



Andover Link Main Hampshire

Geoarchaeological Monitoring of Ground Investigation Works



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Summary

Wessex Archaeology was commissioned by MGJV (ALM), on behalf of Southern Water, to produce a report outlining the results of geoarchaeological monitoring of Ground Investigation (GI) works, carried out to inform the proposed Andover Link Main Scheme, which will comprise the installation of a new pipeline to be built between Crab Wood Water Service Reservoir, Winchester, and River Way Water Supply Works, Andover. The monitoring was carried out in order to mitigate against impacts from the GI works on the geoarchaeological resource, and to characterise any geoarchaeological deposits present.

The GI works included interventions in the valleys of the Rivers Test and Dever where a Desk Based Assessment (Wessex Archaeology 2023a) highlighted the presence of geological deposits that have high potential to contain geoarchaeological remains (artefacts, archaeological layers, environmental remains evidence etc) dating to the Lower and Middle Palaeolithic periods (c. 676–40 Kya). 14 GI boreholes in these areas were subject to geoarchaeological monitoring. This monitoring was carried out alongside a geoarchaeological test pitting evaluation (Wessex Archaeology 2024b). The results of the test pitting have previously been used to provide a Geoarchaeological Landscape Characterisation (GLC), which divided the Scheme route into 17 Geoarchaeological Character Zones (GCZs) based on difference in the Quaternary geological deposits present.

The monitoring has successfully characterised the Quaternary deposits present at selected GI locations. Whilst no archaeology or deposits with potential to preserve significant palaeoenvironmental remains were identified during the monitoring, the combined results of the monitoring and geoarchaeological test pitting (Wessex Archaeology 2024b) have established that the Scheme will impact on Pleistocene river terraces of the River Test that have the potential to contain significant Lower and Middle Palaeolithic archaeology.

Deposits belonging to four terraces of River Test will be impacted. These terraces are located along the sides of the Test Valley within four GCZs of the Scheme's GLC (Wessex Archaeology 2024b). In summary, these are:

- GCZ 3 – Bitterne or the Nursling Terraces (MIS 14 and 13b; 563–478 Kya). These terraces have the potential to contain Lower Palaeolithic lithic artefacts relating to the earliest period of Palaeolithic settlement history in the region.
- GCZ 5 – Mottisfont/Lower Warsash Terrace. (MIS 9–8; 337–243 Kya). This terrace dates to the transitional archaeological period between the late Lower and early Middle Palaeolithic and can contain significant early Middle Palaeolithic archaeology. A flake was recovered from these terrace deposits during the test pitting evaluation (Wessex Archaeology 2024b), whilst Palaeolithic artefacts were recovered from these terrace deposits in Cottage End Gravel Pit, located 250m to the west of the Scheme route (Wymer and Wessex Archaeology 2009).
- GCZ 6 – Hamble Terrace (MIS 7–6; 243–130 Kya). This terrace dates to the early Middle Palaeolithic, a key period early Neanderthal occupation in the region. The terrace deposits can contain significant early Middle Palaeolithic archaeology.
- GCZ 8 – Broadland's Farm Terrace (MIS 4; 71–57 Kya). The age of this terrace is within period when the region was occupied by late Neanderthal populations and could contain significant late Middle Palaeolithic archaeology.

The results of the GI monitoring, combined with those of the geoarchaeological test pitting evaluation (Wessex Archaeology 2024b), have demonstrated that the Scheme will impact on Pleistocene river terraces of the River Test that have significant geoarchaeological potential. In order to mitigate against these impacts, a program of further targeted geoarchaeological test pits guided by a series Scheme-specific research objectives is recommended.



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Andover Link Main, Hampshire

Geoarchaeological Monitoring of GI Works

1 INTRODUCTION

1.1 Project and planning background

- 1.1.1 Wessex Archaeology was commissioned by MGJV (ALM) ('the client'), on behalf of Southern Water, to produce a report outlining the results of geoarchaeological monitoring of Ground Investigation (GI) works carried out to inform the proposed Andover Link Main Scheme, which will comprise the installation of a new pipeline to be built between Crab Wood Water Service Reservoir, Winchester, and River Way Water Supply Works, Andover. The Scheme route is illustrated in **Figure 1**.
- 1.1.2 The works are a permitted development. Southern Water need to ensure archaeological relics and information are not carelessly or recklessly lost or destroyed, Southern Water has a duty under Part 1, Paragraph 3(2) of the Water Industry Act 1991, in formulating or considering any proposals, to have regard to the 'desirability of protecting and conserving buildings, sites and objects of archaeological, architectural or historic interest.'
- 1.1.3 Following consultation with the County Archaeologist for Hampshire County Council (CA for HCC) and the Archaeological Officer for Winchester City Council (AO for WCC), a programme of archaeological works is required to evaluate the archaeological potential across the pipeline, and to mitigate against the disturbance and destruction of archaeological remains without proper record.
- 1.1.4 Geoarchaeological monitoring of GI was carried out as part of a wider program of archaeological evaluation aimed at assessing the archaeological resource that will be impacted on by the Scheme, and to determine requirements for mitigation works to off-set these impacts. Related evaluation works include programs of archaeological trial trenching (Wessex Archaeology 2024a) and geoarchaeological test pitting (Wessex Archaeology 2024b).

1.2 Scope of works

- 1.2.1 The GI works included interventions in areas where the British Geological Survey (BGS) records Pleistocene geological deposits belonging the Rivers Test and Dever (BGS GeolIndex). A geoarchaeological section of a Desk Based Assessment (Wessex Archaeology 2023a) highlighted that these geological deposits have high potential to contain 'geoarchaeological' evidence dating to the Lower and Middle Palaeolithic periods (c. 676–40 Kya).
- 1.2.2 Geoarchaeological potential refers to the archaeological resource contained within geological deposits. This resource can consist of both archaeological remains (artefacts, archaeological layers etc), as well as environmental remains reflective of past human activity, landscapes and environments. A specialist 'geoarchaeological' approach, which combines archaeological, geological, geophysical and palaeoenvironmental investigative techniques, are required when investigating the archaeological resource.



1.2.3 In order to mitigate against impacts from the GI works on the geoarchaeological resource, and to characterise any geoarchaeological deposits present, selected GI interventions were subject to geoarchaeological monitoring. The monitoring was carried out concurrently with a program of geoarchaeological test pitting. This test pitting is being carried out across the Scheme, and also included test pits targeted the Pleistocene geological deposits of the Rivers Test and Dever (Wessex Archaeology 2024b).

1.2.4 The locations of GI boreholes selected for geoarchaeological monitoring are illustrated in **Figure 2**. Monitored interventions comprised of:

- 10 no. cable percussion (CP) boreholes drilled to 15-20m below ground level (bgl);
- 4 no. window sample (WS) boreholes drilled to 2m bgl.

1.2.5 The monitored interventions are detailed below in **Table 1**.

Table 1 Monitored Ground Investigation interventions

Exploratory Hole	WA Number	Type	Land parcel	Easting	Northing	Depth (m bgl)	Notes
RT/BH04	BH08	CP	HP411976	441887.287	142588.6061	20	River Test (SSSI)
RD/BH04	BH04	CP	HP411976	442593.346	142420.6538	20	River Dever (SSSI)
RD/BH03	BH03	CP	HP722404	442617.359	142328.1078	20	River Dever (SSSI)
RT/BH01	BH05	CP	HP724905	441600.809	142831.47	20	River Test (SSSI)
UF/BH01	BH09	CP	HP724905	441561.359	143091.3605	20	Under A303 at Forton
RD/BH01	BH01	CP	HP591046	442625.101	142156.0359	20	River Dever (SSSI)
UF/BH02	BH10	CP	HP713507	441669.17	143206.5136	20	Under A303 at Forton
RT/BH02	BH06	CP	HP411976	441724.534	142716.5166	20	River Test (SSSI)
RT/BH03	BH07	CP	HP411976	441814.713	142670.9573	20	River Test (SSSI)
CB/BH01	BH11	CP	HP713592	441387	143903	15	Forton Compound
ALM-WS2	BH12	WS	HP 713592	441130.8	144185.4	2	Forton Compound
ALM-WS3	BH13	WS	HP 713592	441265.5	144019.4	2	Forton Compound
ALM-WS4	BH14	WS	HP 713592	441336.7	143843.5	2	Forton Compound
ALM-WS5	BH15	WS	HP 713592	441346	143687.3	2	Forton Compound

1.2.6 All works undertaken were in accordance with the Written Scheme of Investigation (WSI) which detailed the aims, objectives, methodologies and standards to be employed to undertake the evaluation (Wessex Archaeology 2023b).

1.2.7 The monitoring was undertaken from 4th May 2024 to the 19th September 2024.



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 monitoring, and to interpret the results within a local, regional or wider context and to assess whether the aims of the monitoring have been met.
- 1.3.2 The presented results of the geoarchaeological monitoring make available information about the geoarchaeological resource (a preservation by record) present in GI interventions and provide information on the geoarchaeological resource that may be impacted by the proposed Scheme. This information will be used, alongside the results of geoarchaeological test pitting evaluation (Wessex Archaeology 2024b), to facilitate an informed decision with regard to the requirement for, and methods of, any geoarchaeological mitigation works that may be required to offset Scheme impacts on the geoarchaeological resource.
- 1.3.3 To help frame geoarchaeological investigations, Wessex Archaeology has developed a four-stage approach, encompassing different 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 2**). This GI monitoring, alongside the geoarchaeological test pitting evaluation (Wessex Archaeology 2024b), represents Stage 2 of this process.

Table 2 Staged approach to geoarchaeological investigations

<p>Stage 1: Geoarchaeological deposit model and Desk-based Assessment (GDBA)</p>	<p>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</p> <p>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.</p> <p>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.</p> <p>The GDBA highlights any areas of a Site where Pleistocene deposits with possible Palaeolithic geoarchaeological potential may occur.</p>
<p>Stage 2: Geoarchaeological evaluation</p>	<p>Field evaluation to establish the geoarchaeological potential of Quaternary geological deposits within a defined Evaluation Area, which informs on the requirements and scope of Stage 3 palaeoenvironmental assessment and/or Stage 4 mitigation.</p> <p>The principal methods of evaluation are through targeted machine-dug test pits and boreholes.</p> <p>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.</p>
<p>Stage 3: Sample assessment</p>	<p>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.</p> <p>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 carried out 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.</p>



	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: Geoarchaeological mitigation	Based on the results of the Stage 2 and 3 investigations 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 This section provides background information relevant to the monitoring, including site location, topography and geology, and information relating to the geoarchaeological resource present.

2.1.2 The geoarchaeological context of the Scheme was assessed in a section of a prior Historic Environment Desk-based Assessment (HEDBA) (Wessex Archaeology 2023a). This considered the known geoarchaeological resource recorded in the Hampshire and Winchester Historic Environment Records (HER) within a 1km study area of the Scheme route alongside Palaeolithic findspots recorded by the English Rivers Palaeolithic Survey (TERPS) (Wessex Archaeology and Wymer 2009) and Upper Palaeolithic findspots recorded in the Palaeolithic and Mesolithic Lithic Artefact (PaMELA) (Wessex Archaeology and Jacobi 2014) databases within a 5km study area. This information was reviewed in relation to the wider Palaeolithic geoarchaeological record within the Test Valley. Information relevant to current program of works is summarised below.

2.2 Scheme location

2.2.1 The Scheme covers approximately 24km from the Crab Wood Water Service Reservoir, Winchester in the south to the River Way Water Supply Works, Andover in the north. The proposed pipeline route skirts the western and northern extent of the urban areas of Winchester and the south, southeastern urban extent of Andover.

2.2.2 The Scheme consists almost entirely of agricultural land and traverses across numerous historical field and parish boundaries, including:

- Sparsholt,
- Littleton,
- Crawley,
- Wonston,
- Barton Stacey,



- Longparish,
- Goodworth Clatford, and
- Andover.

2.2.3 The Scheme also crosses the Rivers Test and Dever and major roads along its course, markedly the A272, which is a former Roman road, and the modern A303.

2.3 GI monitoring locations and landscape context

2.3.1 GI boreholes selected for geoarchaeological monitoring were located within the valleys of the River Test and River Dever (**Figure 2**). Those located west of the River Test are situated on the western slopes of the Test Valley, within topography formed by Pleistocene terraces and by later dry valleys, which dissect the terraces. In these areas the valley sides reach elevations of c. 93m OD (Ordnance Datum), with ground levels gently descending to south-east, towards the current floodplain of the River Test, where ground levels are at c. 50m OD. East of the Test GI locations were in areas where ground levels rise again to c. 52m OD.

2.3.2 West of the River Test the Scheme crosses the interfluvium between the Rivers Test and Dever. South-west of this interfluvium, two GI boreholes were located within the Valley of the River Dever (**Figure 2**). One (RD/BH03) was positioned on the northern slopes of the Dever Valley, where ground levels are at c. 58m OD, and the other to the south of the river, located on the edge of floodplain, where ground levels are at c. 49m OD.

2.4 Chronology

2.4.1 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).

2.4.2 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 3**).

2.4.3 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 3 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	



Geological Period	Chronostratigraphy	Age (Kya)	MIS
	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

2.5 Previous investigations

2.5.1 Previous investigations relevant to the GI monitoring are listed in **Table 4** and summarised below.

Table 4 Previous investigations

Report type	Title	Report no	Reference
Desk Based Assessment	Andover Link Main, Hampshire: Historic Environment Desk Based Assessment	266080.01	Wessex Archaeology 2023a
Evaluation	Andover Link Main, Hampshire Palaeolithic Geoarchaeological Evaluation	266085.03	Wessex Archaeology 2024b

Andover Link Main, Hampshire: Historic Environment Desk Based Assessment (Wessex Archaeology 2023a)

2.5.2 The archaeological and historical background to the Scheme was assessed in a prior desk-based assessment (DBA) which considered the recorded historic environment resource within a 500m study area of the proposed Scheme (Wessex Archaeology 2023b). Relevant information is included in **Section 2.6**, with relevant entry numbers from the Hampshire Historic Environment Record (HHER) and the National Heritage List for England (NHLE) included.

Andover Link Main, Hampshire Palaeolithic Geoarchaeological Evaluation (Wessex Archaeology 2024b)

2.5.3 A geoarchaeological evaluation, focussed on the Palaeolithic potential of deposits, is being conducted as part of the Scheme. A total of geoarchaeological 66 test pits have excavated to characterise the Quaternary deposits present along the Scheme route and results have been reported (Wessex Archaeology 2024b). A further eight evaluation test pits are planned

to be carried out at a future date in other areas of Scheme. The test pits carried out to-date identified, characterised and assessed the geoarchaeological Pleistocene deposits associated with the Rivers Test and Dever in areas subject to GI monitoring. Results of these investigations are included in **Section 2.6**.

2.6 Geological context

2.6.1 The bedrock geology underlying areas of GI monitoring is mapped by the BGS (GeoIndex) as the Seaford Chalk Formation, the Newhaven Chalk Formation and the Lewes Nodular Chalk Formation (**Figure 3**). These deposits would have been deposited in a marine environment with little terrestrial inflow during the Late Cretaceous period.

2.6.2 The superficial geology mapped at monitored GI locations the BGS consists of Pleistocene river terrace deposits associated with the Rivers Test and Dever, with Holocene alluvium mapped across their current floodplains (**Figure 4**). Head deposits are mapped overlying the terraces and within valleys that have been incised through the terraces. Summaries of these mapped deposits are provided below.

River Terrace Deposits

2.6.3 Pleistocene river terraces represent progressively younger former floodplains preserved at decreasing elevations through climatically influenced downcutting and crustal uplift (see Bridgland 2006). The GI includes areas underlain by BGS mapped terraces of the River Test, (Terraces 4-1), and the River Dever (undifferentiated terrace deposits) (**Figure 4**). Geoarchaeological test pitting evaluation has established that these terraces

2.6.4 The terraces of the Test and Dever are associated with the Solent River Formation (Allen and Gibbard 1993; Westaway et al. 2006; Ashton and Hosfield 2010; Briant et al. 2012). The modern Solent is a sea channel separating the Isle of Wight from southern England, but during the Pleistocene it was a major river system that drained the Hampshire Basin and the surrounding chalklands. The River Solent catchment area included large parts of Hampshire, Dorset, south Wiltshire and the Isle of Wight. Following extensive coastal erosion and eustatic sea level rise in the Holocene, all that is visible terrestrially today of the Solent river system is the upper reaches of the Solent itself (now the River Frome), and its tributary rivers, including the Stour, Avon, Test, Itchen and Medina.

