Extension to New Denham Quarry (Phase 5) Denham, Buckinghamshire

Geoarchaeological Mitigation and Updated Deposit Model

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Summary

Wessex Archaeology was commissioned by Summerleaze Ltd ('the client') to produce a report outlining the results of geoarchaeological mitigation on land adjacent to New Denham Quarry, Denham, Buckinghamshire (the 'Site'), centred on NGR 504400 184800 (TQ 04400 84800).

The proposed development comprises the expansion of the existing New Denham Quarry to the east, between the existing quarry and Knighton-Way. As, the Site is located in the Colne Valley, which contains one of the most important concentrations of Terminal Upper Palaeolithic and Mesolithic archaeology in Britain, often in association with deposits of a high palaeoenvironmental potential a programme of geoarchaeological mitigation was recommended.

The evaluation comprised the excavation, sampling and recording of a 50 m long stepped trench targeting a palaeochannel identified during a previous borehole survey and deposit modelling exercise. The principal aim of the geoarchaeological trench was to evaluate fills of the palaeochannel and understand the relationship between the channel edge and presence of flint artefacts.

The current geoarchaeological evaluation confirmed presence of an approximately 2 m deep channel filled with minerogenic fluvial deposits sealed by gravels with an organic matrix containing charcoal fragments, with their occurrence mainly restricted to the gravel ridge next to the palaeochannel. The fill of the palaeochannel is considered to be of a Holocene date.

A change in climatic condition at the Pleistocene-Holocene transition is marked by deposition of fine-grained alluvium followed by the formation of a peaty soil buried. The preservation of a peaty soil seems to be localised to the near vicinity of the channel. Archaeological test pitting adjacent to the palaeochannel produced a small quantity of worked flints derived predominately from the buried soil and alluvium. The archaeological material indicates the location of a possible campsite near the palaeochannel, though the assemblage appears partially reworked by a fluvial action.

Alluvium sealed the Buried Soil, and a further layer of alluvium in areas where the buried soil was absent. A characteristic band of black clay demarked the formation of the upper alluvium. Based on research at Three Ways Warf the top of the sediment sequence would be equate to the Late Mesolithic period. No archaeological material was recovered from the basal alluvium, but the black clay has high potential to contain material suitable for radiocarbon dating and palaeoenvironmental remains which may shed light on human-environment relationships.

The uppermost deposit recorded at the Site was thick Made Ground deposit suggesting truncation of the Holocene sequence. As the key Holocene layers are located within 1.0m below the ground surface, the proposed extension of the quarry will affect the sequence and any archaeological remains within it.

The proposed quarry expansion will impact on Pleistocene and Early Holocene deposits with a high geoarchaeological and archaeological potential. Consequently, programme of targeted paleoenvironmental assessment and scientific dating is recommended on samples retained from Trench 1 from the fills of the palaeochannel and overlying alluvium and buried soil containing struck flints, to establish the date of the deposits, preservation and concentration of key palaeoenvironmental indicators and potential of these remains to contribute to our understanding of human-environment relationships at the site and Colne Valley.

Acknowledgements

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Extension to New Denham Quarry (Phase 5): Denham, Buckinghamshire

Geoarchaeological Mitigation

1 INTRODUCTION

1.1 Project and planning background

1.1.1 Wessex Archaeology was commissioned by Summerleaze Ltd ('the client') to produce a report outlining the results of archaeological mitigation on land adjacent to New Denham Quarry, Denham, Buckinghamshire (the 'Site'), centred on NGR 504400 184800 (TQ 04400 84800) (**Figure 1**).

1.1.2 The proposed development comprises the expansion of the existing New Denham Quarry to the east, between the existing quarry and Knighton-Way Lane.

1.1.3 The Site will be subject to a future planning application submitted to Buckinghamshire Council. The Site was subject to a previous planning application (CM/22/16) which was granted but has since expired, which included four conditions relating to archaeology:

60. *No development shall take place until the applicant, or their agents or successors in title, have undertaken archaeological evaluation in form of trial trenching in accordance with a written scheme of investigation which has been submitted by the applicant and approved by the County Planning Authority. Where significant archaeological remains are confirmed, these will be preserved in situ.*

Reason: *In order to ensure completion of the archaeological evaluation and safeguard archaeological remains discovered (Buckinghamshire Minerals and Waste Local Plan Policy 24).*

61*. No development shall take place until the applicant, or their agents or successors in title, have produced a Geoarchaeological Deposit Model to inform areas of high potential for Palaeolithic and Mesolithic/Neolithic sites in accordance with a written scheme of investigation which has been submitted by the applicant and approved by the County Planning Authority. The high potential areas will be evaluated and where significant archaeological remains are confirmed these will be preserved in situ.*

Reason: *In order to ensure completion of the archaeological evaluation and safeguard archaeological remains discovered (Buckinghamshire Minerals and Waste Local Plan Policy 24).*

62. *Where significant archaeological remains are confirmed, no development shall take place until the applicant, or their agents or successors in title, have provided an appropriate methodology for their preservation in situ which has been submitted by the applicant and approved by the County Planning Authority.*

Reason: *In order to ensure completion of the archaeological evaluation and safeguard archaeological remains discovered (Buckinghamshire Minerals and Waste Local Plan Policy 24).*

63. *Where archaeological remains are recorded by evaluation and are not of sufficient significance to warrant preservation in situ but are worthy of recording no development shall take place until the applicant, or their agents or successors in title, have secured the implementation of a programme of archaeological work in accordance with a written scheme of investigation which has been submitted by the applicant and approved by the County Planning Authority.*

Reason: *In order to ensure completion of the archaeological evaluation and safeguard archaeological remains discovered (Buckinghamshire Minerals and Waste Local Plan Policy 24).*

1.1.4 The targeted geoarchaeological investigations was conducted alongside a program of archaeological evaluation through hand dug test pits (Wessex Archaeology 2024c) aiming to establish the nature and extent of the concentration of lithic artefacts identified in the prior archaeological evaluations (Wessex Archaeology 2016). The combined results of these investigations will provide further information on the archaeological resource that may be impacted by the proposed development and facilitate an informed decision regarding the requirement for any further archaeological and geoarchaeological works to offset impacts on the resource; or the implementation of a management strategy to avoid impacts.

1.2 Scope of works

1.2.1 Archaeological evaluation, an Electromagnetic Induction (EMI) survey and borehole survey with subsequent deposit modelling (Wessex Archaeology 2016 and 2024a) identified the presence of a broad palaeochannel cut into earlier fluvial sands and gravels and infilled with sediments, including peat layers. A concentration of lithic artefacts was identified situated within sediments on the edge of the channel. This included artefacts potentially diagnostic of a Mesolithic date.

1.2.2 In order to investigate these deposits in detail, recover environmental samples and dating evidence, and to establish the lithostratigraphic context of the lithic artefacts identified in the previous archaeological evaluation a program of targeted geoarchaeological investigations were required.

1.2.3 The agreed program of geoarchaeological mitigation works comprised:

- Excavation, investigation, recording and sampling of stepped trench measuring 50 m in length and up to 2 m deep targeting the palaeochannel recorded during previous archaeological surveys (Wessex Archaeology 2016 and 2024a);
- A programme of updated geoarchaeological deposit modelling, integrating the results of the mitigation work with borehole survey and with data from a previous archaeological evaluation and BGS archive boreholes;
- A report integrating the results of the results and providing further recommendations.

1.2.4 All works undertaken were in accordance with Written Schemes of Investigation (WSI) which detailed the aims, objectives, methodologies and standards to be employed to undertake the evaluation (Wessex Archaeology 2024b). The Archaeological Officer at Buckinghamshire Council approved the WSI, on behalf of the Local Planning Authority

(LPA), prior to fieldwork commencing. The evaluation was undertaken from the 9th to the 12th of July.

1.3 Scope of document

1.3.1 The purpose of this report is to provide a detailed description of the results of the geoarchaeological evaluation, to interpret the results within a local, regional or wider archaeological context and to assess whether the aims of the evaluation have been met.

1.3.2 The presented results will provide further information on the geoarchaeological resource that may be impacted by the proposed development and facilitate an informed decision with regard to the requirement for, and methods of, any further geoarchaeological works; or the formation of a mitigation strategy (to offset the impact of the development on the archaeological resource); or a management strategy.

1.3.3 To help frame geoarchaeological investigations, Wessex Archaeology has developed a four-stage approach, encompassing successive levels of investigation appropriate to the results obtained, accompanied by formal reporting of the results at the level achieved. The stages are summarised below (**Table 1**). This evaluation represents Stage 2 of this process.

Table 1 Staged approach to Palaeolithic geoarchaeological investigations

Stage 1: Geoarchaeological deposit model and Desk-based Assessment (GDBA)	A geoarchaeological deposits model and desk-based assessment (GDBA) examines a range of information (published and unpublished ("grey literature"), geological mapping, Ground Investigation data, historic maps etc.) to inform on the geoarchaeological potential of deposits within a Site The GDBA may include a Geoarchaeological Landscape Characterisation (GLC) which divides the Site into different zones (Geoarchaeological Characterization Zones – GCZs) based on variations in deposits and potential. The GDBA establishes the requirements for and scope of Stage 2 geoarchaeological field investigations. Should Stage 2 work be required, appropriate and proportionate recommendations for each GCZ are provided. The GDBA highlights any areas of a Site where Pleistocene deposits with possible Palaeolithic geoarchaeological potential may occur.
Stage 2: Palaeolithic geoarchaeological evaluation	Field evaluation to establish the Palaeolithic geoarchaeological potential of Pleistocene deposits within a defined Evaluation Area, which informs on the requirements and scope of Stage 3 palaeoenvironmental assessment and/or Stage 4 mitigation. The principal methods of evaluation are through targeted machine-dug test pits and boreholes. An evaluation report is produced, which includes updated deposit modelling and an updated GLC. If required, recommendations for Stage 3 sample assessment and/or Stage 4 mitigation are made.
Stage 3: Sample assessment	Palaeoenvironmental samples and/or sediment samples recovered during Stage 2 are assessed to inform on the geoarchaeological potential of deposits and guide the scope and need for Stage 4 mitigation. Dating of samples taken during Stage 2 may be required to inform on the geoarchaeological potential of deposits and to guide the scope and need for Stage 4 mitigation. If this is the case, dating will be conducted at this stage. Alternatively dating samples will be retained for Stage 4 mitigation, if required. Recommendations for dating requirements during Stage 3 are made in the Stage 2 report.

	A sample assessment report is produced outlining the palaeoenvironmental and dating potential of the deposits including targeted and proportionate recommendations for Stage 4 mitigation.
Stage 4: Palaeolithic geoarchaeological mitigation	Based on the results of the Stage 2 and 3 investigations Palaeolithic geoarchaeological mitigation may be required to offset development impacts. Mitigation may include targeted geoarchaeological sampling for palaeoenvironmental assessment and scientific dating, potentially alongside archaeological excavation. A final mitigation report is provided on completion of mitigation program.
Publication	The scope and location of a publication report will be agreed in consultation with the client and LPA advisor. The publication report may comprise a note in a local journal or a larger publication article or monograph, dependant on the significance of the archaeological work.

2 BACKGROUND

2.1 Introduction

2.1.1 The archaeological and historical background was assessed in a prior heritage statement (HS; Wessex Archaeology 2021), which summarised the recorded historic environment within the vicinity of the Site, compiled from previous investigations within the Site and Denham Quarry. The following background is not exhaustive but is summarised from aspects of the HS that are considered relevant to the proposed works. The geoarchaeological background was assessed by the previous borehole survey and deposit modelling (Wessex Archaeology 2024).

2.2 Chronology

2.2.1 Palaeolithic geoarchaeological investigations are typically undertaken with reference to geological periods (e.g., Quaternary), epochs (e.g., Pleistocene) and sub-epochs (e.g., Devensian) that reflect major climate sea-level and/or environmental changes. Here we adopt British nomenclature correlated to the Marine Isotope Stage (MIS) record to distinguish between different climatic periods, with dates given in Kya BP (thousands of years before present).

2.2.2 Marine Isotope Stages are deduced from marine palaeoclimatic records and reflect alternating warm (interglacial and interstadial) and cold (glacial and stadial) periods throughout the Quaternary (**Table 2**).

2.2.3 Where age estimates are available these are expressed in millions of years (Mya), thousands of years (Kya) and within the Holocene epoch as either years Before Present (BP), Before Christ (BC) and Anno Domini (AD). These are linked to the global Marine Isotope Stage (MIS) chronological framework.

Table 2 British Quaternary chronostratigraphy

Geological Period	Chronostratigraphy		Age (Kya)	MIS
Holocene	Holocene interglacial		11.7 – present	1
Late Pleistocene	Devensian Glaciation	Loch Lomond Stadial	11.7 – 12.9	2 – 5d
		Windermere Interstadial	12.9 – 15	
		Dimlington Stadial	15 – 26	
		Upton Warren Interstadial	40 – 43	
		Early Devensian	60 – 110	
	Ipswichian interglacial		115 – 130	5e
Middle Pleistocene		Unnamed cold stage	130 – 374	6
		Aveley interglacial		7
		Unnamed cold stage		8
		Purfleet interglacial		9
		Unnamed cold stage		10
	Hoxnian interglacial		374 – 424	11
	Anglian glaciation		424 – 478	12
	Cromerian Complex		478 - 780	13 – 19

2.3 Location and geomorphology

2.3.1 The Site comprises a sub-rectangular parcel of land of approximately 5.3 ha located at the north-eastern edge of the existing quarry and immediately south-west of the settlement of New Denham (**Figure 1**). The site is bounded to the north, west and southwest by the existing quarry, undeveloped land to the northeast and south, and Knighton-Way Lane and residential development to the east.

2.3.2 The Site currently comprises agricultural land under pasture and arable cultivation subdivided into a series of land parcels divided by a mixture of fencing and hedging. An overhead cable traverses the Site from north to south. The Site is relatively flat, lying at a height of between 32 and 35 m above Ordnance Datum (OD).

2.3.3 British Geological Survey (BGS) mapping of the Site shows bedrock comprising clay, silts, and sands of the Lambeth Group, overlain by superficial geology comprising Alluvium (**Figures 2**). The alluvial deposits relate to the floodplain of the River Colne and its tributaries, and overly Pleistocene fluvial sands and gravels of the same river.

2.4 Previous investigations

2.4.1 Previous investigations relevant to the Site are listed in **Table 3** and summarised below.

Table 3 Previous investigations

Report type	Title	Report no	Reference
Geophysical survey	N/A	N/A	ERM (2016)
Archaeological Evaluation Report	New Denham Quarry, Denham, Buckinghamshire	114210.02	Wessex Archaeology (2016)
Geophysical Survey, Geoarchaeological Borehole Survey and Deposit Modelling	Extension to New Denham Quarry (Eastern Extension) Denham, Buckinghamshire. Geophysical Survey, Geoarchaeological Borehole Survey and Deposit Modelling	60492.02	Wessex Archaeology (2024)

Geophysical survey (ERM 2016)

2.4.2 Detailed magnetometer survey was undertaken over an area of approximately 5.7 ha, comprising all the present (Phase 5) Site, with additional land to the south-east.

2.4.3 No features were positively identified as archaeological in origin. However, two linear features on a north-east – south-west alignment were identified, approximately on the same orientation as the underlying field system. The most northerly of these was interpreted as likely to relate a former trackway or field boundary, although it does not correspond to anything visible on available historic mapping. To the south of this a broken linear feature was assessed as a likely agricultural feature. Other anomalies were concluded to be of modern date.

