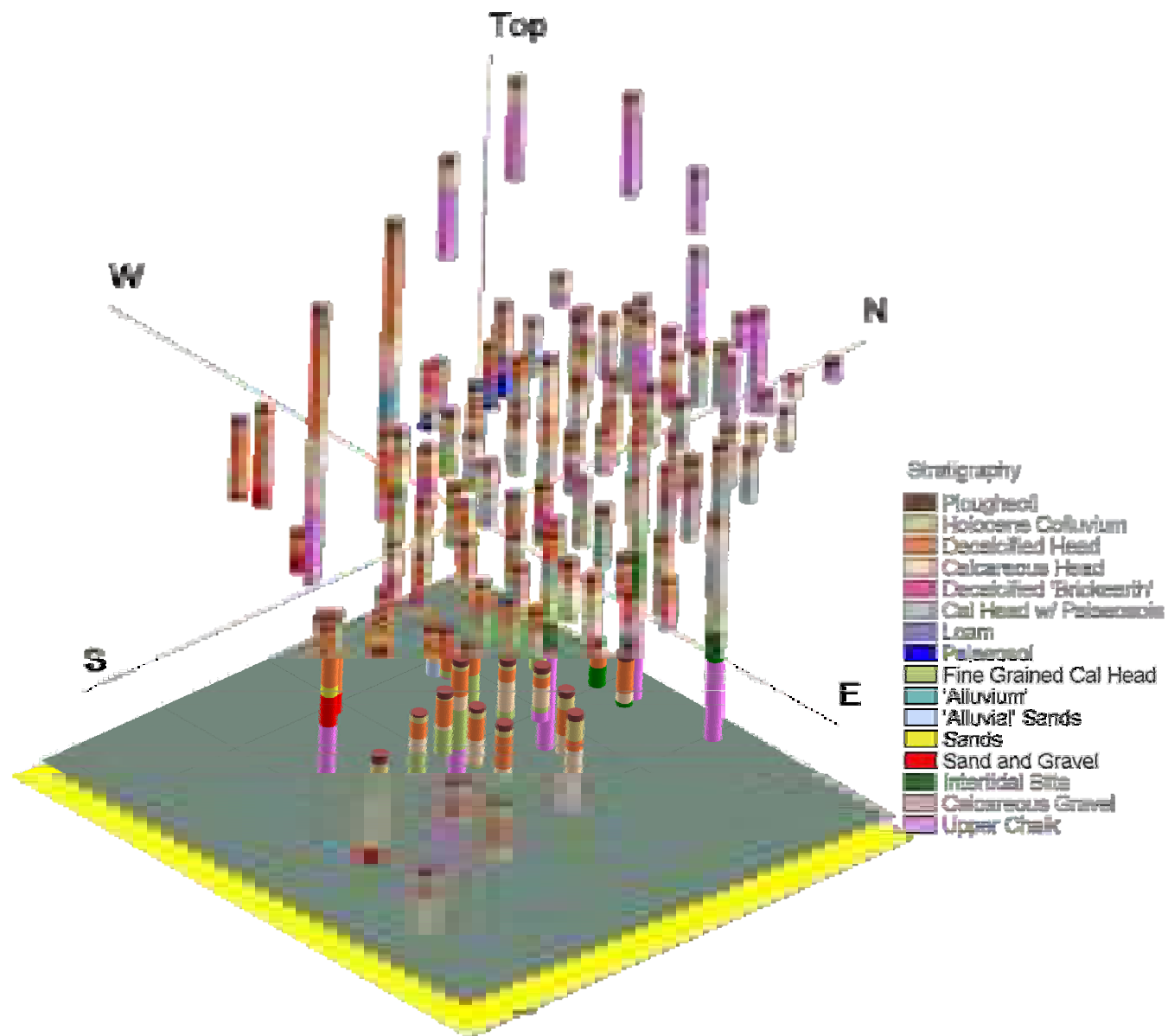
Land east of Downend Road, Portchester, Hampshire

