

HS2

HS2 Phase 2a: Cadent Gas Pipeline Diversion HP32 Trial Trenching, Including Unstratified Survey Final Report

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Executive Summary

- 1.1.1 This report details the findings of an archaeological trial trench evaluation and unstratified survey undertaken by Headland Archaeology (UK) Ltd within the construction boundary of the Aspley to Barlaston high pressure gas pipeline diversion HP32 (hereafter 'the Site'). The Site Codes allocated for the trial trenching and unstratified survey were: 2a21UABSTT and 2a21UABSTP respectively.
- 1.1.2 Cadent (the Contractor) is responsible for the diversion of the Aspley to Barlaston high pressure gas pipeline diversion HP32, which is required to accommodate the construction of Phase 2a of the High Speed Two (HS2) railway, from the West Midlands to Crewe. The HP32 pipeline diversion passes through five agricultural fields under arable cultivation and pasture to the north-west of Tittensor Road, approximately 0.5km to the north-east of the village of Swynnerton, Staffordshire (CA3 Stone to Swynnerton, Swynnerton Parish).
- 1.1.3 A gradiometer survey carried out for the eastern part of the HP32 Site (Headland Archaeology 2021, Project Plan Site Code 2a21UABSMG) reported good data acquisition and conditions for survey, despite frequent ferrous spikes associated with debris in the upper soil horizons but did not locate any anomalies of potential archaeological origin. The survey concluded the archaeological potential of the Site to be low.
- 1.1.4 A total of 18 trenches were excavated and 54 test pits sieved across the five fields. Trenches 1, 5, 10, 11, 12 and 16 revealed the presence of archaeological features that included ditches, hedgerows and gullies. The fills of these features were absent of artefactual material, which was also the outcome of the unstratified survey of the test pits.
- 1.1.5 The archaeological features located as a result of the trial trenching likely formed boundary ditches and hedgerows, with the gullies perhaps being a result of naturally formed water channels influenced by the topography of the area. In general the features were shallow and there does not appear to be a significant density of physical archaeological remains within the Site boundary.
- 1.1.6 Geoarchaeological investigation in an area of Head deposits at the margin of mapped glacial till found no evidence of any buried soil profiles, deposits with paleoenvironmental potential or deposits likely to contain Palaeolithic archaeology. The deposit sequences observed in the trenches confirmed that the extents of both the head and till deposits are broadly as mapped by the BGS, the till extending beneath (but not beyond) the head deposits.

Introduction

- 1.1.7 High Speed Two is a new railway network proposed by the Government to provide a link between London, the West Midlands, the East Midlands and Manchester. Phase 2a of HS2 will involve the construction of a new railway between the West Midlands and Crewe. Powers for the construction, operation and maintenance of Phase One are conferred by the High Speed Rail (West Midlands to Crewe) Act 2021.
- 1.1.8 Cadent (the Contractor) is responsible for the diversion of the Aspley to Barlaston high pressure gas pipeline diversion HP32, which is required to accommodate the construction of Phase 2a of the High Speed Two (HS2) railway.
- 1.1.9 The programme of archaeological trial trenching and unstratified survey described in this report was undertaken to further understand the archaeological potential of the land-take for the pipeline diversion ahead of its construction, and to provide information on the requirement for any further archaeological mitigation that might be necessary.
- 1.1.10 The programme of works was undertaken with reference to previous non-intrusive archaeological investigations, including the results of a gradiometer survey carried out for the eastern part of the HP32 Site (UC47-CDG-EV-SUR-A000-000001, Project Plan Site Code 2a21UABSMG) and gradiometer surveys carried out to the south and west during preparation of the ES.
- 1.1.11 All site works were undertaken in accordance with a Project Plan and the Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (GWSI: HERDS). This was alongside the Location-Specific Written Scheme of Investigation (LS-WSI), which contained a method statement and safe system of work.

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Site Description

Site Location

- 1.1.12 The Site is located in Staffordshire, England, approximately 0.5km to the north-east of the village of Swynnerton in CA3 Stone to Swynnerton Community Area, Swynnerton Parish. Access to the Site is via existing field accesses on Tittensor Road (to the south-east of the diversion) and Stab Lane (to the north west of the diversion).
- 1.1.13 The HP32 diversion spans five agricultural fields under arable cultivation and pasture, centred on NGR 385441 336181, allocated HS2 Land Parcel ID LAP131480 (Figure 1).
- 1.1.14 The diversion extends for a total distance of approximately 500m between two tie-ins to the existing gas main, intersecting the line of the HS2 Phase 2a railway at Chainage 225+100. The south-western tie in is located at NGR 385177, 336144 and the north eastern tie in at NGR 385533, 336326.

Geology and Topology of Site

- 1.1.15 The topography of the Site is varied and undulating, gently falling from approximately 180m AOD at the western tie-in to approximately 163m AOD at the eastern tie-in.

- 1.1.1 The bedrock geology is described in the geotechnical desk study for the HP32 diversion as follows:

- British Geological Survey 1:50,000 Series Sheet 123 (Stoke-on-Trent, 1995 Solid Geology edition) indicates that the western tie-in pit and initial 60m of the diversion is underlain by the Kidderminster Formation of the Sherwood Sandstone Group. This unit is indicated to dip to the west at approximately 10-12°. The Formation comprises interbedded reddish brown sandstones and conglomerates. The sandstone is typically cross bedded and pebbly, whereas the conglomerates display a reddish brown sandy matrix with pebbles of quartzite, quartz conglomerate and vein quartz.
- The Apedale Fault intersects the diversion approximately 60m to the east of the western tie-in pit, trending approximately north-to-south with the downthrow to the east.
- Immediately east of the Apedale Fault and extending towards the eastern tie-in pit, the diversion is expected to be underlain by the Tarporley Siltstone

Formation, previously known as the Maer Formation. This unit typically comprises interbedded and interlaminated siltstones, mudstones and sandstones. The mudstone and siltstone lithologies are typically reddish brown to greenish grey, whereas the sandstones are grey to brown and are rarely seen in thicknesses greater than 0.5m. Sporadic gypsum nodules are present within the mudstones. The Formation belongs to the Mercia Mudstone Group. The dip of this unit is described as “gently inclined” to the south west.

- The eastern tie-in pit is anticipated to be underlain by the Bromsgrove Sandstone Formation of the Sherwood Sandstone Group, comprising sandstone interbedded with siltstones and mudstones. The Sandstones are red, brown and grey in colour and often possess a pebbly or conglomeratic base, whereas the mudstone and siltstone beds are often red or brown. The sandstone is likely to be weathered in the upper horizons.

1.1.2 In respect of superficial geology, the British Geological Survey records a linear band of Head deposits (a Quaternary deposit of weathered downslope solifluction, soil creep and hill wash) orientated north south, located between 40 and 160m from the western tie-in pit. The remainder of the diversion is underlain by glacial till, an unsorted accumulation of glacially deposited clay to boulder sized particles of pre-existing siliciclastic rocks. No superficial deposits are recorded west of the Head deposits in the location of the western tie-in pit (NERC 2022).

1.1.3 The route-wide geoarchaeological desk study for HS2 Phase 2a¹ places the HP32 diversion at the north western limit of Geoarchaeological Character Zone GCZ26: *“this zone is largely devoid of superficial deposits apart from the northern end of the zone where there are deposits of till and head; the former sediment is defined as poorly sorted slope deposits, typically comprising gravels and sands, although they can locally include lenses of silt, clay or even peat.”* Till is noted to have limited archaeological potential but may seal and preserve underlying stratigraphy containing early prehistoric archaeological sites and associated environmental remains.

Archaeological Background

1.1.4 There are no recorded designated or non-designated heritage assets within the Site.

1.1.5 The HP32 diversion is located within Archaeological Character Area ACA5 Meece Brook and Swynnerton, within the Stone Uplands. The site is not within a Recognised Archaeological Zone, the nearest being RAZ22 (Blakelow Farm).

¹ ES Document Ref ES 3.5.0.10.2

1.1.6 Available data on known non-designated assets in a study area of 500m surrounding the Site is summarised in Table 1 below.

1.1.7 Historic mapping indicates that the land through which the diversion passes has remained in agricultural usage since the later 19th century, with only minor alteration to the pattern of field boundaries in the 20th century and no indication of previous development.

1.1.8 The area of glacial till to the north of Swynnerton is noted in the Phase 2a GWSI HERDS as potentially containing redeposited Palaeolithic material, and a number of possible Bronze Age burial mounds (e.g. STS044) are recorded in the vicinity of Swynnerton.

Table 1. Non-designated assets within 500m study area.