2.6.5 **Table 5** outlines the current chronostratigraphic framework for the terraces of the Test, and includes correlations of terrace nomenclature applied by both the BGS (Edwards and Freshney 1987) and revised nomenclature of Harding et al (2012) and Hatch et al (2017).

Table 5 Chronostratigraphic framework for the River Test terraces

Terrace (Edwards and Freshney 1987)	Terrace (Harding et al 2012)	MIS age estimate (Westaway et al 2006)	Luminescence dates	Luminescence MIS age
8	Rownham's Farm	16/15b		
7	Bitterne	14		
6	Nursling	13b		
5	Ganger Wood/ Mallards Moor	12		
4	Belbin/ Upper Warsash	10		
3	Mottisfont/ Lower Warsash	8	305±25 229±24	9-8



2	Hamble	6	231±24 221±20 212±25 204±17 200±23	7-6
1	Broadland's Farm	2	69±5	4

2.6.6 The results of the geoarchaeological test evaluation (Wessex Archaeology 2024b) demonstrates that terraces which correlate with Mottisfont/Lower Warsash (Terrace 3), Hamble (Terrace 2) and Broadland's Farm (Terrace 1) occur within areas of GI and that earlier terrace deposits equivalent with the Bitterne or Nursling terraces (Terrace 7/6) are present along the Scheme route to the north.

2.6.7 Current interpretations suggest that the terraces of the River Test located in areas of GI were formed during MIS 9 to MIS 4, which cover timeframes that encompass the Lower and Middle Palaeolithic archaeological periods.

2.6.8 The terrace deposits of the River Test are known to be rich sources of Lower and Middle Palaeolithic archaeology (see below). Currently there is a lack of associated palaeoenvironmental datasets

Head

2.6.9 Within areas of GI monitoring, Head deposits are mapped by the BGS infilling the dry valleys that are incised through earlier river terraces of the River Test and through chalk bedrock (**Figure 4**).

2.6.10 Deposits mapped by the BGS as Head can have been deposited through different processes, and can include aeolian, colluvial, alluvial and soliflucted material. Such sequences can include material deposited during more than one period of the Pleistocene and can include Holocene colluvium. Where fine-grained units dominate, such deposits are often collectively referred to as 'Head-Brickearth'. These deposits can contain eroded and redeposited artefacts. They can also contain and/or bury stable land-surfaces than can be associated with minimally disturbed, and possibly *in situ*, archaeology and palaeoenvironmental remains, archaeological layers and/or archaeological features.

2.6.11 Palaeolithic test pitting evaluation has demonstrated that these deposits mapped as Pleistocene Head by the BGS in areas of GI in fact comprise Slope Deposits, principally of Holocene date, formed through colluvial processes (Wessex Archaeology 2024b).

2.7 Geoarchaeological context

2.7.1 The known geoarchaeological resource associated with Quaternary deposits located in areas of monitoring GI interventions was reviewed in the DBA (Wessex Archaeology 2023a), whilst these deposits have subsequently has been evaluated through geoarchaeological test pits (Wessex Archaeology 2024b). Relevant information is summarised below, with additional information referenced as appropriate.

Late Lower and Middle Palaeolithic (340–40 Kya)

2.7.2 Terrace deposits within the areas of GI monitoring principally date to the late Lower and Middle Palaeolithic periods (see **Section 2.6**). These terraces are known sources of Palaeolithic archaeology. Such evidence comprises lithic artefacts, including Lower and

Middle Palaeolithic handaxes and artefacts reflecting the Levallois technique, which is diagnostic of the Middle Palaeolithic period.

- 2.7.3 A handaxe tip and two flakes were recovered from these deposits from within 250m of the Scheme at Cottage End Gravel Pit (Wessex Archaeology and Wymer 2009). These are likely from the Mottisfont/Lower Warsash Terrace (Terrace 3). This terrace has age estimates of MIS 9–8 (337–243 Kya), at the end of the Lower Palaeolithic. A further handaxe recorded from Shows Copse (Wessex Archaeology and Wymer 2009) may be from this same pit. Additionally, an abraded flake was recovered from equivalent deposits during the geoarchaeological test pitting evaluation (Wessex archaeology 2024b)
- 2.7.4 Other Palaeolithic finds from within 5km of the Scheme and that are from Test terraces that are present in monitored GI locations include:
- Three handaxes from Testcombe where Terrace 2 is mapped;
 - 10 handaxes and a retouched flake broadly provenanced to Chilbolton, which may be from terrace deposits.
- 2.7.5 Deposits associated with Mottisfont/Lower Warsash Terrace (Terrace 3) downstream of the Scheme at Warsash have produced nationally significant Middle Palaeolithic artefacts which include Levallois material (Burkitt et al 1939; Davis 2013; Davis et al 2016). These are in relatively fresh condition, indicative of contemporary Middle Palaeolithic activity. The specific context of the Middle Palaeolithic artefacts is uncertain but have been suggested to either originate from the fine-grained units in the top of the fluvial sequence, or from the surface of the terrace or from the overlying Head-Brickearth deposits (Davis et al. 2016).
- 2.7.6 Test terraces equivalent to those present at GI locations have also produced typologically Middle Palaeolithic handaxes, which are thought to belong to the late Middle Palaeolithic period (60-40 Kya; White and Jacobi 2002; Davis 2013). These are poorly contextualised and may mostly be from deposits overlying and post-dating the terrace deposits. This may include examples from Dunbridge and Warsash.

Early Upper Palaeolithic (40–29 Kya)

- 2.7.7 No early Upper Palaeolithic archaeology is currently known from within 1km of the GI locations

Late Upper Palaeolithic (15–13 Ka) to Terminal Upper Palaeolithic (10 kya)

- 2.7.8 Although no Late Upper Palaeolithic or Terminal Upper Palaeolithic finds are recorded within 1km of the GI locations, further to the south in the Test Valley at La Sagesse Convent, Romsey, important Late Upper Palaeolithic lithic scatters associated with late Pleistocene alluvial deposits within the River Test floodplain have been excavated (Conneller et al. 2007). These are thought to date to the second half of the Windermere interstadial (c. 2,500 – 11,000 cal BC; 12,000–11,000 BP). This discovery demonstrates that not all alluvial deposits within the base of the Test Valley are Holocene in age and that late Pleistocene alluvium with Upper Palaeolithic archaeological potential may occur.

Mesolithic (8500–4000 BC)

- 2.7.9 Although no Mesolithic archaeology is recorded from within 1km of the GI locations, Mesolithic artefacts are well represented from the wider area, including within the Test Valley (Wessex Archaeology and Jacobi 2014).



2.7.10 The nearest Mesolithic findspots are a collection of lithics from Bury Hill, Andover that include a Mesolithic blade core a lithic assemblage from Merdon that includes a Mesolithic tranchet axe/adze and a Mesolithic tranchet axe/adze from Compton.

Neolithic/Bronze Age (2500BC–43AD)

2.7.11 Geoarchaeological test pitting evaluation has demonstrated that the dry valleys in areas of GI monitoring are infilled with Slope Deposits (mapped as Head by the BGS; see **Section 2.6**). This includes Holocene colluvium, which contained likely late Neolithic/early Bronze Age lithic artefacts. These artefacts had been reworked within the Slope Deposits, and are indicative of later prehistoric activity in this area.

2.8 Geoarchaeological Landscape Characterisation (GLC)

2.8.1 Data provided by the results of the test pitting evaluation have been used to provide a Geoarchaeological Landscape Characterisation (GLC) for the Scheme (Wessex Archaeology 2024b). A GLC works on the same principles as a Historic Landscape Characterisation (English Heritage 2004) and Landscape Character Assessment (Natural England 2014), but in this case largely considers the buried and outcropping Quaternary geological elements of the landscape and their geoarchaeological potential.

2.8.2 The GLC has divided the Scheme route into 17 Geoarchaeological Character Zones (GCZs) based on difference in the Quaternary geological deposits present. These are summarised in **Table 6**. The GLC and GCZs are applied to provide a framework for the results of the GI monitoring. GCZs relevant to the GI monitoring are GCZs 3–11. These are highlighted in **Table 6** and summarised below.

Table 6 Geoarchaeological Character Zones

GCZ	Landscape features	Principal Quaternary deposits
1	Upland chalk downland slopes	Slope Deposits, Chalky Solifluction Deposits and Clay with Flints
2a & b	Dry Valley	Slope and Chalky Solifluction deposits
3	Test Valley	River Terrace Deposits
4	Dry valley	Slope and Chalky Solifluction deposits
5	Test Valley	River Terrace Deposits, Slope and Chalky Solifluction deposits
6	Test Valley	River Terrace Deposits, Slope and Chalky Solifluction deposits
7	Test Valley floodplain	Holocene alluvium and Pleistocene fluvial deposits



GCZ	Landscape features	Principal Quaternary deposits
8	Test Valley	River Terrace, Slope and Alluvial deposits
9	Interfluvium between Test and Dever Valleys	Chalky Solifluction and Slope deposits
10	Dever Valley	River Terrace Deposits
11	Dever Valley floodplain	Holocene Alluvium and Pleistocene fluvial deposits
12	Dry valley	Unknown: ?Slope and Chalky solifluction deposits.
13a, b & c	Dry valley system	Slope and chalky solifluction deposits
14a, b & c	Dry valley	Slope and chalky solifluction deposits
15	Dry valley system	Slope and chalky solifluction deposits

GCZ 3

- 2.8.3 This zone is located on the western, uppermost slopes of Test Valley (**Figures 2–4**), to the southeast of Pound Copse. Quaternary deposits in this zone comprise Pleistocene River Terrace Deposits of the River Test, locally overlain by Slope Deposits, which likely includes Holocene Colluvium. The River Terrace Deposits are attributed to either the Bitterne or the Nursling terraces of the River Test, which may date to MIS 14 and 13b respectively (Westaway et al. 2006).

GCZ 4

- 2.8.4 GCZ 4 is defined by a dry valley that is located to the west of the River Test and is incised through earlier Pleistocene River Terrace Deposits. The valley floor dips south-east into Forton, where it joins the floodplain of the River Test (**Figures 2–4**).
- 2.8.5 Quaternary deposits in the valley comprise chalk gravel overlain by Slope Deposits. The chalk gravels likely result from solifluction processes caused by the seasonal freeze thaw and erosion of the chalk bedrock during periglacial conditions. The Slope Deposits include Holocene Colluvium and are comprised largely of sediments reworked from River Terrace Deposits, which they are cut through. Locally up to c. 3.0m of the Slope Deposits are recorded.
- 2.8.6 The dry valley post-dates the River Terrace Deposits that it truncates, which suggests its formation post-dates MIS 6 (<190 Kya). The Chalky Solifluction Deposits likely date to the Late Pleistocene, whilst the Slope Deposits contain reworked Late Neolithic/Bronze Age artefacts.



GCZ 5

- 2.8.7 GCZ 5 is located trending south from the southern tip of GCZ 4, following field margins towards the western edge of Forton (**Figures 2–4**). Quaternary Deposits identified here include River Terrace Deposits of the Test overlain by Slope Deposits.
- 2.8.8 The River Terrace deposit have been correlated with the Mottisfont/Lower Warsash Terrace, which were deposited during MIS 9–8 (337–243 Kya). A fluviably abraded flake was recovered from these deposits during the evaluation, whilst terrace deposits likely to be equivalent and located 250 m west of the Scheme in Cottage End Gravel Pit has also produced Palaeolithic artefacts (Wymer and Wessex Archaeology 2009). The Slope Deposits are broadly equivalent with those in GCZ 4 and similarly included Holocene deposits containing reworked prehistoric artefacts.

GCZ 6

- 2.8.9 This zone is located immediately west of and above the floodplain of the River Trest (**Figures 2–4**). The zone contains River Terrace Deposits, Chalky Solifluction Deposits and Slope Deposits.
- 2.8.10 The rivers terraces are tentatively correlated with the Hamble terrace of the Test, indicating a MIS 7–6 age range. The Chalky Solifluction Deposits are of an unknown Pleistocene date but underlie and predate the terrace deposits. The Slope Deposits are Holocene colluvium.

GCZ 7

- 2.8.11 This zone is defined by the Holocene floodplain of the River Test (**Figures 2–4**). The geological sequences present have not been investigated and their geoarchaeological potential is poorly understood. They likely include late Pleistocene fluvial deposits, overlain by Holocene Alluvium.

GCZ 8

- 2.8.12 GCZ 8 is located west of the River Test, north of Bransbury and defined by Pleistocene River Terrace Deposits located immediately to the east of the Holocene floodplain (**Figures 2–4**).
- 2.8.13 The terrace deposits are assigned to the Broadland's Farm Terrace which has various age estimates between MIS 4 and MIS 2 (71–11.7 Kya), a period which included the late Middle and Upper Palaeolithic.

GCZ 9

- 2.8.14 This zone is located west of Bransbury, just north of the River Dever, and forms an interfluvium between the Dever and the River Test (**Figures 2–4**). The Quaternary Deposits within this zone are chalky solifluction gravels overlain by Slope Deposits of unknown date.

GCZs 10 and 11

- 2.8.15 These zones comprise the valley of the River Dever, an east bank tributary of the Test (**Figures 2–4**). Pleistocene River Terrace Deposits and the Holocene Alluvium are mapped by the BGS in these zones (These deposits have never been studied and it is unclear how the terrace deposits of the River Dever relate to those of the River Test).



3 AIMS AND OBJECTIVES

3.1 Introduction

3.1.1 The aims and objectives of the geoarchaeological monitoring of GI works follow those outlined within the WSI (Wessex Archaeology 2023b).

3.2 Overarching aims

3.2.1 The general aims (or purpose) of the geoarchaeological monitoring of GI works were:

- provide information about the geoarchaeological potential of the Scheme;
- allow, within the resources available, the preservation by record of any geoarchaeological evidence, and
- inform on possible requirements for further geoarchaeological work that may be required to further characterise the geoarchaeological resource, to offset the impact of the development on the geoarchaeological resource or develop a management strategy.

3.3 Overarching objectives

3.3.1 The objectives of the geoarchaeological monitoring were to:

- record the sequence of deposits at select GI locations and interpret the probable environments represented;
- obtain geoarchaeological samples of relevant deposits (where possible);
- undertake deposit modelling of the data arising from the GI monitoring;
- determine the importance of the deposits with regard to their geoarchaeological potential, and
- make specific recommendations for further geoarchaeological work, where appropriate.

3.4 Site-specific objectives

3.4.1 The following specific objectives of the monitoring were identified in the WSI:

- combine the results of Gi monitoring with those from relevant Palaeolithic geoarchaeological evaluation test pits (Wessex Archaeology 2024b) and provide an update deposits model for relevant areas of the Scheme, and
- guide the mitigation strategy to offset the impact of the Scheme on the Palaeolithic geoarchaeological resource.

4 FIELDWORK METHODS

4.1 Introduction

4.1.1 All works were undertaken in accordance with the detailed methods set out within the WSI (Wessex Archaeology 2023b). Any significant variations to these methods were agreed in writing with the client, prior to being implemented. The GI contractor was responsible for locating services, and any ecological, environmental, UXO or other constraints.



4.1.2 The following interventions were subject to geoarchaeological monitoring:

- 10 no. cable percussion boreholes drilled to 15-20m bgl;
- 4 no. window sample (WS) boreholes drilled to 2m bgl.

4.1.3 The locations of the interventions subject to these monitoring works are shown in **Figures 2–4**.

4.2 Geoarchaeological monitoring

Monitoring

4.2.1 An experienced member of the Wessex Archaeology geoarchaeology team monitored the GI works. The attending geoarchaeologist liaised closely with the geotechnical team in order to ensure effective communication was maintained throughout the works. The GI contractor provided a suitable and safe position for the monitoring geoarchaeologist.