New Denham Quarry, Denham, Buckinghamshire (Wessex Archaeology 2016)

2.4.4 An archaeological trial trench evaluation was subsequently undertaken on the same area (including the present site) comprising nine trenches measuring 20m by 1.5m.

2.4.5 The archaeological and subsurface deposits were encountered below topsoil and subsoil, c. 0.15m bgl. In the westerly trenches a deeper, basally altered topsoil was recorded; this was interpreted as reflecting frequent water saturation in the area, in places allowing the beginning of peat formation. In the more northerly trenches this sequence sits upon sterile alluvial deposits. In all trenches the alluvial sequence was described as capping fluvial sands and gravels.

2.4.6 The only trench containing archaeological material was in the north-eastern part of the Site (Trench 1). This revealed a palaeochannel with well-defined sequences of fluvial/alluvial deposits, with the channel deepening either side of a distinct rise in the gravel surface (109), but nevertheless extant throughout. A well-formed deposit of peat (104) capped the fluvial sequence at the north-west, and lamina of tufa were present at the base of the sequence at the south-east. Two contexts in the extreme south-eastern part of the channel (107 and 110) contained worked flints in fresh, unabraded condition.

2.4.7 The first context (107) was clay-silt with a basal band of sub-rounded flint and veins/patches of tufa and organic rich clay-silt which had the appearance of being redeposited (erosional) or at least disturbed, and the basal flints suggest a period of higher energy water flow

consistent with a period of bank erosion. This produced a blade core, a blade/blade-like flake and a bladelet. The second context (110) was a clay-silt with a distinctly soil-like structure, perhaps more correctly considered as a nascent or transformed peat deposit showing signs of soil formation. This is apparently undisturbed and could well represent a preserved Mesolithic surface viable for at least fleeting activity. This produced a blade-like flake and a possible blade fragment. Little of this deposit was uncovered in excavation, appearing as it does at the very terminal end of the trench. It seems to overlie context 107 from which flint was recovered but this is not entirely clear. It is impossible, at this stage, to say whether these artefacts represent truly in-situ knapping debris, but their condition alone implies they have not been subject to much disturbance.

Geophysical Survey, Geoarchaeological Borehole Survey and Deposit Modelling (Wessex Archaeology 2024a)

2.4.8 A programme of geophysical survey and geoarchaeological boreholes was undertaken at the Site. The Electromagnetic Induction (EMI) detected several anomalies of geoarchaeological interest. This comprised river terrace deposits and a possible palaeochannel aligned broadly northeast to southwest.

2.4.9 Following the results of the geophysical survey, a total of 14 of a proposed 15 boreholes were undertaken (WA-01 to WA-15, with WA-08 descoped) and a programme of geoarchaeological deposit modelling was subsequently undertaken, integrating the results of the geoarchaeological borehole survey with previous data from an archaeological evaluation (Wessex Archaeology 2016).

2.4.10 The results of the deposit modelling identified a sequence of superficial deposits overlying the London Clay bedrock, comprising Pleistocene river terrace deposits (including fluvial sands and gravels, and clay and gravel) sealed beneath gravelly clays, and which are incised into by a later palaeochannel (**Figures 3** and **4**).

2.4.11 The Pleistocene terrace deposits may correlate with the late Pleistocene Colney Street Gravel Member of Gibbard and Hall (1982) that is mapped in this area by BGS. However, basal highs for the Colney Street Gravel Member, as recorded by Gibbard and Hall (1982) and Watson (2015), are around 18 and 25 m OD. At the Site, the average basal high is around 29 m OD. Therefore, they may be equivalent to the earlier Kempton Park Gravel not mapped by the BGS in the Colne Valley.

2.4.12 The Pleistocene river terrace deposits were generally overlain by gravelly clays reflecting the reworking of the underlying deposits. The reworking may reflect a combination of alluvial and slope process. Their age is uncertain but a late Pleistocene and./or Holocene age is possible.

2.4.13 A palaeochannel incised into these earlier deposits to maximum depth of c.1.90m was identified. This is infilled with silty clays which in places became sandier and gravellier towards the base. These channel fills are broadly equivalent to the artefact-bearing and organic alluvium identified in previous archaeological evaluation in 2016.

2.5 Geoarchaeological context

2.5.1 The bedrock geology underlying the site is mapped by the British Geological Survey (BGS GeoIndex) as the Lambeth Group. This was deposited in fluvial, estuarine, lagoonal, or proximal marine environments in the Late Palaeocene to Early Eocene (56-55 Ma), (**Figure 1**) but the borehole survey suggested the presence of London Clay bedrock (Wessex Archaeology 2024a).

2.5.2 The combined BGS mapping of superficial deposits (**Figure 2**) and results of previous archaeological and geoarchaeological evaluation conducted by Wessex Archaeology at the Site (2016 and 2024a) suggest the following Quaternary deposits are present in the:

- Palaeochannel (Holocene)
- Gravelly clay (?Late Pleistocene/Holocene);
- Fluvial sand and gravel (?Late Pleistocene).

2.5.3 Relevant background information on these Quaternary deposits, including their broad potential to preserve archaeology and palaeoenvironmental datasets, and previous discoveries of archaeological and palaeoenvironmental records associated with them, is outlined below.

Fluvial sand and gravel

2.5.4 The BGS GeoIndex maps sands and gravels of the Taplow Gravel Member to the west of the Site. These sands and gravels are thought to have aggraded during the late Middle Pleistocene between MIS 8 to 6 (300-130 Kya; Bridgland 2006). Mapped to the east are outcrops of the Lynch Hill Gravel Member of the Middle Thames. This unit is thought to have aggraded during the late Middle Pleistocene, between MIS 10 the 8 (374-243 Kya; Bridgland 2006).

2.5.5 Gravels immediately underlying the present floodplain of the Colne in the vicinity of the Site are referred to as the Colney Street Gravel Member, dated to the Late Pleistocene (24.0-11.7 Kya). The gravels were laid down by a braided river under relatively high velocity water flow conditions (Gibbard and Hall 1982).

2.5.6 Recent geoarchaeological works at Waterloo Wharf and Uxbridge Business Park recorded the Colney Street Gravel Member as a dark yellowish brown poorly sorted, clast supported gravel with the top often coloured dark grey or black because of penetration of humic acids from overlying reduced alluvium and/or organic muds. The gravel outcrops were recorded at elevations of between 29.58 to 30.64 m OD (Stastney 2015, Watson 2015). The basal highs of the gravels were not recorded at these sites, but at West Drayton the base of these gravels was recorded at around 18.0 to 20.0 m OD in the Colne Valley along the M4 (Gibbard and Hall 1982).

2.5.7 Within the Site itself, fluvial gravels were recorded as underlying the Holocene strata in all archaeological trenches and boreholes (Wessex Archaeology 2016 and 2024a). The average basal high for this deposit is around 29 m OD and they are considered to be Late Pleistocene in date and tentatively correlated with the Colney Street Gravel Member.

2.5.8 In the Colne Valley, the Colney Street Gravel Member is unconformably overlain by fine-grained minerogenic alluvial sediments. The interface between these strata is of high significance and potential, given that archaeological deposits have been found in similar stratigraphic contexts. At Three Ways Wharf, Uxbridge in-situ late Glacial (12,900-11,700 BP) and Early Mesolithic (11,600-8,000 BP) lithic and faunal scatters were encountered within fine-grained mineral strata overlying the Colney Street Gravel Member and sealed by a sequence of black humic clay, tufa, and fine-grained mineral alluvial strata (Lewis and Rackham 2011).

2.5.9 Fluvial gravels at New Denham Quarry, and elsewhere within the Colne Valley, have produced Pleistocene large vertebrate fauna remains likely dating to the Late Middle/Upper Palaeolithic. At The Lea, Denham (TQ 0490 8600; approximately 1.3 km to the northeast)

the midsection of an adult mammoth tusk, probably of woolly mammoth (*Mammuthus primigenus*), was recovered from the base of the gravels at c. 6 m bgl (Coleman et al. 2002). This was assumed to date to the Middle Devensian (MIS 3; 60-25 Kya) but was not directly dated. Similarly, within the main extraction area at New Denham Quarry, two mammoth tusks were recovered from the gravels. These are assumed to be of a similar date to those recovered at The Lea, Denham.

Gravelly clay

2.5.10 This deposit was identified during the borehole survey overlying the earlier fluvial gravels. The top of this unit was noted at between 0.45 m bgl (32.29 m OD) in WA-01 to 1.69 m bgl (30.11 m OD) in WA-04.

2.5.11 The Gravelly Clays are composed mainly of dark brown (oxidised) to greyish brown gravelly clay to clayey gravel, in places with the addition of medium to coarse sand. The sand and gravel are a distinctly differ in lithology and sorting compared to the earlier Fluvial Gravel. The relatively sharp contact boundary between these units implies some erosion and/or a hiatus in deposition. The date of the gravelly clay unit is unknown.

Palaeochannel

2.5.12 A possible palaeochannel incising into the fluvial gravels was initially identified as an area of high conductivity during the EMI survey. The subsequent borehole survey supported by the results of the deposit modelling have confirmed its presence. The continuation of this channel was recorded in Trench 1 during archaeological evaluation (Wessex Archaeology 2016a). The channel is cut into the underlying Pleistocene fluvial sand and gravel and gravely clay and is therefore considered likely to have formed either at the end of the Pleistocene or in the early Holocene and was subsequently infilled with Holocene alluvial sediments.

2.5.13 Borehole WA-04 recorded the full sequence of Holocene alluvium and the infill of the palaeochannel (**Figure 4**). The alluvium shows a fining upwards through the sequence, from fine sandy clays to silty clays, indicating formation within the channel and transition from a higher energy (sand) to lower energy (clays). The uppermost part of the alluvium was organic, potentially formed in stagnant water or ponding water when the channel was abandoned and overgrown by vegetation.

2.5.14 Although no peat is recorded at the site by the BGS GeoIndex, peat was present as a fill of a palaeochannel recorded in evaluation Trench 1 (Wessex Archaeology 2016a). The peat was recorded at between 0.47m and 0.64 m bgl and was recorded as covering an organic silt, both producing Mesolithic flint tools. The borehole survey (Wessex Archaeology 2024a) did not confirmed presence of peat but in borehole WA-04 the alluvium was recorded as a darker gravelly clay. The dark colour may be indicative of a slightly higher organic component. It is possible that borehole WA-04 targeted a different sequence of deposits within the channel, where water flow was active, whereas Trench 1 was positioned at the edge of the channel (the peat and organic alluvium was only c. 0.50 m thick and encountered directly oxidised alluvium and topsoil), where a marginal and/or backwater location allowed the formation and subsequent preservation of peat.

2.5.15 Organic silts with a basal band of sub-rounded flint pebbles and patches of tufa were recorded below the peat at 0.64 m bgl at the edge of the palaeochannel in Trench 1. It has been suggested that these sediments were redeposited (erosional) or at least disturbed, and the basal flints suggest a period of a higher energy water flow consistent with a period of bank erosion. This layer produced a blade core, a blade/blade-like flake and a bladelet

which are likely to be of Mesolithic date. The top of the key archaeological layers was recorded at c. 0.45 m bgl (Wessex Archaeology 2016).

2.5.16 The deposits within the palaeochannel therefore have a high archaeological and paleoenvironmental potential as they are likely to preserve a range of proxy indicators of past environmental conditions during the Mesolithic period associated with human activity.

2.6 Archaeological Background

Palaeolithic and Mesolithic (970,000–4000 BC)

2.6.1 Evidence for early prehistoric activity has been recorded in the gravel and brickearth terraces of the River Colne valley with a number of nationally significant Late Glacial or Upper Palaeolithic and Mesolithic sites recorded (Lacaille 1963; Lewis et al 1992; Wessex Archaeology 2005; 2008; 2009; 2014).

2.6.2 Investigations have suggested that the Late Glacial landscape in the Colne valley comprised a braided river channel, with gravel islands and banks on which the development of mature soils, necessary to support vegetation, has been recorded. Medieval and post-medieval alluvial deposits are known to have sealed the palaeochannels associated with the Late Glacial river. Two gravel islands were identified within the Denham Quarry; the Rusholt Brook island and the River Colne island. Palaeochannels associated with the Alder Bourne, Rusholt Brook and the River Colne have also been recorded during the previous investigations.

2.6.3 Previous archaeological investigations within Denham Quarry have located six in situ flint scatters suggesting activity from the Early Post-glacial and Mesolithic periods. Scatter 1, in the eastern part of the site, comprised an assemblage belonging to the Long Blade technology, including blades, flakes and a Long Blade core. The scatter was post-dated by a peat deposit, radiocarbon dated to 9,300 BP (Wessex Archaeology 2005).

2.6.4 Further late glacial material has also been retrieved from Scatter 2, which has been radiocarbon dated to the Early Mesolithic period. Assemblages comprising Mesolithic flint tools were recovered from Scatters 2, 3, 5 and 6 (Wessex Archaeology 2008; 2009). The scatters had been disturbed in antiquity, the result of both ploughing and bioturbation, and only vestigial basal components of the in situ flint scatters were preserved.

2.6.5 The most significant site in the surrounding area was located at Three Ways Wharf, east of the Site on the opposite bank of the River Colne. Here an undisturbed sequence of sediments was revealed, which contained four artefact scatters with faunal material, the oldest of which was dated to c.10,500 BP and was associated with the Long Blade industry.

Neolithic and Bronze Age (4000–700 BC)

2.6.6 There is some evidence for Neolithic and Bronze Age activity in the vicinity of the Site as a Neolithic axe head was found just to the south-west found to the south-east of the Site and recovered during test-pitting investigations within the quarry (Wessex Archaeology 2005). A number of Late Bronze Age features indicative of possible settlement were also identified, cut into the ‘brickearth’ adjacent to the Rusholt Brook (Wessex Archaeology 2005; 2009).

Iron Age and Romano-British (700 BC–AD 410)

2.6.7 To the north-east of the Site along the approximate line of the A4020 lies the possible route of a Roman road. Also, a small number of ditches containing Late Iron Age and Romano-

British pottery were recorded during the previous investigations in the quarry (Wessex Archaeology 2009).

Saxon and medieval (AD 410 – 1500)

2.6.8 During the evaluation within the quarry an irregular, possibly natural, hollow was located within which some early medieval pottery, burnt flint and charcoal was found (Wessex Archaeology 2007). Medieval pottery and roof tile, often un-stratified, has also been recovered during other phases of the works (Wessex Archaeology 2021).

Post-medieval and modern (AD 1500 – present day)

2.6.9 Several post-medieval field boundaries were recorded during the evaluation of Preferred Area 4 (Wessex Archaeology 2007), the strip and map investigation within extraction phases 3A and 4B (Wessex Archaeology 2010) and within extraction phases 1 and 5 (Wessex Archaeology 2009), to the south of the Site, these are likely to date from the late medieval period onwards.

2.6.10 An 18th-century copy of a late 16th-century map suggests that the Site comprises several pasture fields with an access track forming the northern boundary of the Site. An 18th century map indicates that the Site comprises portions of four fields, demarcated by north-east – south-west aligned hedgerows. The northern portion of the access track is no longer extant, though the eastern section, now Knighton-Way Lane is still depicted (Wessex Archaeology 2021).