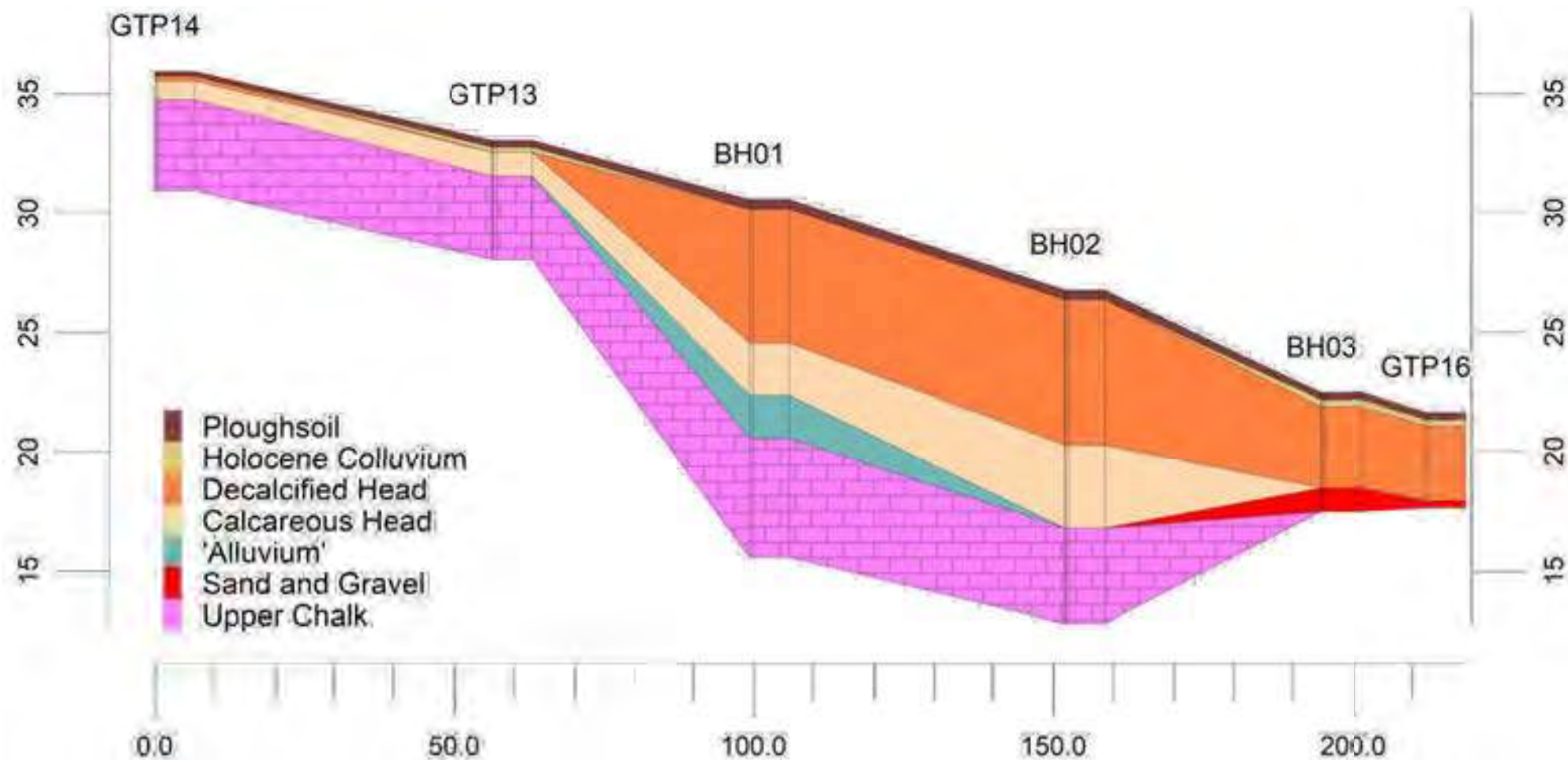
Topographic Survey of Site

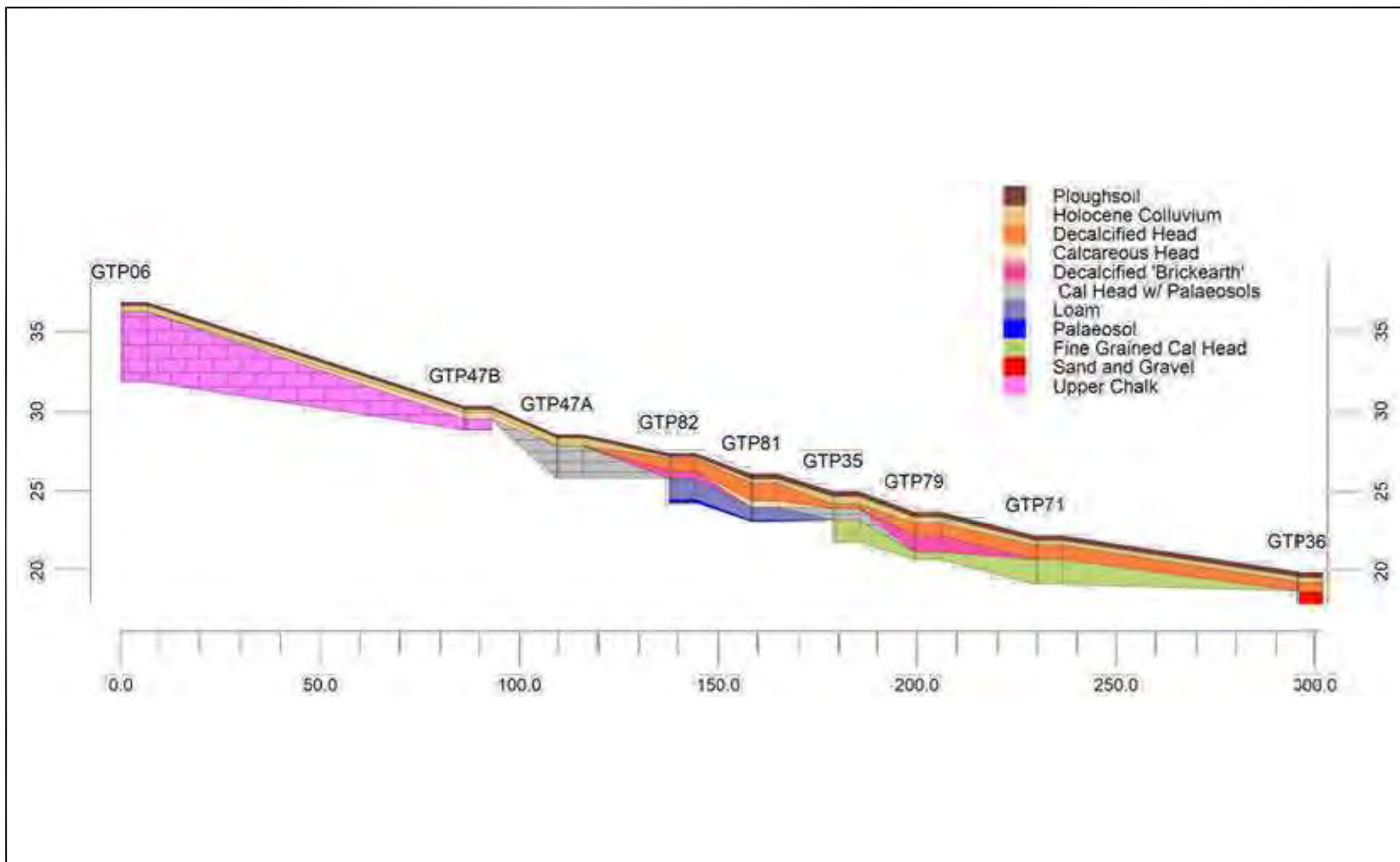
Fig. 4



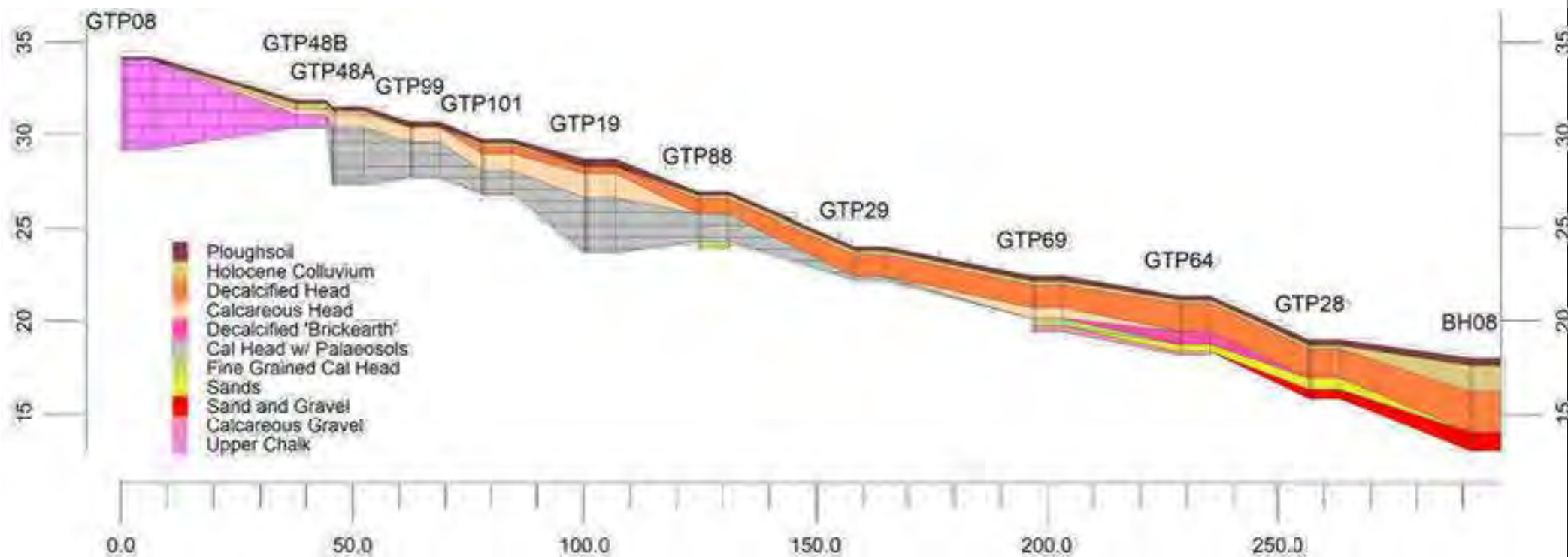
• Archaeology South-East		Land east of Downend Road, Portchester, Hampshire	Fig. 5
Project Ref: 190776	March 2020	Conductivity survey results	
Report Ref:	Drawn by: JR		







• Archaeology South-East		Land east of Downend Road, Portchester, Hampshire	Fig. 8
Project Ref: 190776	March 2020	Transect 2 North-South Strip Logs facing east (Mid West of Site)	
Report Ref:	Drawn by: JR		