Asset ID	Name	Description	Period	Distance from Site	HER ref
STS040	Swynnerton Park	Boundaries, trackways and fishponds (former and extant).	Post medieval	246m to south	-
STS044	Ring ditch, Sandyford	A ring ditch, representing a possible ploughed out barrow, and curvilinear feature identified as cropmarks on aerial photography. The possible ring ditch is also very faintly visible on LiDAR plots. (BID-CH-004-003- LiDAR feature 2300).	Bronze Age	350m to north east of northern tie-in	-
STS045	Linear feature, Wing House Farm, Swynnerton	A linear feature of unknown date, identified as a cropmark on aerial photography. (BID-CH-004-003- Aerial Photograph feature 142).	Unknown	220m to north east of northern tie-in	MST4287
N/A	Rugeley and Stone Turnpike Road	Current route of the A51	Post Medieval	120m north of northern tie-in	-
STS074	Swynnerton Park outer parkland	Outer parkland east and north of Swynnerton, characterised by some 'clumping' and deliberate planting such as Lodge Covert. Now mostly given over to agricultural use. Bounded by M6 to east and Cliffords Wood to north. The significance of the asset is derived from its relationship with Swynnerton Hall, which has been significantly degraded.	Post Medieval	190m to south east	MST4172, MST14397, MST1325

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Previous Archaeological Surveys

- 1.1.9 There is a single previous (non-HS2) archaeological survey (event) coincident with the eastern half of the HP32 site: an archaeological desk based assessment of the M6 corridor through Staffordshire (EST1159). Four further events are recorded within the study area, all focussed within the village of Swynnerton to the south of the pipeline diversion:
- An archaeological watching brief at St Mary's Church, 2017 (EST3106)
 - A heritage impact assessment for St Mary's Church, 2017-2018 (EST2986)
 - Historic Building Recording -The Old Post Office, Swynnerton, no date given (EST1919)
 - An archaeological watching brief on land off Early Lane, Swynnerton, 2012 (EST3302)
- 1.1.10 A number of preconstruction surveys have been undertaken for HS2 Phase 2a, both within the HP32 site and the immediately surrounding area.
- 1.1.11 Fieldwalking was undertaken in 2016 by Wessex Archaeology on land to the north of Swynnerton (HS2 ES survey number 10210). The survey area was coincident with the western and central parts of the HP32 diversion to the south of the A51. The survey recorded 93 artefacts, overwhelmingly comprising post-medieval ceramic building material, pottery and glass. A single sherd of Roman greyware pottery was located 200m north-west of the diversion, to the west of Closepit Plantation.
- 1.1.12 Two land parcels spanned by the HP32 diversion have been the subject of previous geophysical magnetometer survey:
- The field to the south of the western tie-in was surveyed in 2016 ('South of Closepit Plantation, Swynnerton', ES Survey CA3-2223). The survey identified broadly east-west aligned ridge and furrow spanning the westernmost c.70m of the pipeline diversion. Discrete anomalies consistent with variation in the natural geology were also noted, alongside discrete ferrous responses across the field and around its perimeter. A zone of industrial/burning was recorded at the southern end of the field adjacent to The Old School House.
 - A second parcel 150m to the east was surveyed as part of the same phase of work, located adjacent to Tittensor Road. The survey covered the pipeline diversion at NGR 385422, 336122. Results included field drains, a buried pipe and a zone of industrial/burning. A zone of discrete and curvilinear anomalies of potential archaeological origin was recorded 70m to the south of the diversion.

- 1.1.13 Further geophysical survey to the north-west of the diversion (west of Stabhill Plantation and to the south east of HP32 (south of Sandyford Farm)) did not record any anomalies of potential archaeological origin. Additional areas of ridge and furrow were seen to the south-east of Sandyford Farm.
- 1.1.14 Remote sensing (aerial photograph and LiDAR analysis) did not identify any features within the fields through which the diversion passes. A ridge and furrow field system was recorded to the south of Sandyford Farm.
- 1.1.15 In August 2021 a gradiometer survey was carried out covering the eastern land parcel in use as pasture; a total area of 6.5ha (Headland Archaeology Site Code 2a21UABSMG).
- 1.1.16 The ground conditions were found to be very good throughout the survey area and the data quality was also very good, with only minimal post-processing required. Consequently, it was concluded that magnetometry was the most appropriate methodology for evaluating the Site.
- 1.1.17 No anomalies of potential archaeological origin were recorded. Linear anomalies indicative of a land drain, the existing high-pressure gas main and recent ploughing were recorded. Based solely on the geophysical survey the archaeological potential of the geophysical survey area was assessed as low.

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Aims and Specific Objectives

Specific Objectives

- 1.1.18 Archaeological trial trenches and unstratified survey are used to determine, as far as reasonably possible, the nature of the archaeological resource within a specified area. This comprises a limited programme of intrusive fieldwork to determine the presence or absence of archaeological features, structures, deposits, artefacts and/or ecofacts.
- 1.1.19 Where present, the investigation was to define the character, extent, quality, and preservation of any archaeological deposits in order to determine their likely ability to contribute to Specific Objectives set out in the GWSI: HERDS.
- 1.1.20 Accordingly, trial trenching and unstratified survey has the potential to identify and therefore to address several of the research objectives outlined in the Phase 2a GWSI: HERDS, as summarised in **Table 2** below.

Table 2. HERDS specific objectives met by proposed trial trenching and unstratified survey

GWSI: HERDS Specific Objective	Comment	Field evaluation strategy aim
2aKC2: Explore glacial tills along the Phase 2a route to establish with the greatest precision possible the extent and date of the maximum advance of the most recent (Devensian) ice sheet	The diversion is located at the mapped limit of glacial till to the north of Swynnerton.	Trial trenching has the potential to provide more detailed information on the boundary between the glacial till and adjacent geology through direct observation and description of the sediments. Trenches have been placed to investigate this boundary.
2aKC5: Identify and investigate evidence for change in the environment and management of the landscape during the Mesolithic, Neolithic, and Early Bronze Age periods	Head deposits are present at the western end of the diversion. These downslope erosional deposits have the potential to seal buried land surfaces which may contain evidence of past environments and anthropogenic influence on the landscape.	Trial trenching has the potential to provide more detailed information on the presence or absence of buried land surfaces with the potential to yield environmental data. Trenches have been placed to investigate this deposit and its interface with the glacial till noted above.

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GWSI: HERDS Specific Objective	Comment	Field evaluation strategy aim
2aKC22: Test and develop geophysical survey methodologies	Gradiometer survey has been carried out across the majority of the HP32 site, with ground conditions and data quality reported as good.	Trial trenching has the potential to test and confirm the quality of the gradiometer data captured. This may help to provide further information on the strengths or weaknesses of the technique in these conditions if, for example, trial trenching locates features which were not visible in the geophysical data.

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Scope and Methodology

Scope

1.1.21 The trial trench plan and unstratified survey was specified in the approved LS-WSI and all fieldwork was conducted in accordance with the following documents:

- Code of Conduct (Chartered Institute for Archaeologists 2021);
- Standards and Guidance for Field Evaluation (Chartered Institute for Archaeologists 2020a);
- Location Specific Written Scheme of Investigation for HS2 Phase 2a: Cadent Gas Pipeline Diversion HP32, Trial Trenching and Unstratified Survey (Document no: UC47-CDG-EV-ESH-A000-000001);
- Technical Standard, Specification for historic environment investigations (HS2 2019)
- Phase 2a Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (GWSI: HERDS) (HS2 2019)

Change Control

1.1.22 The programme of archaeological works comprised 18 trenches, all initially measuring 50m x 1.8m. Trench 13 was stepped after machine excavation to a depth >1m to allow the geoarchaeologist to assess the geological deposits in that area. Sondages were also machine excavated in trenches 14, 15, 16 and 18 for further geological analysis. Where trench depths exceeded 1m, these were recorded and backfilled immediately to mitigate the risk of harm to personnel on site and the public.

1.1.23 Due to its position within the gas pipeline exclusion zone, Trench 10 was relocated 12m to the south of its proposed location, on the same alignment. Trench 7 was reoriented from its proposed alignment due to the presence of a water monitoring standpipe part way along the trench. Trench 16 was also reoriented to avoid a machine access route. None of these changes affected archaeological targets of the trenches.

1.1.24 All changes were agreed in advance by the Archaeology and Heritage Advisor for HS2 Ltd.

1.1.25 No other changes were carried out during the programme of archaeological works.

Methodology

- 1.1.26 The programme of archaeological works was carried out by Headland Archaeology (UK) Ltd between the 7th and 17th March 2022 and consisted of 18 trial trenches and 54 test pits (Figure 2).
- 1.1.27 All works were undertaken in accordance with the detailed methods set out in the LS-WSI (Harris 2021; UC47-CDG-EV-ESH-A000-000001), and in accordance with current industry best practice and guidance (CifA 2020a & b and 2021) and in line with the standards set out by HS2 in the HS2 Technical Standard - Specifications for Historic Environment Investigations (HS2-HS2-EV-STD-000-000035).

Setting out and recording

- 1.1.28 Trial trenches were located to a horizontal accuracy of $\pm 0.5\text{m}$ and were set out with Global Navigation Satellite System (GNSS) equipment with Real Time Kinematic (RTK) corrections.
- 1.1.29 Surface heights were recorded using RTK GNSS. Ordnance Survey Bench Marks (OSBM) were not used.

Unstratified survey

- 1.1.30 Three sample locations were tested at each trench, and these were located at each end of each trench and at its centre. Samples were recovered using a hand shovel.
- 1.1.31 Each sample was equivalent in volume to a 0.25m^2 test pit, the contents of which was dry hand sieved. All soil samples were sieved through a 6mm wire mesh to recover artefacts. Provision was made for further sieving through a 4mm wire mesh in the event that artefacts were encountered at 6mm.

Machine excavation

- 1.1.32 Trenches were excavated to either the first archaeological horizon or the natural substrate, whichever was reached first, using a mechanical excavator fitted with a toothless ditching bucket under the continuous supervision of a competent archaeologist.
- 1.1.33 Prior to excavation, each trench area was subjected to a cable avoidance tool (CAT) scan to check for buried services. Excavation and CAT survey proceeded at 300mm spits.

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1.1.34 Topsoil and subsoil were stripped and stored separately at either side of the trench, as per the Technical Standard: Route Wide Soil Resource Plan (HS2-HS2-EV-STD-000-000008).

1.1.35 Trenches 13-16 and 18 were machine excavated under the supervision of a qualified geoarchaeologist. This was to ensure that the head deposits and the interface between the head deposits, glacial till and other geological units was accurately identified and recorded, and to advise on the suitability of deposits for sampling where this was deemed necessary.

Hand excavation

1.1.36 Archaeological hand excavation was undertaken according to the requirements described in the GWSI: HERDS and the Technical Standard Specification for historic environment investigations (Document No. HS2-HS2-EV-STD-000-000035; section 4.14 and 4.17). The sample strategy was guided by the ClfA Standard and guidance for field evaluation (2020a), as well as the specification detailed in the LSWSI. A sufficient sample of the features and deposits encountered were sampled/fully excavated to allow the resolution of the aims and objectives of the work.