3 AIMS AND OBJECTIVES

3.1 General Aims

3.1.1 The aims and objectives of the evaluation are in accordance with those outlined within the WSI (Wessex Archaeology 2024b). The overarching aim of the proposed works was to investigate in detail the geoarchaeological resource associated with a palaeochannel that was identified during previous investigations at the Site (Wessex Archaeology 2016 and 2024a).

3.1.2 Specific identified aims (or purpose) were to:

- record and characterise the deposits within the palaeochannel and the relationship to associated deposits containing Mesolithic artefacts;
- establish the presence/absence of archaeology within or associated with the palaeochannel;
- recover suitable samples for paleoenvironmental assessment and analysis;
- date the deposits within the channel; and
- provide information to inform the scope and nature of any further archaeological and/or geoarchaeological works required to offset development impacts.

3.2 General objectives

3.2.1 In order to achieve the above aims, the overarching objectives of the evaluation were to:

- excavate and investigate a single 50 m long stepped geoarchaeological trench excavated across the palaeochannel;

- interpret the stratigraphy within the palaeochannel and relationship to possible artefact-bearing deposits;
- identify deposits containing archaeological evidence;
- obtain suitable samples for palaeoenvironmental assessment, analysis and scientific dating; and
- report on the results and make suitable recommendations for assessment and dating of retained samples, where appropriate

4 FIELDWORK METHODS

4.1 Introduction

4.1.1 All works was undertaken in accordance with the detailed methods set out within this WSI (Wessex Archaeology 2024b). To avoid disturbance of the test pits, the geoarchaeological trench was divided into three segments, and the investigations comprised (**Figure 3**):

- 24.5 m long, 3.5 m wide and c. 1.90 m deep north-west part of the trench, labelled as TR1.1;
- 3.6 m long, 1.8 m wide and 1.0 m deep section between Test Pit 1 and Test Pit 4, labelled as TR1.2; and
- 11.83 m long, 3.5 m wide and c. 1.20 m deep south-east part of the trench, labelled as TR1.3

4.2 Setting out of interventions

4.2.1 All interventions were set out using GNSS in the positions shown in **Figure 3**. Locations were tied into the Ordnance Survey (OS) National Grid and Ordnance Datum (OD) (Newlyn), as defined by OSGM15 and OSTN15.

4.3 Service location and other constraints

4.3.1 Prior to fieldwork commencing the client provided information regarding the presence of any below/above-ground services, and any ecological, environmental or other constraints.

4.3.2 Before excavation began the evaluation area was walked over and visually inspected to identify, where possible, the location of any below/above-ground services. All intervention locations were scanned before and during excavation with a Cable Avoidance Tool (CAT) to verify the absence of any live underground services.

4.4 Excavation methods

4.4.1 A single trench divided into three segments was machine excavated perpendicular to the long axis of the palaeochannel and dug to the channels base. The trench required stepping to the maximum depth of 2.0 m in the central part of TR1.1 to investigate the deeper sequence within the channel. Due to high water table level the entire width of the palaeochannel could not be excavated for safety reasons and two deeper sondages (TR1.1a and TR1.1b) were excavated to characterise the channel fills.

4.4.2 Excavation was be conducted under the supervision of suitably qualified members of Wessex Archaeology's geoarchaeological team.

4.4.3 The trench was excavated using a 13 tonne 360º mechanical excavator with a toothless bucket. Machine excavation was under the constant supervision and instruction of a

geoarchaeological specialist experienced in interpreting Quaternary sediments and identifying lithic artefacts, who recorded and numbered the sequence of sedimentary units as excavation progressed following standard descriptive practices. The textural characteristics (grain-size, consolidation, colour, material and sedimentary structures) of sedimentary units were recorded, and the shape and nature of their lithostratigraphic contacts (dip, conformity and overall geometry).

4.4.4 Machine excavation proceeded in level spits of approximately 50 mm, respecting the interface between sedimentary units. The first step was machined to the level of the buried soil, whereas the second step to the top of the fluvial gravels following outline of the previous evaluation Trench 1 (Wessex Archaeology 2016).

4.4.5 Three sections of the long section of the geoarchaeological trench were hand cleaned prior recording.

4.4.6 The deposits were assessed for the presence of artefacts, large vertebrate remains and wood fragments. The depth of and lithostratigraphic context of all archaeological material was recorded, as a minimum and consideration was given to the suitability of any sediment units for luminescence dating. Samples for luminescence were taken in accordance Historic England's *Luminescence Dating: Guidelines on using luminescence dating in archaeology* (English Heritage 2008).

Recording

4.4.7 The trench was recorded in the form of a measured sketch sections of at least one face and accompanying geoarchaeological descriptions and interpretations.

4.4.8 Descriptions included information such as:

- *Depth*
- *Texture*
- *Composition*
- *Colour*
- *Inclusions*
- *Structure*
- *Shape and nature of contacts between deposits*

4.4.9 Interpretations included, where possible, probable depositional environments and formation processes.

4.4.10 All samples were individually numbered. The location, size, stratigraphic context, purpose and whether retained or processed on-site were recorded.

4.4.11 A full photographic record was made using digital cameras equipped with an image sensor of not less than 10 megapixels. This recorded both the detail and the general context of the principal lithostratigraphic features of the sediments, and the evaluation areas as a whole. Digital images are subject to managed quality control and curation processes which will embed appropriate metadata within the image and ensure long term accessibility of the image set. Photographs were taken of all areas, including access routes, to provide a record of conditions prior to and on completion of the evaluation.

Reinstatement

4.4.12 The trench was immediately backfilled on completion using excavated materials in the order in which they were excavated. No further reinstatement was conducted.

4.5 Survey

4.5.1 The real time kinematic (RTK) survey of all as dug intervention was conducted using a Leica GNSS connected to Leica's SmartNet service. All survey data was recorded in OS National Grid coordinates and heights above OD (Newlyn), as defined by OSGM15 and OSTN15, with a three-dimensional accuracy of at least 50 mm.

4.6 Monitoring

4.6.1 The client informed the Archaeological Officer for Buckinghamshire Council of the start of the evaluation.

5 POST-EXCAVATION METHODS

5.1 Stratigraphic evidence

5.1.1 All written and drawn records from the evaluation have been collated, checked for consistency. Where possible, probable depositional environments, formation processes and chronostratigraphic context have been considered. A written description was made of all geoarchaeological deposits, ordered by intervention and lithostratigraphy. Details of all lithostratigraphic contexts are provided in tables in **Appendix 1**.

5.1.2 The results of the geoarchaeological mitigation were supplemented by the stratigraphic logs arising from previous borehole survey supplied by the current archaeological test pits and Trench 1 (Wessex Archaeology 2016; 2024b; 2024c). All logs and interventions for the deposit model are presented in **Appendix 2**.

5.2 Deposit modelling

5.2.1 Deposit modelling identifies the range of Quaternary deposits that may be present in a defined area and maps the lateral extent and depth. Recorded section within the geoarchaeological trench, together with borehole survey (Wessex Archaeology 2024a) and archaeological test pits (Wessex Archaeology 2024c) have been used to provide an updated deposit model. In total six points along the north-east facing section of the trench were used and labelled as follows: TR1.3, TR1.1a, T.R1.1b, TR1.1c. In total 23 logs were used, and all are listed in **Appendix 2**.

5.2.2 The deposit modelling has been conducted in accordance with *Deposit modeling and archaeology: guidance for mapping buried deposits* (Historic England 2020).

5.2.3 All available data points were entered into industry standard geological utilities software (Rockworks™ 23). Each stratigraphic unit was given a colour and pattern allowing cross correlation and grouping of the different sedimentary units. The grouping of these deposits is based on lithological descriptions, which define distinct depositional environments referred to as 'stratigraphic units' (e.g., Bedrock, Alluvium and Made Ground).

5.2.4 Outputs include two-dimensional stratigraphic profiles ('transects') of selected interventions, generated using RockWorks 23™ and are presented in **Figure 6** and **Figure 7**.

5.3 Palaeoenvironmental, sedimentological and scientific dating samples

5.3.1 A program of palaeoenvironmental sampling was designed to recover the full range of environmental proxies from the organic deposits associated with the palaeochannel, undertaken following Wessex Archaeology's in-house guidance, which adheres to the principles outlined in Historic England's guidance (English Heritage 2011 and Historic England 2015).

5.3.1 Samples were obtained during the evaluation and are summarised in **Table 4** (**Section 6.4**) and will be used in accordance with the staged approach outlined in **Table 1**. Recommendations for Stage 3 sample assessment of retained samples are made in **Section 8.2**.

6 RESULTS

6.1 Introduction

6.1.1 A 50 m long and stepped Trench 1 divided into three segments was excavated as outlined in **Section 4**, followed by the programme of geoarchaeological deposit modelling. The updated deposit model integrated results of the mitigation with the results obtained during the archaeological test pitting (Wessex Archaeology 2024c) and existing deposit model for the Site (Wessex Archaeology 2024a).

6.2 Stratigraphic sequence

6.2.1 The full sequence of geological deposits recorded during the mitigation and forming the basis of the deposit modelling, comprises:

- Topsoil (Recent)
- Made Ground (Recent)
- Alluvium I (Holocene)
- Buried Soil (Holocene)
- Alluvium II (Holocene)
- Calcareous Alluvial (Early Holocene)
- Sandy Calcareous Alluvium (Early Holocene)
- Organic Gravels (Early Holocene)
- Oxidised Channel Fill (?Late Pleistocene/Early Holocene)
- Gravelly Channel Fill (?Late Pleistocene/Early Holocene)
- Grey Channel Fill (?Late Pleistocene/Early Holocene)
- Dark Grey Channel Fill (?Late Pleistocene/Early Holocene)
- Basal channel Fill (?Late Pleistocene/Early Holocene)

- Clayey Gravel (Pleistocene)
- Fluvial Gravels (Pleistocene)

6.2.2 The specific lithologies and lithostratigraphic succession encountered in each intervention are outlined in **Appendix 1** and their stratigraphic succession recorded in Trench 1 illustrated in **Figure 6** (Transect 1). The mitigation results in their wider geoarchaeological context of the Site are illustrated in **Figure 7** (Transect 2).

6.2.3 The deposits, their lithostratigraphic relationship and their distribution are described below.

Fluvial Gravels

6.2.4 The lowermost unit recorded at the Site are fluvial gravels consisting of loose, clast supported gravel that predominated in the south-east end of Trench 1. Matrix supported gravel was more common towards north. The gravel was poorly to moderately sorted, subrounded to subangular, with less common rounded and angular clasts. Fine to coarse – sized flint pebbles predominate with only occasional subrounded cobbles recorded. Very few rounded quartzite pebbles were noted throughout.

6.2.5 The Fluvial Gravels were encountered at between 0.90 m (31.3 m OD) to 1.10 m bgl (below ground level) (31.0 m OD) and were not bottomed in the mitigation trench. Based on the previous borehole survey the estimated thickness of this unit range between 2.5 m (WA04 – below the channel) and up to 5.4 m in borehole WA-06 (**Figures 6** and **7**).

Clayey Gravels

6.2.6 Recorded at the base in the centre of Trench 1 and mapped below the fills of the palaeochannel (**Figure 7**), this unit consisted of light grey to yellowish grey clayey/silty sand with poorly sorted flint gravel. The fine matrix was slight calcareous. The clasts were mainly subangular to subrounded, fine to coarse – sized flint pebbles.

6.2.7 The top of this unit was recorded at 0.92 m bgl (31.0 m OD) in TP1 and c. 1.8 m bgl (29.7 m OD) below the palaeochannel. The base of this unit was not reached in the trench. The clayey gravels likely correspond with the gravelly clay unit recorded during the borehole survey (Wessex Archaeology 2024a) where the thickness was ranged from 0.30 m to around 1.0 m (**Figure 4**).

6.2.8 Based on the stratigraphic relationship observed at the Site, this unit post-dates the fluvial gravels and its formation pre-date accumulation of early Holocene sediments.

Palaeochannel fill

<u>Yellow sandy clayey silt</u>

6.2.9 The lowermost fill of the palaeochannel consisted of medium brownish yellow, slightly sandy clayey silt with occasional subrounded to subangular, fine to medium – sized flint pebbles. A sharp contact boundary with the overlying context was recorded at c. 1.80 m bgl (31.0 m OD), and the average thickness was c. 0.30 m (**Figures 6** and **10**).

<u>Dark Grey clayey silt</u>

6.2.10 Covering the lowermost fill of the channel was dark grey clayey silt with occasional vertical channels after rooting and dark plant detritus. The top of the unit was encountered at c. 1.60 m bgl (c. 30.3 m OD) and its thickness was c. 0.20 m (**Figures 6** and **10**).

Grey clay silt

6.2.11 Overlying the dark grey unit was minerogenic grey clay/silt with very few, fine to medium - sized flint pebbles and few black plant detritus. Vertical channels after rooting and fine root fragments indicate post-depositional bioturbation. This unit was recorded within the palaeochannel between 1.44 to 1.60 m bgl (c. 30.6 m OD) (**Figures 7**, **10** and **11**).

Grey gravelly sandy clay

6.2.12 This unit was recorded butting the south-east edge of the palaeochannel, overlying the minerogenic lower fill. This unit comprised of grey sandy clay matrix with randomly distributed and poorly sorted flint pebbles. The clasts were poorly sorted, subangular to subrounded, fine to coarse – sized flint pebbles. The top of this unit was recorded at around 1.30 m bgl (c. 30.7 m OD) and the thickness was approximately 0.14m (**Figure 6**, **9** and **10**).

Oxidised slightly gravelly clayey silt

6.2.13 Recorded as the uppermost fill of the palaeochannel, slightly extending beyond the cut of the feature. This deposit consisted of clay silt with occasional, subangular to subrounded, fine to medium – sized flint pebbles. The yellowish brown colour of this deposit is an effect of post-depositional oxidation due to fluctuations in the water table level.

6.2.14 This unit was recorded at around 1.0 m bgl (30.8 m OD) with a maximum thickness up to 0.40 m. This deposit was covered by an organic gravel (mapped between TP1 and the southern edge of the palaeochannel) and Alluvium II (**Figure 6**).

Organic Gravel

6.2.15 This deposit was recorded in Test Pit 1 extending towards the palaeochannel and often infilled the uneven surface of the underlying Clayey Gravel (**Figure 11**). This deposit was weakly cohesive, black matrix supported gravel. The gravel was poorly sorted, subangular to rounded poorly sorted, fine to coarse – sized flint pebbles embedded in an organic silt. Occasional charcoal fragments were recorded and sampled. The upper boundary of this unit was at 0.76 m bgl, and the average thickness was c. 0.20 m (**Figure 6**).

Sandy Calcareous Alluvium

6.2.16 This unit was recorded in south-east part of Trench 1 sealing the Fluvial Gravels. This unit was a firm pale yellowish brown sandy silt. The sand component was very fine to fine creating lenses of well sorted sand. Pockets of grey silty with white secondary calcium mottling was recorded throughout (**Figures 6** and **12**).

6.2.17 The upper boundary of this unit was recorded at average depth of 0.70 m bgl (31.5 m OD), and the thickness was c. 0.14 m. The extend of this unit is unknown as was not recorded during the borehole survey.

Calcareous Alluvium

6.2.18 The sandy calcareous deposit graded into a pale greyish brown, slightly sandy silt with rare subrounded fine – sized flint gravel. Secondary calcite mottling/accumulations were record within this unit.