• **Archaeology South-East**

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March 2020

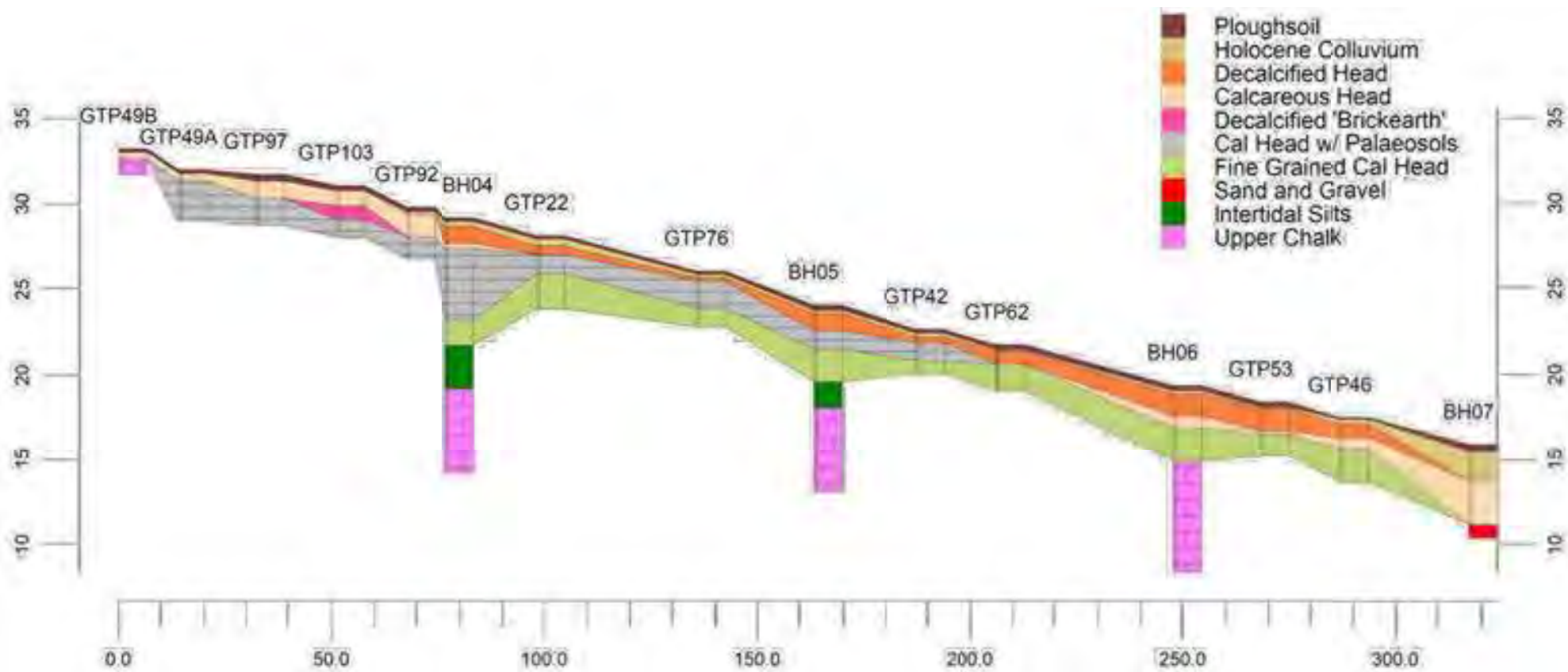
Report Ref:

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Land east of Downend Road, Portchester, Hampshire

Transect 3 North-South Strip Logs facing south-east (Mid Site)

Fig. 9



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Project Ref: 190776

March 2020

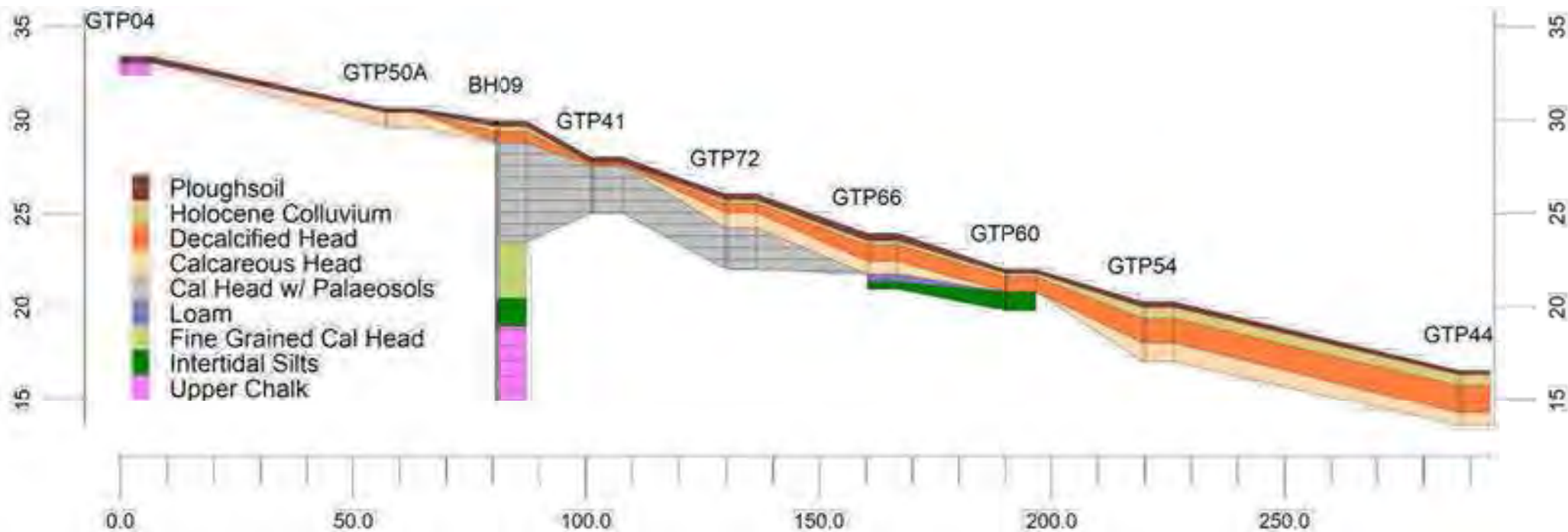
Report Ref:

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Land east of Downend Road, Portchester, Hampshire

Transect 4 North-South Strip Logs facing south-east (Mid East of Site)

Fig. 10



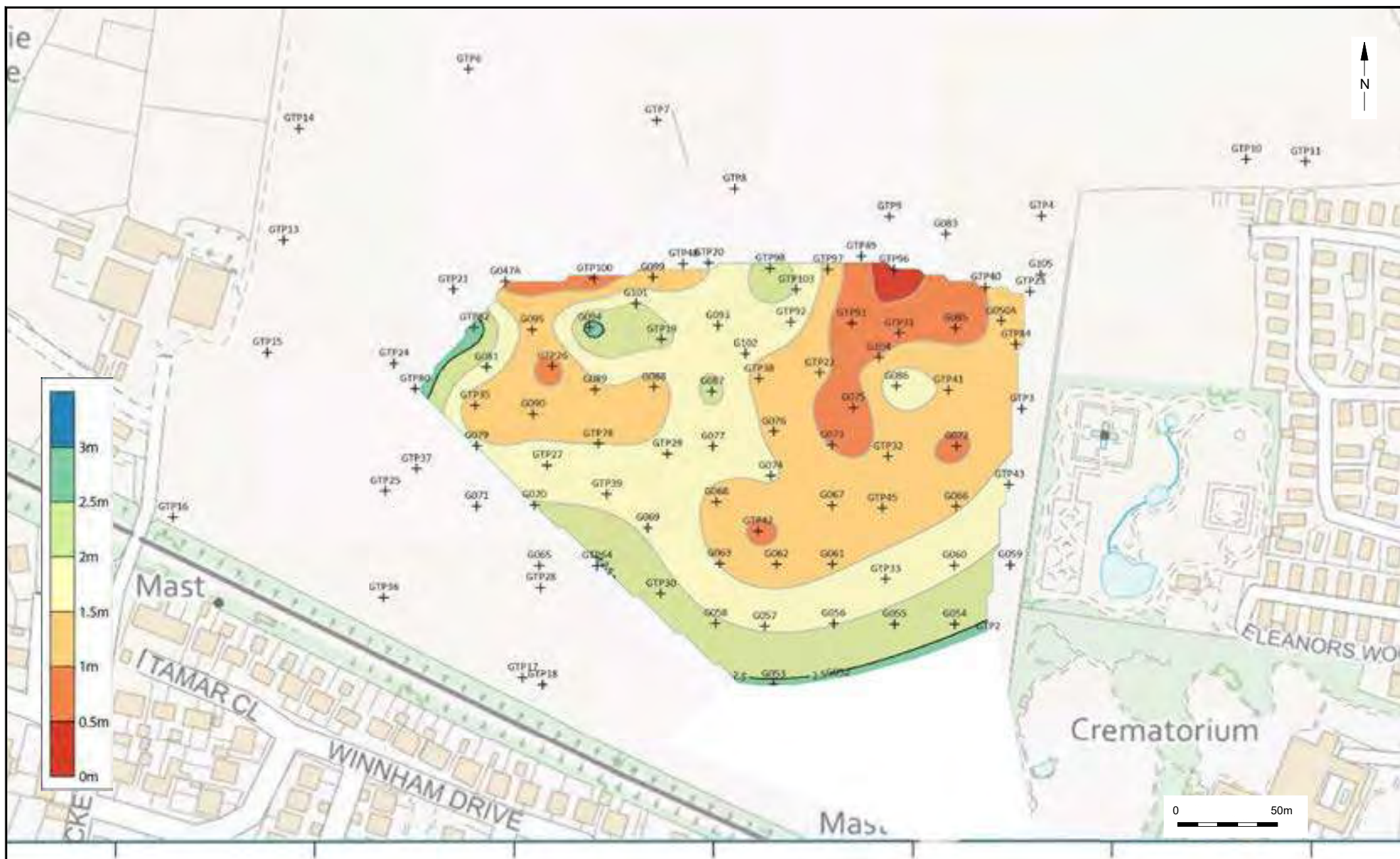
• **Archaeology South-East**

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Land east of Downend Road, Portchester, Hampshire