4.2.2 The supervising geoarchaeologist recorded and interpreted the sequence of geological deposits encountered in all monitored interventions in order to allow assessment of likely geoarchaeological potential.

Sampling

4.2.3 The potential for Quaternary geological deposits to preserve paleoenvironmental evidence was assessed by the geoarchaeological specialist. No deposits with paleoenvironmental potential were identified and no samples were taken.

Recording

4.2.4 The monitored GI interventions were recorded using Wessex Archaeology's pro-forma digital recording system. For each stratigraphic unit descriptions and interpretations of the deposits are provided. Descriptions of deposits included information such as:

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

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

4.2.6 A full photographic record was made using a digital camera equipped with an image sensor of not less than 10 megapixels. This recorded both the detail and the general context of the principal lithological and stratigraphic features.

4.2.7 Digital images were 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.



4.3 Survey

- 4.3.1 A record of the as-dug location of all monitored interventions, along, with surface datum (metres above Ordnance Datum), has been provided by the GI contractor. 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 50mm.

5 POST-EXCAVATION METHODS

5.1 Stratigraphic evidence

- 5.1.1 All written and drawn records from the monitoring have been collated, checked for consistency.
- 5.1.2 Where possible, probable depositional environments, formation processes and chronostratigraphic context have been considered.
- 5.1.3 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**.

5.2 Deposit modelling

- 5.2.1 The results of the geoarchaeological monitoring were supplemented by data obtained from Palaeolithic geoarchaeological evaluation test pits (Wessex Archaeology 2024b), which included a review of British Geological Survey (BGS) archive boreholes (BGS GeoIndex). The data has been utilised to provide an updated deposit model for the Scheme. Deposit modelling identifies the range of Quaternary deposits that may be present in a defined area and maps their lateral extent and depth.
- 5.2.2 The deposit modelling has been carried out in accordance with *Deposit modeling and archaeology: guidance for mapping buried deposits* (Historic England 2020).
- 5.2.3 Only lithostratigraphic records with sufficiently detailed descriptive terminology and location data (including surface elevation) were included in the model. In total 47 deposit records were used in the deposit modelling, as shown in **Appendix 2**.
- 5.2.4 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).
- 5.2.5 Outputs comprised two-dimensional stratigraphic profiles ('transects') of selected interventions, using an inverse-distance weighted (IDW) algorithm for the stratigraphic units present. All modelling was undertaken using RockWorks™.

5.3 Finds evidence

- 5.3.1 No archaeological finds were discovered during the monitoring.

5.4 Geoarchaeological samples

- 5.4.1 No geoarchaeological samples were taken during monitoring.



6 RESULTS

6.1 Introduction

- 6.1.1 This section outlines the results of the monitoring. It includes summaries of the deposits identified, relates them those identified during previous geoarchaeological test pitting evaluation (Wessex Archaeology 2024b), and integrates the results within an updated deposit model. No archaeology was recovered and no geoarchaeological samples were taken during the monitoring.
- 6.1.2 The framework provided by the Geoarchaeological Landscape Characterisation (GLC) (see **Section 2.8**) is applied to outline the results of the geoarchaeological monitoring. The specific lithologies and lithostratigraphic succession encountered in each intervention are outlined in **Appendix 1**.

6.2 GCZ 4

- 6.2.1 Deposits with GCZ 4 were investigated in three GI boreholes (CB/BH01, ALM-WS4–5) (**Figures 2–4**). These deposits can be related to those previously recorded in 10 geoarchaeological test pits (TP11–20) (**Figures 2–4**). The generalised lithostratigraphic sequence present within GCZ 4 comprises:

- Topsoil (Recent)
- Slope Deposits (Pleistocene/Holocene)
- Chalky Solifluction Deposits (Pleistocene)
- Bedrock (Cretaceous).

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

Bedrock

- 6.2.3 Chalk Bedrock was present within two monitored GI boreholes (CB/BH01 and ALM-WS5), as well as eight geoarchaeological test pits (TP11, TP13, TP15, TP17–20). Bedrock surfaces reflect the geometry of a dry valley that runs west to east through this zone. Bedrock surfaces in interventions were highest in the north-west (c. 77.0m OD) and decreased to the south-east (c. 58.0m OD), towards the distal end of the valley and the floodplain of the River Test (**Figure 5**).

Chalky Solifluction Deposits

- 6.2.4 Chalky Solifluction Deposits were present in all three GI boreholes and nine geoarchaeological test pits (TP11–14, TP16–29), where they overlay Bedrock. Chalky Solifluction Deposits were encountered from 0.80 to 3.15m below ground level (bgl), with thicknesses ranging from 0.05 to 1.30m. Deeper sequences were in interventions located within the base of the dry valley, with shallower deposits in those situated on the valley slopes (**Figure 5**).
- 6.2.5 Chalky Solifluction Deposits were typically moderately soft to moderately firm yellowish white to brownish white chalky gravelly silty clays and slightly clayey silty gravel. Gravel clasts were fine to coarse sub-rounded to rounded chalk, and fine to coarse angular to sub-angular to flint. The clasts were poorly sorted.



6.2.6 These deposits are characteristic of Pleistocene sediments which have been remobilised down-slope via solifluction processes (seasonal freeze-thaw in periglacial environments).

Slope Deposits

6.2.7 Slope Deposits were present in all GI boreholes and geoarchaeological test pits (**Figure 6**) and overlay Chalky Solifluction Deposits. Slope Deposits were present between 0.22 to 0.95m bgl and varied in thickness between 0.38 and 0.43m.

6.2.8 These Slope Deposits were firm dark brown to light orangish brown, clay to sandy silty clayey gravel. Gravel clasts were typically fine to coarse angular to sub-rounded flint, with some sub-rounded chalk clasts. These gravels were matrix supported, poorly sorted and massive, lacking any bedding structureless.

6.2.9 Slope Deposits are formed through the downslope reworking of sediments via a combination of processes, such as colluviation and/or water run-off. The sediment source for these Slope Deposits were the earlier Pleistocene fluvial sediments of the river terraces, which are located on the edges of the valleys. Intact fluvial terrace deposits likely belonging to the Mottisfont / Lower Warsash Terrace (Terrace 3) were recorded in a geoarchaeological test pit (TP15) that was located on western slope of the dry valley (**Figure 4**).

6.2.10 The geoarchaeological test pitting recovered late Neolithic/early Bronze Age lithic artefacts, reworked within these Slope Deposits (Wessex Archaeology 2024b). This indicates that these Slope Deposits are principally Holocene Colluvium.

Topsoil

6.2.11 Topsoil comprised mid-brown to dark brown sandy gravelly clay to gravelly silt. It ranged from 0.22 to 0.40m in thickness.

6.3 GCZ 5

6.3.1 Deposits within GCZ 5 were investigated in two boreholes (ALM-WS2–3) (**Figures 2–4**). These deposits can be related to those previously recorded in five geoarchaeological test pits (TP21–25) (**Figures 2–4**). The generalised lithostratigraphic sequence present within GCZ 5 comprises:

- Topsoil (Recent)
- Slope Deposits (Pleistocene/Holocene)
- River Terrace Deposits - Mottisfont/Lower Warsash Terrace (late Middle Pleistocene)
- Bedrock (Cretaceous).

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

Bedrock

6.3.3 Bedrock was not reached in two monitored boreholes, but Chalk Bedrock was encountered in two geoarchaeological test pits (TP22 and TP25), where its surface was at 65.01 and 57.95m OD (**Figures 6–7**).

River Terrace Deposits

6.3.4 River Terrace Deposits were present from between 0.20 to 1.65m bgl in both GI boreholes and the five archaeological test pits. These Terrace Deposits were generally at least 1.5m



thick. Transects through these deposits demonstrate that they all correlate with Mottisfont/Lower Warsash Terrace (Terrace 3) of the River Test (**Figures 6–7**).

- 6.3.5 River Terrace Deposits were mid reddish brown to greyish brown, slightly clayey sandy gravel. Gravel clasts were typically fine to coarse, sub-angular to sub-rounded flint. Occasional rounded chalk clasts were often observed. Gravels were generally moderately well sorted and varied from clast supported to matrix supported. They are characteristic of relatively high energy fluvial sediments.

Slope Deposits

- 6.3.6 Slope Deposits were present in ALM-WS2, but absent from ALM-WS3. This distribution is similar to that for the geoarchaeological test pits in this zone, with Slope Deposits concentrated in areas to the west, located down-slope towards the floodplain of the River Test (**Figures 6–7**). These Slope Deposits overlie River Terrace Deposits and were generally c. 0.50m thick.
- 6.3.7 The Slope Deposits were firm dark brown to light orangish brown, clay to sandy silty clayey gravels. Gravel clasts were typically fine to coarse rounded chalk and angular to sub-rounded flint. Gravels were poorly sorted, massive and matrix supported. These deposits were structureless.
- 6.3.8 These Slope Deposits are lithologically similar to those in GCZ 4 and a likely late Neolithic or Bronze Age piercer was recovered during the test pitting evaluation (Wessex Archaeology 2024b), indicating that they are principally Holocene Colluvium.

Topsoil

- 6.3.9 Topsoil comprised mid brown to dark brown sandy gravelly clay to gravelly silt and ranged in thickness from 0.20 to 0.45m.

6.4 GCZ 6

- 6.4.1 Deposits within GCZ 6 were investigated in two boreholes (UF/BH01 and RT/BH01) (**Figures 2–4**). These deposits can be related to those previously recorded in five geoarchaeological test pits (TP26–30) (**Figures 2–4**). The generalised lithostratigraphic sequence present within GCZ 6 comprises:

- Topsoil (Recent)
- Slope Deposits (Pleistocene/Holocene)
- River Terrace Deposits - Hamble Terrace (late Middle Pleistocene)
- Bedrock (Cretaceous).

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

Bedrock

- 6.4.3 Chalk Bedrock was reached in both monitored boreholes and all geoarchaeological test pits, with surface heights ranging from 50.64 to 54.69m OD. The lowest bedrock surface height, and thickest sequences of overlying River Terrace Deposits, was in UF/BH01.



River Terrace Deposits

- 6.4.4 River Terrace Deposits were present in GI borehole UF/BH01 and all geoarchaeological test pits from depths of 0.26 to 1.90m bgl. The terrace deposits were generally less than 2.0m thick, with exception of UF/BH01 where 3.95m were recorded. This, along with the decrease in Bedrock surface height at this location (see above), may be indicative of the presence of a deeper fluvial channel
- 6.4.5 River Terrace Deposits were mid reddish brown to greyish brown, slightly clayey sandy gravels. Gravel clasts were typically fine to coarse, sub-angular to sub-rounded, flint. Clasts of sub-rounded to rounded to chalk were also noted. Gravels were moderately well sorted and varied from clast supported to matrix supported. Within the test pits, horizontal fluvial bedding was observed. The deposits are characteristic relatively high energy fluvial sediments. Transects through these deposits suggest that the River Terrace Deposits in all interventions in this zone belong to Hamble Terrace of the River Test (**Figures 6–7**).

Slope Deposits

- 6.4.6 Slope Deposits were less extensive in interventions in this zone than in those to the north-west (GCZ 5), but were recorded in borehole RT/BH01, as well as TP27 and TP29. The sequence of Slope Deposits in RT/BH01 was unusually thick (3.00m), and directly overlies chalk bedrock, with no River Terrace Deposits recorded.
- 6.4.7 These Slope Deposits were firm dark brown to light orangish brown, clay to sandy silty clayey gravel. Gravel clasts were typically fine to coarse rounded chalk and angular to sub-rounded flint. Gravels were poorly sorted, and matrix supported.
- 6.4.8 The Slope Deposits in RT/BH01 are located at the eastern edge of the Hamble Terrace and on the western edge of the current Test floodplain. They are therefore likely to have been formed banked up against slopes formed on the edge of the terrace and the current floodplain. Their age is uncertain. They are similar to Holocene colluvial deposits located in zones to the north-west (GCZ 4 and GCZ 5), but they could include Pleistocene sediments.

Topsoil

- 6.4.9 Topsoil comprised mid brown to dark brown sandy gravelly clay to gravelly silt. It ranged in thickness from 0.30 to 0.45m.

6.5 GCZ 7

- 6.5.1 Deposits within GCZ 7 were investigated in two boreholes (RT/BH02 and RT/BH03) (**Figures 2–4**). The lithostratigraphic sequence encountered comprised:

- Topsoil (Recent)
- River Terrace Deposits – Late Pleistocene Sands and Gravels (Upper Pleistocene)
- Bedrock (Cretaceous)

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

Bedrock

- 6.5.3 Chalk Bedrock was reached in both boreholes, with the Bedrock surfaces being at 44.94 to 45.10m OD.



River Terrace Deposits

- 6.5.4 In both boreholes Bedrock was overlain by 4.15 to 4.55m of bedded, sandy gravels. These gravels comprised mid reddish brown to greyish brown, slightly clayey, sandy gravel with silty gravel units towards the base. Gravel clasts were typically fine to coarse, sub-angular to sub-rounded flint. Gravels were generally moderately sorted, with both clast supported to matrix supported units.
- 6.5.5 These are sequences of high energy fluvial sands and gravels, which have been deposited within a deeply incised channel located in the base of the current floodplain of the River Test (**Figures 6–7**). Transects through the deposits (**Figures 6–7**) demonstrate that they are younger than the Hamble Terrace and, likely, the Broadland's Farm Terrace. This suggests that they are late Pleistocene fluvial deposits, post-dating MIS 4 (<71 Kya).

Topsoil

- 6.5.6 Although Holocene Alluvium is mapped in these areas by the BGS (**Figure 4**), and whilst it is possible that upper units of the fluvial sands and gravels could date to the Holocene, no clear Holocene Alluvium was identified in either borehole. Topsoil (c. 0.30m) comprising mid brown to dark brown gravelly silt directly overlay the sands and gravels.

6.6 GCZ 8

- 6.6.1 One GI intervention was located in this zone (RT/BH04), as were four geoarchaeological test pits (TP31–34) (**Figures 2–4**). The generalised lithostratigraphic sequence encountered comprised:

- Topsoil (Recent)
- Alluvium (Holocene)
- Slope Deposits (Pleistocene/Holocene)
- River Terrace Deposits – Late Pleistocene Sands and Gravels (Upper Pleistocene)
- River Terrace Deposits – Broadland's Farm Terrace (Upper Pleistocene)
- Bedrock (Cretaceous).

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

Bedrock

- 6.6.3 Chalk Bedrock was reached in RT/BH04 at a surface height of 45.33m OD. The geoarchaeological test pits did not reach Bedrock.

River Terrace Deposits

- 6.6.4 Sequences of fluvial sands and gravels were present in geoarchaeological test pits TP31–34, which were located on the eastern flank of the Test Valley (**Figure 4**). The position of the sands and gravels in TP34, located above the current floodplain, suggests that they belong to a low Pleistocene terrace of the River Test. Transects through these deposits suggest that the fluvial sands and gravels in TP34 belong to the Broadland's Farm Terrace (Terrace 1) (**Figures 6–7**).
- 6.6.5 Fluvial sands and gravels located further west in TP31–33 may be equivalent but, as only their tops were identified in the test pits, some or all could correlate with later Pleistocene Sands and Gravels identified in RT/BH04



6.6.6 RT/BH04 recorded a c. 5.0m sequence of fluvial sands and gravels above bedrock. These sands and gravels are analogous to those recorded in RT/BH02 and RT/BH03, located to the west in GCZ 7. Transects through these deposits demonstrate that they post-date the Broadland's Farm Terrace and belong to the same sequence of late Pleistocene fluvial sands and gravels (**Figures 6–7**).

Slope Deposits

6.6.7 In RT/BH04 0.75m of Slope Deposits overlay the fluvial sands and gravels. The Slope Deposits comprised sub-angular and sub-rounded flint gravel in a yellowish-brown sandy clay matrix. Similar deposits overlay River Terrace Deposits to the east, in TP34. These sediments are undated, but their stratigraphic position above likely late Pleistocene deposits indicates that they are most likely to be Holocene Colluvium.

Alluvium

6.6.8 A shallow 0.10m deep sequence of minerogenic Holocene Alluvium was recorded overlying fluvial sands and gravels in geoarchaeological test pit TP32.