6.2.19 The top of this unit was recorded at between 0.50 m to 0.84 m bgl with the thickness up to 0.20 m. The calcareous alluvium is clearly visible in the south-west part of Trench 1, TP1, TP2, TP 3 and TP 4. Towards the north-east this, beyond Test Pit 1, the unit was not identified (**Figures 6**, **12** and **13**).

Alluvium II

6.2.20 A sharp contact boundary separated Alluvium II from underlying calcareous alluvium in the south-east part of the trench and all hand dug test pits. Alluvium II was recorded as a layer directly under the Buried Soil, separated by a gradual to clear sub-horizontal boundary. The interface with the palaeochannel fills were more gradual.

6.2.21 Alluvium II consisted of dark greyish brown to brownish grey (slightly olive in places) silty clay with occasional, rounded to subangular, fine to coarse – sized flint pebbles. The alluvium between the buried soil and palaeochannel fills was siltier and greyer in hue which could be results of its deposition above the former channel, likely create wetter/marshy ground and a slightly higher organic content. Occasional iron oxide mottling was recorded throughout this alluvium. In Test Pit 1, the alluvium contained reworked calcareous alluvium in its upper parts (**Figure 8**).

6.2.22 The changes in the colour recorded along the section of the trench could be post-depositional (bioturbation, oxidation, leaching) rather than depositional and associated with changing hydrological conditions across the Site.

6.2.23 The top of this alluvium was recorded at 0.50 to 0.70 m bgl (31.7 to 30.7 m OD) (**Figure 6**). The lowest elevations are associated mainly with the extent of the palaeochannel, with a thickness ranging from 0.10 to 0.35 m.

Buried Soil

6.2.24 This deposit was recorded across the entire length of the north-west part of the Trench (section TR1.1), TP1 and TP2. The buried soil was absent in the southern parts of Trench 1 (section TR1.2 and TR1.3), TP 3 and TP 4 and the south-east extend of the, where this layer is thinning out, was not recorded during the mitigation (**Figure 8** and **12**). The extend of the buried soil is currently unknown as it was not recorded during the borehole survey (Wessex Archaeology 2024a).

6.2.25 This deposit was recorded as a very dark brown clayey silt with granular to crumble structure indicating biological reworking. Rare, subangular to subrounded, fine to medium – sized flint pebbles were notes. Fine roots and mineralised, humified plant material was noted, including fragments of wood. No archaeological material was recovered from this deposit within Trench 1.

6.2.26 The surface of the buried soil was recorded between 0.50 to 0.58 m bgl (31.1 to 31.3 m OD) (**Figure 6**) and ranged in thickness from 0.10 to 0.20m.

Alluvium I

6.2.27 Recorded along Trench 1 and all hand dug test pits as sealing the buried soil. It consisted of dark greyish brown, silty clay with occasional reddish to orange mottling and very rare fragments of red CBM (possibly reworked from above context). Very rare fine channels were often filled with dark silt (?decomposed plants).

6.2.28 At the interface between alluvium, I and the buried soil a 20 mm thick lens of black clay was recorded. The black clay was not always visible along the trench, and often was reworked/bioturbated by roots. Where the buried soil was not present, the black clay was clearly recorded (TP4) at the interface between Alluvium II and Alluvium I (**Figure 13**).

6.2.29 The upper surface of the unit was encountered at between 0.30 to 0.58 m bgl (31.0 m to 31.8 m OD). As in case Alluvium II, the lower elevation highs are present in the area of the palaeochannel.

Made Ground

6.2.30 This deposit of greyish brown to dark brown with silty clay to slightly sandy clayey silt covered Alluvium I in all interventions. Occasional flint pebbles and very rare fragments of red CBM, white ceramic, and very few metal fragments were recorded. Very rare fragments of white chalk/tufa incorporated in this deposit were noted throughout.

6.2.31 Made Ground was recorded at c. 0.38 m bgl (c. 31.6 m OD) and varied in thickness from 0.20 to 0.25 m.

Topsoil

6.2.32 Developed on the top of the made ground and recorded as c. 0.30m a very dark greyish brown, firm clayey silt with common fine vertical rooting and very rare fragments of white ceramics and stoneware (Victorian).

6.3 Archaeology

6.3.1 A single pit (109) was recorded at the interface between Test Pit 1 and Trench 1 (**Figure 16**). The feature was circular in plan, with moderately straight symmetrical sides and rounded base, c. 0.50 m in diameter and 0.38 m in depth. Pit 109 was filled with a firm and homogenous, dark grey silty clay (context 110).

6.3.2 The pit was cut into the organic gravels, alluvium II and buried soil, and thus is later than their formation but can be contemporary with the buried soil. The fill was covered by alluvium I, indicating that this feature was out of use before accumulation of the later alluvium.

6.3.3 No archaeological material was recovered from either pit 109 or deposits within Trench 1. Diagnostically Mesolithic flints were however recovered from the Buried Soil and Alluvium II during the test pitting (Wessex Archaeology 2024c).

6.4 Finds evidence

Introduction

6.4.0 A very small assemblage of finds, weighing 199 g, was recovered from a single made ground deposit (102) in trench 1. The finds are all post-medieval to modern in date and where appropriate, they have been cleaned and quantified by material type. The data have been recorded using a digital database, which forms part of the project archive. The material is in a generally good to slightly abraded condition.

Pottery

6.4.1 Pottery is outlined below by common name, with the associated Museum of London Archaeology (MOLA) ware code provided in brackets.

6.4.2 Twelve sherds were retained (153 g), they comprise eleven fragments of modern date and one sherd of post-medieval pottery. The single post-medieval piece is a small and worn Metropolitan slipware body sherd (METS; 2 g), reinforcing the likelihood that it is residual within the made ground deposit. The modern component is made up of one fragment of a blue stoneware flagon displaying the letters ‘SONS I‘ and ‘UBS’ (BLUE; 40 g); one sherd of flowerpot (MISC; 13 g); and nine fragments of a refined whiteware jar (REFW; 98 g).

Ceramic Building Material

6.4.3 1.3.1 The four fragments of ceramic building material (46 g) all occur in a hard, oxidised red to reddish yellow fabric. Two are brick fragments (33 g) and two are flat roof tile fragments (13 g). The pieces are largely undiagnostic and can be said to be post-medieval or later in date.

6.5 Palaeoenvironmental, sedimentological and scientific dating samples

6.5.1 The mitigation allowed the geoarchaeological potential of the deposits underlying, infilling and sealing the palaeochannel to be assessed and the significance of the geoarchaeological resource to be considered. The recorded Quaternary deposits have moderate to high archaeological potential and can be associated with Upper Palaeolithic and Mesolithic activity at the Site that is well known in the Colne Valley (**see Section 2.6**).

6.5.2 The Quaternary deposits have a high potential to contain paleoenvironmental evidence, principally mollusc, mineralised and waterlogged plant remains, charcoal and microfossils (e.g., pollen) that could provide multi proxy data on past vegetation, landscape and human-environment relationships at the Site and which is potentially contemporary with archaeological evidence for human activity.

6.5.3 All key stratigraphic units were sampled for potential further palaeoenvironmental assessment, recovery of micro-finds (flint debitage) and scientific dating (**Figures 15**, **16**, **17** and **18**). The table below summarise all the obtained samples and their rationale:

Table 4 Summary of environmental samples

Sample	Context	Stratigraphic Unit	Type of sample	Rationale
1	101-104	Topsoil, Made Ground, Alluvium I, Buried Soil	Monolith	Taken for further subsampling, e.g., pollen, diatoms, loss on ignition (LOI), particle size analysis (PS) of the Holocene sequence
2	104-118	Buried Soil, Alluvium II, fills of the palaeochannel	Monolith	Taken for further subsampling, e.g., pollen, loss on ignition (LOI), particle size analysis (PS) of the Holocene sequence and possible Late Pleistocene palaeochannel fills
3	115	Alluvium II	Column 10	Taken for mollusc and waterlogged plant remains
4	116	Oxidised Channel Fill	Column 10	Taken for mollusc and waterlogged plant remains
5	116	Oxidised Channel Fill	Column 10	Taken for mollusc and waterlogged plant remains
6	118	Grey Channel Fill	Column 10	Taken for mollusc and waterlogged plant remains
7	118	Grey Channel Fill	Column 10	Taken for mollusc and waterlogged plant remains

Sample	Context	Stratigraphic Unit	Type of sample	Rationale
8	118	Grey Channel Fill	Column 10	Taken for mollusc and waterlogged plant remains
9	119	Dark Grey Channel Fill	Column 10	Taken for mollusc and waterlogged plan remains
11	111	Organic Gravel	10 l Bulk	Taken for paleoenvironmental assessment. Rich in charcoal – assessment for C14 dating
13	121	Lower Fill of palaeochannel	OSL	Luminescence dating
14	121	Lower Fill of palaeochannel	OSL	Luminescence dating
15	103 and 104	Alluvium I and Buried Soil	Kubiena	Soil micromorphology
16	104 and 105	Buried Soil and Alluvium II	Kubiena	Soil micromorphology
17	104 and 105	Buried Soil and Alluvium II	Kubiena	Soil micromorphology
18	113	Sandy Calcareous Alluvium	OSL	Luminescence dating
19	106	Alluvium II	OSL	Luminescence dating
20	107	Calcareous Alluvium	OSL	Luminescence dating
21	102	Made Ground	Column 27	Taken for mollusc
22	103	Alluvium I	Column 27	Taken for mollusc
23	104	Buried Soil	Column 27	Taken for mollusc
25	106	Alluvium II	Column 27	Taken for mollusc
26	107	Calcareous Alluvium	Column 27	Taken for mollusc and ostracods
28	104	Buried Soil (top)	10l bulk	Taken for paleoenvironmental assessment and finds recovery.
29	104	Buried soil (base)	10 bulk	Taken for paleoenvironmental assessment and finds recovery.
30	110	Fill of pit 109	10l bulk	Taken for paleoenvironmental assessment and finds recovery.

Sample	Context	Stratigraphic Unit	Type of sample	Rationale
31	102-107	Made Ground, Alluvium I, Buried Soil, Alluvium II, Calcareous Alluvium	Monolith	Taken for further subsamples, i.e. pollen, loss on ignition (LOI), particle size analysis (PS) of the Holocene sequence
32	113	Sandy Calcareous Alluvium	OSL	Luminescence dating
34	103	Alluvium I	Column 33	Taken for mollusc
35	106	Alluvium II	Column 33	Taken for mollusc
36	106	Alluvium II	Column 33	Taken for mollusc
37	107	Calcareous Alluvium	Column 33	Taken for mollusc and ostracods
38	107	Calcareous Alluvium	Column 33	Taken for mollusc and ostracods
39	113	Sandy Calcareous Alluvium	Column 33	Taken for mollusc and ostracods

7 DISCUSSION

7.1 Introduction

7.1.1 The mitigation has successfully recorded and characterised the Quaternary deposits underlying, infilling and overlying a palaeochannel identified during early archaeological surveys, and closely associated with Mesolithic activity. These finds are currently being assessed and will be reported on in the accompany archaeological test pitting report (Wessex Archaeology 2024c). The geoarchaeological mitigation together with results of the archaeological test pitting in combination with the previous deposit modelling provided a good coverage for the Site, and the recorded Quaternary sequence fits well with deposits recognised in the wider area of New Denham quarry (Wessex Archaeoloy 2003; 2005; 2009 and 2016).

7.1.2 A suite of samples has been retained from Trench 1 and recommendations for further woks on these samples are provided in **Section 8.2**.

7.2 Sedimentary sequences and depositional environments

7.2.1 The base of the Quaternary sequence recorded at the Site is represented by fluvial gravels and that fit well with the result of the borehole survey (**Figure 6**). A palaeochannel incised into this fluvial deposit was filled with series of minerogenic alluvial fills, that potentially could be dated between Late Pleistocene to Early Holocene. Two episodes of overbank alluvial deposit, consisted of calcareous and minerogenic silty clays, sealed the Late Pleistocene sediments and channel. A hiatus in sedimentation led to soil formation, possibly associated with Early Holocene human activity.

Pleistocene

7.2.2 The fluvial sands and gravels recorded at the base of the trench formed as channel bedload during high energy flows characteristic for a braided river system in periglacial environment. In general, the surface of these deposits was recorded at elevations between 31.0 m to 31.3 m OD, creating a higher area in the landscape dissected by later channels. Tentatively the gravels were interpreted as the Colne Street Member Gravel dated to the Late Devensian, 24-11.7 Kya of Gibbard (1985). All gravels were visually assessed for the presence for Palaeolithic artefacts, but no worked flints or any datable material was recovered during the borehole survey.

7.2.3 The previous borehole survey together with deposit modelling suggested that in places the Pleistocene fluvial gravels were covered by gravels with a higher clay content labelled as gravelly clays and the mitigation works indeed confirmed their presence of clayey gravels that are likely to be equivalent of gravelly clays recorded by the preceding borehole survey (Wessex Archaeology 2024a). This deposit was observed at the base of the geoarchaeological trench and in Test Pit 1 and was mainly mapped close to the edges of the palaeochannel channel and directly below its fills. This unit is likely to be fluvial in origin but may represent later deposition, under relatively lower energy flow. The calcareous component may indicate indicating a possible spring source, reworking of material from the wider catchment, including through slope processes from the bank. The date of the gravelly clay unit is unknown but may be of Late Devensian date.

Late Pleistocene/Early Holocene

7.2.4 The palaeochannel incised into the fluvial gravel, this occurred after deposition of the Colne Street Member, possibly in Late Devensian. The channel was up to 11.46 m wide and a maximum of 1.2 m deep with steep edges (**Figures 6** and **10**).

7.2.5 Channel fills were predominately fine-grained and minerogenic indicating deposition in a slowly moving or stagnant water which would indicate change in sedimentary processes from a periglacial to warmer climate, possibly dating to the late glacial interstadial (Windermere Interstadial 13-11 Ka) or Early Holocene. The basal fills of the channel are coarser and indicate a higher energy deposition, but are succeeded by finer-grained deposition, reflecting lower energy sediment deposition likely occurring in an ameliorating climate. Covering the initial fill was a dark grey fill that could reflect a higher organic content. This layer may have potentially form in low energy, stagnant setting when the channel was abandoned and overgrown by vegetation. The upper two fills are minerogenic with variable content of coarser sediments, suggesting changes in the water regime. The uppermost fill extends beyond the channel, reflecting sedimentation across the wider floodplain, and is oxidised indicating post-depositional change in the water table lever and/or weathering by exposure.

Early Holocene

7.2.6 At the beginning of Holocene (ca. 9.700 BC), the ameliorating climatic brought a stabilisation of the land surface and an end to channel gravel aggradation. The climatic change can be traced at the Site by a sharp change in sedimentation. Covering the Pleistocene sediments was a calcareous alluvium recorded in the south-east part of Trench 1, TP3 and TP4; and Organic Gravels mainly present in Test Pit 1 and southernmost part of Trench 1 (**Figures 11**, **12**, and **13**). The stratigraphic relationship between these sedimentary units and the channel fills is unknown, it is possible that the oxidized alluvial fill is contemporary with the calcareous alluvium, but tufa/secondary calcium inclusion were absent in the channel. The channel could be still active and only partially infilled with the

fine sediments in the Early Holocene period, but further dating and microfossil assessment would be necessary to establish the chronology.