1.1.37 All investigation of archaeological levels was undertaken by hand, with cleaning, examination and recording both in plan and section.

1.1.38 Within significant archaeological levels, the minimum number and proportion of features required to meet the aims of the evaluation were hand excavated. 10% of linear features were sectioned as appropriate.

Fieldwork Recording

1.1.39 The requirements for fieldwork recording are set out in paragraphs 6.6.1 - 6.6.8 of the LSWSI. All archaeological recording was carried out in accordance with the general requirements as described in the GWSI: HERDS and the HS2 Technical Standard for Historic Environment Investigations (Document No. HS2-HS2-EVSTD-000-000035).

1.1.40 Features were sufficiently sampled to meet the requirements of the GWSI: HERDS and in accordance with the dialogue and advice from the HERDS archaeologist.

1.1.41 Archaeological recording included as a minimum:

- One representative section at 1:10 scale of each evaluation trench, from ground level to the base of the excavation;

- Other sections, including the half-sections of individual layers or features, drawn as appropriate to 1:10 or 1:20;
- Plans at appropriate scales (1:10, 1:20);
- The written record of individual contexts on appropriate pro-forma; and
- Photographs and other appropriate drawn and written records.

1.1.42 The stratigraphy of all trial trenches was recorded (even where no archaeological deposits are identified), by means of a representative section for each trench.

1.1.43 A Harris matrix stratification diagram was produced to record stratigraphic relationships (Harris 1989), where appropriate. This record was compiled and fully checked during the excavations.

Environmental Sampling

1.1.44 In line with the Employer's Technical Standard Specification for Historic Environment Investigations (Document No. HS2-HS2-EV0STD-000-000035) the initial sampling strategy was based on the existing information about the Site, gathered from nonintrusive surveys and the HERDS objectives.

1.1.45 This sample strategy, along with the HERDS objectives, identified the key elements that should, where present, be sampled during the evaluation. However, there was scope for the strategy to be reviewed throughout the on-site work and, if necessary, revised accordingly and in consultation with the HERDS manager.

1.1.46 The purpose of sampling at the evaluation stage was to identify the range of environmental materials present on site, their preservation, significance and distribution.

1.1.47 The evidence from non-intrusive archaeological investigations undertaken within the Site for the evaluation area indicated a generally low potential for archaeological features that should be targeted through sampling, however the wider area contains features associated with potential Bronze Age activity and post medieval boundaries and agricultural activity.

1.1.48 The sampling strategy therefore sought to target the following, where present, as a minimum:

- Buildings, ditches, pits, gullies, postholes, of prehistoric to medieval date;
- Floor surfaces where they survive and have not been truncated;
- Deposits representing the main phases of activity (to assess whether there are changes in rates of deposition, material survival over time);
- Where present, samples were screened for the presence of hammerscale and other indicators of industrial processes. Where significant concentrations are identified, this information should be fed back to the field team, so that where necessary, further samples can be taken to help to define any areas of metalworking, or other industrial processes;
- The approach to sampling did not only target charcoal-rich and wet deposits but the full range of features outlined above. This ensured that samples were recovered from a representative sample of contexts.

1.1.49 Where undertaken, samples were taken using ten litre plastic buckets (with lids and handles), Labelling followed guidance set out in the Technical Standard Specification for Historic Environment Investigations (Document No. HS2-HS2-EV-STD-000-000035).

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Results of the Trial Trench Evaluation and Unstratified Survey

- 1.1.50 Trenches 1, 5, 10, 11, 12 and 16 contained archaeological features consisting of ditches, hedgerows and gullies. Trenches 2-4, 6-9, 13-15 and 17 and 18 were found to be archaeologically sterile. Possible trace evidence of ridge and furrow ploughing was noted as faint banding in Trench 6.
- 1.1.51 The unstratified survey, involving the sieving of topsoil material from three test areas located at the two ends and centre of each trench, did not result in the retrieval of any archaeological material.

General Stratigraphy and Geoarchaeology

- 1.1.52 All trenches contained the same stratigraphic topsoil, which comprised a mid-greyish brown clayey silt which was excavated to a depth below ground level (bgl) of between 0.30m (Trenches 4 and 5) and 0.95m (Trench 13). Subsoil was only present in Trenches 1-3 and 11-16 and comprised a mid orange-brown clay silt, averaging a depth of 0.12m. The natural deposits comprised a light yellow-brown silty coarse sand with frequent sub-rounded stone inclusions and sometimes patches of red-brown clay. This was excavated to a maximum thickness of 0.20m (Trench 18).
- 1.1.53 A geoarchaeologist was present during the machining of Trenches 13-16 and 18, to supervise the removal of the head deposits and examine the surface of the sealed glacial till deposits.
- 1.1.54 The head deposits are characterised by heterogeneous gravelly sandy silts and silty sands. These deposits are formed due to solifluction, mass movement of deposits sitting on top of permafrost. The till deposits generally consist of heterogeneous deposits deposited by glaciers with limited sorting.
- 1.1.55 Trench 13 was stepped and widened at its north-western end to investigate the head/till interface. The topsoil overlay head deposits consisting of bands of sandy silt and silty sand with moderate gravel and cobble inclusions to a maximum thickness of 1.5m. At the base of the intervention was a fine sandy clay deposit with occasional coarse gravel inclusion which was interpreted as the underlying till deposit.
- 1.1.56 A sondage was excavated at the north western end of Trench 14, containing 0.3m of topsoil overlying a silty sand deposit with poorly sorted gravel (0.3-1.2m bgl)

interpreted as head deposit. From 1.2-1.3m bgl was a stiff sandy clay with gravels, which is the top of the till deposit.

- 1.1.57 A sondage was excavated at the western end of Trench 15 which contained 0.3m thickness of topsoil, overlying 0.3 to 0.7m sandy silts and silty sand deposits with occasional gravel inclusions interpreted as the head deposit. Between 0.7-1.0m bgl was a stiff sandy clay with gravel, the top of the till deposit.
- 1.1.58 A sondage was excavated at the northern end of Trench 16 which contained 0.3m thickness of topsoil underlain by the head deposit comprising mixed bands of silty sand, sand and gravel to a depth of 1.4m bgl. From 1.4-1.6m bgl a stiff sandy clay deposit was uncovered similar to the till seen in other areas of site.
- 1.1.59 A sondage was excavated at the eastern end of Trench 18 which contained 0.3m thickness of topsoil overlying 1m thickness of light yellow brown sand with 15% poorly sorted subangular to rounded fine to coarse gravel and cobbles, a head deposit. Beneath this deposit between 1.30 and 1.50m bgl was a till deposit of heterogeneous silty sand to sand clay deposit with moderate fine to coarse gravels and cobble sized inclusions
- 1.1.60 No evidence was found of any buried soil profiles, deposits with paleoenvironmental potential or remains likely to contain Palaeolithic archaeology. The deposit sequences observed confirm that the extents of the head and till deposits are broadly as mapped by the BGS, the till extending beneath (but not beyond) the head deposits.

Trench 1

- 1.1.61 Trench 1 was orientated north-east to south-west and contained two east – west aligned features (Figure 3-7).
- 1.1.62 The parallel linear features, [001004] and [001007] measured between 0.48m and >1m wide, and continued beyond the trench limits. They were irregular in plan, with [001004] being truncated by two modern drains. Both comprised a relatively shallow 'U' shaped profile and measured between 0.14m -0.21m in depth. Each contained a very similar fill, (001005) and (001008), which consisted of a waterlogged reddish-grey silty fine sand. A mid orange-brown fill (001006) overlay both fills. No finds were recovered from either ditch.

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- 1.1.63 The two features in Trench 1 were relatively shallow indicating a large amount of truncation from the installation of land drains and agricultural activity. No artefacts were recovered from the features.

Trench 5

- 1.1.64 Trench 5 was orientated north to south and contained two ditches which were both running east to west (Figure 8-10).
- 1.1.65 Ditch [005003] measured 1.25m in width and contained two fills, (005004) and (005005), reaching a depth of 0.32m. The ditch had a 'U' shaped profile with gradually sloping sides and a rounded base. Primary fill (005004) was 0.06m thick and organic in composition, containing decomposing wood with some fragments measuring c.0.12m in length. It was theorised to be either a result of deliberate lining of the ditch, or possibly accidental from environmental activity. Stratigraphically above this was another fill (005005) which comprised of a light brownish-grey sandy silt with occasional small sub-angular stone inclusions, which was 0.17m thick. No artefactual material was recovered from either of the fills present, but a 5-litre sample of (005004) was collected for environmental.
- 1.1.66 The second ditch cut the upper fill (005005) of ditch [005003] and measured 0.95m in width. There was one fill present (005007) measuring 0.11m in thickness, which was likely a natural infilling based on the homogenous character of the reddish-brown silty sand fill. Small sub-rounded stones were occasionally found throughout, but otherwise no artefactual material.

Trench 10

- 1.1.67 Oriented north-east to south-west, Trench 10 contained one gully which ran north to south (Figure 11).
- 1.1.68 Gully [010003] measured 0.64m wide and contained one fill (010004). It had a V-shaped cut and an uneven base deepening towards the north-west end of the trench. Within the sterile, grey clay-silt fill (010004) a concentration of rounded stones were noted at the base, indicating a waterborne natural infilling. There were no finds within this feature.

Trench 11

- 1.1.69 Situated on a north-east to south-west alignment, Trench 11 contained a ditch and a hedgerow running north-west to south-east (Figure 12 and 13).

1.1.70 Ditch [011004] measured 1.2m in width and was cut by hedgerow [011006], which was of indeterminate width due to its location at the most north-eastern part of the trench but was at least 0.88m wide. In contrast to ditch [011004] which had a regular cut, [011006] had an uneven base with evidence of heavy rooting. Both had similar depths of 0.28m ([011004]) to 0.31m ([011006]) and had very similar fills. The fills (011005) and (011007) comprised of a grey fine sandy silt, which appeared lighter in the fill of the hedgerow (011007). Both are suspected natural infillings which produced no artefactual material.