Topsoil

6.6.9 Topsoil comprised 0.25 to 0.40m of mid brown to dark brown gravelly silt.

6.7 GCZ 9

6.7.1 GI borehole RD/BH04 and geoarchaeological TP35 were located in the east of GCZ 9, on the southern edge of the interfluvium above the valley of the River Dever (**Figures 2–4**). These interventions recorded sequences of deposits comprising:

- Topsoil (Recent)
- Slope Deposits (Pleistocene/Holocene)
- Bedrock (Cretaceous).

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

Bedrock

6.7.3 Chalk Bedrock was present in RD/BH04 and TP35 at surface heights of heights of 53.09 to 53.94m OD.

Slope Deposits

6.7.4 TP35 identified deposit overlying Bedrock on western edge of Chalk Bedrock spur overlooking the Dever Valley (**Figure 4**). RD /BH04 was located further towards the centre of this spur and recorded Topsoil overlying Bedrock.

6.7.5 In TP35 c. 1.0m of Slope Deposits with c. 0.10m of chalky gravel at the base overlay Bedrock. The Slope Deposits comprised yellowish to reddish brown gravelly sandy silt, silty sand and gravelly clay with medium to coarse angular flint clasts. They are undated, but maybe Holocene Colluvium.

Topsoil

6.7.6 RD/BH04 and TP35 recorded c. 0.40m of sandy clay Topsoil.



6.8 GCZ 10

6.8.1 One GI borehole, RD/BH03, was located in the south of this zone (**Figures 2–4**). The lithostratigraphic sequence encountered comprised:

- Made Ground (Recent)
- Possible River Terrace Deposits – ?Broadland's Farm Terrace equivalent (?Upper Pleistocene)
- Bedrock (Cretaceous).

6.8.2 The deposits, their lithostratigraphic relationship and their distribution are illustrated in **Figure 8** and described below.

Chalk Bedrock

6.8.3 Chalk Bedrock was recorded at a surface height of 48.86m OD.

Possible River Terrace Deposits

6.8.4 Possible River Terrace Deposits were present in RD/BH03. They comprised 1.15m of light orangish brown silty clay, with abundant sub-rounded chalk inclusions. These are not unequivocally fluvial sediments, and could be Slope Deposits. However, they are located where terrace deposits of River Dever are mapped by the BGS (**Figure 4**). If river Terrace Deposits, their age and correlation with terraces of the River Test is uncertain, but based on their basal height of c.49 m OD they could be broadly equivalent in age with the Broadland's Farm Terrace (Terrace 1) in the Test Valley.

Made Ground

6.8.5 The Possible River Terrace Deposits in RD/BH03 were overlain by 0.65m of redeposited dark brown silty clay with very frequent sub-rounded chalk and occasional sub-rounded flint clasts

6.9 GCZ 11

6.9.1 One GI borehole, RD/BH01, was located in the south of this zone (**Figures 2–4**). The lithostratigraphic sequence encountered comprised:

- Topsoil (Recent).
- Slope Deposits (Pleistocene/Holocene)
- River Terrace Deposits – ?Late Pleistocene Sands and Gravels (Upper Pleistocene)
- Bedrock (Cretaceous)

6.9.2 The deposits, their lithostratigraphic relationship and their distribution are illustrated in **Figure 8** and described below.

Chalk Bedrock

6.9.3 Chalk Bedrock was encountered in RD/BH01 at a height of 48.20m OD.



River Terrace Deposits

- 6.9.4 At a depth of 2.60m bgl, and with a thickness of 0.60m, coarse sandy fine to coarse subangular and subrounded flint gravels were recorded overlying Bedrock in RD/BH01. These gravels are characteristic of fluvial sands and gravels. They occur beneath 2.30m of Slope Deposits. They are likely to be late Pleistocene fluvial deposits of the River Dever.

Slope Deposits

- 6.9.5 Slope Deposits were present in intervention RD/BH01 and overlying the fluvial sands and gravels. These Slope Deposits were present at 0.30m bgl and were 2.30m thick. Two stratigraphic units were identified, a lower gravelly silt and an upper silty gravelly clay. The gravel comprised sub-angular, fine to coarse flint and fine, rounded chalk. These two units are likely both colluvial and were deposited where the southern side valley joins the that of the Dever (**Figure 4**). The age of these Slope Deposits is unknown, but it is possible that the stratigraphy reflects a division between late Pleistocene and Holocene sediments.

Topsoil

- 6.9.6 In RD/BH01 0.40m of loose mid brown slightly fine sandy gravelly clay Topsoil overlay the Slope Deposits.

7 DISCUSSION

7.1 Introduction

- 7.1.1 The following discussion considers the depositional and stratigraphic context of the deposits identified during the monitoring, their age and their geoarchaeological potential. The information on these deposits provided by the monitoring adds and enhances that obtained from geoarchaeological test pitting evaluation (Wessex Archaeology 2024b).

7.2 Sedimentary sequences and depositional environments

Test River Terraces

- 7.2.1 Monitoring of GI works has further demonstrated the presence of Pleistocene River Terrace Deposits of River Test along the Scheme route. These terrace deposits of the Test are principally located within Geoarchaeological Character Zones (GCZs) 3 and 5–8 of the Scheme's Geoarchaeological Landscape Characterisation (GLC). The terrace deposits in each of these zones belong to different terraces of the River Test, and are different ages. The terrace deposits present in each GCZ are reviewed below.

GCZ 3

- 7.2.2 Whilst no GI boreholes were located in this zone, geoarchaeological test pitting evaluation has demonstrated the presence of Test terraces, which can be correlated with either the Bitterne or the Nursling Terraces (Wessex Archaeology 2024b). These are the oldest Test terraces present along the Scheme route. Based on modelling of uplift rates, tied to luminescence dating of younger terraces (Westaway et al. 2006), these terrace deposits are thought to broadly date to MIS 14 and 13b (563–478 Kya), which is during the Lower Palaeolithic archaeological period. The terrace deposits in the test pits comprised fluvial sands and gavel, with some sand and clay units. They are characteristic of fluvial deposits but the nature of the depositional regime (braid bars, channels, floodplain sediments etc) is uncertain (Wessex Archaeology 2024b).

GCZ 5

- 7.2.3 River Terrace Deposits GI boreholes and geoarchaeological test pits within GCZ 5 have been correlated with Mottisfont/Lower Warsash Terrace. This terrace has been dated

through luminescence dating to MIS 9–8 (337–243 Kya), during the transitional archaeological period between the late Lower and early Middle Palaeolithic (Harding et al. 2012, Hatch et al. 2017). These terrace deposits in both the GI boreholes and evaluation test pits were fluvial sands and gravels, but may reflect a range of fluvial environments.

GCZ 6

- 7.2.4 Both GI boreholes and geoarchaeological test pits have identified terrace deposits in GCZ 6, which belong to the Hamble Terrace of the Test. Luminescence dating indicates that the Hamble Terrace dates to MIS 7–6 (243–130 Kya), during the early Middle Palaeolithic archaeological period (Briant et al. 2012, Hatch et al. 2017). The borehole monitoring has established the eastern lateral extent of these terrace deposits is towards the south-east boundary of GCZ 6, between geoarchaeological TP31 and GI borehole RT/BH01 (**Figure 4**). The deposits recorded comprised bedded, fluvial sands and gravels. The GI monitoring (UF/BH01) indicated the possible presence of a channel within the Hamble Terrace.

GCZ 7

- 7.2.5 The GI monitoring has established that across this zone, and extending into the east of GCZ 8, are c. 4.0–4.5m of fluvial sands and gravels, which are within a deeply incised channel located in the base of the current floodplain of the River Test. The sands and gravels post-date the Hamble Terrace and, likely, the Broadland's Farm Terrace. Thus, they likely post-date MIS 4 (<71 Kya). They represent the earliest deposits associated with the current floodplain of the Test and are likely to date to the late Pleistocene. They were deposited subsequent to the final phase of terrace downcutting at the end of the Pleistocene, which suggests that they were deposited during the last Pleistocene cold stage, most likely during MIS 2 (29–11.7 Kya). Deposition by a braided river system across a braid plain in a periglacial cold stage environment would be consistent with the deep sequences of high energy fluvial sands and gravels recorded in the GI monitoring.

GCZ 8

- 7.2.6 Within the west of GCZ 8, borehole monitoring identified the lateral continuation of the late Pleistocene fluvial sands and gravels recorded in GCZ 7 (e.g. RT/BH04). Further west, it is likely that fluvial sands and gravels in geoarchaeological test pits included the earlier, final Pleistocene terrace of the Test, the Broadland's Farm Terrace (e.g. TP34). This terrace is dated through luminescence to MIS 4 (71–57 Kya) during the late Middle Palaeolithic period (Briant et al. 2012). As the geoarchaeological test pits located to the east of RT/BH04 only reached the top of the fluvial sands and gravels, with the resultant absence of heights for the base of the terrace deposits, the location of the division between the edge of the Broadland's Farm Terrace and the late Pleistocene sands and gravels is currently uncertain.

Dry Valley

- 7.2.7 GI monitoring of boreholes and geoarchaeological test pitting evaluation has established that a significant dry valley runs through areas of the Scheme located to west of the River Test, which truncates the Test terraces. The extent of this dry valley along the Scheme route is defined by GCZ 4 (**Figure 4**). This dry valley joins the current floodplain of the River Test in the area north of GCZ 6 (**Figure 4**). As this dry valley cuts through all Test terraces at least up to and including the Hamble Terrace, this demonstrates that the valley formed after MIS 6 (<130 Kya). As it joins the current floodplain, it is like the valley was formed at the end of the Pleistocene.
- 7.2.8 The GI monitoring and test pitting within GCZ 4 has established that the valley contains basal chalky gravels, which are likely periglacial solifluction deposits. These were likely deposited during a late Pleistocene cold stage, most likely during MIS 2 (29–11.7 Kya).

These chalk gravels are overlain by Slope Deposits, which comprise sediments colluvially reworked from the Pleistocene terraces. The geoarchaeological test pitting demonstrated that these Slope Deposits contain late Neolithic/early Bronze Age lithic artefacts, which indicates that the sediments are principally Holocene Colluvium.

River Dever

- 7.2.9 Monitoring of GI boreholes in areas north (RD/BH03) and south (RD/BH01) of the River Dever, in GCZs 10 and 11, identified fluvial and possible fluvial deposits which may be Pleistocene. These are poorly understood and are undated, but most likely date to the late Pleistocene. Those in GCZ 10 could be Slope Deposits of unknown age, but if they are Pleistocene fluvial sediments, they could be equivalent with the Broadland's Farm Terrace of the River Test. Those in GCZ 11 are more clearly Pleistocene fluvial deposits. Their position in the base of the current floodplain of the Dever indicates that they are most likely to be late Pleistocene fluvial sands and gravels equivalent to those of the Test in GCZ 7. They may therefore have been deposited during MIS 2 (29–11.7 Kya).
- 7.2.10 The combined data from borehole monitoring and geoarchaeological test pitting suggests that the River Dever does not have an extensive staircase of Pleistocene river terraces and that the river system likely formed during the late Pleistocene, possibly as late as MIS 2. The Slope Deposits recorded in RD/BH01 in GCZ 11 are likely to be at least partially equivalent with Holocene Colluvium identified within the dry valley in GCZ 4.

7.3 Geoarchaeological resource

- 7.3.1 Whilst no archaeology or Quaternary deposits with palaeoenvironmental potential were identified during the geoarchaeological monitoring, deposits present with geoarchaeological potential (in particular for containing Palaeolithic archaeology) were identified. The geoarchaeological potential of deposits and likely Scheme impacts are reviewed below.

Test River Terraces

Geoarchaeological potential

- 7.3.2 The Test River Terrace Deposits along the Scheme route include deposits which have potential to contain significant Palaeolithic archaeology. The results of GI monitoring and geoarchaeological test pitting (Wessex Archaeology 2024b) suggest that these deposits have generally low potential to contain significant palaeoenvironmental remains. The archaeological potential of the different terraces is summarised below, ordered by GCZ.

GCZ 3

- 7.3.3 Bitterne or Nursling Terrace Deposits in this zone have the potential to contain Lower Palaeolithic lithic artefacts that relate to the earliest period of Palaeolithic settlement history in the Solent river system. Within the Test Valley large numbers of handaxes are known from sediments of the Nursling Terrace, with fewer recorded from the earlier Bitterne Terrace (Davies et al. 2021). The fluvial deposits recorded in the test pitting could contain artefacts contemporary with the deposits, or fluvially reworked examples from older sediments. Archaeology that was contemporary with the deposits, would be highly significant, reflecting some of earliest minimally disturbed evidence for human occupation in the Solent region. If reworked, their significance would lie in reflecting a general early Lower Palaeolithic human presence in the area.

GCZ 5

- 7.3.4 Terrace deposits in GCZ 5 are correlated with the Mottisfont/Lower Warsash Terrace. Within the Test Valley, this terrace contains significant early Middle Palaeolithic

archaeology. This archaeology includes contemporary lithic artefacts that provide the first evidence for Middle Palaeolithic Levallois core working practices. A fluviably abraded flake was recovered from these deposits during the test pitting evaluation (Wessex Archaeology 2024b), whilst equivalent terrace deposit located 250m west of the Scheme in Cottage End Gravel Pit also produced Palaeolithic artefacts (Wymer and Wessex Archaeology 2009). These finds demonstrate the archaeological potential of these terrace deposits. Archaeology from these deposits could include further finds of fluviably abraded artefacts, reflective of general patterns of Palaeolithic settlement history, and minimally disturbed material reflective of Palaeolithic activity at particular locations within the landscape.

GCZ 6

- 7.3.5 The River Terrace Deposits in this zone are correlated with the Hamble Terrace. The archaeological potential of this terrace is poorly understood, but its MIS 7–6 (243–130 Kya) places it within the early Middle Palaeolithic, a key period for early Neanderthal occupation (e.g. Scott 2011). The deposits could contain both minimally disturbed archaeology and material reworked with the fluvial deposits, potentially incorporating artefacts from earlier terraces.

GCZ 7

- 7.3.6 This zone contains late Pleistocene fluvial sands and gravels formed within the floodplain of the current river, likely during a cold stage at the end of the Pleistocene, and potentially during MIS 2 (29–11.7 Kya). This is period when humans are thought to be absent from Britain, whilst any archaeology contain with these cold stage fluvial deposits is likely to be significantly reworked, and would probably be from earlier terraces. This implies that the potential for significant Palaeolithic archaeology is limited.

GCZ 8

- 7.3.7 The east of this zone may contain terrace deposits of the Broadland's Farm Terrace. As with the preceding Hamble Terrace, the archaeological potential of this terraces is poorly understood, However, it dates to a period associated with reoccupation of the region by late Neanderthal populations and could contain late Middle Palaeolithic archaeology. Diagnostic late Middel Palaeolithic artefacts are known Test Valley, which may be from this terrace, but the context of these artefacts is generally poorly understood (Cutler 2013).

Scheme impacts

- 7.3.8 The principal Scheme impacts on terrace deposits of the River Test will be an open cut pipe trench and entry points to trenchless crossings of the river (**Figure 9**). These will impact on terrace deposits in GCZ 3–6 and 8. These zones contain deposits of the Bitterne or Nursling, Mottisfont/Lower Warsash Terrace, Hamble and, likely Broadland's Farm Terrace, which have potential to contain significant Palaeolithic archaeology. The trenchless crossing will prevent impacts on deposits in GCZ 7 (late Pleistocene fluvial sands and gravels and any overlying Holocene Alluvium).

Dry Valley

Geoarchaeological potential

- 7.3.9 Test pitting evaluation has demonstrated that Holocene Slope Deposits in GCZ 4 contain reworked prehistoric artefacts. Whilst these may indicate areas of the landscape where undisturbed prehistoric archaeology could occur, they are of themselves limited significance. The geoarchaeological test pitting evaluation concluded that the geoarchaeological potential (both archaeological and palaeoenvironmental) of deposits within this dry valley is low (Wessex Archaeology 2024b)



Scheme impacts

7.3.10 Deposits within the dry valley will be impacted by an open cut pipe trench (**Figure 9**).

River Dever

Geoarchaeological potential

7.3.11 Gi monitoring and test pitting evaluation has demonstrated that the Dever Valley within the Scheme contains late Pleistocene fluvial deposits and Slope Deposits. These are likely to date to late Pleistocene and Holocene. Although the archaeological potential of these deposits is relatively poorly understood, the available evidence and comparison with likely broadly equivalent deposit investigated in adjacent areas of the Test Valley indicates geoarchaeological potential to contain significant evidence (both archaeological and palaeoenvironmental) is low.