7.2.7 Covering the fluvial gravels was a localised deposit of organic gravel that seems to be preserved only in the area where the gravel is slightly higher compared to the rest of the geoarchaeological trench. The organic content represents later plant growth, colonising the newly exposed gravel surface during the Early Holocene. These organic deposits filled cavities within the underlying gravel and one of these patches contained well-preserved plant detritus and charcoal fragments, possibly associated with human activity nearby (**Figure 13**). The formation of the organic gravel is either contemporary with or later than the final silting of the palaeochannel as these gravels were recorded covering the oxidised alluvial fill (Figure 10).

7.2.8 Directly sealing the fluvial gravels in the south-east part of mitigation trench was a sandy calcareous alluvium grading into calcareous sandy silt alluvium. In general, tufa deposits are left by calcium rich waters and are indicative of presence of a non-tidal, shallow, broad and slow-moving rivers/streams. The most extensive deposition of tufa took place during the early Holocene, with dates of c. 7000-3800 cal. BC commonly cited as the period for optimum tufa deposition (Rosen et al 2019, Brummage 2023). At the Site, calcareous alluvium was recorded as a layer outside the palaeochannel and was absent within this feature. Lenses of tufa were however noted in alluvium II covering organic gravels in Test Pit 1 suggesting their erosion and incorporation into later alluvial sequence. Therefore, the formation of calcareous alluvium likely pre-date or is contemporary with accumulation of the lower alluvial sequence.

7.2.9 The calcareous alluvium, palaeochannel and organic gravels were sealed by alluvium II. The texture of this deposit slightly differs across the Site. Where the alluvium was recorded above the calcareous alluvium, it contained a higher silt content, lenses of reworked calcareous alluvium and post-depositional iron mottling was more noticeable. Above the palaeochannel the alluvium was greyer in hue and clay dominated (context 115).

7.2.10 The presence of a humified peat indicates the formation of semi-terrestrial marshland conditions. The peat has undergone extensive humification and biological reworking leading to formation of the granular/crumble structure and occasional presence of mineralised plant fragments, interpreted as buried soil at the Site. The preservation of this deposit predominately defined by the extend of the palaeochannel as the buried soil is absent towards south-east (**Figures 6** and **12**). The precise date of the soil is unknown at present, but a Mesolithic date is suggested by of diagnostically Mesolithic flint recorded from the buried soil adjacent to the channel suggest. A circular pit cutting alluvium II and partially sealed by the buried soil indicates presence of early Mesolithic activity in the area that potentially could be associated with camp sites and exploring the local resources (**Figure 14**).

7.2.11 The thin black layer of clay was often noticeable at the interface between Buried Soil and alluvium I, and where the buried soil was not recorded, this organic clay was present between alluvium II and alluvium I (**Figure 13**). The back clay could reflect a change into wetter conditions and brackish environment close to a channel. No organic remains were identified within this clay and in places the black clay was mixed with alluvium I as a result of post-depositional bioturbation. Alluvium I was predominantly minerogenic and was deposited as a result of overbank flooding. The post-depositional mottling is indicative of weathering and changing oxidation conditions. No finds were recovered suggesting chronology of this deposit.

Late Holocene

7.2.12 The erosional contact between alluvium I and made ground is suggestive of truncation of the lower deposit by post-medieval/modern activity at the Site. The made ground deposit was consisted along the trench section and contained mixed assemblage of post-medieval and modern pottery sherds and ceramic.

7.3 Geoarchaeological and archaeological context of the Site

7.3.1 The Site is located in the Colne Valley which contains one of the most important concentrations of Terminal Upper Palaeolithic and Mesolithic archaeology in Britain, often in association with deposits of a high palaeoenvironmental potential (Lacaille 1968; Wessex Archaeology 2006; Lewis and Rackham 2011; Jones et al. 2013; Barclay et al 2017; Brummage 2023).

7.3.2 The fluvial gravels beneath the floodplain of the Colne Valley were assigned to the Colney Street Gravel that underlying post-glacial floodplain deposits (Gibbard and Hall 1982; Gibbard 1985, 81-82). At the Site these Late Pleistocene gravels were cut by a channel formed either at the end of the Pleistocene or in the early Holocene and was subsequently infilled with Holocene alluvial sediments, but their earlier date cannot be ruled out at this stage. Channels (and series of gravel islands) with similar sediment sequences associated with former courses of the Colne were investigated c. 600m to the south-west from the Site at Alder Bourne and Rusholt Brook (Wessex Archaeology 2003). Former courses of channels were also recorded within the middle and upper Colne at Riverside Way at Uxbridge, Sanderson`s Road, Packet Boat Lane, Mayfied Farm (Heathcote 1990, MoLAS; 2006, Wessex Archaeology 2006, Cotswold Archaeology 2015, Brummage 2023).

7.3.3 The higher gravelly island and ridges between these palaeochannel were often foci of human activity and numerous prehistoric sites are known in the vicinity of the Site. These include nationally significant sites of Late Glacial and Early Mesolithic date in the Uxbridge area including Three Ways Wharf (Lewis and Rackham 2011, Grant et al 2014), Iver (Lacaille 1963) and Denham (Wessex Archaeology 2003, 2005, 2006, 2016), Cowley Mill Road, Sanderson Road (MoLAS 2006); and in the upper Colne sites at Moor Park south of Rickmansworth (Brummage 2023). The archaeological material on almost all these sites was encountered at the interface between the Late Pleistocene gravels and basal peats. The beginning of peat formation has been dated at around 8340 - 8040 cal. BC at Riverside Way, with peat at New Denham Area 4, closely associated with scatters of Mesolithic material, dated to 8730 - 8370 cal. BC and 8530- 8260 cal. BC (Wessex Archaeology 2014). Consequently, the interface between the fluvial gravels and upper organic layer at the Site may be roughly of the same dates, however a precise scientific dating would be necessary to confirm this chronology.

7.3.4 At the Site, peat directly covering the fluvial gravels was absent and the unit post-dating the gravels was organic gravels with rare plant fragments and occasional charcoal. Similar gravels were recorded at Sanderson`s site (MoLAS 2006) and were associated with the onset of vegetation cover in a warmer climatic condition following the end of the Devensian. It could be suggested that this layer is contemporary with beginning of peat formation within the Colne Valley but the peat itself was possibly truncated by fluvial/alluvial processes associated with the still active channel and preserved locally on the higher gravel's ridge/bar. The organic matrix of the gravel could be the remnant of a peat at the Site. Furthermore, at Riverside Way in Uxbridge, c. 1 km south, charcoal from a layer overlying fluvial gravels was dated to between 7730-7550 cal. BC and at Three Ways Wharf, c. 700 m east, to 9880–9380 cal. BC being associated with Terminal Upper Palaeolithic

archaeology, likely campfires or other anthropogenic activity (Grant et al 2014; Wessex Archaeology 2006).

7.3.5 An alluvial deposit (Alluvium II) sealed the Pleistocene gravels. At Three Ways Wharf, c. 250m to the north-east of the Site, a thin layer of finer alluvium above the gravels was dated to 9810–9450 cal BC. This period is usually associated with the appearance of Long Blade flint assemblage's characteristic of the Terminal Upper Palaeolithic. A Late Glacial Long Blade flint scatter (Scatter 1) was recorded at New Denham in 2005, c. 380 m south-west of the current Site, at the interface of bioturbated gravels and a peat layer (Wessex Archaeology 2005, Fig. 4). It could be suggested that the organic gravels and alluvium II date to this phase.

7.3.6 At the Site, a peaty buried soil was recorded sealing the palaeochannel, alluvium II and the organic gravels. The buried soil may be contemporary with early Mesolithic peat recorded previously at New Denham, dating between 8850 and 7430 cal. BC; broadly similar dates were obtained on peat from Three Ways Wharf from 8640 -8470 cal. BC to 6470-6370 cal. BC (Wessex Archaeology 2005; Grant et al 2014, 7).

7.3.7 Covering the buried soil at the Site was alluvium I with the characteristic thin black clay at the base. Similar sequence is known from the area of New Denham where the black clay was interpreted as gyttja. The gyttja and humic silts over the peats were largely confined to the Colne Brook catchment and were Mesolithic in date (Wessex Archaeology 2005). At Three Ways Wharf the clack clay was dated 5620–5470 cal. BC and was in turn overlain by a fine alluvium dated to 4330–4050 cal. BC. The black clay at New Denham can be attributed to fluctuating water levels (leading to fine overbank alluviation and ponding) and could perhaps contain microcharcoal associated with vegetation clearance as recorded at Uxbridge.

7.3.8 Calcareous alluvium deposits were recorded below and as lenses within alluvium II. This sequence is in contrast with sequence recorded at New Denham along Colne River where the tufaceous deposit could be seen both at the base of the sequence over the gravel and as sealing the peats (Wessex Archaeology 2005). At Three Ways Wharf artefact-bearing sediments were sealed by black humic clay, which, in turn, was overlain in places by a thin calcareous deposit (Grant et al 2014, 4). Also, at sites located at Colne and Alderbourne confluence artefacts were situated in the sandy top part of the basal gravels and in the lower peat while overlying the peat was a shelly calcareous mud with tufa (Lacaille; 1963). The calcareous deposits are likely to waterlain by stream/river but the date of its deposition and its relationship with later layers and the human activity at the Site would need further investigation.

7.3.9 The uppermost deposit sealing the entire sequence contained reworked peat, alluvium and a relatively high quantity of modern debris, including post-medieval ceramics, modern bricks and glass fragments. It can be suggested that the upper part of alluvium I was heavily truncated as is preservation vary across the geoarchaeological trench. Furthermore, it is quite possible that post-medieval and modern activity affected preservation of the Holocene sequence at the Site, thus this sequence was not recorded in the borehole survey further away from the palaeochannel and was localised to the norther corner of the area. The Made Ground deposit has no archaeological and palaeoenvironmental potential

7.4 Geoarchaeological and archaeological potential and significance

7.4.1 The geoarchaeological and archaeological potential of the Holocene deposits is summarised below in **Table 5**, focusing on the potential of deposits to preserve palaeoenvironmental datasets and associated archaeological and ecofacts.

Table 5 Summary of archaeological and palaeoenvironmental potential

Lithostratigraphic unit	Period	Depth m bgl	Archaeological potential	Palaeoenvironmental potential
Channel Fills	Late Pleistocene to Early Holocene	1.00m	Low Likely to represent reworked and redeposited artefacts.	Low to Medium The alluvial fills are likely to contain material that have been reworked and redeposited by fluvial activity. Organic fill context 119 may contain remnants of vegetation overgrowing the channel.
Organic Gravels	Early Holocene	0.76m	Medium to High Contains charcoal fragments that could be associated with Terminal Palaeolithic – Early Mesolithic activity in the area. Radiocarbon dating of the charred material will provide a precise date.	High The plant material recorded in this unit may represent the beginning of Holocene period and remnant of truncated peat deposit. Assessment of plan material can provide information about the Early Holocene landscape and vegetation.
Sandy Calcareous Alluvium and Calcareous Alluvial	Early Holocene	0.80m	Low to Medium At the Site they contained a low number of reworked flint flakes, possibly Mesolithic in date.	Medium to High Good condition for preservation of ostracods and mollusc allowing precise reconstructions of past climates.
Alluvium II	Early Holocene	0.70m	Medium to High At the Site they contained a low number of worked flints.	Low to Medium Contains material washed in, with uncertain source areas and there is a significant chance for material to have been reworked and redeposited.
Buried Soil	Early Holocene	0.58m	High Stabilisation horizon containing worked flints.	High Favourable for preservation of wide range of environmental remains (e.g. wood, pollen and plant macrofossils) and material suitable for radiocarbon dating.
Alluvium I	Early to ?Late Holocene	0.40m	Low Likely to represent reworked and redeposited artefacts.	Low to Medium Contains material washed in, with uncertain source areas and there is a significant chance for material to have been reworked and redeposited.
Charred plant remains ad				

8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

8.1.1 The archaeological and geoarchaeological potential the Site has been evaluated through the investigation, sampling and recording of deposits within the stepped geoarchaeological trench excavated across the palaeochannel and beyond. The results of the geoarchaeological mitigation conformed presence of Holocene sequence underlain by fluvial gravels as previously recorded by Wessex Archaeology (2016 and 2024a).

8.1.2 The principal aim of the geoarchaeological trench was to evaluate fills of the palaeochannel recorded in WA04 (Wessex Archaeology 2024a) and understand the relationship between the channel edge and presence of flint artefacts. The high-water table at the Site prevented full excavation of the palaeochannel but two deep sondages (TR1.1a and TR1.1b) enable characterisation, sampling and interpretation of its fills. Despite the assessment of the channel for archaeological material, no finds were recovered. Based on the stratigraphic relationship with overlying layers, the channels were likely filled by the time of formation Alluvium II and the Buried Soil. The channel could form in Late Pleistocene but filled with sediments accumulated during the transition between Pleistocene and Early Holocene.

8.1.3 The Pleistocene deposit was covered by sequence of Early Holocene deposits. The earliest deposit identified are Organic Gravels mapped at the gravel ridge next to the palaeochannel. The timing of their formation is uncertain, but they likely formed in a warmer Holocene period. The recorded charcoal than would be associated with clearance or campfires indicating human presence at the time of their formation.

8.1.4 A change in climatic condition is marked by the onset of alluviation and formation of Alluvium II. It can be suggested that formation of Calcareous Alluvium preceded formation of Alluvium II as reworked lenses of tuffaceous deposit was recorded within the later layer. The phase of overbank flooding was followed by formation of peaty soil buried. The preservation of peaty soil seems to be localised to the near vicinity of the channel. The archaeological test pitting suggested that worked flints are present in the Buried Soil and Alluvium II. Furthermore, the presence of human activity is suggested by pit 109 cut into Alluvium II. Possibly the area of the former channel was boggy and the higher gravel ridges were more suitable for human activity.

8.1.5 Alluvium I covered the Buried Soil, and Alluvium II. A characteristic band of black clay demarked the formation of the upper alluvium. No archaeological material was however recovered from Alluvium I, but the black clay has high potential to contain charcoal associated with Mesolithic clearance.

8.1.6 The uppermost deposit recorded at the Site was thick Made Ground deposit suggesting truncation of the Holocene sequence. As the key Holocene layers are located within 1.0m below the ground surface, the proposed extension of the quarry will affect the sequence and any archaeological remains within it.

8.2 Recommendations

8.2.1 The evaluation has demonstrated that development proposals will impact the Holocene and Pleistocene deposits that are part of the nationally important Upper Palaeolithic and Mesolithic landscape in the Clone Valley, thus further work is required to mitigate against damage/loss of this resource and/or to formulate a management strategy.

8.2.2 A programme of targeted palaeoenvironmental assessment is recommended on selected samples taken from deposits with high palaeoenvironmental and archaeological potential to provide evidence about changes in the local landscape, vegetation and land management by prehistoric communities (i.e. woodland clearance). The assessment will build upon existing archaeological and environmental data from previous work across New Denham (Wessex Archaeology 2005, 2014). The proposed sampling and rationale are summarised in **Table 6**.