Transect 5 North-South Strip Logs facing east (Far East of Site)

Fig. 11



• **Archaeology South-East**

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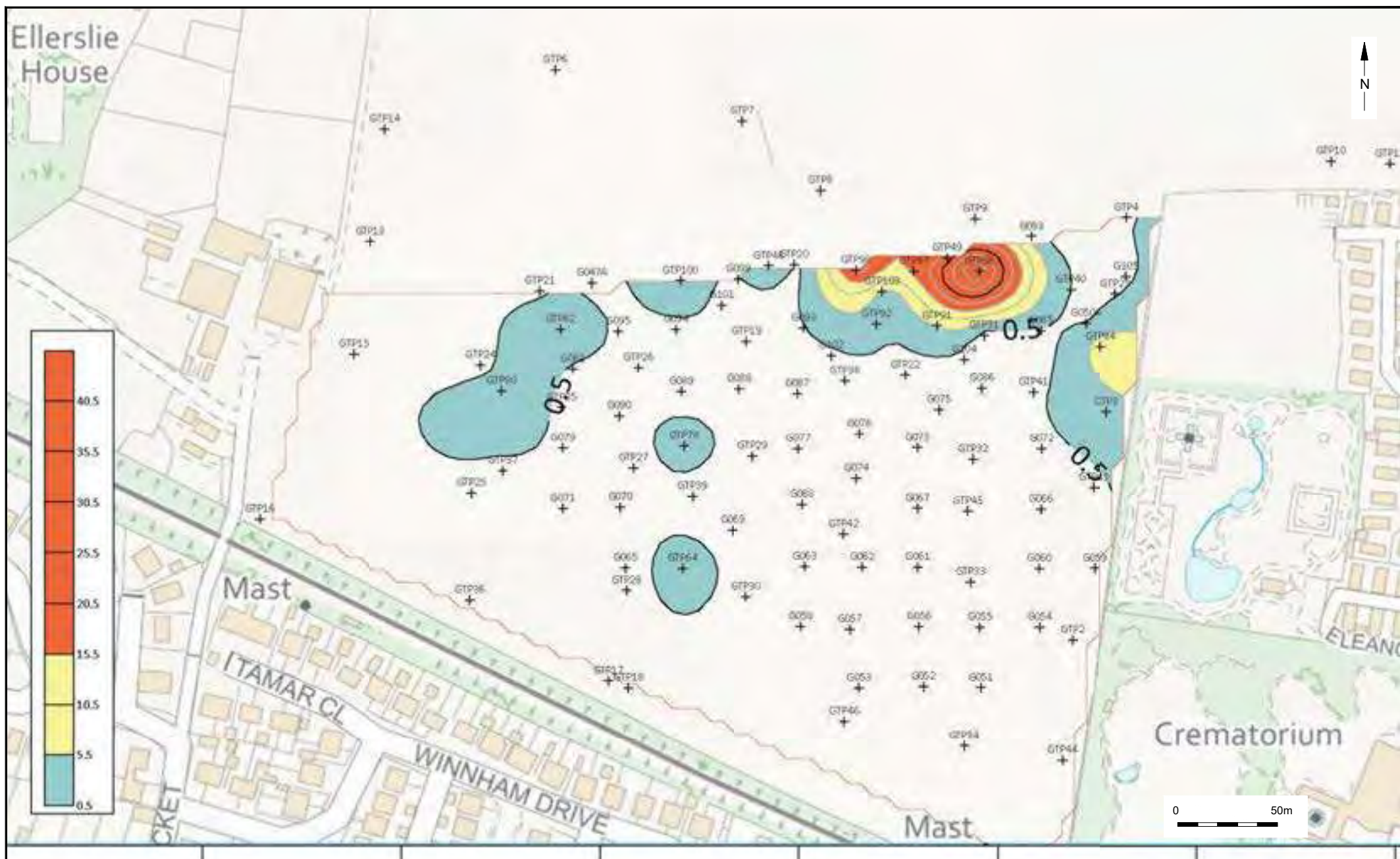
March 2020

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Land east of Downend Road, Portchester, Hampshire

Map showing the extent and depth of Chalk Head with Palaeosols (CHwP)

Fig. 12



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March 2020

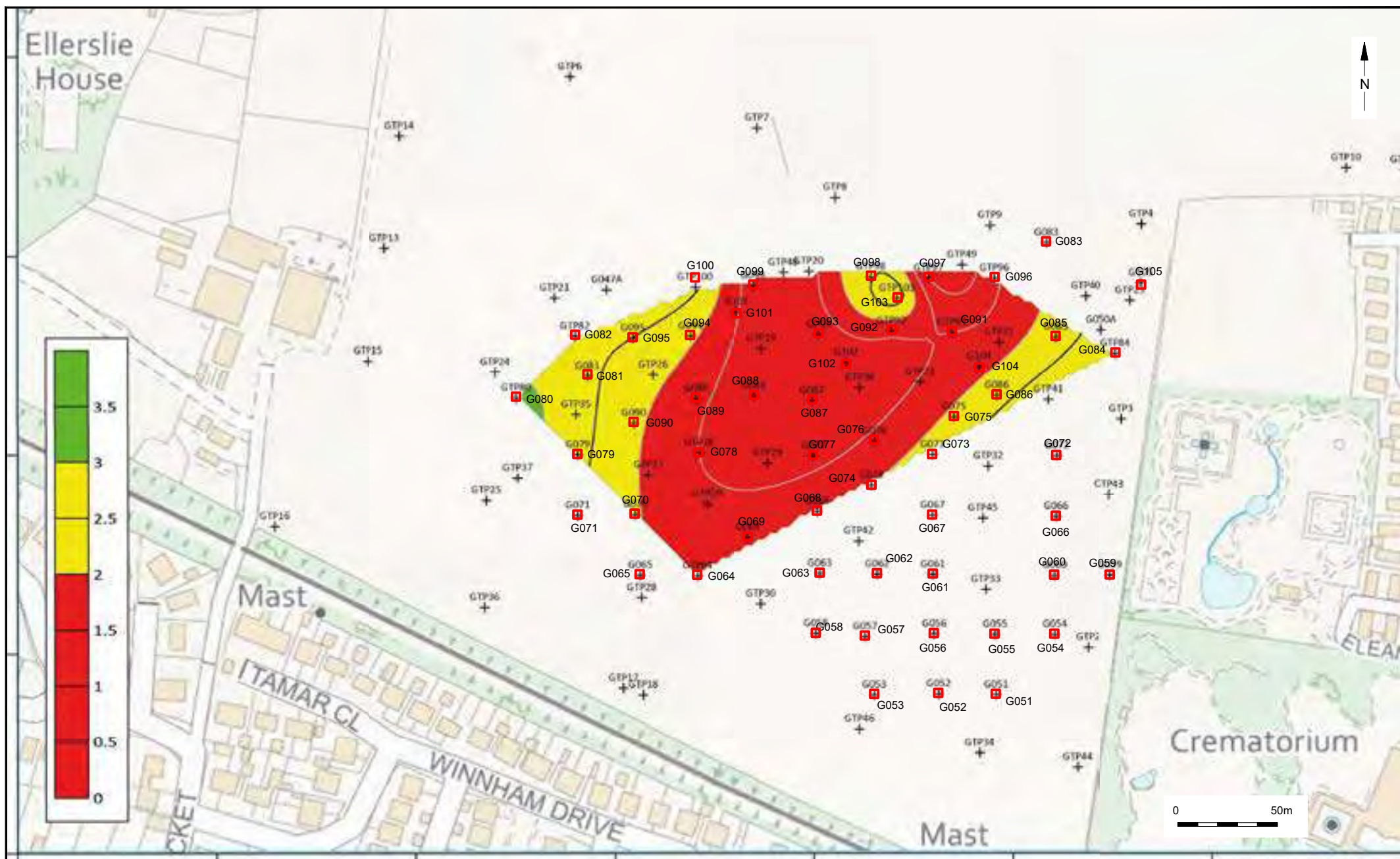
Report Ref:

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Land east of Downend Road, Portchester, Hampshire

Map showing modelled artefact density based on our sample

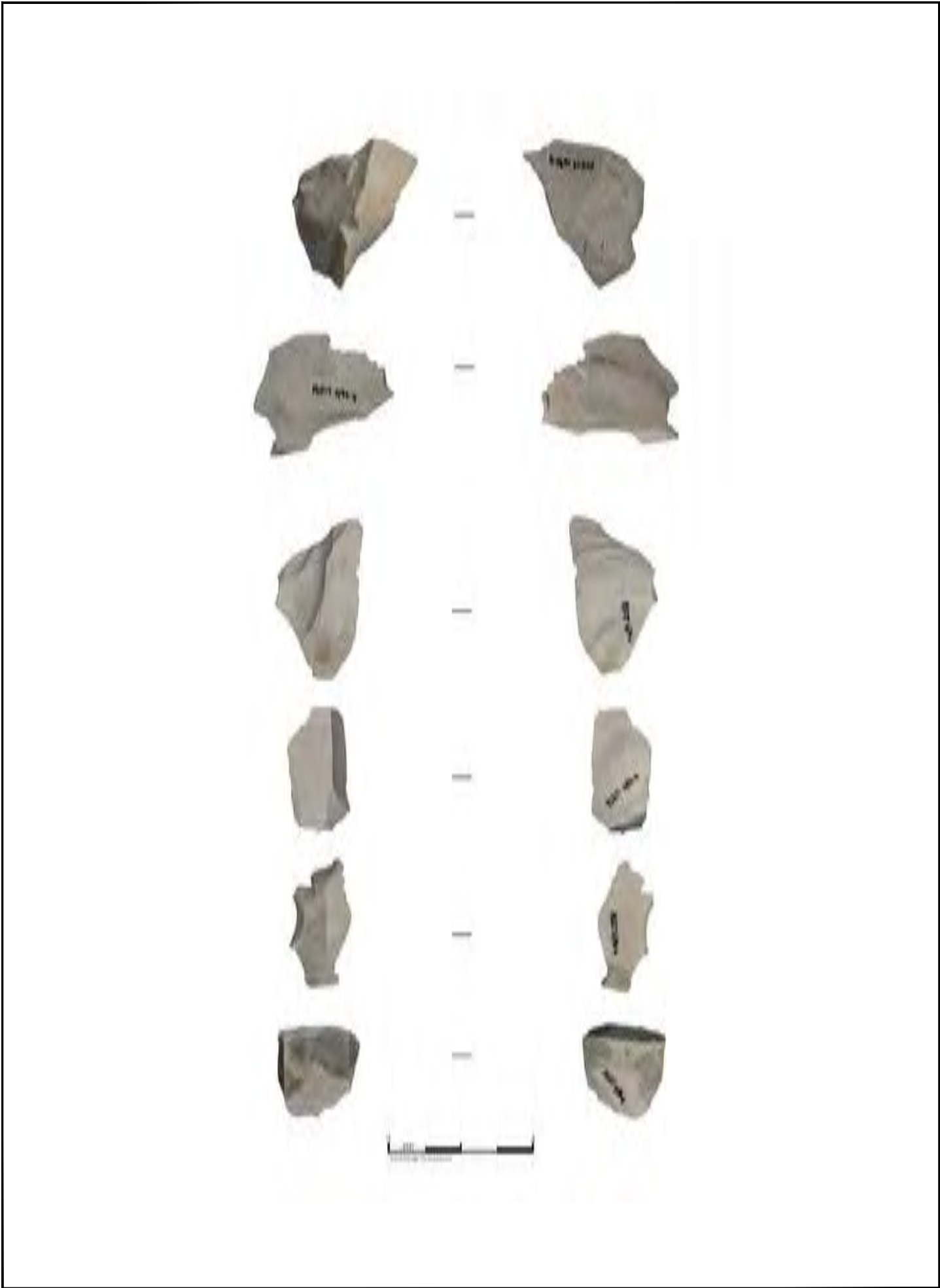
Fig. 13



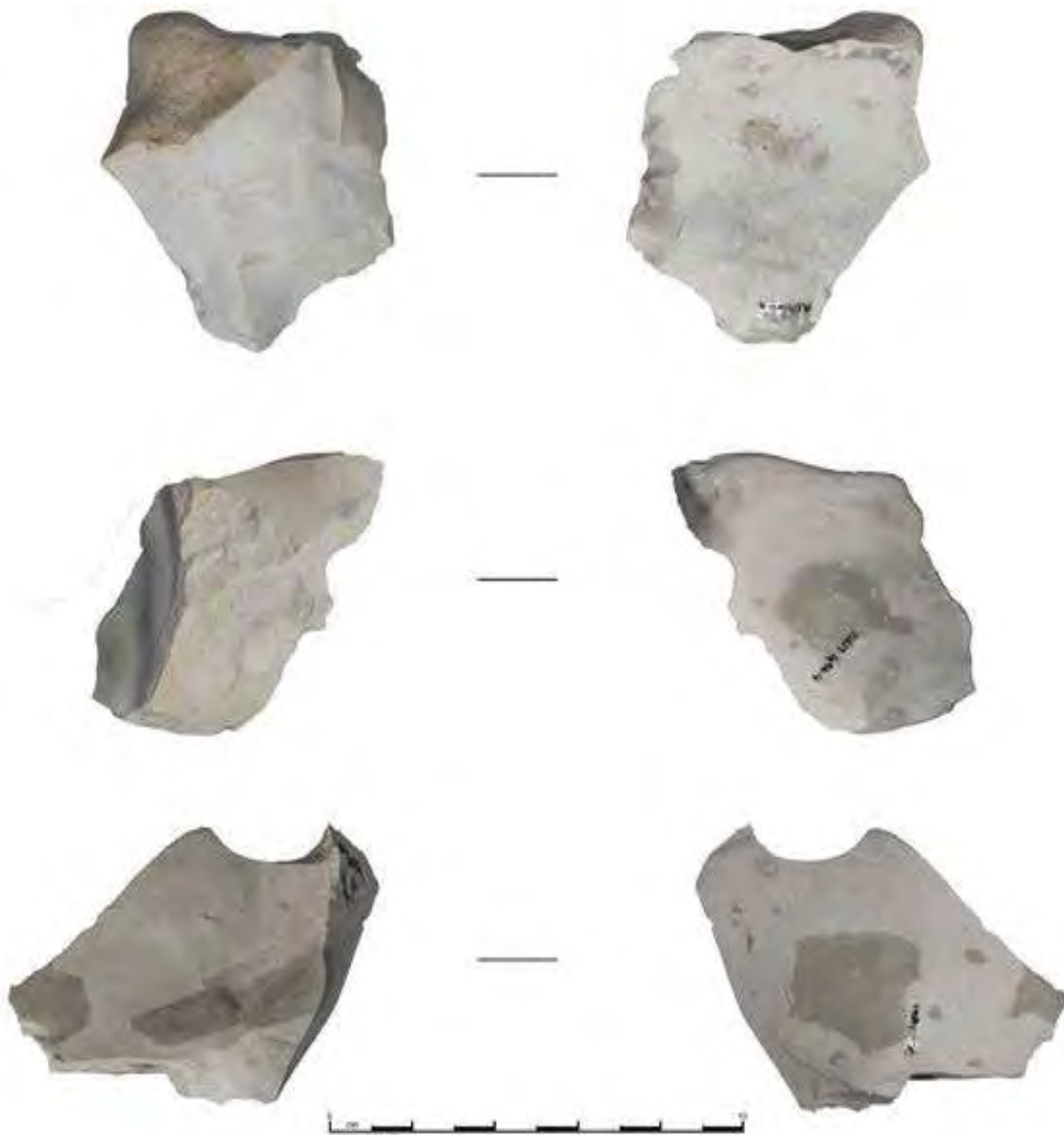
• Archaeology South-East		Land east of Downend Road, Portchester, Hampshire	Fig. 14
Project Ref: 190776	March 2020	Map showing depth at which artefacts first encountered based on our sample	
Report Ref:	Drawn by: JR		