8 CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

8.1.1 A program of geoarchaeological monitoring of selected Ground Investigation (GI) works relating to the Andover Link Main Scheme was carried out. The purpose of this monitoring was to mitigate against impacts on, and to characterise, any geoarchaeological deposits present. The monitoring was carried out as part of a wider program of archaeological evaluation carried out to assess the archaeological resource that will be impacted on by the Andover Link Main Scheme and was carried out alongside a program of geoarchaeological test pitting evaluation (Wessex Archaeology 2024b).

8.1.2 The monitoring has successfully characterised the Quaternary deposits present at selected GI locations. Whilst no archaeology or deposits with potential to preserve significant palaeoenvironmental remains were identified during the monitoring, the combined results of the monitoring and geoarchaeological test pitting (Wessex Archaeology 2024b) have established that the Scheme will impact on Pleistocene river terraces of the River Test that have the potential to contain significant Lower and Middle Palaeolithic archaeology.

8.1.3 Deposits belonging to four terraces of River Test will be impacted. These terraces are located along the sides of the Test Valley within four GCZs of the Scheme's GLC (Wessex Archaeology 2024b). In summary, these are:

- GCZ 3 – Bitterne or the Nursling Terraces (MIS 14 and 13b; 563 –478 Kya). These terraces have the potential to contain Lower Palaeolithic lithic artefacts relating to the earliest period of Palaeolithic settlement history in the region.
- GCZ 5 – Mottisfont/Lower Warsash Terrace. (MIS 9–8; 337–243 Kya). This terrace dates to the transitional archaeological period between the late Lower and early Middle Palaeolithic and can contain significant early Middle Palaeolithic archaeology. A flake was recovered from these terrace deposits during the test pitting evaluation (Wessex Archaeology 2024b), whilst Palaeolithic artefacts were recovered from these terrace deposits in Cottage End Gravel Pit, located 250m to the west of the Scheme route (Wymer and Wessex Archaeology 2009).
- GCZ 6 – Hamble Terrace (MIS 7–6; 243–130 Kya). This terrace dates to the early Middle Palaeolithic, a key period early Neanderthal occupation in the region. The terrace deposits can contain significant early Middle Palaeolithic archaeology.



- GCZ 8 – Broadland's Farm Terrace (MIS 4; 71–57 Kya). The age of this terrace is within period when the region was occupied by late Neanderthal populations and could contain significant late Middle Palaeolithic archaeology.

8.2 Recommendations

8.2.1 The results of the GI monitoring, along with the geoarchaeological test pitting evaluation (Wessex Archaeology 2024b,) has demonstrated that the Andover Link Main Scheme will impact on Pleistocene River Terrace Deposits of the River Test that have the potential to contain significant Lower and Middle Palaeolithic archaeology. The results of the monitoring support recommendations made in the geoarchaeological test pitting report (Wessex Archaeology 2024b) for further targeted geoarchaeological investigations to mitigate against these impacts. These further investigations should be guided by Scheme-specific research objectives. A series of Scheme-specific research objectives and targeted recommendations for geoarchaeological investigations are provided below.

Scheme-specific research objectives

8.2.2 Based on the results of the GI monitoring and geoarchaeological test pitting evaluation, Scheme-specific geoarchaeological research objectives are presented as research questions. These questions are framed with reference to research questions and objectives outlined in the *Archaeological Strategy for Hampshire* (Hampshire County Council 2012).

Pleistocene River Terrace Deposits of the River Test

- G1 – What is the distribution of Pleistocene River Terrace deposits of the River Test along the Scheme route?
- G2 – How many different river terraces River Test are there, and how are they distributed?
- G3 – How old are the different terraces? How do they correlate with Test terraces in other areas?
- G4 – How were different units within different terraces deposited? What different depositional contexts do these represent (e.g. high energy braided fluvial systems, overbank floodplain deposits, river edge fluvial/colluvial sediments etc.)? How are deposits reflecting different modes of deposition distributed both laterally and vertically within terraces?
- G5 – What archaeological records, and from which archaeological periods of the Palaeolithic, are preserved within different terraces (e.g. Lower, early Middle and late Middle)? To what extent have archaeological finds within the terraces been fluvially reworked? Do the terraces contain horizons preserving minimally disturbed/in situ archaeology?
- G6 – What patterns of Palaeolithic settlement history and occupation do archaeological records from the Pleistocene River Terrace Deposits reflect? How do these compare to regional settlement histories associated with fluvial systems of other Solent rivers, and national patterns of human presence and absence?

Slope Deposits overlying River Terrace Deposits of the River Test

- G7– How old are Slope Deposits overlying River Terrace Deposits?
- G8 – What processes formed these sequences?
- G9 – Do these Slope Deposits preserve significant Palaeolithic archaeology?



Geoarchaeological mitigation

- 8.2.3 In accordance with recommendations provided geoaarchaeological test pitting evaluation report (Wessex Archaeology 2024b), in order to address the Scheme-specific research objectives additional test pits are recommended targeted on River Terraces Deposits of the River Test that will be impacted. These test pits should include sieving to recover any Palaeolithic archaeology and capacity for stepping to enable recording, sampling (including taking of luminescence samples for dating) and controlled artefact recovery, as appropriate. 17 additional geoaarchaeological test pits are recommended to be located as illustrated in **Figure 9**.

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. Hampshire Cultural Trust has agreed in principle to accept the archive on completion of the project, under the accession code **A2023.19**.

9.2 Preparation of archive

Physical archive

- 9.2.1 The archive, which includes paper records, and graphics will be prepared following the standard conditions for the acceptance of excavated archaeological material by Hampshire Cultural Trust, and in general following nationally recommended guidelines (Brown 2011; ClfA 2020a; SMA 1995).
- 9.2.2 All archive elements are marked with the **A2023.19**, and a full index will be prepared. The physical archive currently comprises the following:
- 01 files/document cases of paper records

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, ClfA 2020b) and generic selection policies (SMA 1993; Wessex Archaeology's internal selection policy) and follows ClfA'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.

Finds

9.3.5 No finds were recovered during the monitoring.

Palaeoenvironmental, sedimentological and scientific dating samples

9.3.6 No samples were taken during the monitoring.

Documentary records

9.3.7 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

9.3.8 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.

9.3.9 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 Archaeologist at the New Forest National Park Authority 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 COPYRIGHT

10.1 Archive and report copyright

- 10.1.1 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*.
- 10.1.2 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.

10.2 Third party data copyright

- 10.2.1 This document, the monitoring 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 Geoarchaeological monitoring – borehole summaries

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

Site Code: 266085		Site Name: Andover Link Main		Borehole ID: RD/BH01 (WABH01)	
Coordinates (NGR) X: 442625		Coordinates (NGR) Y: 142156		Level (top): 51.4	
				Depth: 20.00 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
1001	Loose mid brown slightly sandy gravelly CLAY. Gravel is fine to coarse subrounded to subangular flint. Sand is fine. rooting common.	Topsoil	0.00-0.30	51.40-51.10	
1002	Moderately firm slightly sandy silty gravelly clay. Gravel is subangular fine to coarse flint and fine rounded chalk. Sand is fine. Rooting present.	Slope Deposits	0.30-1.50	51.10-49.90	
1003	Yellowish brown gravelly SILT. Gravel is fine to coarse subangular to subrounded chalk and fine to coarse angular flint.	Slope Deposits	1.50-2.60	49.90-48.80	
1004	Sandy GRAVEL. Gravel is fine to coarse subangular to subrounded flint. Sand is coarse.	Fluvial Sands and Gravels (River Terrace Deposits)	2.60-3.20	48.80-48.20	
1005	Brownish white to white structureless chalk. .	Bedrock (Chalk)	3.20+	48.20+	



Site Code: 266085		Site Name: Andover Link Main		Borehole ID: RD/BH03 (WABH03)	
Coordinates (NGR) X: 442623		Coordinates (NGR) Y: 142328		Level (top): 50.66	
				Depth: 20.00 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
301	Dark brown silty CLAY with very frequent subrounded chalk and occasional subrounded flint.	Made Ground	0.00-0.65	50.66-50.01	
302	Light orangish brown silty CLAY with abundant subrounded chalk inclusions. 150mm sub-angular flint clast present.	?Fluvial Clay (Possible River Terrace Deposits)	0.65-1.80	50.01-48.86	
303	CHALK. Observed until 5m and only change was the context moving from solid chalk to sludgy and waterlogged.	Bedrock (Chalk)	1.80+	48.86+	



Site Code: 266085		Site Name: Andover Link Main		Borehole ID: RD/BH04 (BH04)	
Coordinates (NGR) X: 442593		Coordinates (NGR) Y: 142406		Level (top): 54.34	
				Depth: 20.00 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
401	Yellowish brown firm sandy CLAY. with subangular flint clasts. chalk bedrock encountered at 0.40m. Some rooting from crops.	Topsoil	0.00-0.40	54.34-53.94	
402	Chalk	Bedrock (Chalk)	0.40+	53.94+	



Site Code: 266085		Site Name: Andover Link Main		Borehole ID: RT/BH01 (WABH05)	
Coordinates (NGR) X: 441584.5		Coordinates (NGR) Y: 142824.3		Level (top): 52.91	
				Depth: 20.00 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
501	Mid greyish brown brecciated gravelly slightly clayey SILT. Gravel is fine to coarse (2-32mm) subangular flint gravel clasts. Frequent roots. Unconsolidated. Moderately to poorly sorted.	Modern Soil Profile	0.00-0.30	52.91-52.61	
502	Mid slightly orangish brown slightly sandy gravelly clayey SILT. Sand is fine. Gravel is occasional (<30%) fine to coarse (2-28mm) subangular to angular (80:20) flint gravel clasts. Gravel increasing to abundant (<40%). Matrix supported. Medium dense. Moderately consolidated. Moderately to poorly sorted. Rare fine roots.	Slope Deposits	0.30-1.00	52.61-51.91	
503	Mid grey mottled cream slightly sandy very gravelly CLAY. Gravel is fine to coarse (2-24mm) subrounded to angular (20:80) flint gravel clasts. Moderately consolidated. Coarse fragments of white silty clay becoming frequent with depth. Poorly sorted. Rare fine to medium chalk clasts. (1.00-1.20m was drilled so contains some roots and straw from topsoil)	Slope Deposits	1.00-4.00	51.91-48.91	
504	Cream slightly gravelly slightly sandy SILT. Wet slop due to water added to drill process. Gravel is occasional (<40%) fine to medium (2-15mm) subangular flint and chalk clasts. Poorly sorted. Becoming more consolidated with rare flint gravel at 6.50m. Rare nodular clasts with depth.	Possible Bedrock (Chalk)	4.00-7.00	48.91-45.91	
505	CHALK bedrock	Bedrock (Chalk)	7.00+	45.91+	



Site Code: 266085		Site Name: Andover Link Main		Borehole ID: RT/BH02 (WABH06)	
Coordinates (NGR) X: 441734.9		Coordinates (NGR) Y: 142730.8		Level (top): 49.89	
				Depth: 20.00 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
6001	Dark blackish brown slightly gravelly SILT with frequent plant roots (Hand-dug trial hole)	Topsoil	0.00-0.25	49.89-49.64	
6002	Brownish grey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse (2-35mm) subangular to subrounded (80:20) flint clasts and rare quartz clasts. Dense and moderately sorted. Lower boundary is unclear	Fluvial Sands and Gravels (River Terrace Deposits)	0.25-1.65	49.64-48.19	
6003	Brownish grey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse (2-50mm) subangular to subrounded (65:35) flint clasts with occasional becoming frequent cobble-sized (<110mm) subangular flint clasts. Dense and poorly sorted. Lower boundary is unclear	Fluvial Sands and Gravels (River Terrace Deposits)	1.65-4.40	48.19-45.44	
6004	Slightly yellowish to white grey slightly clayey very silty GRAVEL. Gravel is fine to coarse (2-58mm) angular to subangular chalk and occasional flint including nodular clasts. Slightly sandy (fine to coarse) at upper boundary. Sand content decreases with depth.	Fluvial Sands and Gravels (River Terrace Deposits)	4.20-4.70	45.44-44.94	
6005	Slightly yellowish to white grey very silty GRAVEL. Gravel is fine to coarse (2-65mm) angular to subangular chalk and occasional flint including nodular clasts.	Bedrock (Chalk)	4.70+	44.94+	



Site Code: 266085		Site Name: Andover Link Main		Borehole ID: RT/BH03 (WABH07)	
Coordinates (NGR) X: 441778.9		Coordinates (NGR) Y: 142672.2		Level (top): 49.90	
				Depth: 20.00 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
7001	Dark blackish brown slightly gravelly SILT with frequent modern roots and grass. Gravel is fine to coarse (2-24mm) subangular flint clasts. Brecciated structure. Lower boundary is unclear (Hand-dug trial hole)	Topsoil	0-0.25	49.90-49.65	
7002	Multi coloured slightly sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse (5-32mm) subrounded to subangular (15:85) flint clasts with few medium nodular clasts and rounded tertiary clasts. Moderately sorted.	Fluvial sands and gravels (River Terrace Deposits)	0.25-3.00	49.65-46.90	
7003	White to grey very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse (2-75mm) subrounded to subangular (25:75) flint clasts and rare nodular and cobble-sized (<95mm) subangular clasts. Dense and poorly sorted.	Fluvial Sands and Gravels (River Terrace Deposits)	3.00-4.80	46.90-45.10	
7004	White silty GRAVEL. Gravel is fine to coarse (2-65mm) subangular chalk and occasional flint and occasional cobble-sized (<105mm) subangular to angular flint clasts.	Bedrock (Chalk)	4.80+	45.10+	



Site Code: 266085		Site Name: Andover Link Main		Borehole ID: RT/BH04 (WABH08)	
Coordinates (NGR) X: 441900.5		Coordinates (NGR) Y: 142604.9		Level (top): 51.33	
				Depth: 20.00 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
801	Heavily rooted yellowish brown CLAY. Frequent subangular flint cobbles present, approximately 2.5cm long at max. Pea gravel present in small amounts.	Topsoil	0.00-0.25	51.33-51.08	
802	Large subangular (30%) and subrounded (70%) GRAVEL yellowish brown sandy clay matrix. Flint pea gravel present in larger amounts than topsoil.	Possible Slope Deposits	0.25-1.00	51.08-50.33	
803	Sandy yellowish brown CLAY, becoming darker as depth increases. Moderately sorted flint cobbles present as subangular (70%) and subrounded (30%). Large amount of pea gravel. Chalk bedrock at base.	Fluvial Sands and Gravels River Terrace Deposits	1.00-6.00	50.33-45.33	
804	CHALK	Bedrock (Chalk)	6.00+	45.33+	



Site Code: 266085		Site Name: Andover Link Main		Borehole ID: UF/BH01 (WABH09)	
Coordinates (NGR) X: 441556.0		Coordinates (NGR) Y: 143095.5		Level (top): 55.74	
				Depth: 20.00 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
1001	Dark brown loose silty GRAVEL. Gravel is fine to coarse subangular to subrounded flint. Rooting present. Structureless.	Topsoil	0.00-0.35	55.74-55.39	
1002	Silty sandy GRAVEL. Gravel is fine to coarse subangular to subrounded flint. Structureless. Sand is coarse. Becomes sandy clayey gravel from 3.3-4.3m bgl.	Fluvial Sands and Gravels. (River Terrace Deposits)	0.35-4.30	55.39-51.34	
1003	Whitish brown chalky gravelly CLAY. Gravel is fine to coarse angular flint and fine to medium subrounded chalk.	Fluvial Sands and Gravels. (River Terrace Deposits)	4.60-5.30	51.34-50.64	
1004	Structureless White CHALK	Bedrock (Chalk)	5.30+	50.64+	