Table 6 Proposed samples for Stage 3 palaeoenvironmental assessment

Proxy	Sample number	Unit	Context	Depth m bgl	No samples	Rationale
Luminescence dating (OSL)	13	Lower fill of palaeochannel	121	0.98m	1	To date the deposit and develop a chronology for the palaeochannel
Luminescence dating (OSL)	32	Sandy Calcareous Alluvium	113	0.60m	1	To date the calcareous alluvium, and develop a chronology for the palaeochannel
Radiocarbon dating	11	Organic Gravel	111	0.90m	1	To date deposit and develop a chronology for the palaeochannel
Radiocarbon dating	9	Dark Grey Channel Fill	119	1.60m	1	To date deposit and develop a chronology for the palaeochannel
Radiocarbon dating	28 and 29	Buried Soil	104	0.58m	2	To date buried soil and associated struck flint
Plant macrofossil and artefacts	28 and 29	Buried Soil (top and base)	104	0.58	2	Assess for preservation of plant macrofossil, micro-debitage and suitable short-lived plant remains for radiocarbon dating
Waterlogged Plant Remains	Column 33	Calcareous Alluvium and Minerogenic alluvium	103, 106, 107, 113	0.32m to 0.74m	6	Assessment preservation and palaeoenvironmental potential of calcareous alluvium
Mollusc	Column 33	Calcareous Alluvium and Minerogenic alluvium	103, 106, 107, 113	0.32m to 0.74m	6	
Waterlogged Plant Remains	Column 10	Palaeochannel fills	116, 118, 119	0.70m to 1.60m	6	Assessment preservation and palaeoenvironmental potential of channel deposits
Mollusc	Column 10	Palaeochannel fills	116, 118, 119	0.70m to 1.60m	6	
Pollen	Monolith 1 and 2, and grab sample from sample 11	Holocene Sequence	101-118, and 111		9	Assess pollen concentrations and preservation and palaeoenvironmental potential for vegetation reconstruction and human activity
Charred plant material and artefacts	30	Fill 110 of Pit 109	0.60		1	Assess plant remains. establish the function of the feature.

8.2.3 Radiocarbon dating and scientific dating in the form of Optically Stimulated Luminescence (OSL) of the selected deposits will enable to set the site in the wider geoarchaeological and archaeological context of Colne Valley, in turn helping to fully evaluate their geoarchaeological potential.

8.2.4 Palaeoenvironmental assessment of the Holocene sequence enable evaluation of the palaeoenvironmental and archaeological potential of these deposits and establish their suitability for further analysis. The suggested recommendations will enable a greater understanding of the geoarchaeological resource present at the Site and allow for mitigation of the impact of the proposed development.

8.2.5 Assessment of the bulk sample taken from the archaeological feature will enable recovered of any archaeological material such as micro-debitage, or charred plant material that will assist in dating of the feature and inform about its potential function.

9 ARCHIVE STORAGE AND CURATION

9.1 Museum

9.1.1 The archive resulting from the evaluation is currently held at the offices of Wessex Archaeology in Salisbury. Discover Bucks Museum has agreed in principle to accept the archive on completion of the project, under the accession code **AYBCM:2024.32**. Deposition of any finds with the museum will only be conducted with the full written agreement of the landowner to transfer title of all finds to the museum.

9.2 Preparation of archive

Physical archive

9.2.1 The archive, which includes paper records, graphics, artefacts and ecofacts, will be prepared following the standard conditions for the acceptance of excavated archaeological material by Discover Bucks Museum, and in general following nationally recommended guidelines (Brown 2011; CIfA 2020; SMA 1995).

9.2.2 All archive elements are marked with the **site/accession code**, and a full index will be prepared.

Digital archive

9.2.3 The digital archive generated by the project will be deposited with a Trusted Digital Repository, in this instance the Archaeology Data Service (ADS), to ensure its long-term curation. Digital data will be prepared following ADS guidelines (ADS 2013 and online guidance) and accompanied by metadata.

9.3 Selection strategy

9.3.1 It is widely accepted that not all the records and materials (artefacts and palaeoenvironmental data) collected or created during the course of an archaeological project require preservation in perpetuity. These records and materials will be subject to selection in order to establish what will be retained for long-term curation, with the aim of ensuring that all elements selected to be retained are appropriate to establish the significance of the project and support future research, outreach, engagement, display and learning activities, i.e. the retained archive should fulfil the requirements of both future researchers and the receiving Museum.

9.3.2 The selection strategy, which details the project-specific selection process, is underpinned by national guidelines on selection and retention (Brown 2011, section 4, CIfA 2022) and generic selection policies (SMA 1993; Wessex Archaeology's internal selection policy) and follows CIfA's *Toolkit for Selecting Archaeological Archives*. It should be agreed by all stakeholders (Wessex Archaeology's internal specialists, external specialists, local authority, museum) and fully documented in the project archive.

9.3.3 Project-specific proposals for selection are presented below. These proposals are based on recommendations by Wessex Archaeology's internal specialists and will be updated in line with any further comment by other stakeholders (museum, local authority). The selection strategy will be fully documented in the project archive.

9.3.4 Any material not selected for retention may be used for teaching or reference collections by Wessex Archaeology.

Palaeoenvironmental, sedimentological and scientific dating samples

9.3.5 A series of samples was retained from Trench 1 during the course of fieldwork, with recommendations outlined for targeted scientific dating and palaeoenvironmental assessment. Samples will be retained until a program of palaeoenvironmental assessment, analysis and scientific dating has been completed and the need for and scope agreed with the client and County Archaeologist for Buckinghamshire.

Documentary records

9.3.6 Paper records comprise site registers (other pro-forma site records are digital), drawings and reports (Written Scheme of Investigation, client report). All will be retained and deposited with the project archive.

Digital data

9.3.7 The digital data comprise site records (tablet-recorded on site) in spreadsheet format; finds records in spreadsheet format; survey data; photographs; reports. All will be deposited, although site photographs will be subject to selection to eliminate inferior quality and duplicated images, and any others not considered directly relevant to the archaeology of the site.

9.3.8 Wessex Archaeology follows national guidelines on selection and retention (SMA 1993; Brown 2011, section 4). In accordance with these, and any specific guidance prepared by the museum, a process of selection and retention will be followed so that only those artefacts or ecofacts that are considered to have potential for future study will be retained. The selection policy will be agreed with the museum and is fully documented in the project archive.

9.4 Security copy

9.4.1 In line with current best practice (e.g., Brown 2011), on completion of the project a security copy of the written records will be prepared in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

9.5 OASIS

9.5.1 An OASIS (online access to the index of archaeological investigations) record (http://oasis.ac.uk) has been initiated, with key fields completed (**Appendix 3**). A .pdf

version of the final report will be submitted following approval by the Archaeological Officer at Buckinghamshire Council on behalf of the LPA. Subject to any contractual requirements on confidentiality, copies of the OASIS record will be integrated into the relevant local and national records and published through the Archaeology Data Service (ADS) ArchSearch catalogue.

10 OUTREACH AND SOCIAL MEDIA

10.1.1 In line with its charitable aims, Wessex Archaeology will, where possible and in consultation with the client, seek opportunities to disseminate the results of the evaluation and engage with the local community through social media, press releases, open days and volunteer involvement, while considering issues such as health and safety, confidentiality and vandalism.

11 COPYRIGHT

11.1 Archive and report copyright

11.1.1 The full copyright of the written/illustrative/digital archive relating to the project will be retained by Wessex Archaeology under the *Copyright, Designs and Patents Act 1988* with all rights reserved. The client will be licenced to use each report for the purposes that it was produced in relation to the project as described in the specification. The museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use conforms to the *Copyright and Related Rights Regulations 2003*.

11.1.2 Information relating to the project will be deposited with the Historic Environment Record (HER) where it can be freely copied without reference to Wessex Archaeology for the purposes of archaeological research, or development control within the planning process.

11.2 Third party data copyright

11.2.1 This document, the evaluation report and the project archive may contain material that is non-Wessex Archaeology copyright (e.g., Ordnance Survey, British Geological Survey, Crown Copyright), or the intellectual property of third parties, which Wessex Archaeology are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Wessex Archaeology. Users remain bound by the conditions of the *Copyright, Designs and Patents Act 1988* with regard to multiple copying and electronic dissemination of such material.

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APPENDICES

Appendix 1 Trench summaries

The stratigraphic succession encountered the trench is outlined below. Both heights and coordinates were taken at the centre of each trench. Depth bgl = below ground level

Trench No 1	**Length** 50.0 m	**Width** 3.5 m	**Depth** 1.90 m
Easting 504470 / 504464	**Northing** 184841 / 184848	31.82 m OD (TR1.1a) to 31.54 m OD (TR1.1c)	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth m bgl
101		Topsoil	Very dark greyish brown, firm clayey silt. Common fine vertical rooting and very rare fragments of white ceramics and stoneware (Victorian). Gradual lower boundary.	0.00–0.38
102		Made ground/subsoil	Mid greyish brown to dark brown with rare reddish to yellowish red mottles, firm silty clay to clayey silt, slightly sandy. Very rare fragments of red CBM (<≤2mm) and fine, vertical rooting. Very rare, sub-angular, middle to large - sized flint pebble (< ≤2%,< 30mm).Very rare fragments of white chalk / tufa throughout (<≤2%, <≤1mm). Sharp lower boundary.	0.38–0.52
103		Alluvium I	Dark greyish brown, firm silty clay with occasional reddish / orange mottling and very rare fragments of red CBM (≤2mm). Very rare fine channels filled with dark silt (?decomposed plants). At the interface with the lower context a black clay layer (`organic mud`), c. 20mm thick. (In places, along the 50m section, was not well visible, but in places dominated by the black clay, i.e. TP 4). Sharp lower boundary.	0.52–0.58
104		Buried soil	Very dark brown, firm clayey silt with granular / crumble structure. Rare, sub-angular to sub-rounded, fine to mid-sized flint pebble (≤<5%, ≤<30mm). Occasional fresh fine vertical rooting. Gradual lower boundary.	0.58–0.64

Trench No 1	**Length** 50.0 m	**Width** 3.5 m	**Depth** 1.90 m
Easting 504470 / 504464	**Northing** 184841 / 184848	31.82 m OD (TR1.1a) to 31.54 m OD (TR1.1c)	

Context Number	**Fill Of/Filled With**	**Interpretative Category**	**Description**	**Depth m bgl**
105		Alluvium with reworked tufa (Alluvium II)	Dark brown, firm silty clay with pale brown silty / loose tufa lenses. Very rare, fine to mid-sized, rounded to sub-rounded flint pebble (≤<1%, <≤10mm). (Only recorded in TP1 area). Diffuse lower boundary.	0.64–0.70
106		Alluvium (II)	Dark greyish brown to brownish grey (to greyish olive) firm silty clay with occasional, rounded to sub-angular, fine to coarse flint pebble (<5%, <≤50mm). Sharp lower boundary.	0.70–0.84
107		Calcareous Alluvium	Pale greyish brown, firm, uncohesive slightly sandy (very fine) silt. Rare, sub-rounded flint gravel (≤10mm, ≤ 2%). Sharp lower boundary.	0.84–0.90
108		Clayey Gravel	Light grey to yellowish grey, loose clayey / silty sandy gravel. Gravel is sub-angular to sub-rounded, fine to coarse flint pebble (≤<60%, <50mm). The matrix is clayey fine to very fine sand. Very rare, rounded quartz pebbles. (Recorded at the base of the trench predominantly in the area of the deep palaeochannel). Not bottomed.	0.92+
109		Archaeological Pit	Circular in plan with straight, symmetrical sides and rounded `V` shaped base.	0.50 x 0.38
110	109	Fil of 109	Firm, very dark grey SILTY CLAY.	0.50 x 0.38
111		Organic Gravel	Loose to friable, weakly cohesive, black MATRIX SUPPORTED GRAVEL. Gravel is sub-angular to rounded and weathered / abraded, poorly sorted, fine to coarse -sized flint pebbles (<60mm). Matrix is organic SILT with few charcoal fragments (<2%, <20mm). Sharp lower contact with 108.	0.76–0.96

Trench No 1	**Length** 50.0 m	**Width** 3.5 m	**Depth** 1.90 m
Easting 504470 / 504464	**Northing** 184841 / 184848	31.82 m OD (TR1.1a) to 31.54 m OD (TR1.1c)	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth m bgl
112		Mixed Alluvium	Firm, dark yellowish to grey SILTY CLAY with black mottling (plant detritus, <10%). Few (<10%), vertical channels after rooting. Gradual lower contact.	0.40–0.52
113		Sandy Calcareous Alluvium	Firm but moderately cohesive, pale yellowish brown SANDY SILT. Sand is very fine to fine, few lenses of well sorted fine sand. Pockets of grey silty with white secondary calcium mottling recorded throughout (<5%, <1mm). Sharp lower contact with 114.	0.70–0.85
114		Alluvium	Fluvial gravel. Loose CLAST SUPPORTED GRAVEL to MATRIX SUPPORTED GRAVEL. Gravel is poorly to moderately sorted, sub-rounded to sub-angular weather and abraded, fine to coarse -sized flint pebbles and occasional cobbles (<60%, <80mm). Very few rounded quartzite pebbles noted (<5%, <30mm). Not bottomed.	1.10+
115		Alluvium (II)	Firm but soft, dark grey SILTY CLAY with few sub-rounded, fine to medium -sized flint pebbles. Common vertical channels after rooting, often oxidised. Occasional waterlogged roots and plant fragments noted throughout (<5%). Clear lower contact. (possibly same as 106 but siltier).	0.70–0.98
116		Oxidised Channel Fill	Firm but soft, light yellowish brown CLAY SILT with occasional, subangular to subrounded, fine to medium -sized flint pebbles, often abraded/weathered (<10%, <40mm). Common vertical channels after roots filled with grey clay/silt (<15%). Very few plants fragments/detritus (<5%). Clear lower contact.	1.00–1.40

Trench No 1	**Length** 50.0 m	**Width** 3.5 m	**Depth** 1.90 m
Easting 504470 / 504464	**Northing** 184841 / 184848	31.82 m OD (TR1.1a) to 31.54 m OD (TR1.1c)	

Context Number	**Fill Of/Filled With**	**Interpretative Category**	**Description**	**Depth m bgl**
117		Gravelly Channel Fill	Friable to lose, grey GRAVELLY SANDY CLAY. Gravel is poorly sorted, sub-angular to sub-rounded, fine to coarse -sized flint pebbles in mid to fine sandy clay matrix (<25%, <50mm). Sharp lower contact.	1.30–1.44
118		Grey Channel Fill	Firm but soft, grey CLAY SILT with very few, fine to medium -sized flint pebbles (<2%, <30mm). Few plant detritus, vertical channels after rooting and fine roots (<5%). Sharp lower contact.	1.44–1.60
119		Dark Grey Channel Fill	Firm but soft, dark grey CLAYEY SILT with occasional vertical channels after rooting, plant detritus. Almost stoneless. Sharp lower contact.	1.60–1.80
120		Basal Channel Fill	Firm, mid brownish yellow, slightly sandy (very fine to fine) CLAYEY SILT with occasional sub-rounded to sub-angular, fine to medium -sized flint pebbles (<8%, <30mm). Sharp lower contact with 108.	1.80–2.10
121		Sandy Alluvium	Friable, soft grey sandy SILTY CLAY with few subrounded to subangular fine to medium flint pebbles (<5%, <35mm). Sharp lower contact with 108. Possibly same as channel fill 120, but grey and sander.	1.00-1.15
122	101	Modern Disturbance	Firm to friable, dark grey brown CLAYEY SILT with occasional flint pebbles and red fragments of bricks, pipes and ceramic (<10%, <30mm).	1.40m in length 0.50m in depth