Trench 12

1.1.71 Trench 12 was oriented north to south and was heavily disturbed from modern activity. A dark organic deposit was found at the south end of the trench, along with a ditch and a hedgerow of similar nature to those found in Trench 11 (Figure 14-16).

1.1.72 Deposit (012004) was 4.40m in width and 0.09m in depth, present only in the south end of the trench. Displaying a dark blackish-grey colour, the deposit comprised of a clayey silt and was of irregular shape, with occasional small, rounded stone inclusions. It is possible that this was a result of modern disturbance; no dating evidence or artefactual material was found.

1.1.73 Similar to the features found in Trench 11 ([011004] and [011006]), a ditch and a hedgerow were present at the south end of Trench 12, both of north-east to south-west alignment. Ditch [012005] measured 1.73m in width, with an average depth of 0.36m. With a 'U' shaped cut and shallow sloped edges, the ditch contained one fill (012006) which consisted of a firm greyish-brown silty fine sand, with moderate small to medium sub-rounded stone inclusions. The ditch was truncated by a steep cut for a field drain towards the centre, suggesting that its original purpose may have been water management, though it may have served as a field boundary.

1.1.74 Hedgerow [012007] measured 1.21m wide and 0.29m deep. The cut of this feature was very irregular with a flat base and sloping edges. Fill (012008) was sterile, mid-grey silty fine sand.

1.1.75 When comparing the location of Trench 12 with a 1st Edition OS map, a field boundary is seen to have been present in the location of [012005] and [012006], appearing in the same north-east to south-west alignment. It is likely that these features represent recut and minor realignments of the boundary, with those in Trench 11 likely an extension of the same boundary running perpendicular.

Trench 16

- 1.1.76 Trench 16 was excavated on a north to south alignment and was found to contain one gully (Figure 19 and 20).
- 1.1.77 Gully [016004] was aligned east to west, measuring 0.95m wide and 0.22m deep. The irregular, 'U' shaped profile was filled by light grey-brown, coarse sand infilling with occasional rooting throughout (016005). This was likely a natural geological feature.

Table 3: Trench Summary

Trench No. (UID)	Field No	Trench dimensions length x width (m)	Trench depth min-max (m)	Environmental Remains	Finds	Archaeology present
01	1	50.00 x 1.80	0.40-0.77	N	N	Y
02	1	50.00 x 1.80	0.35-0.50	N	N	N
03	1	50.00 x 1.80	0.40-0.45	N	N	N
04	1	50.00 x 1.80	0.30-0.60	N	N	N
05	2	50.00 x 1.80	0.30-0.35	Y	N	Y
06	2	50.00 x 1.80	0.45-0.50	N	N	N
07	3	50.00 x 1.80	0.43-0.50	N	N	N
08	3	50.00 x 1.80	0.35-0.45	N	N	N
09	3	50.00 x 1.80	0.35-0.40	N	N	N
10	3	50.00 x 1.80	0.35-0.47	N	N	Y
11	4	50.00 x 1.80	0.40-0.55	N	N	Y
12	4	50.00 x 1.80	0.55-0.62	N	N	Y
13	4	50.00 x 1.80	0.46-0.95	N	N	N
14	4	50.00 x 1.80	0.50-0.60	N	N	N
15	4	50.00 x 1.80	0.50-0.65	N	N	N
16	4	50.00 x 1.80	0.50-0.75	N	N	Y
17	5	50.00 x 1.80	0.43-0.50	N	N	N
18	6	50.00 x 1.80	0.50-0.70	N	N	N

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Artefact and Environmental Assessment

1.1.78 Of the 18 trenches and 54 hand dug test pits excavated, no artefactual or dateable material was retrieved from any of the potential features present.

Environmental Assessment

1.1.79 One environmental sample, with a total volume of five litres, was collected from fill (005004) in Trench 5. On review the sample was not deemed to be of sufficient interest to warrant processing. The sample has been retained and is being held at Headland S&E.

Table 4: Quantification of bulk samples

Site	No. taken	Vol. taken	Vol. processed	No. Assessed
HP32	1 sample	1 bucket	TBC	TBC
		5 litres		
	Range of material	Range of Species	Preservation and Taphonomy	
	FLOTS: RETENTS:	N/A	TBC	

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Assessment and Interpretation of Results

Evaluation of Methodology

- 1.1.80 The trial trench evaluation comprised the excavation of 18 trenches and the unstratified survey of 54 locations across the Site. The trenches all initially measured 50m x 1.8m. Trench 13 was widened and stepped and sondages were machine excavated in Trenches 14, 15, 16 and 18 for further geoarchaeological analysis. All of the trenches planned were excavated.
- 1.1.81 The soil horizons throughout the stratigraphic sequence were generally clear and well defined. It is unlikely that any archaeological features were not identified during trenching. The trenching methodology is judged therefore to have been a suitable method of evaluation in this landscape.

Interpretation of Archaeological Remains

- 1.1.82 The archaeological trial trenching and unstratified survey at the HP32 site revealed sparse archaeological features of geological and agricultural origin and numerous ceramic land drains across fields 1, 2, 3, and 4.
- 1.1.83 It is likely that the linear features recorded represent post-medieval land divisions. These were of relatively shallow depth indicating that they had been truncated by agricultural activity over time. The two similar features in Trenches 11 and 12 ([011004], [011006] and [012005], [012007]) are likely to represent removed land divisions in the form of hedgerows and field boundary ditches respectively, which are mapped on the first edition OS. Elsewhere, natural geological features have formed as a result of the topography of the area. A possible trace of ridge and furrow ploughing represented by faint banding in the subsoil of Trench 6 may suggest agricultural land use from the late medieval or early post-medieval period, but with no surface expression in the form of earthworks.
- 1.1.84 Geoarchaeological investigation was carried out in Trenches 13, 14, 15, 16 and 18, excavating through the head deposits and partially into the underlying till. Head deposits were recorded to depths of between c. 0.7-1.2m. There was no indication of buried land surfaces or pedogenesis within the Head or Till. No organics were encountered, indicating that there is no significant palaeoenvironmental potential in this location. The investigation confirmed that the limits of the till are accurately mapped by the BGS, extending beneath the head.

Consideration of Results in their Wider Context

- 1.1.85 The archaeological trial trenching within the site has demonstrated the presence of sparse remains associated with land division, agricultural activity and natural depositional processes within the site. The features are of little interpretive value and do not contribute strongly to identified HERDS objectives.
- 1.1.86 Geoarchaeological investigation of the head deposits and till within trenches in the western half of the site confirmed that there is no significant palaeoenvironmental potential, limiting the extent to which the deposits can assist in refining chronologies for the final glaciation of the Devensian period or subsequent Holocene environments. The investigation confirmed the presence of till beneath the head, the limit of the till extending slightly west of the extent mapped by the British Geological Survey, however at a broader level the extent of the till is effectively as previously understood.
- 1.1.87 Accordingly, Table 5 below summarises the potential contribution of these results to the identified HS2 Phase 2a HERDS specific objectives. There is negligible potential for the results to contribute to new or different HERDS objectives.

Table 5: Contribution to specific objectives - Knowledge Creation

Specific Objective	Contribution
2aKC2: Explore glacial tills along the Phase 2a route to establish with the greatest precision possible the extent and date of the maximum advance of the most recent (Devensian) ice sheet	The geoarchaeological work has characterised and confirmed the boundaries of the Till and Head at the western end of the site and identified negligible palaeoenvironmental potential in this location. There is limited potential for contributing to an understanding of the date of the most recent maximum Devensian ice sheet advance. The extent of the till is broadly as previously mapped, indicating little variation beyond the existing understanding of the deposit.
2aKC5: Identify and investigate evidence for change in the environment and management of the landscape during the Mesolithic, Neolithic and Early Bronze Age periods	Investigation of the head deposits at the western end of the site confirmed that there are no buried land surfaces or palaeoenvironmental potential within the deposit or sealed beneath it. No archaeological features of these dates were identified within the site. There is

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Specific Objective	Contribution
	therefore no further potential for contribution to this objective.
2aKC22: Test and develop geophysical survey methodologies	<p>With regard to testing geophysical survey methodologies, magnetometry coverage for this site was available for Fields 1, 2 and 5. The survey for Field 1 and 5 appear to have been good and the results of the trenching are consistent with the original survey. Magnetometry in Field 2 was heavily affected by background magnetic noise which was clearly a function of manuring the field with waste. Techniques other than magnetometry may have been a better method of survey here. However, there is clearly an issue in terms of predicting whether such manuring activities have taken place when considering which technique(s) to use, as evidenced by the very different qualities of result using the same technique in directly adjacent fields.</p>

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Scheme Impacts and Further Work

- 1.1.88 The construction of the HP32 diversion requires ground-breaking works associated with the creation of the site compound, haul roads, topsoil storage areas, tie in pits and pipe trench excavation. All works are to be undertaken within the area of land-take considered as part of the scope of this investigation.
- 1.1.89 In light of the findings of the trial trenching and unstratified survey, it was agreed in consultation with HS2 that the results would not contribute to further knowledge creation for the existing identified HERDS objectives or and new or different objectives, and therefore that no further mitigation of the development impact is required.

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Publication and Dissemination Proposals

- 1.1.90 Publication of the results of this fieldwork will be undertaken in a method and at an appropriate time as determined by HS2 Ltd.

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Archive Deposition

- 1.1.91 All archaeo-environmental samples will be treated and conserved in accordance with the UKIC's document, Guidelines for the Preparation of Excavation Archives for Long Term Storage (1990). Should further work be required, the evaluation archive along with any further archive will be compiled into an ordered, indexed and internally consistent Site archive that will be prepared and deposited in accordance with Archaeological Archives: A Guide to Best Practice in Creation, Compilation, Transfer and Curation – Revised Edition (Archaeological Archives Forum 2011). A summary of information from the project has been entered onto the OASIS online databases of archaeological projects in Britain.
- 1.1.92 Final deposition of the archive will be with the Potteries Museum and Art Gallery.