Site Code: 266085		Site Name: Andover Link Main		Borehole ID: CB/BH01 (WABH11)	
Coordinates (NGR) X: 441380.6		Coordinates (NGR) Y: 143948.4		Level (top): 61.88	
				Depth: 20.00 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
1101	Moderately soft greyish brown slightly sandy gravelly clayey SILT. Sand is medium to coarse. Gravel is fine to coarse, subangular to subrounded flint. Structureless. Rooting common in upper 0.10m bgl. Gradual lower boundary	Topsoil	0.00-0.40	61.88-61.48	-
1102	Moderately firm reddish brown gravelly CLAY. Gravel is fine to coarse, subangular to angular flint. Structureless. Gradual lower boundary	Slope Deposits	0.50-1.15	61.48-60.83	-
1103	Moderately firm yellowish brown clayey GRAVEL. Gravel is Chalk (70%) and flint (30%). Chalk clasts fine (20%) to medium (80%), rounded (70%) to subrounded (30%). Flint clasts fine (30%), medium (50%) to coarse (20%), subangular (80%) to angular (20%). Moderately poorly sorted. Moderately low sphericity to low sphericity. Matrix supported. Structureless	Soliflucted Chalk	1.15-2.10	60.83-59.78	-
1104	Firm cream white silty GRAVEL. Gravel is subangular to angular fine to coarse chalk. Silt is chalky. By 2.50 very firm.	Bedrock (Chalk)	2.10-3.00+	59.78-58.88	-



Site Code: 266085		Site Name: Andover Link Main		Borehole ID: ALM-WS2 (WABH12)	
Coordinates (NGR) X: 441443.5		Coordinates (NGR) Y: 143625.8		Level (top): 67.57	
				Depth: 2.45 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
1201	soft mid slightly orange brown silty CLAY. Some gravel, 1-3cm subangular flint	Slope Deposits	0.00-0.60	67.57-66.97	
1202	Firm orange brown gravelly CLAY. Gravel is subangular flint, primarily 1-3cm in size	Possible River Terrace Deposits	0.60-2.45+	66.97-65.13+	



Site Code: 266085		Site Name: Andover Link Main		Borehole ID: ALM-WS3 (WABH13)	
Coordinates (NGR) X: 441429.6		Coordinates (NGR) Y: 143789.7		Level (top): 69.65	
				Depth: 2.45 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
1301	Mid orange-brown silty clayey GRAVEL. Gravel is 95% subangular 5% subrounded. 80% 2-4cm in size, 20% under 1cm	Topsoil	0.00-0.30	69.65-69.35	
1302	Increasingly sticky mid orange brown silty clayey GRAVEL. Slightly lighter than above context and gravel more prolific. Gravel is 90% subangular, 5% over 5cm in size, 50% under 1cm, 45% 2-5cm.	Possible River Terrace Deposits	0.30-2.45+	69.35-67.25+	



Site Code: 266085		Site Name: Andover Link Main		Borehole ID: ALM-WS4 (WABH14)	
Coordinates (NGR) X: 441366.1		Coordinates (NGR) Y: 143961.9		Level (top): 61.77	
				Depth: 2.45 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
1401	Mid brown soft silty gravelly CLAY. Gravel is subangular flint, 3-5cm in size. Very rare subangular cobbles.	Topsoil	0.00-0.35	61.77-61.42	
1402	Mid yellowish brown silty gravelly CLAY. Gravel is subangular flint, 40% subangular 2-4cm, 60% 4-5cm.	Slope Deposits	0.35-1.15	61.42-60.62	
1403	Brownish off white subrounded chalk GRAVEL. Very rare flint, primarily soft chalk.	Soliflucted Chalk	1.15-2.45+	60.62-59.32+	



Site Code: 266085		Site Name: Andover Link Main		Borehole ID: ALM-WS5 (WABH15)	
Coordinates (NGR) X: 441230.4		Coordinates (NGR) Y: 144128.2		Level (top): 65.07	
				Depth: 2.45 m	
Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
1501	Mid greyish brown soft silty gravelly CLAY. Gravel is subangular flint with rare subrounded flint, 3-5cm in size.	Topsoil	0.00-0.30	65.07-64.77	
1502	Mid yellowish brown silty gravelly CLAY. Gravel is subangular to rare subrounded flint, 0.5-4cm in size.	Slope Deposits	0.30-0.80	64.77-64.27	
1503	Brown off-white chalk GRAVEL. Gravel is 60% subrounded to 40% subangular. 30% less than 1cm in size, 70% 1-4cm.	Soliflucted Chalk	0.80-1.50	64.27-63.57	
1504	Chalk	Bedrock (Chalk)	1.50-2.45+	63.57-62.62+	



Appendix 2 Data used in the deposit model

Name	Easting	Northing	Total depth (m)	Elevation (m OD)
ALM-WS2	441443.50	143625.80	2.45	67.57
ALM-WS3	441429.60	143789.70	2.45	69.65
ALM-WS4	441366.10	143961.90	2.45	61.77
ALM-WS5	441230.40	144128.20	2.45	65.07
CB/BH01	441380.60	143948.40	20.00	61.88
RD/BH01	442625.00	142156.00	20.00	51.40
RD/BH03	442623.00	142328.00	20.00	50.66
RD/BH04	442593.00	142406.00	20.00	54.34
RT/BH01	441584.50	142824.30	20.00	52.91
RT/BH02	441734.90	142730.80	20.00	49.89
RT/BH03	441778.90	142672.20	20.00	49.90
RT/BH04	441900.50	142604.90	20.00	51.33
SU34SE11	446380.00	132540.00	2.80	64.70
SU43NE1	447380.00	135120.00	2.20	92.00
SU43NE2	447460.00	135140.00	1.90	91.50
SU43NE3	447470.00	135100.00	2.00	89.30
SU43SE1	446210.00	132030.00	15.00	66.50
SU43SE10	446410.00	132590.00	11.00	63.00
SU43SE12	446370.00	132470.00	2.80	69.60
SU43SE13	446310.00	132740.00	3.00	55.60
SU43SE14	446200.00	132740.00	3.00	56.30
SU43SE16	446170.00	132500.00	2.80	70.60
SU43SE17	446340.00	132330.00	3.00	65.50
SU43SE18	446280.00	132330.00	2.80	68.20
SU43SE2	446200.00	132100.00	12.00	68.10
SU43SE21	446070.00	132220.00	2.60	70.65
SU43SE22	446280.00	132250.00	2.80	67.50
SU43SE23	446200.00	132300.00	2.50	70.40
SU43SE24	446330.00	132570.00	2.70	67.30
SU43SE26	446170.00	132220.00	2.40	70.00
SU43SE27	446210.00	132200.00	2.70	69.90
SU43SE28	446250.00	132250.00	2.50	68.70
SU43SE3	446260.00	132120.00	3.00	65.75
SU43SE33	446440.00	132540.00	2.70	60.50
SU43SE35	445390.00	132580.00	2.40	64.20
SU43SE40	446250.00	132660.00	10.20	61.00
SU43SE41	446230.00	132750.00	10.20	56.00
SU43SE45	446300.00	132860.00	9.90	60.90
SU43SE47	446410.00	132790.00	9.90	54.80



Name	Easting	Northing	Total depth (m)	Elevation (m OD)
SU43SE48	446390.00	132880.00	9.90	60.80
SU43SE5	446310.00	132060.00	9.45	63.50
SU43SE7	446390.00	132310.00	8.50	62.00
SU43SE8	446350.00	132390.00	12.00	65.20
SU43SE9	446280.00	132550.00	10.50	69.50
SU44SW3	443900.00	142400.00	6.00	59.00
SU44SW4	443800.00	142400.00	5.30	57.60
SU44SW5	443300.00	142200.00	8.10	51.15
SU44SW6	443200.00	142100.00	8.00	51.10
SU44SW7	443200.00	142000.00	8.20	51.10
SU44SW8	443200.00	141900.00	8.20	51.00
SY43NE4	447350.00	135070.00	2.20	89.30
TP01	438622.46	144463.49	3.00	118.76
TP02	438683.40	144529.88	2.00	117.17
TP03	438729.04	144538.76	1.20	116.57
TP04	439251.83	144553.58	3.00	82.08
TP05	439272.19	144529.75	1.20	80.93
TP06	439373.33	144459.43	1.50	75.56
TP07	439923.14	144325.08	2.60	70.50
TP08	440016.67	144315.21	2.10	69.46
TP09	440526.60	144458.09	3.30	89.70
TP10	440603.52	144498.17	2.20	88.02
TP11	440716.81	144561.44	1.60	78.60
TP12	440785.24	144592.96	1.45	70.95
TP13	440820.87	144544.23	1.80	71.08
TP14	440878.10	144474.75	1.20	70.23
TP15	440945.93	144396.51	1.70	68.03
TP16	441059.43	144303.55	1.60	66.84
TP17	441080.19	144270.79	3.00	66.73
TP18	441348.73	144012.17	3.00	61.97
TP19	441375.23	143933.07	3.00	63.22
TP20	441363.38	143974.24	3.50	61.37
TP21	441434.88	143820.90	1.20	67.71
TP22	441458.52	143636.90	3.00	67.21
TP23	441478.32	143580.91	3.10	66.09
TP24	441561.37	143497.60	3.00	65.15
TP25	441643.29	143424.96	3.00	59.80
TP26	441701.67	143383.00	3.00	56.09
TP27	441674.45	143227.06	3.10	57.38
TP28	441560.11	143043.16	3.60	56.01



Name	Easting	Northing	Total depth (m)	Elevation (m OD)
TP29	441552.82	143016.22	2.80	55.71
TP30	441568.44	142835.88	3.60	53.85
TP31	441918.37	142578.96	2.30	51.26
TP32	442005.00	142577.47	1.20	49.98
TP33	442049.14	142571.94	0.90	50.32
TP34	442211.44	142576.96	2.50	51.95
TP35	442588.89	142412.52	3.00	54.49
TP38	443245.01	140545.91	1.20	54.95
TP39	443263.06	140490.52	2.50	55.92
TP40	443619.79	140035.94	3.00	57.84
TP41	443631.49	139972.83	3.20	58.41
TP48	444098.65	138115.74	1.50	66.78
TP49	444090.21	138059.34	0.95	68.28
TP50	444085.20	138018.38	1.10	69.42
TP51	444130.31	137311.84	0.95	85.49
TP52	444117.81	137201.80	1.00	89.32
TP53	444127.69	137052.82	2.20	91.23
TP54	444207.19	136896.44	3.00	95.86
TP55	444468.57	136480.15	1.20	106.54
TP56	444562.67	136344.85	0.65	108.06
TP57	444728.75	136070.38	0.85	113.41
TP58	444763.73	133434.67	1.50	94.88
TP59	444751.47	133349.83	2.80	96.32
TP60	444764.76	133286.71	1.30	97.69
TP61	444814.02	133142.86	1.20	104.63
TP62	444845.71	133033.43	2.90	108.81
TP63	445257.43	132117.59	1.20	76.46
TP64	445327.46	131985.64	2.50	68.68
TP65	445359.65	131886.96	3.00	69.94
TP66	445566.55	131486.56	3.80	75.30
TP67	445328.38	130058.11	1.20	141.96
TP68	445207.69	129994.47	2.00	143.77
TP69	445027.30	129799.19	1.20	152.99
TP70	444976.52	129733.01	1.20	155.52
TP71	444949.99	129657.07	1.20	156.79
TP72	444104.39	137535.03	1.20	77.28
TP85	438431.45	144461.61	1.80	113.38
TP86	437760.22	145207.31	1.20	123.63
UF/BH01	441556.00	143095.50	20.00	55.74
UF/BH02	441672.90	143202.70	20.00	56.40

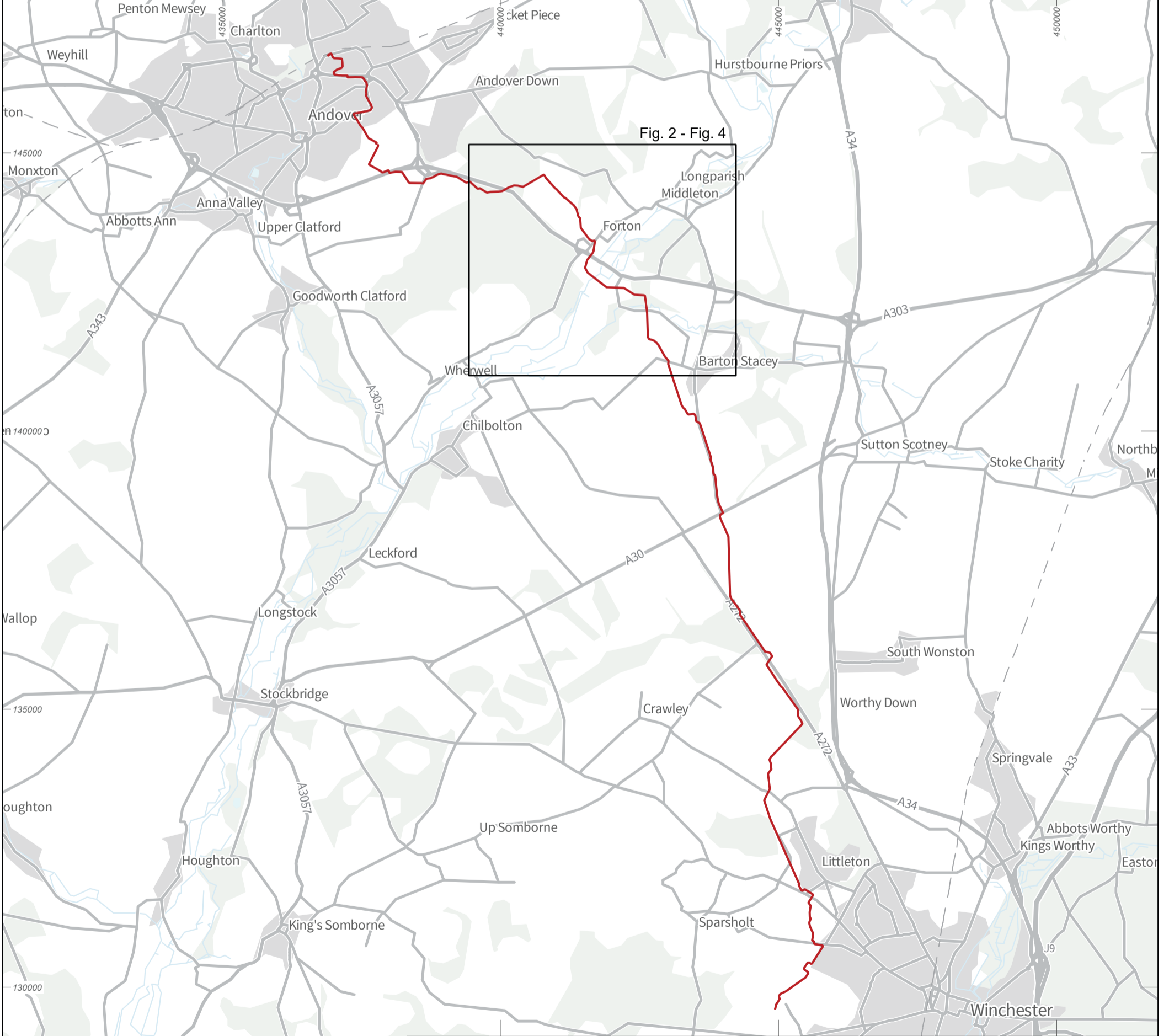


Appendix 3 OASIS form

OASIS Summary for wessexar1-529971

OASIS ID (UID)	wessexar1-529971
Project Name	Andover Link Main, Hampshire, Geoarchaeological Monitoring of GI works
Sitename	Andover Link Main, Andover Link Main
Sitecode	266085
Project Identifier(s)	266085
Activity type	Watching Brief
Planning Id	
Reason For Investigation	Statutory requirement
Organisation Responsible for work	Wessex Archaeology
Project Dates	04-May-2024 - 19-Sep-2024
Location	<p>Andover Link Main NGR : SU 45113 29109 LL : 51.05955532696863, -1.357654077827364 12 Fig : 445113,129109</p> <p>Andover Link Main NGR : SU 36827 46714 LL : 51.21844285505471, -1.474087458727976 12 Fig : 436827,146714</p>
Administrative Areas	<p>Country : England County/Local Authority : Hampshire Local Authority District : Winchester Parish : Hursley Local Authority District : Test Valley Parish : Andover</p>
Project Methodology	<p>Wessex Archaeology was commissioned by MGJV (ALM), on behalf of Southern Water, to produce a report outlining the results of geoarchaeological monitoring of Ground Investigation (GI) works , carried out to inform the proposed Andover Link Main Scheme, which will comprise the installation of a new pipeline to be built between Crab Wood Water Service Reservoir, Winchester, and River Way Water Supply Works, Andover. The monitoring was carried out in order to mitigate against impacts from the GI works on the geoarchaeological resource, and to characterise any geoarchaeological deposits present.</p> <p>The GI works included interventions in the valleys of the Rivers Test and Dever where a Desk Based Assessment (Wessex Archaeology 2023a) highlighted the presence of geological deposits that have high potential to contain geoarchaeological remains (artefacts, archaeological layers, environmental remains evidence etc) dating to the Lower and Middle Palaeolithic periods (c. 676–40 Kya). 14 GI boreholes in these areas were subject to geoarchaeological monitoring. This monitoring was carried out alongside a geoarchaeological test pitting evaluation (Wessex Archaeology 2024b). The results of the test pitting have previously been used to provide a Geoarchaeological Landscape Characterisation (GLC), which divided the Scheme route into 17 Geoarchaeological Character Zones (GCZs) based on difference in the Quaternary geological deposits present</p>