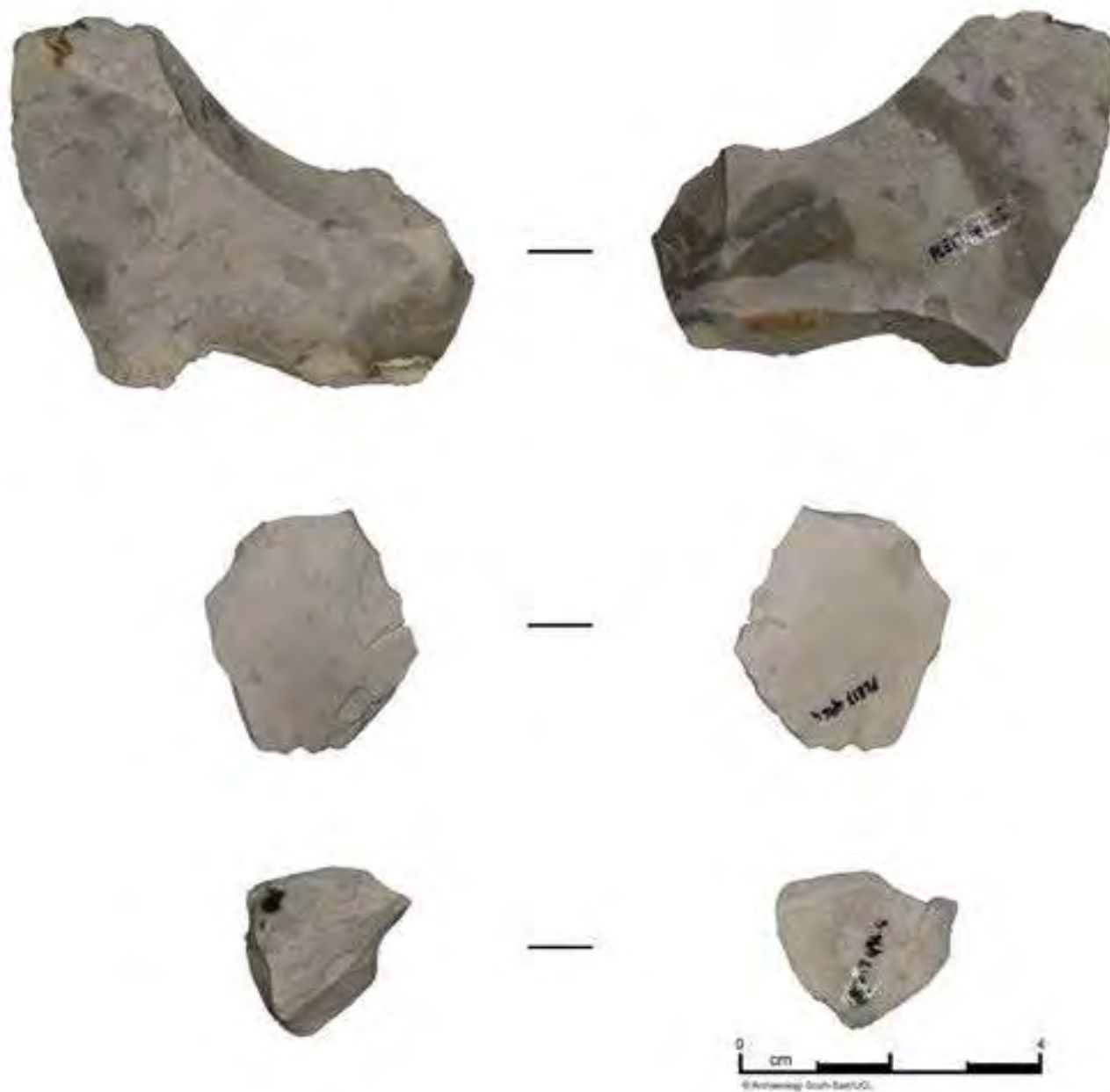
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Project Ref: 190776	March 2020	Flint artefacts from GTP96.	
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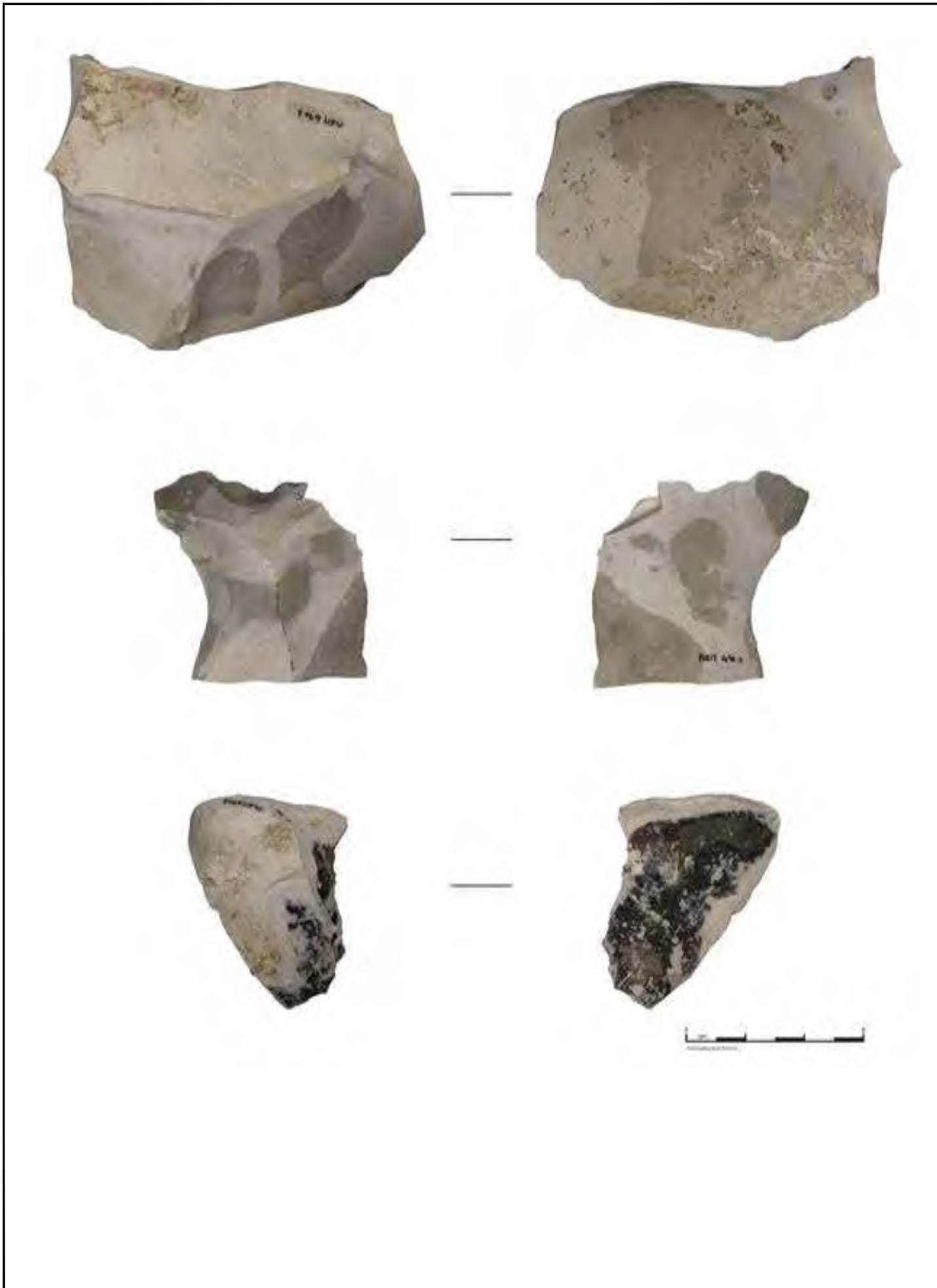


