C263 ARCHAEOLOGY LATE EAST
Fieldwork Report
Evaluation
Connaught Tunnel – XSY11

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Non technical summary

This report presents the results of a field evaluation carried out by the Museum of London Archaeology (MOLA) on the site of Connaught Tunnel, London E16, in the London Borough of Newham. This report was commissioned from MOLA by Crossrail Ltd.

This work is being undertaken as part of a wider programme of assessment to quantify the archaeological implications of railway development proposals along the Crossrail route.

The sequence in the four trenches excavated is typified by basal sands grading up from the underlying gravels, overlain by peats and sealed by alluvial clays. The elevation of the surface of the Pleistocene / Early Holocene sands indicates that Trenches 1 and 4 are likely to be on the margins of discrete landscape features such as the floodplain islands previously reported around Custom House and others suggested around London City Airport. Trenches 2 and 3 appear to be within lower areas of migrating channels.

The peat deposits contained discrete bands of organic clays; the thickness, position and number of which varied between the trenches and indicates different landscape positions or hydrology, with prehistoric and potentially historic channels evident in Trench 3. The top of the upper alluvial clays were likely to have been truncated in the past within some of the trenches and the thickness of the overlying made ground varied between the trenches. Trenches 1, 3 and 4 appeared to have been truncated but showed later possible medieval to historic soil development before the addition of made ground. The alluvial clay in Trench 2 appears to have been least truncated with the survival of upper weathered alluvial deposits and very little made ground.

The site has the potential to provide a high resolution, site specific palaeoenvironmental reconstruction. Data sets such as this need to be integrated and synthesised into their wider environmental context. This will allow broader models derived from the Late East data set as whole to focus down to the human scale in order to understand how the changing landscape would have influenced human behaviour, exploitation of the landscape and changing settlement patterns. Because of this potential the results from Connaught Tunnel are assessed as being of regional significance.

These results will be used by the Crossrail Project Archaeologist to revise and finalise the mitigation strategy for the site.

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1 Introduction

This report describes the archaeological evaluation carried out at Connaught Tunnel site by the C263 Museum of London Archaeology (MOLA).

All fieldwork was conducted between 05/12/11 to 18/04/12 and supervised by Isca Howell (MOLA Supervisor), and included the following:

Task	Principal Contractor	Date
• **Trial trench evaluation** (4 located across the surface rail alignment, where lowering is required)	C315 Vinci Construction UK Ltd	05/12/11 to 18/04/12

The Connaught Tunnel is located in the London Borough of Newham, between Prince Regent Station and Victoria Dock Road at its northern end and Silvertown Station and Connaught Road/Factory Road at its southern end (NGR 541050 180945 to 542060 180110). The Connaught Tunnel passes beneath Connaught Passage, with Royal Victoria Dock to the west and Albert Dock to the east (Figure 1). The event code (site code) is XSY11.

The trial trenching was intended to assess the archaeological potential across areas of track lowering across the surface rail.

2 Planning background

The legislative and planning framework in which all archaeological work took place was summarised in the Site Specific Written Scheme of Investigation (SS-WSI): *Connaught Tunnel and Surface Rail Archaeological Written Scheme of Investigation,* Doc. No. C122-OVE-T1-GMS-CR146_WS158-00002 Version 5, 11-08-11; a brief summary is included here:

The overall framework within which archaeological work will be undertaken is set out in the Environmental Minimum Requirements (EMR) for Crossrail (http://www.crossrail.co.uk/therailway/ getting-approval/parliamentary-bill/environmental-minimum-requirements-includingcrossrail- construction-code). The requirements being progressed follow the principles of Planning Policy Guidance Note 16 on archaeology and planning (1990). Accordingly the nominated undertaker or any contractors will be required to implement certain control measures in relation to archaeology before construction work begins.

Schedules 9, 10 and 15 of the Crossrail Bill (2005) concern matters relating to archaeology and the built heritage and allows the dis-application by Cross Rail of various planning and legislative provisions including those related to listed building status, conservation areas and scheduled ancient monuments (Schedule 9). Schedule 10 allows certain rights of entry to English Heritage given that Schedule 9 effectively dis-applied their existing rights to the Cross Rail project, and Schedule 15 allows Cross Rail to bypass any ecclesiastical or other existing legislation relating to burial grounds.

Notwithstanding these dis-applications, it is intended that agreements setting out the detail of the works and requiring relevant consultations and approvals of detail and of mitigation arrangements will be entered into by the nominated undertaker with the relevant local planning authorities and English Heritage in relation to listed buildings and with the Department of Culture, Media and Sport (DCMS) and English Heritage in relation to Scheduled Ancient Monuments (SAMs).