Appendix 2 Data used in the deposit model

Name	Easting	Northing	Total depth (m)	Elevation (m OD)
TP1	504479	184832	0.92	31.88
TP2	504481	184837	0.84	31.88
TP3	504486	184831	0.74	31.99
TP4	504484	184826	0.75	32.05
TR1.1a	504470	184841	1.30	31.83
TR1.1b	504468	184844	1.90	31.60
TR1.1c	504464	184848	0.70	31.54
TR1.2	504483	184828	1.08	32.02
TR1.3	504491	184820	0.90	32.10
WA01	504438	184881	5.70	32.74
WA02	504445	184863	5.70	32.48
WA03	504454	184836	5.70	31.91
WA04	504458	184825	5.70	31.80
WA05	504461	184812	4.20	31.87
WA06	504468	184795	5.70	31.98
WA07	504477	184776	5.70	32.20
WA09	504495	184729	4.20	32.02
WA10	504368	184833	5.70	32.42
WA11	504377	184807	4.20	32.16
WA12	504395	184769	5.70	32.37
WA13	504417	184733	5.70	32.15
WA14	504439	184699	5.70	32.22
WA15	504464	184660	5.70	31.55

OASIS Summary for wessexar1-527862

OASIS ID (UID)	wessexar1-527862
Project Name	Excavation, Assessment And Analysis at New Denham Quarry, Denham, Buckinghamshire
Sitename	New Denham Quarry, Denham, Buckinghamshire
Sitecode	60495.03
Project Identifier(s)	60495
Activity type	Excavation, Assessment And Analysis
Planning Id	
Reason For Investigation	Planning: Between application and determination
Organisation Responsible for work	Wessex Archaeology
Project Dates	09-Jul-2024 - 11-Jul-2024
Location	New Denham Quarry, Denham, Buckinghamshire NGR : TQ 04400 84800 LL : 51.552438606826215, -0.495623816163963 12 Fig : 504400,184800
Administrative Areas	Country : England County/Local Authority : Buckinghamshire Local Authority District : Buckinghamshire Parish : Denham
Project Methodology	Wessex Archaeology was commissioned by Summerleaze Ltd (‘the client’) to produce a report outlining the results of geoarchaeological mitigation on land adjacent to New Denham Quarry, Denham, Buckinghamshire (the ‘Site’), centred on NGR 504400 184800 (TQ 04400 84800). The proposed development comprises the expansion of the existing New Denham Quarry to the east, between the existing quarry and Knighton-Way. As, the Site is located in the Colne Valley, which contains one of the most important concentrations of Terminal Upper Palaeolithic and Mesolithic archaeology in Britain, often in association with deposits of a high palaeoenvironmental potential a programme of geoarchaeological mitigation was recommended. The evaluation comprised the excavation, sampling and recording of a 50 m long stepped trench targeting a palaeochannel identified during a previous borehole survey and deposit modelling exercise. The principal aim of the geoarchaeological trench was to evaluate fills of the palaeochannel and understand the relationship between the channel edge and presence of flint artefacts.

Project Results	The current geoarchaeological evaluation confirmed presence of an approximately 2 m deep channel filled with minerogenic fluvial deposits sealed by gravels with an organic matrix containing charcoal fragments, with their occurrence mainly restricted to the gravel ridge next to the palaeochannel. The fill of the palaeochannel is considered to be of a Holocene date. A change in climatic condition at the Pleistocene-Holocene transition is marked by deposition of fine-grained alluvium followed by the formation of a peaty soil buried. The preservation of a peaty soil seems to be localised to the near vicinity of the channel. Archaeological test pitting adjacent to the palaeochannel produced a small quantity of worked flints derived predominately from the buried soil and alluvium. The archaeological material indicates the location of a possible campsite near the palaeochannel, though the assemblage appears partially reworked by a fluvial action. Alluvium sealed the Buried Soil, and a further layer of alluvium in areas where the buried soil was absent. A characteristic band of black clay demarked the formation of the upper alluvium. Based on research at Three Ways Warf the top of the sediment sequence would be equate to the Late Mesolithic period. No archaeological material was recovered from the basal alluvium, but the black clay has high potential to contain material suitable for radiocarbon dating and palaeoenvironmental remains which may shed light on human-environment relationships. The uppermost deposit recorded at the Site was thick Made Ground deposit suggesting truncation of the Holocene sequence. As the key Holocene layers are located within 1.0m below the ground surface, the proposed extension of the quarry will affect the sequence and any archaeological remains within it. The proposed quarry expansion will impact on Pleistocene and Early Holocene deposits with a high geoarchaeological and archaeological potential. Consequently, programme of targeted paleoenvironmental assessment and scientific dating is recommended on samples retained from Trench 1 from the fills of the palaeochannel and overlying alluvium and buried soil containing struck flints, to establish the date of the deposits, preservation and concentration of key palaeoenvironmental indicators and potential of these remains to contribute to our understanding of human-environment relationships at the site and Colne Valley.
Keywords	
Funder	Private or public corporation Summerleaze Ltd
HER	Buckinghamshire HER - unRev - STANDARD
Person Responsible for work	Nina Olofsson, Daniel Young
HER Identifiers	
Archives	Physical Archive, Documentary Archive, Digital Archive - to be deposited with Archaeology Data Service Archive; Physical Archive, Documentary Archive, Digital Archive - to be deposited with Discover Bucks Museum;

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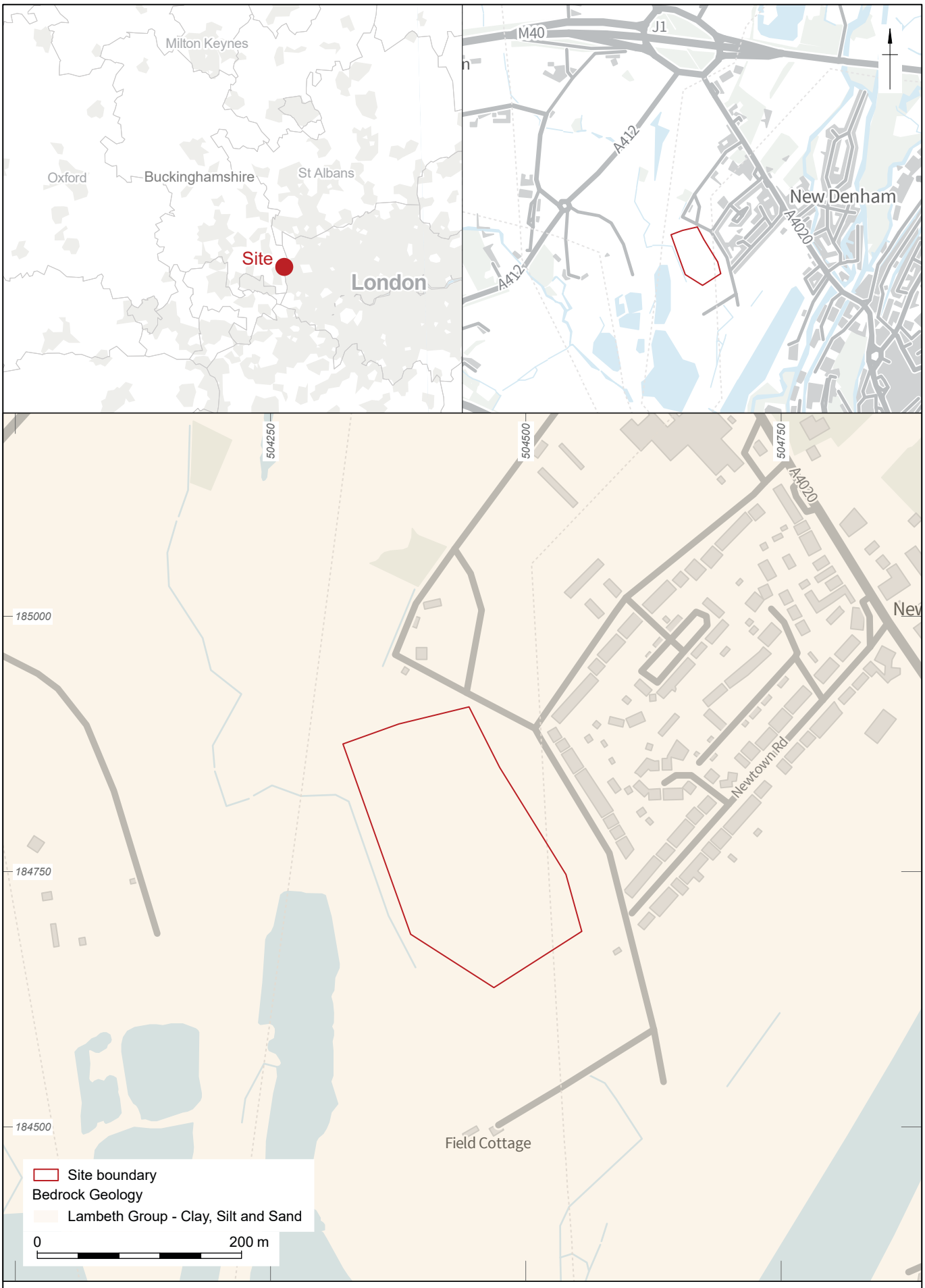

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Figure 1: Site location and BGS bedrock geology

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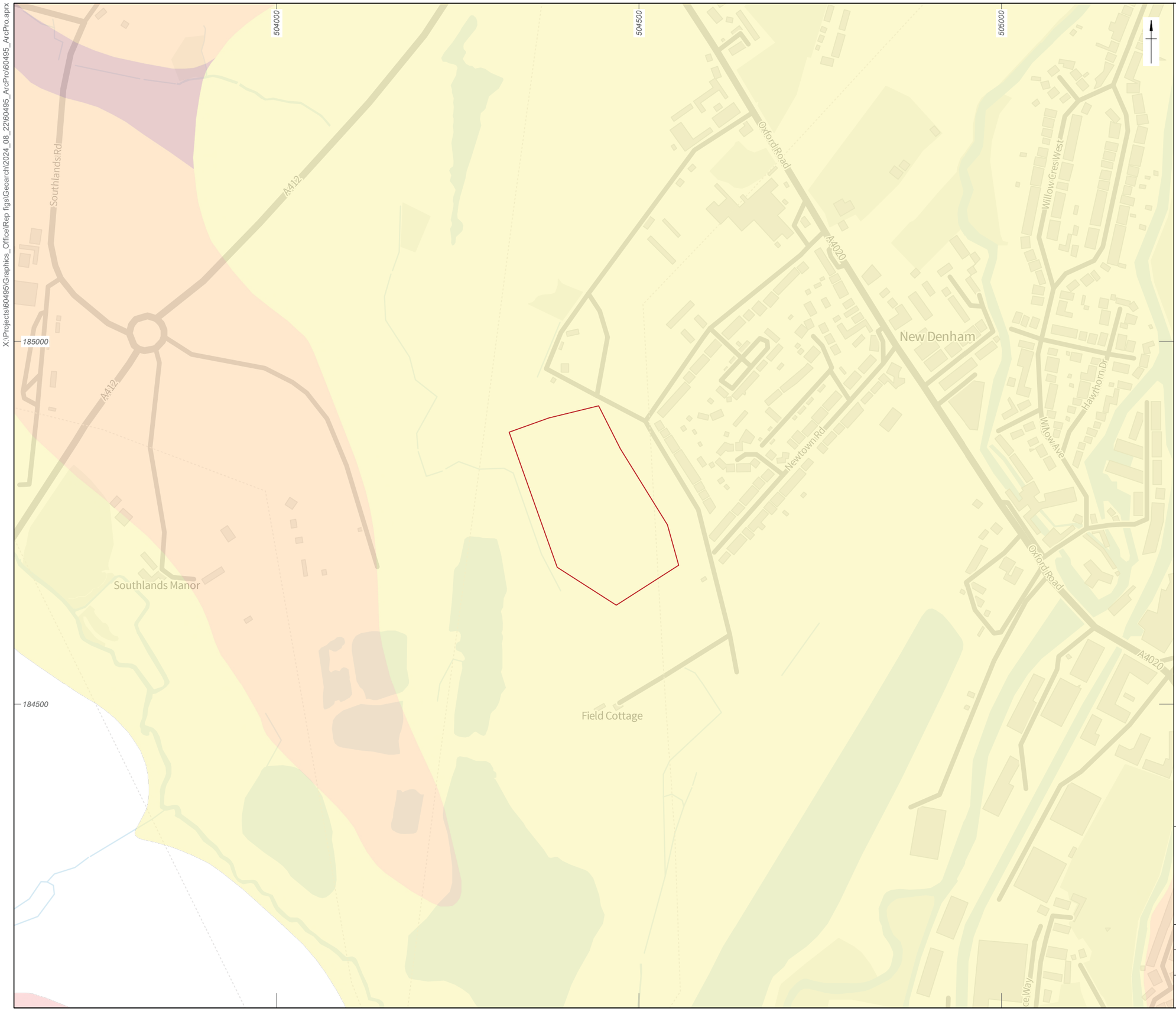

Site boundary

Superficial Geology

- Alluvium - Clay, Silt, sand and Gravel
- Taplow Gravel Member - Sand and Gravel
- Head - Clay and Silt

0 250 m

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Figure 2: Site location and BGS superficial geology

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504400 504500 504600 504700

184900 184800 184700 184600

Knight

Orchard Gl

wtownRd

Inset

WA01 TR04 WA02 WA10 TR05 WA11 WA03 WA04 WA05 WA06 WA07 WA12 TR06 WA13 WA09 TR02 TR07 WA14 WA15 TR08 TR09

TR1.1b TR1.1c TR1.1a TP2 TP3 TP1 TP4 TR1.2 TR1.3

Inset 1:250

Section 3 Section 2 Section 1 Section 4

TR1.1c TR1.1b TR1.1a TP2 TP1 TR01 TP3 TR1.2 TP4 TR1.3 WA05

Site boundary
Trial pits (60491)
Stepped trench (60495)
Archaeology
Geology
Intervention slot
Boreholes
Transect 1
Transect 2

0 50 m

Coordinate system: OSGB 1936 British National Grid

Date: 29/08/2024	Created by: MKP	Revision: 0	Scale: 1:1,250 at A3

Figure 3: Location of stepped trench, trial pits and Transects 1 and 2

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504300 504400 504500 504600

184900 184800 184700 184600

T4 WA-01 WA-02 T5 WA-10 WA-11 T1 WA-03 WA-04 WA-05 WA-06 T6 WA-12 WA-07 T2 WA-13 WA-09 T7 WA-14 T8 WA-15

Knighton Way Lla

Nine Stiles Cl

Newtown Rd

Site boundary
Previous Trench
Field Boundary Buffer
Previous Borehole
Geographical Survey Interpretation
Trend
Ferrous
Gravel outcrop
Possible channel
Channel
Geology

0 50 m

Coordinate system: OSGB 1936 British National Grid

Date: 29/08/2024	Created by: MKP	Revision: 0	Scale: 1:1,250 at A3

Figure 4: Location of previous evaluation trenches and boreholes, showing interpreted results of EMR survey