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Project Ref: 190776	March 2020	Flint artefacts from GTP96.	
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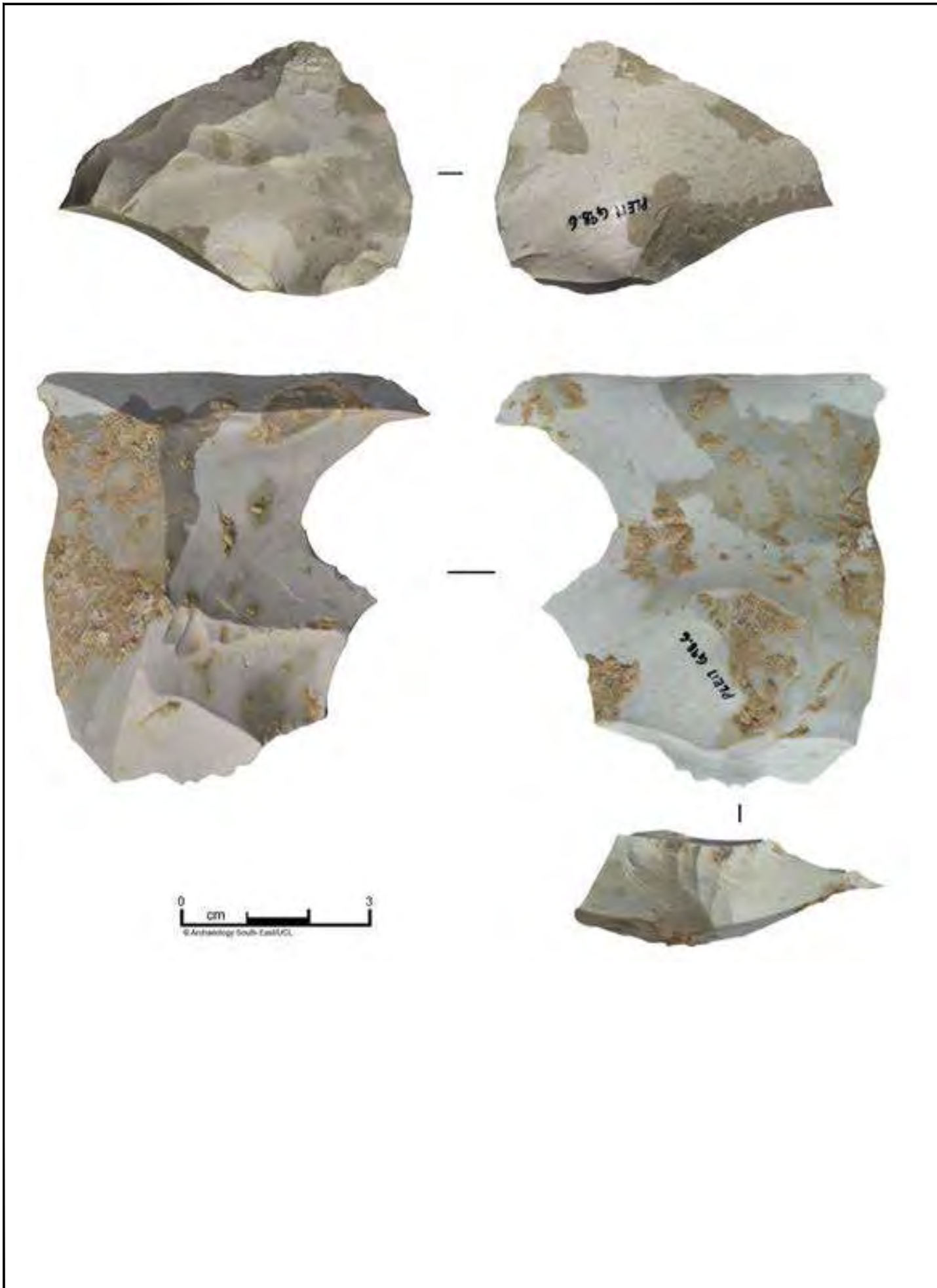




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Project Ref: 190776	March 2020	Flint artefacts from GTP96.	
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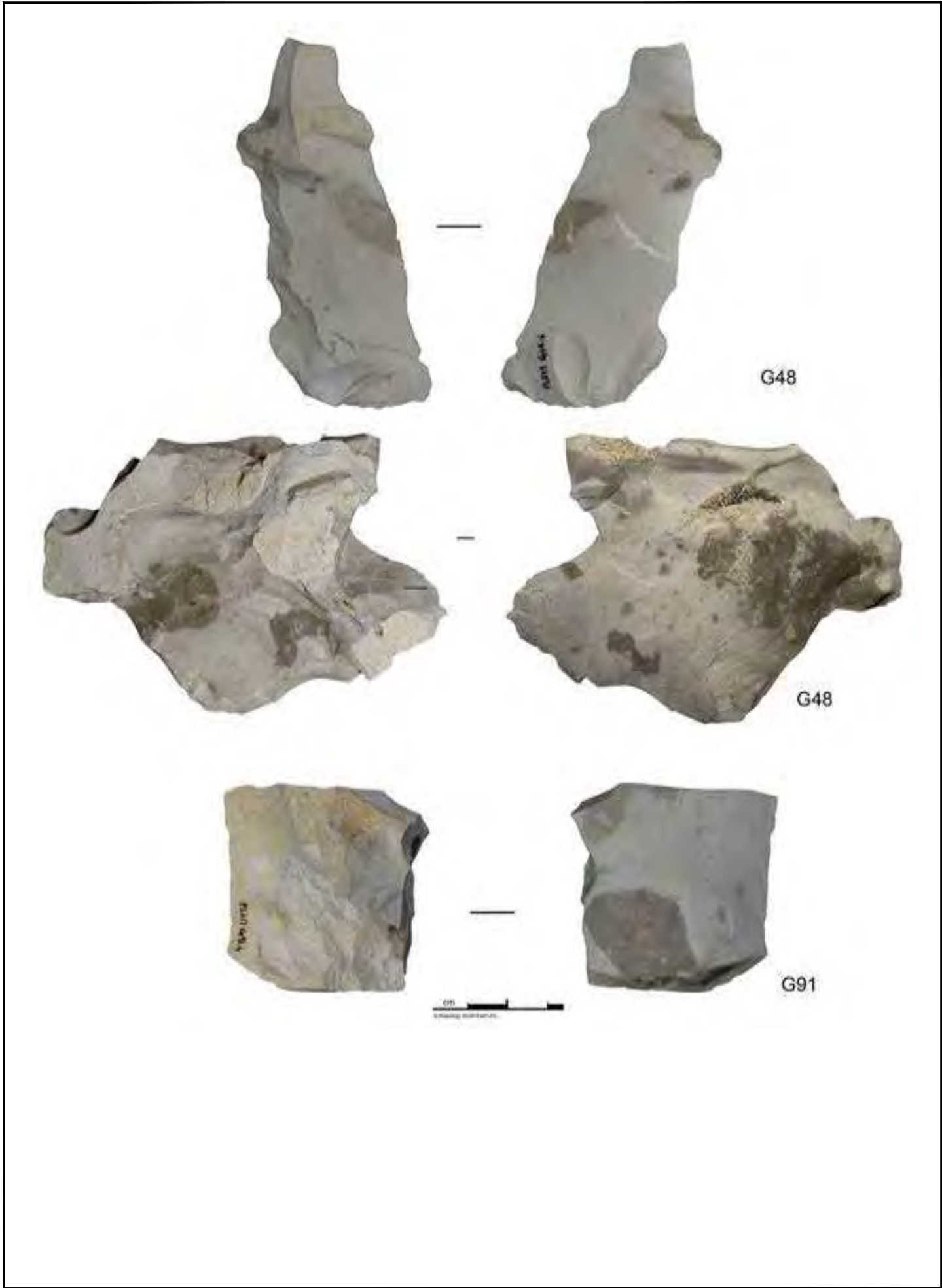