Project Results	<p>The monitoring has successfully characterised the Quaternary deposits present at selected GI locations. Whilst no archaeology or deposits with potential to preserve significant palaeoenvironmental remains were identified during the monitoring, the combined results of the monitoring and geoarchaeological test pitting (Wessex Archaeology 2024b) have established that the Scheme will impact on Pleistocene river terraces of the River Test that have the potential to contain significant Lower and Middle Palaeolithic archaeology.</p> <p>Deposits belonging to four terraces of River Test will be impacted. These terraces are located along the sides of the Test Valley within four GCZs of the Scheme's GLC (Wessex Archaeology 2024b). In summary, these are:</p> <p>GCZ 3 – Bitterne or the Nursling Terraces (MIS 14 and 13b; 563 –478 Kya). These terraces have the potential to contain Lower Palaeolithic lithic artefacts relating to the earliest period of Palaeolithic settlement history in the region.</p> <p>GCZ 5 – Mottisfont/Lower Warsash Terrace. (MIS 9–8; 337–243 Kya). This terrace dates to the transitional archaeological period between the late Lower and early Middle Palaeolithic and can contain significant early Middle Palaeolithic archaeology. A flake was recovered from these terrace deposits during the test pitting evaluation (Wessex Archaeology 2024b), whilst Palaeolithic artefacts were recovered from these terrace deposits in Cottage End Gravel Pit, located 250m to the west of the Scheme route (Wymer and Wessex Archaeology 2009).</p> <p>GCZ 6 – Hamble Terrace (MIS 7–6; 243–130 Kya). This terrace dates to the early Middle Palaeolithic, a key period early Neanderthal occupation in the region. The terrace deposits can contain significant early Middle Palaeolithic archaeology.</p> <p>GCZ 8 – Broadland's Farm Terrace (MIS 4; 71–57 Kya). The age of this terrace is within period when the region was occupied by late Neanderthal populations and could contain significant late Middle Palaeolithic archaeology.</p> <p>The results of the GI monitoring, combined with those of the geoarchaeological test pitting evaluation (Wessex Archaeology 2024b), have demonstrated that the Scheme will impact on Pleistocene river terraces of the River Test that have significant geoarchaeological potential. In order to mitigate against these impacts, a program of further targeted geoarchaeological test pits guided by a series Scheme-specific research objectives is recommended.</p>
Keywords	
Funder	Private or public corporation MGJV, Water company Southern Water Ltd
HER	<p>Hampshire Archaeology and Historic Buildings Record (AHBR) - unRev - STANDARD</p> <p>Winchester HER - unRev - STANDARD</p>
Person Responsible for work	Andrew Shaw, Alex Brown
HER Identifiers	
Archives	<p>Documentary Archive, Digital Archive - to be deposited with Winchester Museums;</p> <p>Documentary Archive, Digital Archive - to be deposited with Hampshire Cultural Trust;</p>

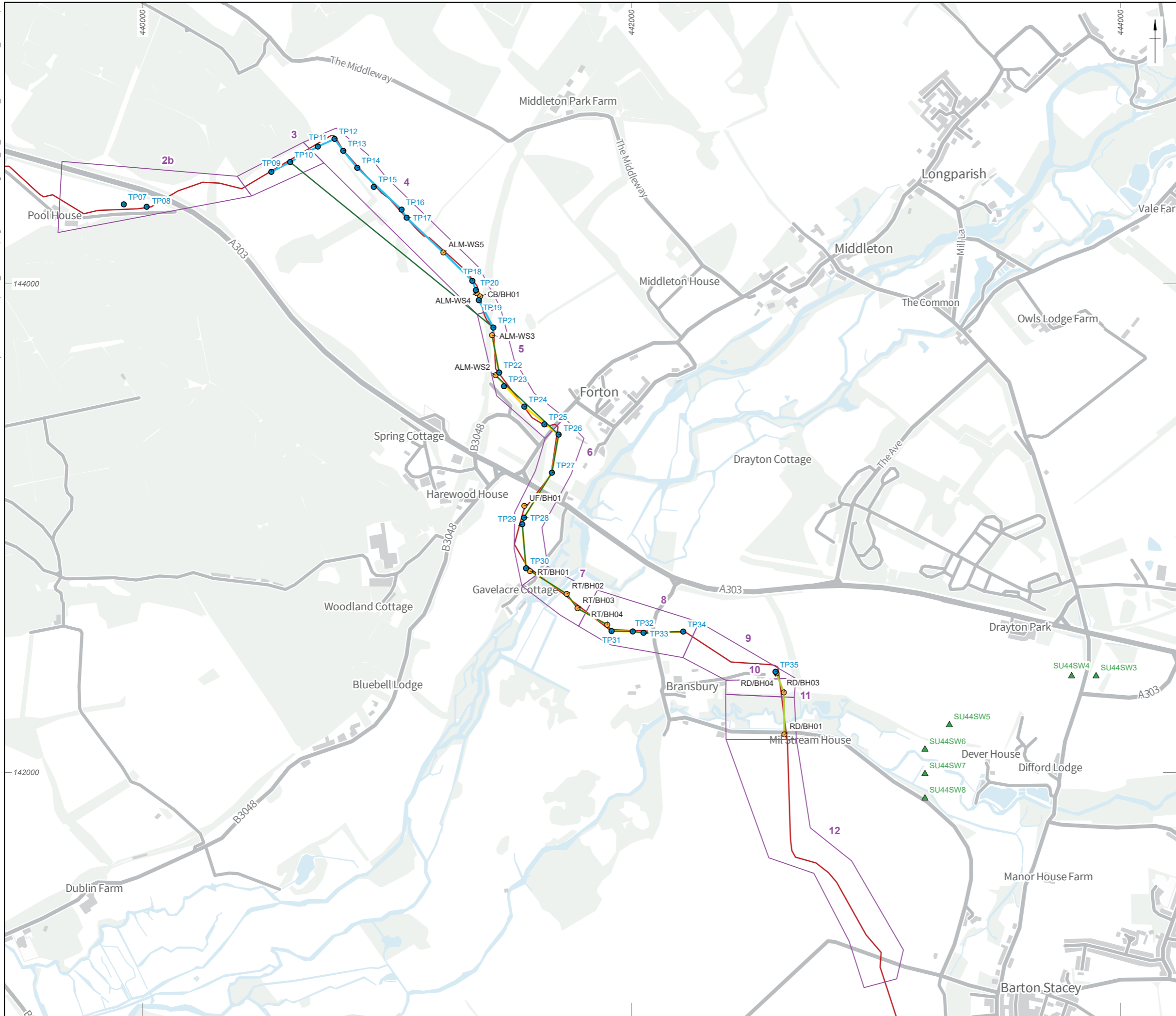


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Figure 1: Scheme location





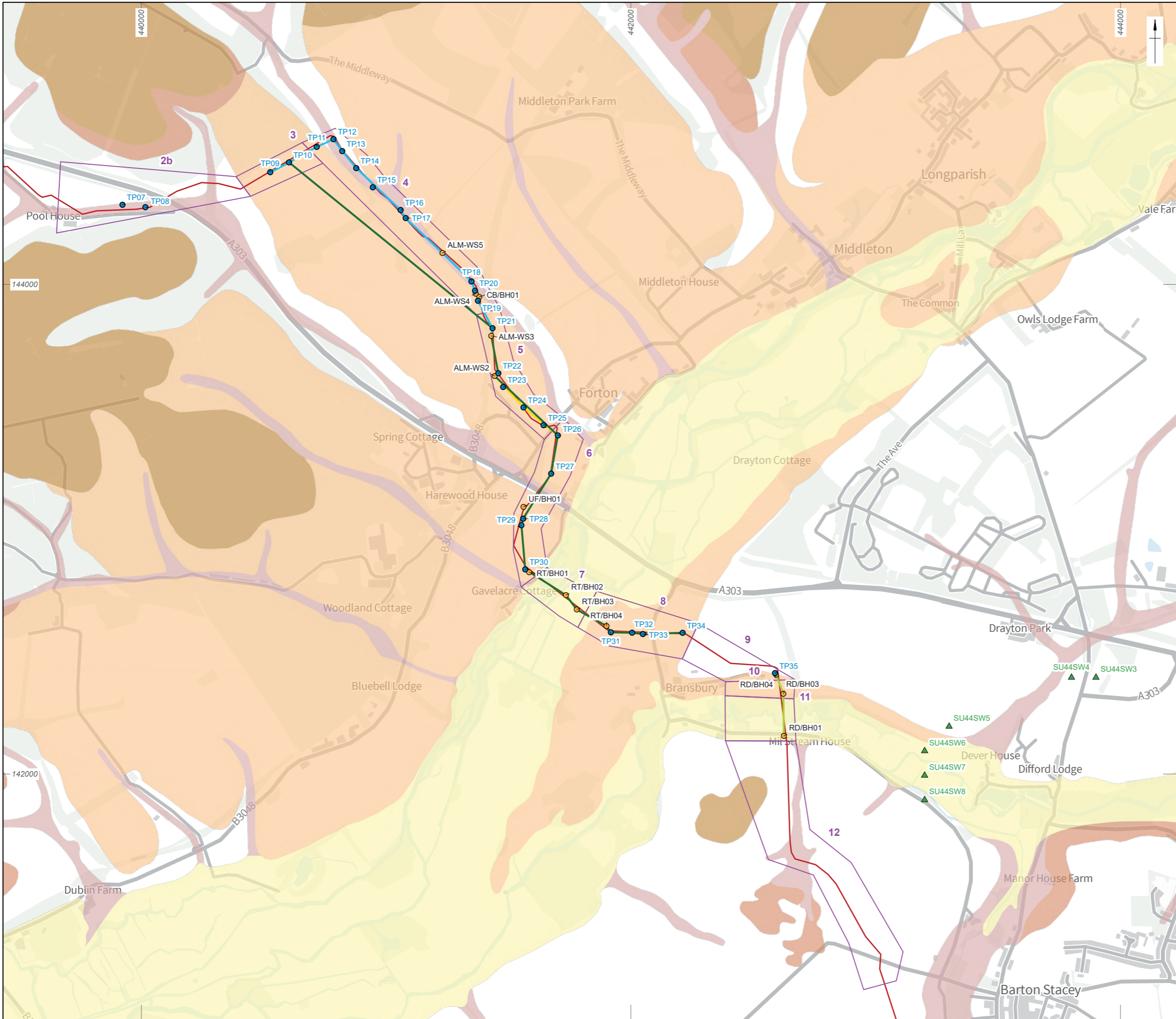
- GCZ
- Scheme route
- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Evaluation test pit
- Ground Investigation borehole
- ▲ BGS deposit record

0 500 m

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Figure 2: Location of boreholes monitored



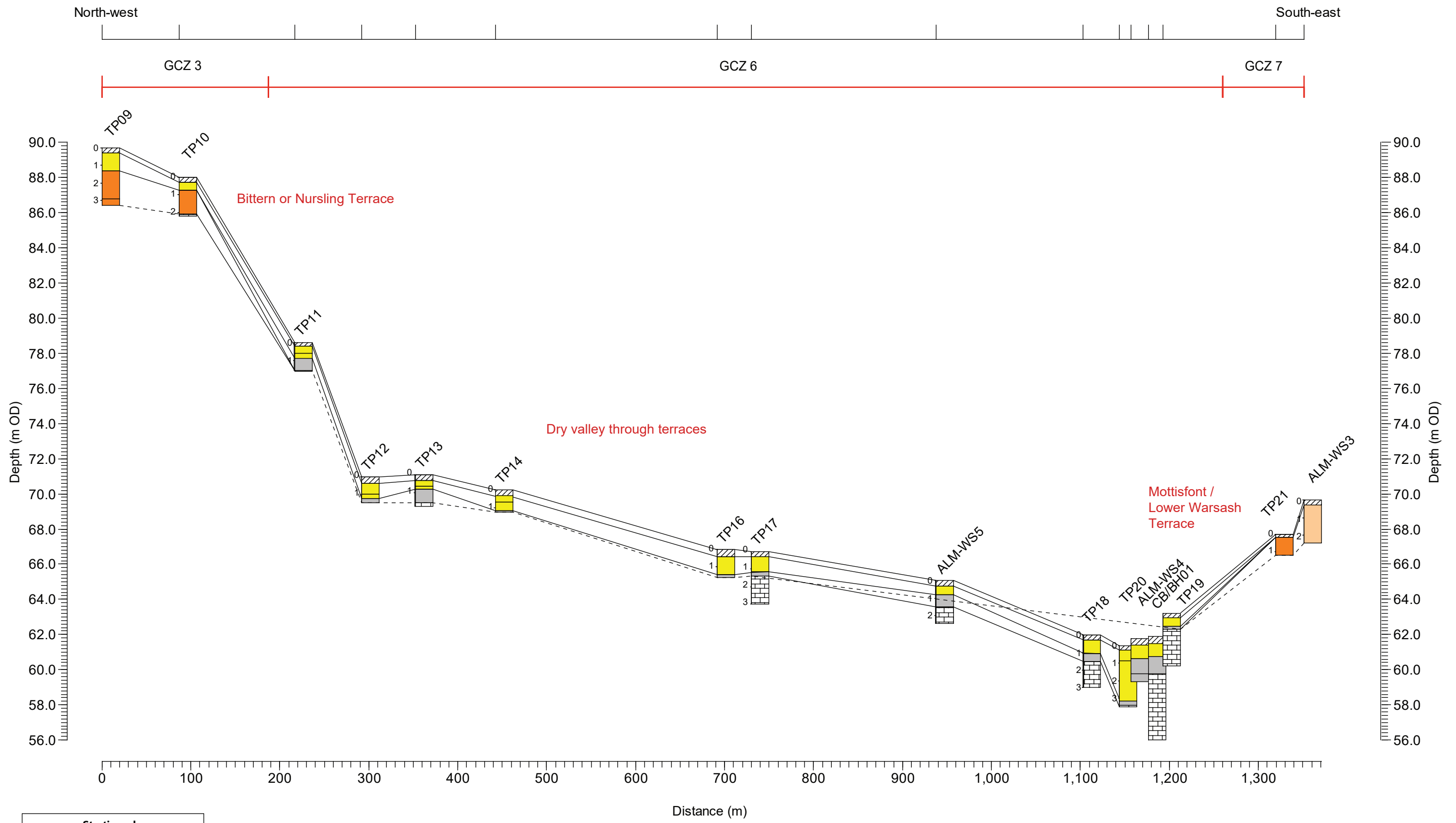
- GCZ
 - Scheme route
 - Transect 1
 - Transect 2
 - Transect 3
 - Transect 4
 - Evaluation test pit
 - Ground Investigation borehole
 - ▲ BGS deposit record
- BGS Superficial deposits**
- Alluvium - Clay, Sand and Gravel
 - River Terrace Deposits, 1 - Sand and Gravel
 - Head - Clay, Silt, Sand and Gravel
 - Clay with Flint Formation - Clay, Sand and Gravel
 - Head, 1 - Clay, Silt, Sand and Gravel