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References and glossary

References

Reference	HS2 Document Reference No.
Archaeological Archives: A guide to best practise in creation, compilation, transfer and curation – Revised Edition	AAF 2011
Chartered Institute for Archaeologists (CIfA) 2020a Standard and Guidance for Archaeological Field Evaluation	CIfA 2020a
Chartered Institute for Archaeologists (CIfA), 2020b Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives	CIfA 2020b
Chartered Institute for Archaeologists (CIfA), 2021. Code of Conduct	CIfA 2021
Principles of Archaeological Stratigraphy Academic Press	Harris E 1989
Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy GWSI: HERDS	HS2-HS2-EV-STR-000-000015
Technical Standard Specification for historic environment investigations	HS2-HS2-EV-STD-000-000035
Technical Standard Specification for historic environment project plans and location specific written schemes of investigation	HS2-HS2-EV-STD-000-000036
BGS Geology of Britain viewer https://mapapps.bgs.ac.uk/geologyofbritain/home.html?&_ga=2.122236043.1469999329.1648732514-2104073334.1648732514 accessed 31.03.2022	NERC 2022
Harris SJ 2021 Location Specific Written Scheme of Investigation for HS2 Phase 2a: Cadent Gas Pipeline Diversion HP32, Trial Trenching and Unstratified Survey	UC47-CDG-EV-ESH-A000-000001
Guidelines for the preparation of excavation archives for long term storage	UKIC 1990

Acronyms

aOD	Above Ordnance Datum
BGL	Below Ground Level
CAT	Cable Avoidance Tool
CA	Community Area
CIfA	Chartered Institute of Archaeological
ES	Environmental Statement
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
HA	Hectare
HE	Historic Environment
HER	Historic Environment Record
HERDS	Historic Environment Research and Delivery Strategy
ID	Identification
JV	Joint Venture
LiDARr	Light Detection and Ranging
NGR	National Grid Reference

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Site manager	Tom Hodgson
Field Archaeologists	Dana Gaskell, Colin Elder and Bobbie Carter
Finds & Environmental processing team	James Hodgson
Illustrator	Dunia Sinclair

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Appendix 1: Context Register

No. (Feature Id.)	Trench No. (UID)	Feature Type	Context Depth (m)	Artefactual Remains	Environmental Remains	Description/Comment
001001	01	Topsoil	0.35	N	N	Mid brown grey clayey silt. Loose with occasional small to medium sub-rounded stones and frequent rooting.
001002	01	Subsoil	0.10	N	N	Mid mottled yellow red silty sand. Occasional small to medium dark grey sandstone inclusions.
001003	01	Natural	0.15	N	N	Mid mottled yellow red silty sand with occasional small to medium sub-rounded stones.
001004	01	Cut of ditch	0.21	N	N	A linear feature aligned east to west, interpreted as a possible drainage ditch. Shallow 'U' shaped profile with gentle sloping sides, boxed off at the south west side due to truncation from modern drain. Runs parallel to another likely drainage ditch [001007]. L: 2.70m W: >1m
001005	01	Fill of [001004]	0.21	N	N	Light brown grey silty fine sand. Compact with moderate small to medium angular stones. Sterile fill; no finds retrieved and no sample taken.
001006	01	Fill [001004]	0.24	N	N	Mid red brown silty fine sand. Compact with moderate small to medium angular stones and occasional small rounded stones. Sterile fill; no finds retrieved and no sample taken.
001007	01	Cut of ditch	0.14	N	N	A linear feature aligned east to west, interpreted as a drainage ditch. Shallow 'U' shaped profile with gradually sloping sides. Runs parallel to ditch [001004]. L: >1m W: 0.48m
001008	01	Fill of [001007]	0.14	N	N	Mid red grey silty fine sand. Loose with occasional small rounded stone inclusions. Very waterlogged but sterile; no finds retrieved and no sample taken.
002001	02	Topsoil	0.30	N	N	Mid brown grey clayey silt. Loose with occasional small to medium sub-rounded stones and frequent rooting.
002002	02	Subsoil	0.08	N	N	Light brownish grey silty clay. Compact.
002003	02	Natural	0.06	N	N	Mottled yellow and red brown silty clay. Compact with frequent small to medium rounded stones and frequent manganese flecks.

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No. (Feature Id.)	Trench No. (UID)	Feature Type	Context Depth (m)	Artefactual Remains	Environmental Remains	Description/Comment
003001	03	Topsoil	0.30	N	N	Mid grey brown clayey silt. Loose with occasional small sub-rounded stones and frequent rooting.
003002	03	Subsoil	0.05	N	N	Light brownish grey clayey silt. Compact with frequently occurring small to medium rounded stones.
003003	03	Natural	0.07	N	N	Light orange grey clayey silt. Compact with frequent small to medium rounded stone inclusions.
004001	04	Topsoil	0.25-0.40	N	N	Mid grey brown clayey silt. Loose with occasional small sub-rounded stones and frequent rooting.
004002	04	Natural	0.10	N	N	Mottled orange and red brown silty clay. Compact with frequent very small to medium rounded stones.
005001	05	Topsoil	0.25	N	N	Mid grey brown clayey silt. Loose with occasional small sub-rounded stones and frequent rooting.
005002	05	Natural	0.07	N	N	A combination of a red brown silty clay and a light yellow brown silty sand. Both compact, with frequent small to medium sub-rounded stone inclusions.
005003	05	Cut of ditch	0.32	N	N	A linear feature aligned east to west, interpreted as a drainage ditch. Gradually sloping 'U' shaped profile, with a sharp break of slope towards the base. L: >0.35m W: 1.25m
005004	05	Basal fill of [005004]	0.06	N	Y	Dark grey fine sandy silt. Compact basal fill, containing organic material. Contains rare small angular and rounded stones and frequent small to medium fragments of decomposing wood. Interpreted as either the deliberate lining of a drainage ditch or as a result of natural processes. No artefactual material produced; one sample taken for environmental analysis (#001).

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No. (Feature Id.)	Trench No. (UID)	Feature Type	Context Depth (m)	Artefactual Remains	Environmental Remains	Description/Comment
005005	05	Secondary fill of [005004]	0.13	N	N	Light brown grey sandy silt. Firm and homogenous with occasional small rounded and angular stone inclusions. Interpreted as a natural infilling. Cut by ditch [005006]. Sterile fill; no artefacts retrieved or samples taken.
005006	05	Cut of ditch	0.11	N	N	Linear feature of east to west alignment which cuts context (005005). Regular 'U' shaped profile with gentle sloping edges. L: >0.35m W: 0.95m
005007	05	Fill of [005006]	0.11	N	N	Mid red brown sandy silt. Firm with rare small angular stone and occasional small rounded stone inclusions. Likely a natural, sterile fill, with no artefactual material. No sample taken.
006001	06	Topsoil	0.35	N	N	Mid grey brown clayey silt. Loose with frequent rooting and occasional small to medium sub-rounded stone inclusions.
006002	06	Natural	0.10	N	N	Light yellow brown clayey silt. Compact with frequent small to medium rounded stone inclusions.
007001	07	Topsoil	0.30	N	N	Mid grey brown clayey silt. Loose with frequent rooting and occasional small to medium sub-rounded stone inclusions.
007002	07	Natural	0.13	N	N	Mid yellow and red brown silty sand with frequent small to medium rounded stones. This changes at the south west end to a light grey silty fine sand with occasional small to medium rounded stones.
007003	07	Natural	0.15	N	N	Mid grey brown clayey silt. Only present at the south west end of the trench, stratigraphically beneath (007001) and above (007002).
008001	08	Topsoil	0.30	N	N	Mid grey brown clayey silt. Loose with frequent rooting and occasional small to medium sub-rounded stone inclusions.
008002	08	Natural	0.07	N	N	Mid yellow red brown silty clay with frequent small to medium rounded stone inclusions
009001	09	Topsoil	0.25	N	N	Mid grey brown clayey silt. Loose with frequent rooting and occasional small to medium sub-rounded stone inclusions.

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No. (Feature Id.)	Trench No. (UID)	Feature Type	Context Depth (m)	Artefactual Remains	Environmental Remains	Description/Comment
009002	09	Natural	0.06	N	N	Light red brown clayey sand. Compact with frequent small to large sub-rounded stone inclusions.
010001	10	Topsoil	0.30	N	N	Mid grey brown clayey silt. Loose with frequent rooting and occasional small to medium sub-rounded stone inclusions.
010002	10	Natural	0.05	N	N	Light red yellow brown sandy clay. Compact with occasional small to medium sub-rounded stone inclusions.
010003	10	Cut of gully	0.20	N	N	Linear gully formed from natural processes. Regular 'V' shaped profile with an uneven base, deeper at the north west end of the intervention. L: 1.8m W: 0.64
010004	10	Fill of [010003]	0.20	N	N	Mid grey clayey silt. Compact with occasional small to medium rounded stone inclusions. Sterile waterborne fill, no artefacts retrieved or samples taken.
011001	11	Topsoil	0.28	N	N	Mid grey brown clayey silt. Loose with frequent rooting and occasional small to medium sub-rounded stone inclusions.
011002	11	Subsoil	0.10	N	N	Mid brown grey silty clay. Compact.
011003	11	Natural	0.10	N	N	Mid orange brown silty sand. Compact with frequent small to large rounded stone inclusions.
011004	11	Cut of ditch	0.28	N	N	Linear feature of north west to south east alignment. Break of slope is much steeper on the south west edge compared with the gradual break of slope on the north east edge. Interpreted as a boundary ditch. Possibly related to similar feature found in Trench 12 ([012005]). L: 1.1m W: 1.2m
011005	11	Fill of [012004]	0.28	N	N	Mid grey fine sandy silt infilling. Compact with occasional small to medium rounded stone inclusions. Higher concentration of stones at the bottom suggests a natural infilling. Sterile fill; no artefacts or samples taken.