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Project Ref: 190776	March 2020	Flint artefacts from GTP98 including flake with faceted platform.	
Report Ref:	Drawn by: JR		

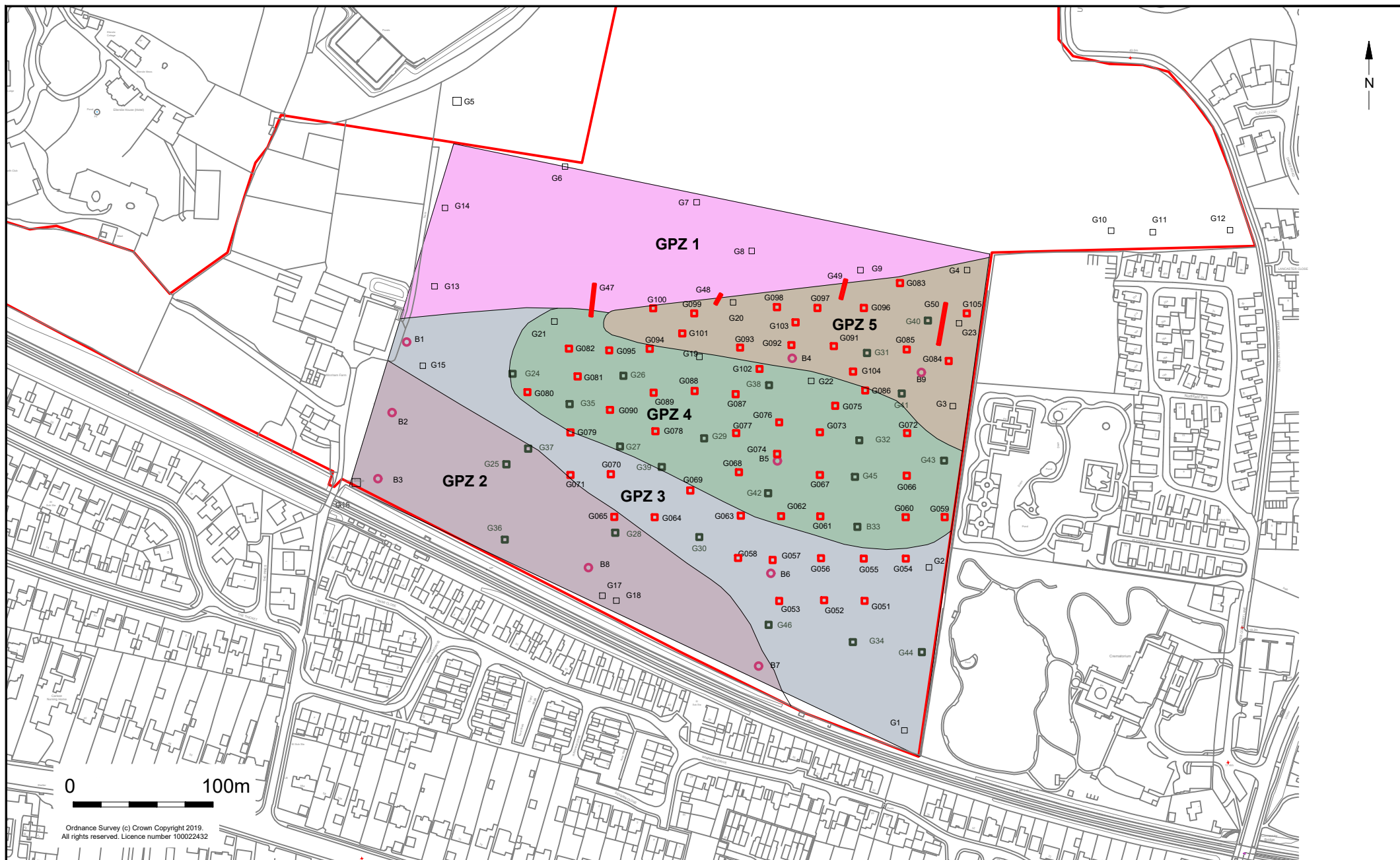


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Project Ref: 190776	March 2020	Flint artefacts from GTP97 including retouched piece.	
Report Ref:	Drawn by: JR		





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Project Ref: 190776	March 2020	Flint artefacts from GTP48 and GTP91.	
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March 2020

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Land east of Downend Road, Portchester, Hampshire

GTP and BH Map with Updated Geoarchaeological Potential Zones GPZ's

Fig. 27



GTP 24



GTP 25



GTP 26



GTP 27



GTP 28



GTP 29



GTP 30



GTP 31



GTP 32



GTP 33



GTP 34



GTP 35



GTP 36



GTP 37



GTP 38



GTP 39



GTP 40



GTP 41



GTP 42



GTP 43



GTP 44



GTP 45



GTP 46



G47



G48



G49



G50



G51



G52



G53



G54



G55



G56



G57



G58



G59



G60



G61



G62



G63



G64



G65



G66



G67



G68



G69



G70



G71



G72



G73



G74



G75



G76



G77



G78



G79



G80



G81



G82



G83



G84



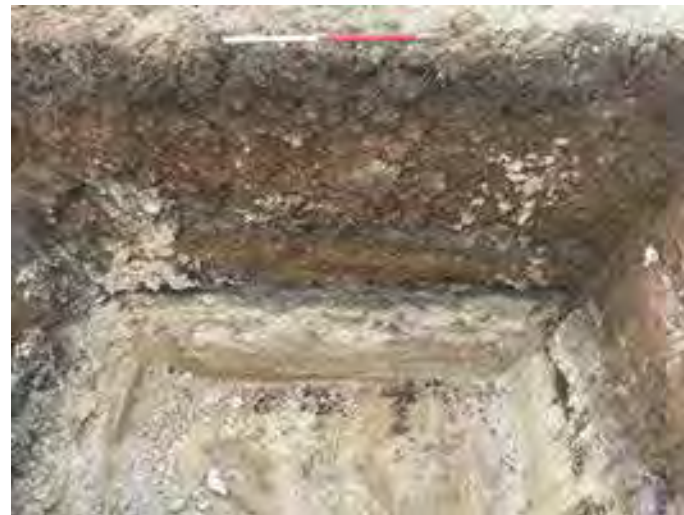
G85



G86



G87



G88



G89



G90



G91



G92



G93



G94



G95



G96



G97



G98



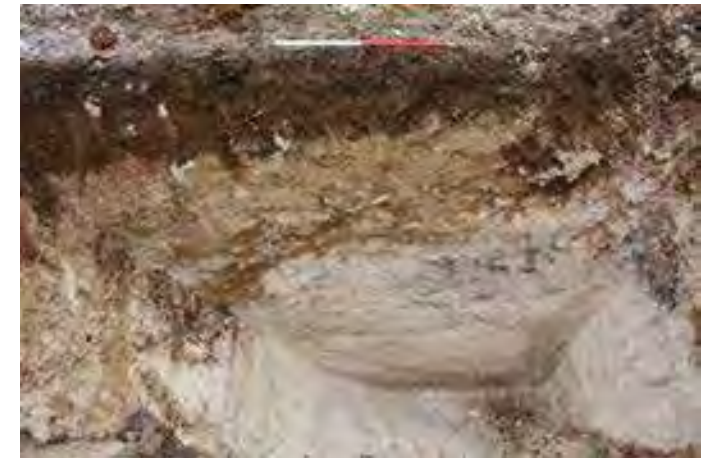
G99



G100



G101



G102



G103



G104



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