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Figure 4: Superficial geology



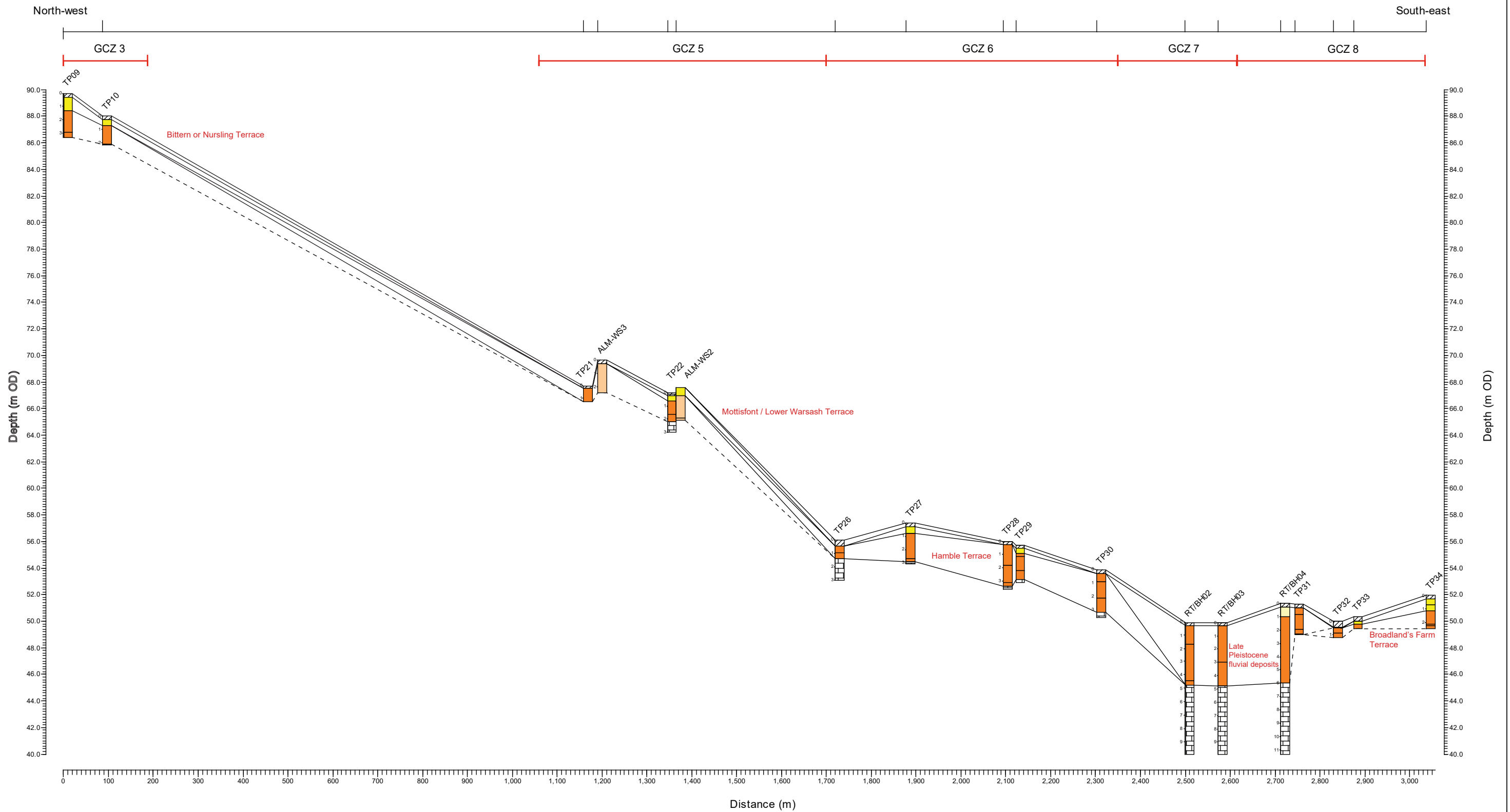
Stratigraphy	
	Topsoil/Subsoil
	Slope Deposits
	River Terrace Deposits
	Possible River Terrace Deposits
	Possible Bedrock (Chalk)
	Bedrock (Chalk)

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Figure 5: Transect 1





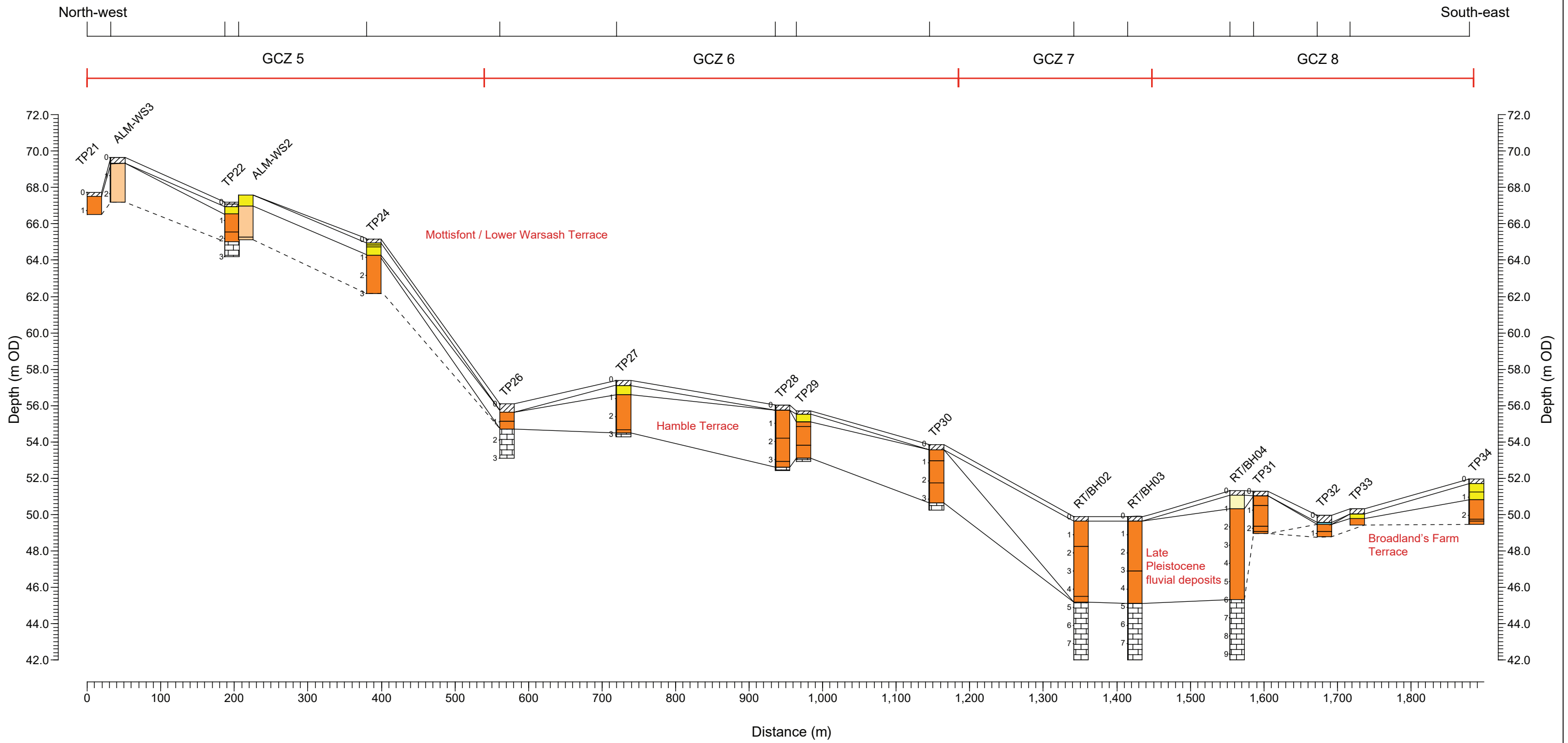
Stratigraphy	
	Topsoil/Subsoil
	Alluvium
	Slope Deposits
	River Terrace Deposits
	Possible River Terrace Deposits
	Possible Bedrock (Chalk)
	Bedrock (Chalk)

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Figure 6: Transect 2





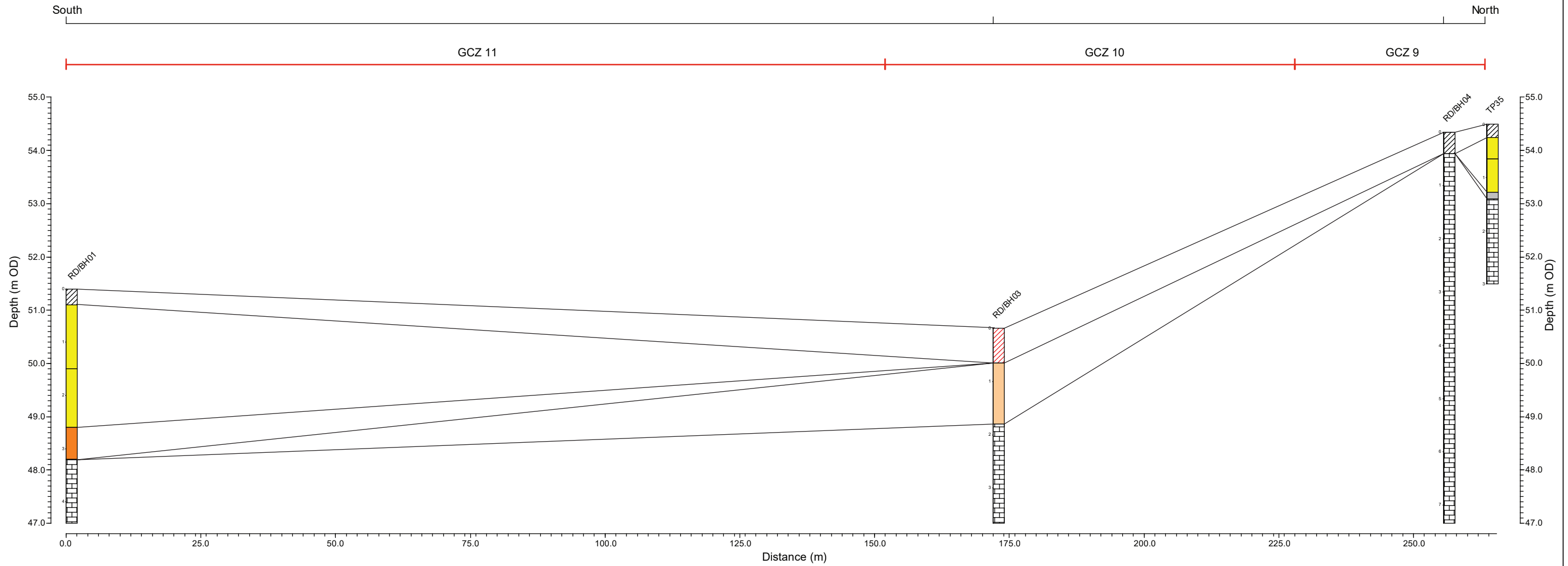
Stratigraphy	
	Topsoil/Subsoil
	Alluvium
	Slope Deposits
	River Terrace Deposits
	Possible River Terrace Deposits
	Possible Bedrock (Chalk)
	Bedrock (Chalk)







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Figure 7: Transect 3





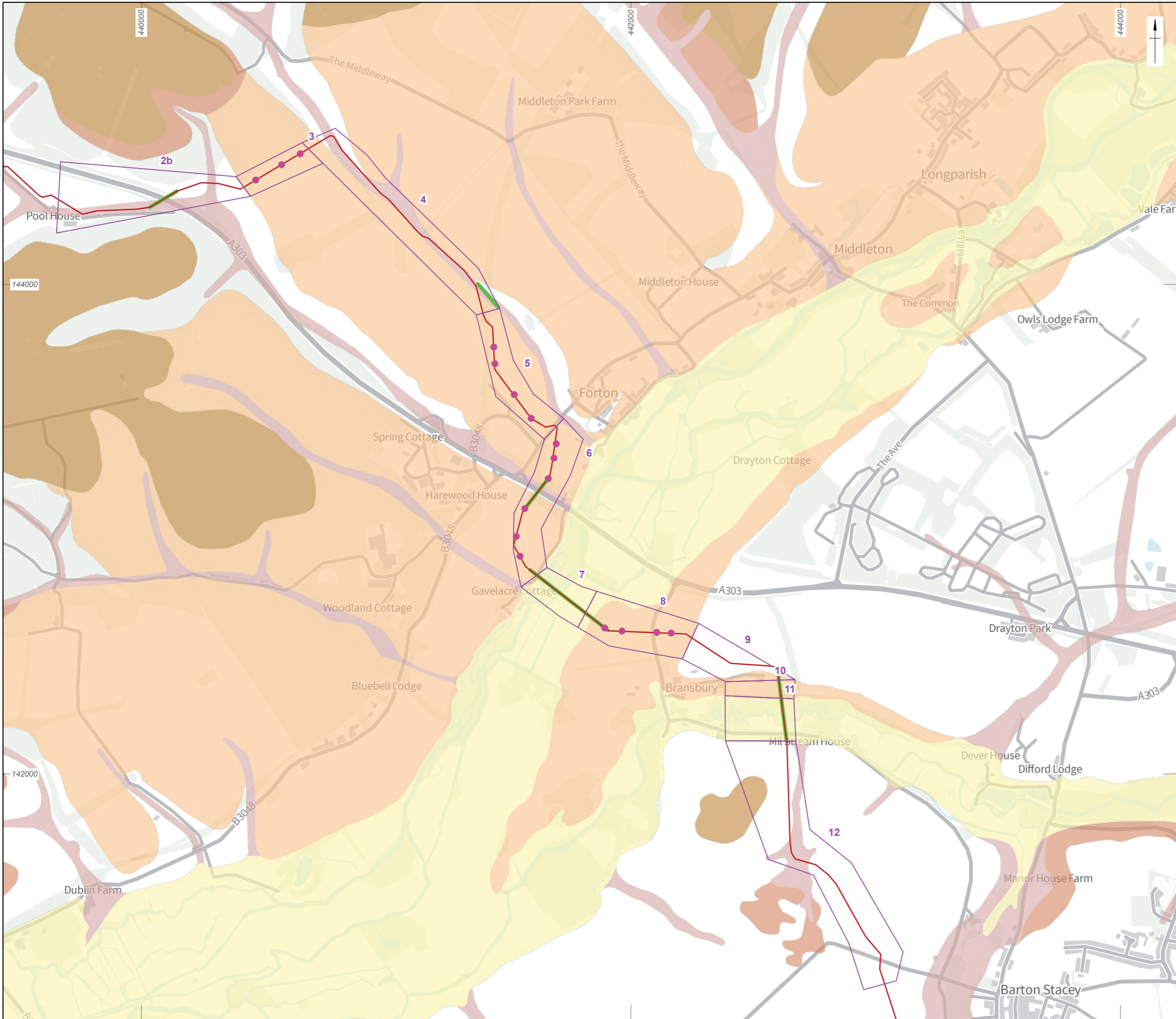
Stratigraphy	
	Topsoil/Subsoil
	Slope Deposits
	Chalky Solifluction Deposits
	River Terrace Deposits
	Possible River Terrace Deposits
	Bedrock (Chalk)

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Figure 8: Transect 4





- GCZ
- Scheme route
- Trenchless section of pipeline route
- Proposed test pit
- BGS Superficial deposits**
- Alluvium - Clay, Sand and Gravel
- River Terrace Deposits, 1 - Sand and Gravel
- Head - Clay, Silt, Sand and Gravel
- Clay with Flint Formation - Clay, Sand and Gravel
- Head, 1 - Clay, Silt, Sand and Gravel



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Figure 9: Scheme development proposals and proposed test pit locations



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