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No. (Feature Id.)	Trench No. (UID)	Feature Type	Context Depth (m)	Artefactual Remains	Environmental Remains	Description/Comment
011006	11	Cut of hedgerow	0.31	N	N	Linear feature of north west to south east orientation. Irregular 'U' shaped profile with an uneven base. Cuts ditch [011004] at the north east edge. Interpreted as a hedgerow serving as a boundary. L: >1m W: 0.88m
011007	11	Fill of [011006]	0.31	N	N	Light grey silty fine sand. Compact with occasional plant remains (rooting). No artefacts recovered or samples taken.
012001	12	Topsoil	0.30	N	N	Mid grey brown clayey silt. Loose with frequent rooting and occasional small to medium sub-rounded stone inclusions.
012002	12	Subsoil	0.16	N	N	Mid red brown clayey silt. Compact.
012003	12	Natural	0.10	N	N	Grey brown fine sandy silt. Compact with frequent small to medium sub-rounded stone inclusions.
012004	12	Deposit	0.09	N	N	Dark grey sandy silt, likely organic. Irregular in shape with some occasional small rounded stones, only seen at the southern end of the trench.
012005	12	Cut of ditch	0.36	N	N	Linear feature of north east to south west alignment. Shallow regular 'U' shaped profile with a base disturbed by a modern field drain. Interpreted as a boundary ditch or water management system. Potentially same as ditch [011004] in Trench 11. L: >1.8m W: 1.73m
012006	12	Fill of [012005]	0.36	N	N	Mid grey brown silty fine sand. Firm with rare small to medium angular stone inclusions and moderate small to medium rounded stone inclusions. Natural sterile fill, likely waterborne material. No artefacts retrieved or samples taken.
012007	12	Cut of hedgerow	0.29	N	N	Linear feature of north east to south west alignment. Irregular profile with gradual sloping sides and a flat base. Interpreted as a hedgerow. Cut by ditch [012005] at the north west edge. L: >1.8m W: 1.21m

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No. (Feature Id.)	Trench No. (UID)	Feature Type	Context Depth (m)	Artefactual Remains	Environmental Remains	Description/Comment
012008	12	Fill of [012007]	0.29	N	N	Mid grey fine sandy silt. Compact with rare small to medium angular stone and moderate small to large rounded stone inclusions. Likely a result of water movement or root decay of hedgerow. Sterile; no artefacts retrieved or samples taken.
013001	13	Topsoil	0.35	N	N	Mid grey brown clayey silt. Loose with frequent rooting and small to medium sub-rounded stones.
013002	13	Subsoil	0.12	N	N	Mid orange brown clayey silt. Compact with frequent small to medium sub-rounded stones.
013003	13	Natural	0.15	N	N	Mid red brown silty clay. Plastic with possible remnants of rooting and rare small rounded stone inclusions (boulder clay).
013004	13	Natural	0.11	N	N	Mid red brown silty sand. Compact with frequent small sub-rounded stone inclusions.
0013005	13	Natural	0.32	N	N	Mid orange brown sand gravel. Compact with frequent very small to large sub-rounded stone inclusions.
0013006	13	Natural	0.10	N	N	Mid orange brown silty clay with patches of dark red silty clay. Compact with frequent small to medium sub-rounded stone inclusions.
0014001	14	Topsoil	0.30	N	N	Mid grey brown clayey silt. Loose with frequent rooting and occasional small to medium sub-rounded stones.
0014002	14	Subsoil	0.15	N	N	Dark orange brown clayey silt. Compact.
014003	14	Natural	0.13	N	N	Mid orange brown clayey sand. Compact with frequent small to medium sub-rounded stones.
015001	15	Topsoil	0.32	N	N	Mid grey brown silty clay. Loose with frequent rooting.
015002	15	Subsoil	0.20	N	N	Dark orange brown clayey silt. Only present in the eastern end of the trench.
015003	15	Natural	0.13	N	N	Light orange brown clayey silt. Compact with frequent small to medium sub-rounded stone inclusions.
015004	15	Natural	0.12	N	N	Dark orange brown clayey sand. Compact with frequent small to medium sub-rounded stones. Possible palaeochannel deposit; only present in the eastern end of the trench.

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No. (Feature Id.)	Trench No. (UID)	Feature Type	Context Depth (m)	Artefactual Remains	Environmental Remains	Description/Comment
016001	16	Topsoil	0.30	N	N	Mid grey brown sandy clay. Loose with frequent rooting and occasional small or medium sub-rounded stones.
016002	16	Subsoil	0.15	N	N	Mid orange brown clayey sand. Compact with frequent small to medium sub-rounded stones.
016003	16	Natural	0.14	N	N	Mid brown orange silty sand. Compact with frequent small to medium sub-rounded stones.
016004	16	Cut of linear	0.22	N	N	Linear feature of east to west alignment. Irregular 'U' shaped profile, with gradually sloping sides. Interpreted as a natural watercourse. L: >1m W: 0.95m
016005	16	Fill of [016004]	0.22	N	N	Light grey brown silty coarse sand. Compact with a gradual interface and frequent small to medium rounded stone inclusions. Occasional rooting throughout. Sterile natural infill; no artefacts or samples taken.
017001	17	Topsoil	0.33	N	N	Mid grey brown clayey silt. Loose with frequent rooting and small to medium sub-rounded stones.
017002	17	Natural	0.10	N	N	Mid orange brown coarse sand with patches of sandy gravel. Compact with frequent small to medium sub-rounded stone inclusions.
018001	18	Topsoil	0.30	N	N	Mid grey brown clayey silt. Loose with frequent rooting and small to medium sub-rounded stones.
018002	18	Natural	0.20	N	N	Mid. orange brown coarse sand. Compact with frequent small to medium sun-rounded stones.

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Appendix 2: Photographic Register

Photo no. (id)	Digital image no.	Direction facing	Description
001	100-0121	NW	Pre-excavation field condition shot of Field 1
002	100-0122	NE	Pre-excavation field condition shot of Field 1
003	100-0123	SW	Pre-excavation field condition shot of Field 1
004	100-0124	SE	Pre-excavation field condition shot of Field 1
005	100-0125	W	Pre-excavation field condition shot of Field 1
006	100-00126	SE	Pre-excavation field condition shot of Field 1
007	100-0127	NE	Pre-excavation field condition shot of Field 1
008	100-0128	SW	Pre-excavation general shot of Trench 1
009	100-0129	SE	North west facing representative section of Trench 1
011	100-0131	NE	Pre-excavation general shot of Trench 1
012	100-0132	NE	Pre-excavation general shot of Trench 1
013	100-0133	NE	Pre-excavation general shot of Trench 1
014	100-0134	W	Showing alignment of features in Trench 1 with modern water tower to the west
015	100-0135	W	Showing alignment of features in Trench 1 with modern water tower to the west
016	100-0136	SE	Showing alignment of features in Trench 1 with modern water tower to the west
017	100-0137	SE	Showing alignment of features in Trench 1 with modern water tower to the west
018	100-0138	SE	Post excavation general shot of Trench 2
019	100-0139	NE	South west facing 1m representative section of Trench 2
020	100-0140	NW	Post excavation general shot of Trench 2
021	100-0141	N	Post excavation general shot of Trench 3
022	100-0142	E	West facing representative section of Trench 3
023	100-0143	S	Post excavation general shot of Trench 3
024	100-0144	SW	North east facing section of drain in Trench 2
025	100-0145	SW	North east facing section of drain in Trench 2
026	100-0146	SW	North east facing section of drain in Trench 2
027	100-0147	SW	North east facing section of drain in Trench 2
028	100-0148	NW	South east facing section of ditch [001004] in Trench 1

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HS2 Phase 2a: Cadent Gas Pipeline Diversion HP32 Trial Trenching, Including Unstratified Survey Final Report

Document no: UC47-CDG-UT-REP-A000-000041

Revision: 01

Photo no. (id)	Digital image no.	Direction facing	Description
029	100-0149	NW	South east facing section of ditch [001004] in Trench 1
030	100-0150	NW	South east facing section of ditch [001004] in Trench 1
031	100-0151	NW	South east facing section of ditch [001004] in Trench 1
032	100-0152	NW	South east facing section of ditch [001004] in Trench 1
033	100-0153	NW	South east facing section of ditch [001004] in Trench 1
034	100-0154	NW	South east facing section of ditch [001004] in Trench 1
035	100-0155	W	Post excavation general shot of Trench 4
036	100-0156	E	Post excavation general shot of Trench 4
037	100-0157	S	North facing representative section of Trench 4
038	100-0158	NW	Post excavation general shot of Trench 6
039	100-0159	SE	Post excavation general shot of Trench 6
040	100-0160	NE	South west facing representative section of Trench 6
041	100-0161	E	Pre-excavation field condition shot of Field 3
042	100-0162	S	Pre-excavation field condition shot of Field 3
043	100-0163	SE	Pre-excavation field condition shot of Field 3
044	100-0164	NE	Pre-excavation field condition shot of Field 3
045	100-0165	W	Pre-excavation field condition shot of Field 3
046	100-0166	E	West facing section of ditch [001007] in Trench 1
047	100-0167	OH	Plan shot of ditch [001007] in Trench 1
048	100-0168	OH	Plan shot of ditch [001007] in Trench 1
049	100-0169	OH	Plan shot of ditch [001007] in Trench 1
050	100-0170	SW	North east facing section of drain in Trench 2
051	100-0171	SW	General shot of drain in Trench 2
052	100-0172	OH	General shot of drain in Trench 2
054	100-0174	N	Post excavation general shot of Trench 5
055	100-0175	S	Post excavation general shot of Trench 5
056	100-0176	E	West facing representative section of Trench 5
057	100-0177	E	Post excavation general shot of Trench 8
058	100-0178	W	Post excavation general shot of Trench 8
059	100-0179	S	North facing representative section of Trench 8
060	100-0180	S	North facing representative section of Trench 8
061	100-0181	OH	Modern drain in Trench 8
062	100-0182	W	Location shot of modern drain in Trench 8
063	100-0183	SW	Pre-excavation field condition shot of Field 4