3 Origin and scope of the report

This report has been commissioned from Museum of London Archaeology (MOLA) by Crossrail Ltd. The report has been prepared within the terms of the relevant standard specified by the Institute for Archaeologists (IFA, 2008). It considers the significance of the fieldwork results (in local, regional or national terms) and makes appropriate recommendations for any further action, commensurate with the results.

4 Previous work relevant to archaeology of site

The principal previous Crossrail studies are as follows:

- Crossrail Environmental Statement, February 2005;
- Crossrail, Specialist Technical Report (STR); 'Assessment of Archaeology Impacts, Technical
- Report. Part 4 of 6, South-East Route Section' February 2005, (1E0318-E2E00-00001);
- Crossrail 'MDC4 Archaeology Updated Baseline Assessment', January 2008; and
- Crossrail 'Archaeology Generic Written Scheme of Investigation' (as per 04 April 2008).

All on-site archaeological work was carried out in accordance with the following documents:

- A Crossrail **Site-specific Written Scheme of Investigation** (SS-WSI): *Connaught Tunnel and Surface Rail Archaeological Written Scheme of Investigation,* Doc. No. C122-OVE-T1-GMS-CR146_WS158-00002 Version 5, 11-08-11
- C263 Archaeology Late East **Method Statement**, *Watching Briefs, Non Listed Building recording and trench evaluation, Connaught Tunnel,* Doc. No. C263-MLA-X-RGN-CRG07-50023 Version 2.1, 09-05-12

5 Geology and topography of site

The geological and topographical setting for the Connaught Tunnel site was covered in detail in the SS-WSI (Connaught Tunnel and surface rail archaeological written scheme of investigation, August 2011, Document No C122-OVE-T1-RSI-CR146_WS158-00002, Revision 5.0). This information is summarised below

Across the site the Tertiary bedrock consists of Eocene London Clay and Palaeocene Thanet Sands. This is overlain by a mantle of sand and gravel deposits that make up the Pleistocene Shepperton Gravel formation. These sands and gravels were deposited during the closing stages of the last glacial episode, the Devensian, between 18,000 to 10, 000 years ago. These deposits accumulated within a wide extensive braidplain, consisting of elevated gravel bars separated by multiple low lying channel threads. As the climate ameliorated at the beginning of the Holocene, c 10 000 years ago, the river system contracted to the lower lying channel threads, leaving the surface of the elevated gravel bars as dry land. This gravel surface topography created the 'Early Holocene' template that influenced later sedimentation and areas of dryland occupation from the Mesolithic onwards.

From the Late Mesolithic/ Early Neolithic channel capacity exceed the discharge rate, resulting in many former channel threads of the braided river becoming abandoned and infilling with peat and organic sediment. An overall increase in river levels, due to ponding back and relative sea level rise further down the estuary, caused the waterlogging of previously dry terrestrial land surfaces across the elevated gravel surface topography. The impeded drainage gave rise to the extensive peat beds present within the Thames alluvial floodplain. The peats formed within semi terrestrial alder carr floodplain woodland, and formed an important resource to the prehistoric populations.

From the Early Iron Age, the increase in river level outstripped the rate of peat formation. The alder carr woodlands were inundated by floodwaters depositing fine grained inorganic sediment. The semi terrestrial peat wetlands gradually transformed into intertidal mudflats and salt marsh environments. This tidal inundation continued into the medieval period, gradually raising and levelling off the surface of the floodplain. The raised surface of the floodplain in conjunction with the construction of drainage ditches and bankside revetments protected the floodplain from regular tidal inundation. The intertidal environments consequently transformed from salt marsh and mud flats to floodplain accretionary soils.

6 Research objectives and aims

The overall objectives of the trial trench evaluation is to establish the nature, extent and state of preservation of any surviving archaeological remains that will be impacted upon by the track lowering. A number of site specific research aims were stated in the Written Scheme of Investigation (Doc. No. C122-OVE-T1-GMS-CR146_WS158-00002). These are;

- What is the development of the local landscape and topography of the Thames floodplain from prehistory to the medieval period?
- Are peat deposits present? If so, at what level(s) and at what date did they form?
- Is there evidence for stream channel, lakes, etc in the floodplain gravel surface?
- Is there any evidence for prehistoric activity? If prehistoric remains are present, what is their character and what can be learned about the exploitation of the floodplain by prehistoric groups? In particular, is there any evidence for Mesolithic activity at the base of the alluvium/surface of the gravels?
- Is there any evidence for timber trackways or other structures of later prehistoric date?
- Is there any evidence for Roman activity, in particular for reclamation or flood defences, and marine transgression and regression?
- Is there any evidence for the medieval manor house of Sudbury within the Connaught Tunnel West Worksite?
- What can be learned about the process of land reclamation and management of the area from the medieval period until the construction of the docks?
- What is the evidence for the development of the area in connection with the Docks during the 19th century?
- Are any features present that can be related to the initial construction of the North Woolwich Railway in the 1840s?
- What evidence is there for modifications to the Connaught Tunnel over time?