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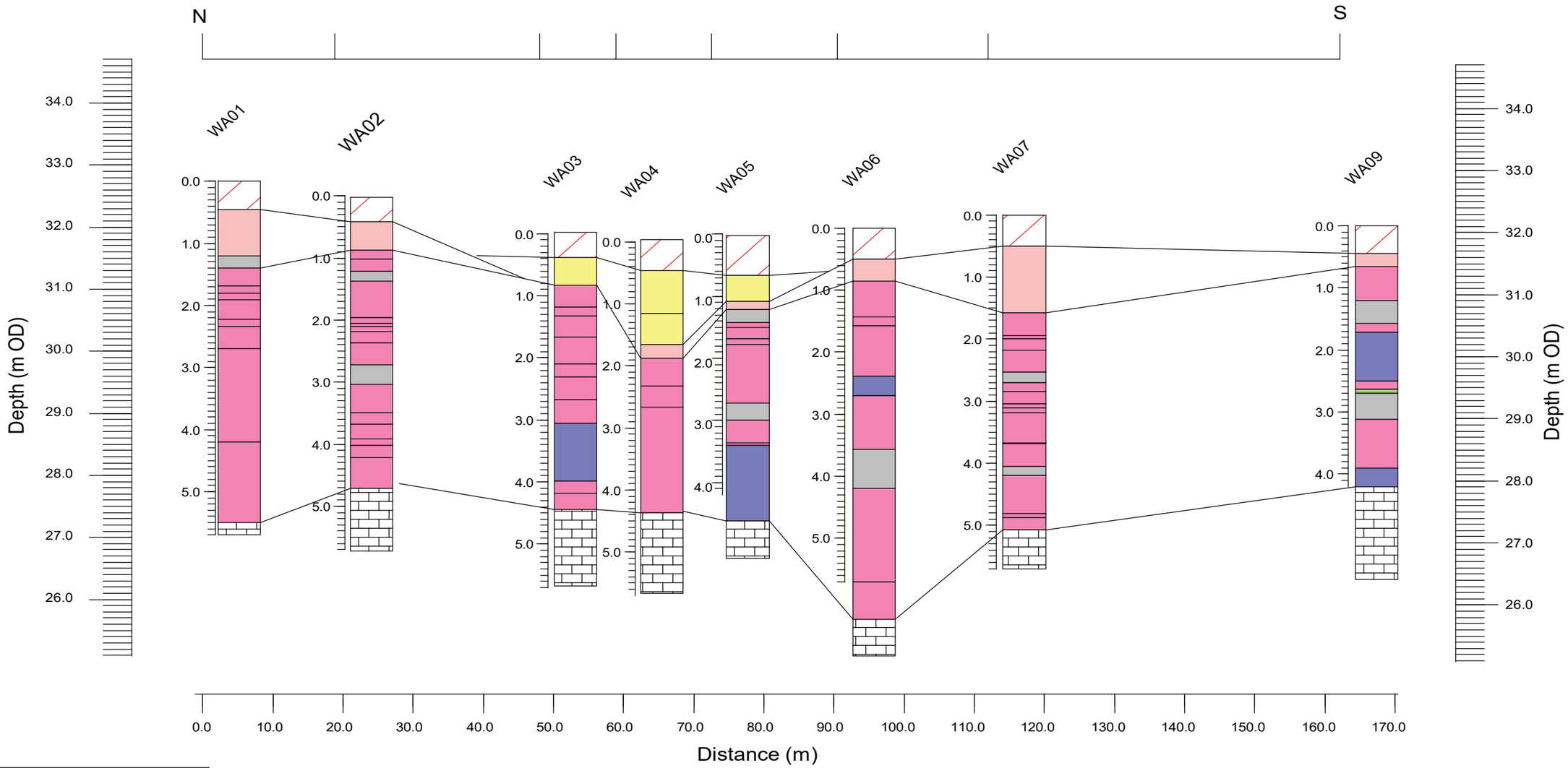

Stratigraphy

- Topsoil
- Made Ground
- Alluvium
- Gravelly Clay
- Sand
- Fluvial Gravel
- Fluvial Sands and Gravels
- Clay and Gravel
- Bedrock

Date: 22/08/2024	Created by: AW, MKP	Revision: 0	Scale: NTS at A3

Figure 5: Results of previous borehole survey

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SE

NW

TR1.3

TP4

TR1.2

TP3

TP1

TR1.1a

TR1.1b

TR1.1c

Depth (m OD)

32.0

31.5

31.0

30.5

30.0

0.0

0.5

1.0

1.5

0.0

10.0

20.0

30.0

40.0

Distance (m)

Stratigraphy

- Topsoil
- Made Ground
- Alluvium I
- Buried soil
- Alluvium II
- Organic gravel
- Calcareous Alluvium
- Sandy Calcareous Alluvium
- Oxidised channel fill
- Gravelly channel fill
- Grey channel fill
- Dark grey channel fill
- Basal channel fill
- Clayey Gravel
- Fluvial gravel

Date: 22/08/2024	Created by: MKP	Revision: 0	Scale: NTS at A3

Figure 6: Transect 1 (Geoarchaeological Trench 1)

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SE

NW

WA09

WA07

WA06

TR1.3

TP4

TP1

TR1.1a

WA04

TR1.1b

TR1.1c

WA02

WA01

Depth (m OD)

33.0
32.0
31.0
30.0
29.0
28.0
27.0
26.0

0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0 100.0 110.0 120.0 130.0 140.0 150.0 160.0 170.0 180.0 190.0 200.0 210.0 220.0

Distance (m)

Stratigraphy

- Void
- Topsoil
- Made Ground
- Alluvium I
- Alluvium
- Buried soil
- Alluvium II
- Organic gravel
- Calcareous Alluvium
- Sandy Calcareous Alluvium
- Oxidised channel fill
- Grey channel fill
- Dark grey channel fill
- Basal channel fill
- Clayey Gravel
- Gravelly Clay
- Fluvial gravel
- Bedrock

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Figure 7: Transect 2

Figure 8: Hand Dug Test Pit 1, north-east facing section

Figure 9: Sondage TR1.1a through paleochannel, north-east facing section

Figure 10: Sondage TR1.1b through paleochannel, north-east facing section

Figure 11: The base of geoarchaeological Trench 1 showing the Organic Gravels. Looking north-west

Figure 12: North-east section of geoarchaeological Trench 1 (TR 1.3)

Figure 13: North-east facing of hand dug Test Pit 4

Figure 14: North-east facing of Pit 109 recorded in the corner of Test Pit 1

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Section 1: North-East facing section of sampled Test Pit 1/Trench 1.1/1.2/1.3 above trench step

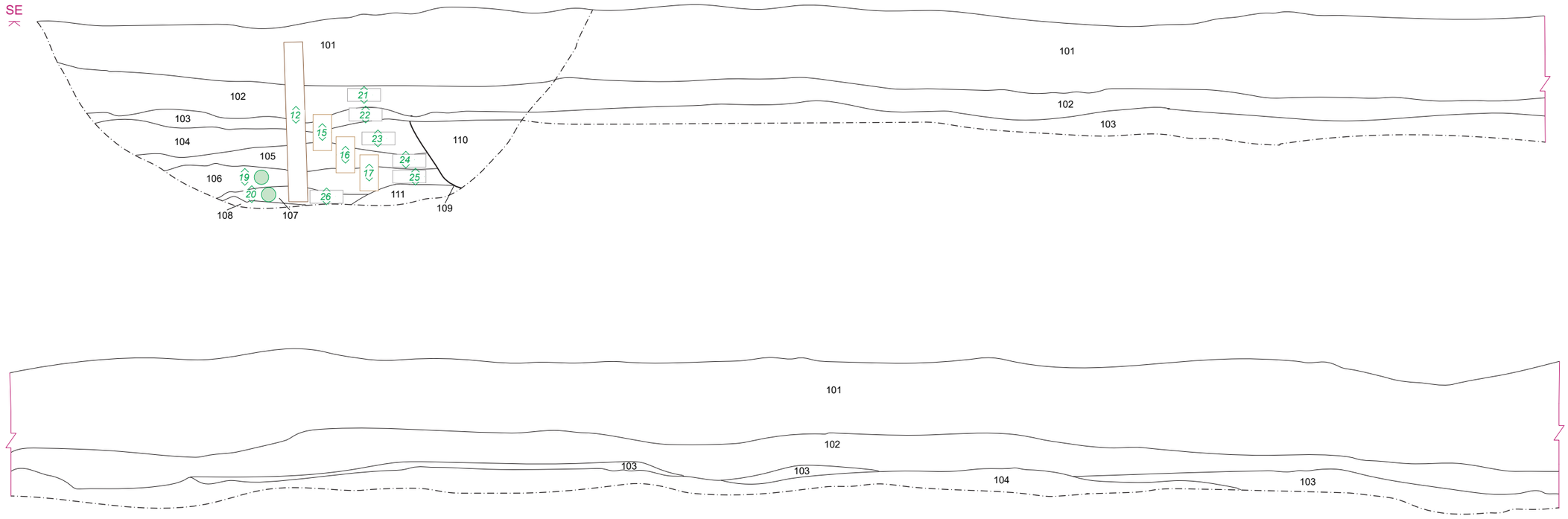

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Figure 15: North-East facing section of sampled Test Pit 1/Trench 1.1/1.2/1.3 above trench step

Section 2: North-East facing section of sampled Trench 1.1/1.2/1.3 in the trench step

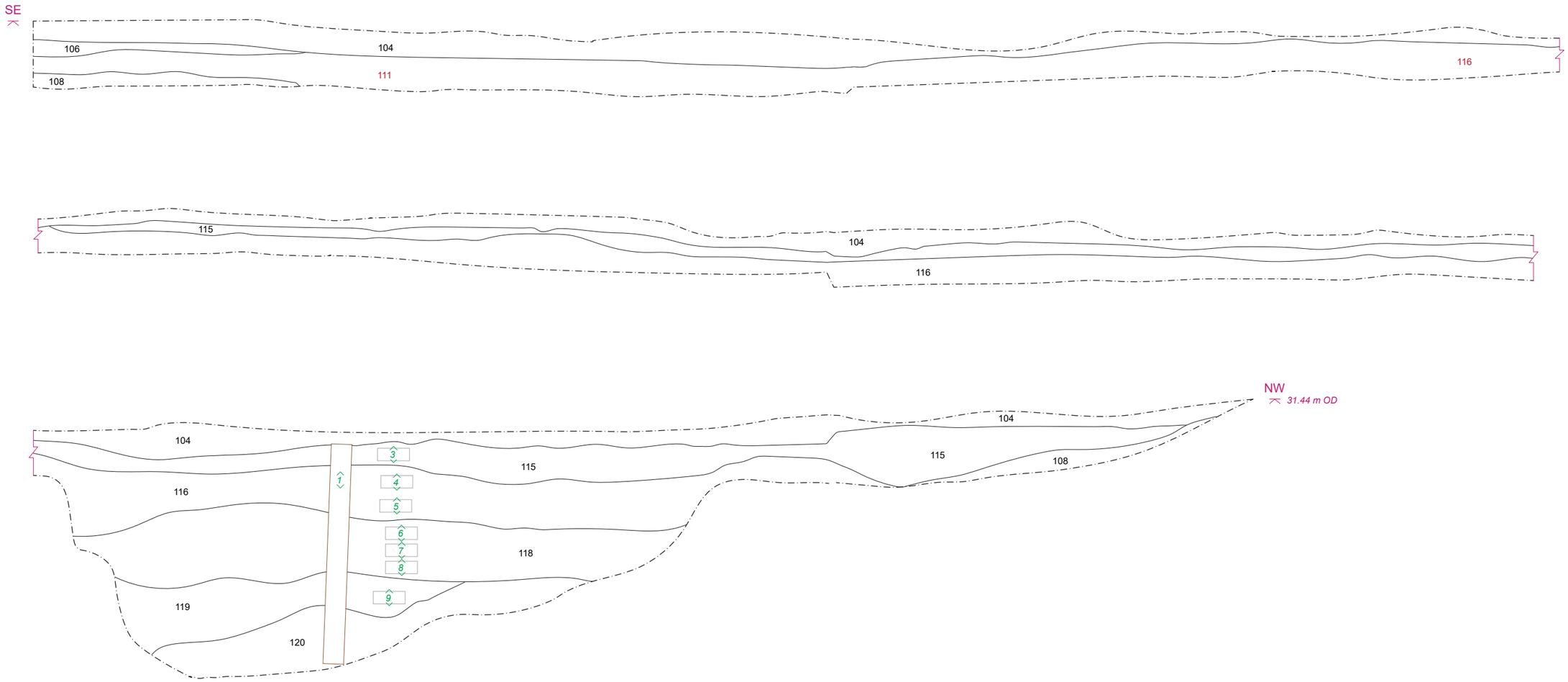

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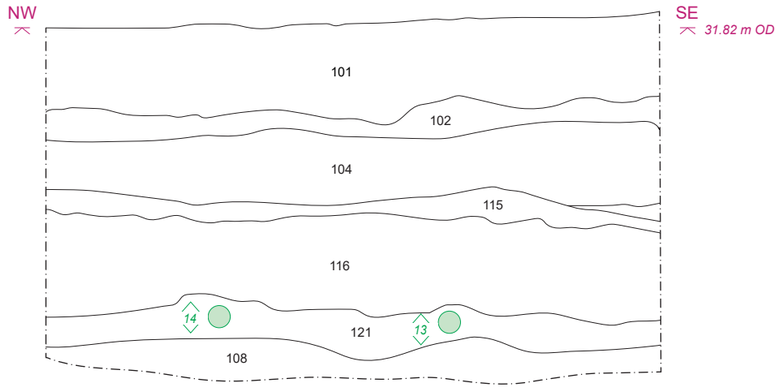
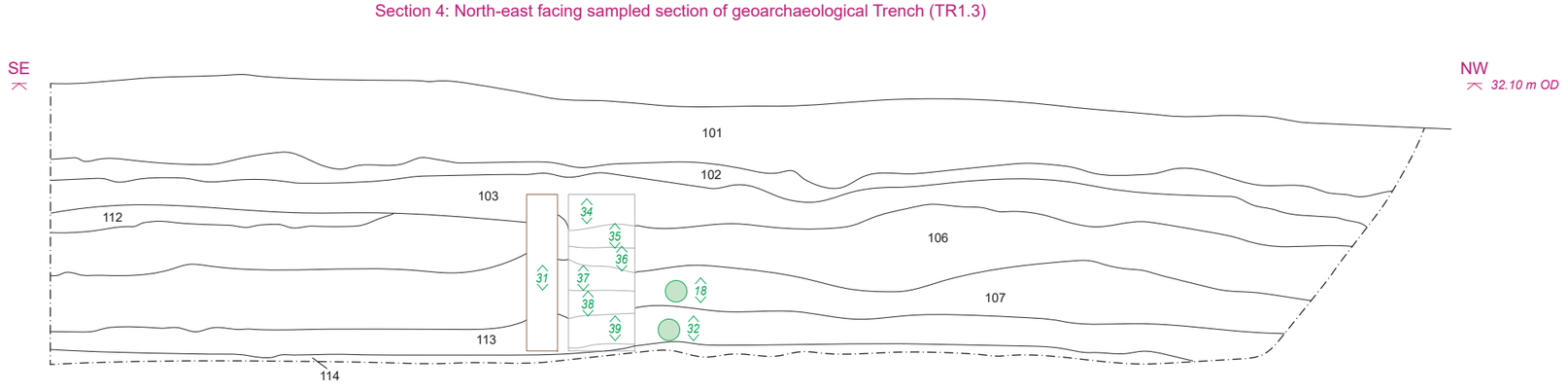
Figure 16: North-East facing section of sampled Trench 1.1/1.2/1.3 in the trench step

Section 3: South-west facing of sampled geoarchaeological Trench 1



Section 4: North-east facing sampled section of geoarchaeological Trench (TR1.3)



Collum Sample
Monolith Sample
OSL Sample

0 1 m

Date: 29/08/2024	Created by: MKP	Revision: 0	Scale: 1:20 at A3

Figure 17: Sections 3 and 4

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