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Photo no. (id)	Digital image no.	Direction facing	Description
064	100-0184	NE	Pre-excavation field condition shot of Field 3
065	100-0185	E	Pre-excavation field condition shot of Field 3
066	100-0186	N	Pre-excavation field condition shot of Field 3
067	100-0187	NE	Post excavation general shot of Trench 7
068	100-0188	SW	Post excavation general shot of Trench 7
069	100-0189	SE	North west facing representative section of Trench 7
070	100-0190	OH	Working shot of ditches [005003] and [005006] before removal of wood (005004)
071	100-0191	OH	Working shot of ditches [005003] and [005006] before removal of wood (005004)
072	100-0192	NW	Working shot of ditches [005003] and [005006] before removal of wood (005004)
073	100-0193	OH	Working shot of ditches [005003] and [005006] before removal of wood (005004)
074	100-0194	W	East facing section of ditches [005003] and [005006]
075	100-0195	W	East facing section of ditches [005003] and [005006]
076	100-0196	S	Post excavation general shot of Trench 12
077	100-0197	N	Post excavation general shot of Trench 12
078	100-0198	W	East facing representative section of Trench 12
079	100-0199	SE	Post excavation general shot of Trench 11
080	100-0200	NW	Post excavation general shot of Trench 11
081	100-0201	SE	North west facing representative section of Trench 11
082	100-0202	W	Investigated land drain in Trench 12
083	100-0203	W	East facing section of investigated land drain in Trench 12
084	100-0204	E	West facing section of deposit (012004)
085	100-0205	SE	Post excavation general shot of Trench 13
086	100-0206	SW	North east facing representative section of Trench 13
087	100-0207	SW	North east facing representative section of Trench 13
088	100-208	NW	Post excavation general shot of Trench 13
089	100-209	N	Working shot of Trench 12
090	100-210	N	Working shot of Trench 12
099	100-0219	SE	Trench 13 after level reduction
100	100-0220	NW	Trench 13 after level reduction
101	100-0221	NW	Trench 13 after level reduction
106	100-0226	SE	North west representative section of Trench 9
107	100-0227	NE	Post excavation general shot of Trench 9

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HS2 Phase 2a: Cadent Gas Pipeline Diversion HP32 Trial Trenching, Including Unstratified Survey Final Report

Document no: UC47-CDG-UT-REP-A000-000041

Revision: 01

Photo no. (id)	Digital image no.	Direction facing	Description
108	100-0228	SE	Post excavation general shot of Trench 9
110	100-0230	NW	Post excavation general shot of Trench 14
111	100-0231	SE	Post excavation general shot of Trench 14
112	100-0232	SW	North east facing representative section of Trench 14
113	100-0233	SW	North east facing section of ditch [012005] and drain in Trench 12
114	100-0234	SW	North east facing section of ditch [012005] and [012007] in Trench 12
115	100-0235	S	Oblique location shot of ditch [012005] and drain in Trench 12
116	100-0236	W	Post excavation general shot of Trench 15
117	100-0237	N	South facing representative section of Trench 15 at the east end
118	100-0238	N	South facing representative section of Trench 15 at the west end
119	100-0239	E	Post excavation general shot of Trench 15
120	100-0240	W	Working shot of Trench 13 after clean
121	100-0241	SW	North east facing section of geological deposits in Trench 13
122	100-0242	SE	Working shot of Trench 13 after clean
123	100-0243	SE	Working shot of Trench 13 after clean
124	100-0244	S	Post excavation general shot of Trench 16
125	100-0245	E	West facing representative section of Trench 16
126	100-0246	N	Post excavation general shot of Trench 16
127	100-0247	NE	Post excavation general shot of Trench 10
128	100-0248	SW	Post excavation general shot of Trench 10
129	100-0249	SE	North west facing representative section of Trench 10
130	100-0250	W	Post excavation general shot of Trench 18
131	100-0251	N	South facing representative section of Trench 18
132	100-0252	E	Post excavation general shot of Trench 18
133	100-0253	N	South facing section of ditch [010003] in Trench 10
134	100-2054	N	Plan shot of ditch [010003] in Trench 10
135	100-0255	OH	Plan shot of ditch [010003] in Trench 10
136	100-0256	E	West facing section of ditch [016004] in Trench 16
137	100-0257	OH	Plan shot of ditch [016004] in Trench 16
138	100-0258	W	Location shot of ditch [016004] in Trench 16

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Photo no. (id)	Digital image no.	Direction facing	Description
139	100-0259	SW	Post excavation general shot of Trench 17
140	100-0260	NW	South east facing representative section of Trench 17
141	100-0261	NE	Post excavation general shot of Trench 17
142	100-0262	NW	South east facing section of ditches [011004] and [011006] in Trench 11
143	100-0263	SW	Condition shot of Trench 11

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Appendix 3: Figures

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LIST OF FIGURES

FIG 1 SITE LOCATION

FIG 2 TRENCH PLAN

FIG 3 TRENCH 1 SHOWING DITCH ALIGNMENT WITH WATER TOWER TO THE WEST

FIG 4 TRENCH 1 NORTH WEST FACING TRENCH SECTION SHOWING DITCH CUT [001007] THROUGH SUBSOIL

FIG 5 PLAN SHOT OF GULLEY [001007]

FIG 6 SOUTH-EAST FACING SECTION OF DITCH [001004]

FIG 7 SOUTH-EAST FACING SECTION OF DITCH [001004] CUT BY MODERN DRAIN

FIG 8 EAST FACING SECTION OF DITCHES [005003] AND [005006]

FIG 9 OBLIQUE SHOT OF DITCHES [005003] AND [005006]

FIG 10 EAST FACING SECTION OF DITCH [005003] AND [005006]

FIG 11 SOUTH FACING SECTION OF GULLEY [010003]

FIG 12 SOUTH-EAST FACING SECTION OF DITCH [011004] AND HEDGEROW [011006]

FIG 13 SOUTH-EAST FACING SECTION OF DITCH [011004] AND HEDGEROW [011006]

FIG 14 NORTH EAST FACING SECTION OF DITCH [012005] AND HEDGEROW [012007]

FIG 15 LOCATION SHOT OF DITCH [012005] AND HEDGEROW [012007] LOOKING SOUTH

FIG 16 NORTH-EAST FACING SECTION OF DITCH [012005] AND HEDGEROW [012007]

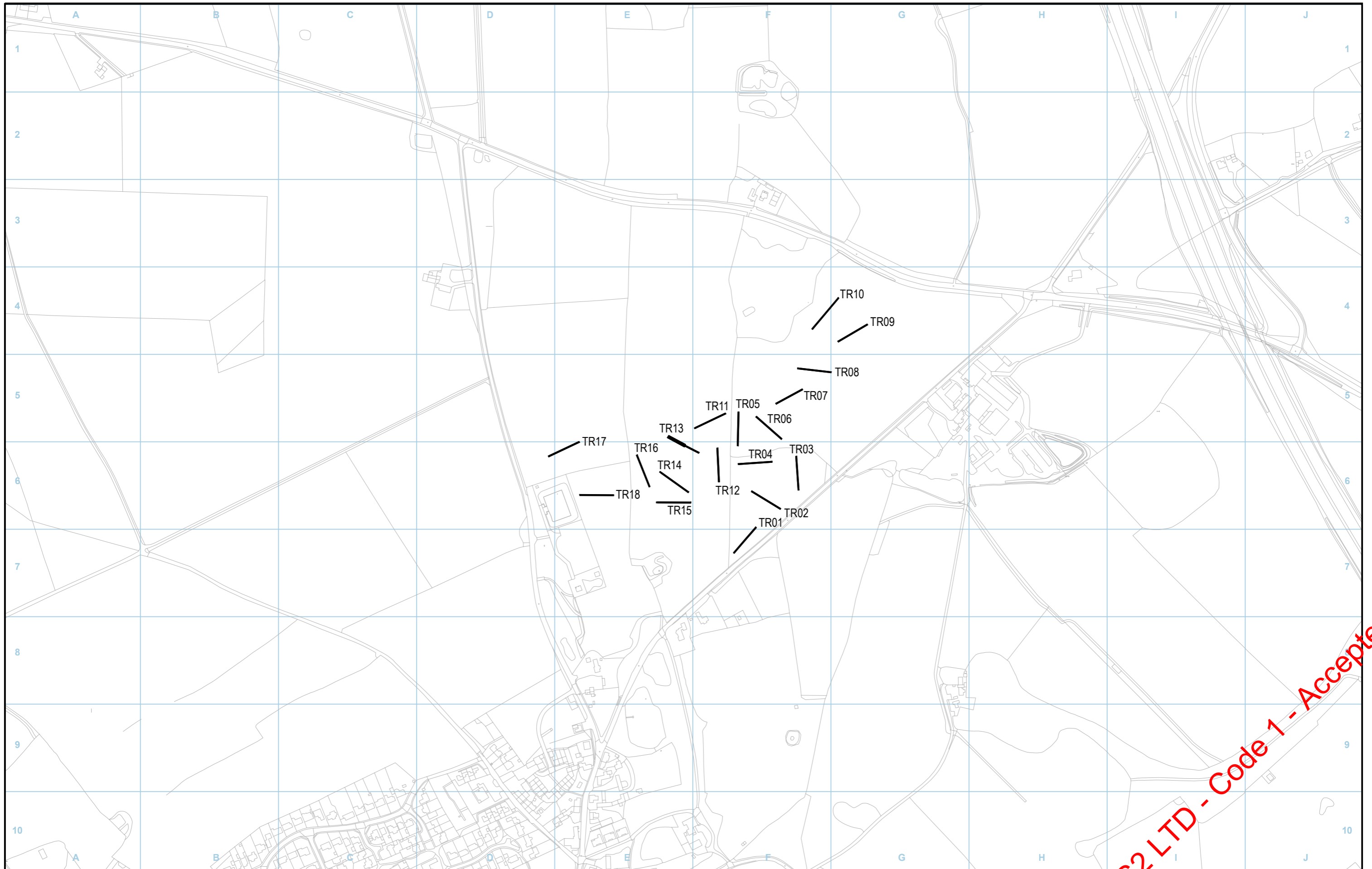
FIG 17 WORKING SHOT OF TRENCH 13 AFTER STEPPING

FIG 18 TRENCH 15 FACING EAST

FIG 19 WEST FACING SECTION OF DITCH [016004]

FIG 20 LOCATION SHOT OF DITCH [016004] FACING WEST

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Legend
 — trench location



Map Number: **Figure 1**
 Map Name: **HP32 Trial Trench: Location Plan**
 Community Forum Area CFAFX

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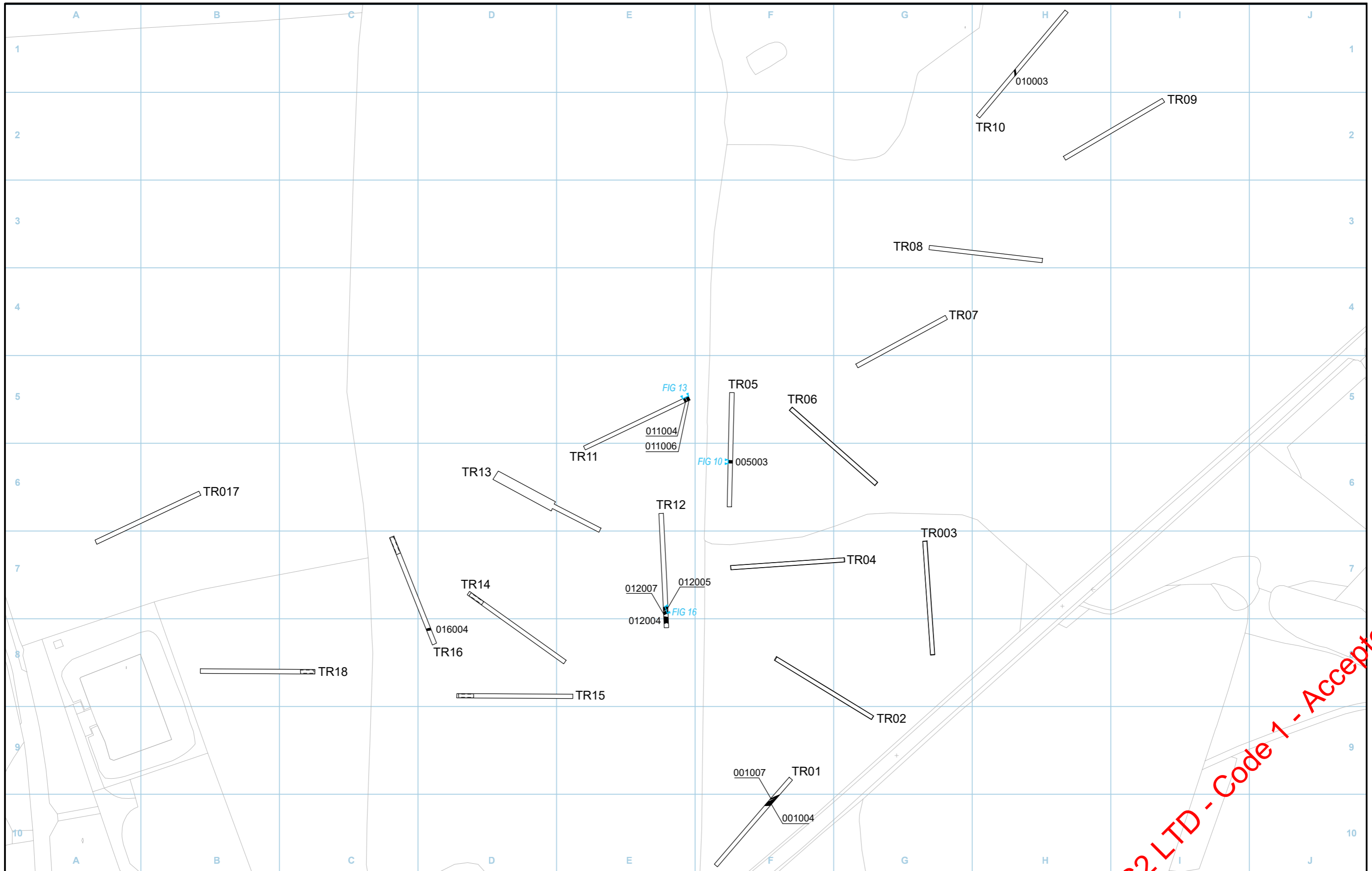
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Scale at A3: 1:5,000

0 50 100 150 200 metres

Date: 01/04/22

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Legend

- trench location
- archaeological feature
- sondage



Map Number: **Figure 2**

Map Name: **HP32 Trial Trench: Trench Plan**

Community Forum Area CFAXX

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FIG 3 Trench 1 showing ditch alignment with water tower to the west cut [001007] through subsoil FIG 4 Trench 1 north west facing trench section showing ditch cut [001007] through subsoil FIG 5 Plan shot of gully [001007] FIG 6 South-east facing section of ditch [001004] FIG 7 South-east facing section of ditch [001004] cut by modern drain

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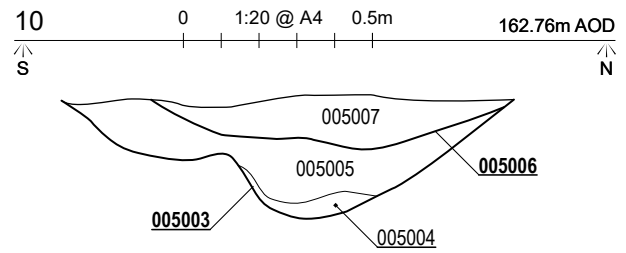


FIG 8 East facing section of ditches [005003] and [005006] FIG 9 Oblique shot of ditches [005003] and [005006] FIG 10 East facing section of ditch [005003] and [005006]

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FIG 11 South facing section of gully [010003]

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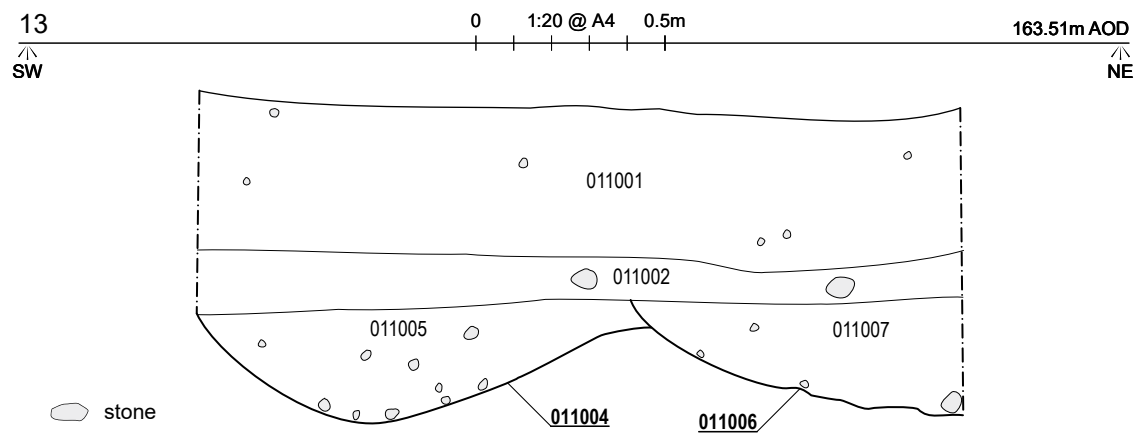


FIG 12 South-east facing section of ditch [011004] and hedgerow [011006]

FIG 13 South-east facing section of ditch [011004] and hedgerow [011006]

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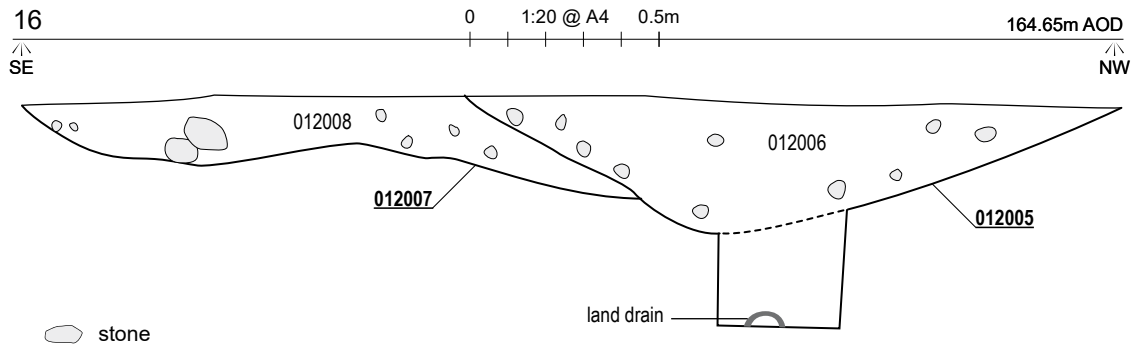


FIG 14 North east facing section of ditch [012005] and hedgerow [012007] FIG 15 Location shot of ditch [012005] and hedgerow [012007] looking south FIG 16 North-east facing section of ditch [012005] and hedgerow [012007]

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FIG 17 Working shot of Trench 13 after stepping

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FIG 18 Trench 15 facing east

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FIG 19 West facing section of ditch [016004] FIG 20 Location shot of ditch [016004] facing west

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