- Is there any evidence for the 19th-century vicarage, associated with St. Mark's Church, within the Connaught Tunnel East Worksite?

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7 Methodology of site-based and off-site work

All archaeological excavation and recording during the evaluation was carried out in accordance with the Crossrail WSI, the MOLA *Method Statement* and the *Archaeological Site Manual* (MoL, 1994).

The site finds and records can be found under the site code XSY11 in the MOLA archive. They will be stored there pending a future decision over the longer-term archive deposition and public access process for the wider Crossrail scheme.

7.1 Evaluation Methodology

The four trenches were placed along the surface railway alignment to investigate the possibility of archaeology surviving within the floodplain deposits. The location of Trenches 1, 2, 3 and 4 are illustrated in Figure 2, Figure 3, Figure 4 and Figure 5. All the trenches were excavated to the surface of the floodplain gravels, or as close to the surface as possible. The surface of these deposits marks the base line for deposits of archaeological/palaeoenvironmental interest. Trench 1 was excavated first followed by Trenches 2, 3 and 4.

Trench 1 was placed within the Connaught Tunnel West Worksite, adjacent to Prince Regent Lane where peat deposits were identified during the archaeological monitoring of the Package 30 geotechnical works. The footprint of the trenches measured 15m x 10m, and reached a depth of 3m bgl, with a sondage at the base of the trench excavated to a depth of 4m bgl. The sondage measured c 1m x 1m. The trench was designed to be stepped first and then battered, with a 1:1 slope. Vertical sections were maintained whenever possible.

Trenches 2 to 4, within the Connaught Tunnel East Worksite, measured up to 9m x 8m and reached a depth of between 3 to 3.5m bgl, with a sondage down to 4m bgl. As with Trench 1 the sides were stepped and then battered with 1:1 slope, although vertical sections were maintained when ground conditions permitted.

The most representative sections through the alluvial sequence in each trench was recorded in detail and sampled by a MOLA geoarchaeologist. The alluvial sediments were recorded according to standard geoarchaeological practice. Continuous overlapping monolith tins were placed through the deposit sequence to retrieve undisturbed columns of sediment suitable for offsite sedimentological, and microecofact (i.e pollen and diatoms) anlaysis. To complement the monolith samples, bulk slab samples of c 20 litres were taken at c 0.1m intervals up through the deposit succession. These were taken to retrieve plant macro fossils, molluscs, ostracods and identifiable organic remains suitable for radiocarbon dating

7.2 Evaluation Recording Methods

The archaeological remains were recorded to best practice standards, in order to achieve archaeological objectives. The site recording included as a minimum:

- The written record of individual context descriptions on appropriate pro-forma sheets.
- The drawn record: including, plans and section drawings of appropriate features, structures and individual contexts (1:10 1:20 or 1:50).
- A stratigraphic matrix of the sequence of deposits and structures encountered in each trench was produced.
- The photographic record: photographs taken with a digital camera of resolution of 12 megapixel or greater, providing similar resolution to a conventional 35mm SLR. The photographic record included photographs of deposits and samples. Each photograph was recorded on site using a proforma photographic record sheet, showing image number, area/test pit, context number(s), subject/description, direction of view, and date. In addition, appropriate record photographs were undertaken to illustrate work in progress.
- Levels on plans, sections and other fieldwork records were related to OS datum.
- The location of all evaluation trenches, temporary grids and baselines were electronically surveyed by MOLA Geomatics staff.

8 Evaluation results and observations including stratigraphic report and quantitative report

For trench locations see Figure 2 to Figure 5. A section through each trench is provide in Figure 6 to Figure 9 for trenches 1 to 4 respectively. All levels in this report are quoted in metres Above Tunnel Datum (m ATD). Tunnel Datum is calculated as being 100m above Ordnance Datum e.g. 1m OD = 101m ATD

8.1 Trench 1

Photo 1, Trench 1, looking north-west, sampling of transition between upper clay and lower peats.

Trench 1	
Location	West side – tunnel approach
Dimensions	15m x 10m x 4m
London Survey grid co-ordinates	91426, 35426
OS National grid co-ordinates	541095, 180944
Modern Ground Level/top of the slab	102.57m ATD
Modern subsurface deposits	Subsurface deposits were composed of 20th-century ballast dump/make up layers for the railway.
Level of base of archaeologically important natural deposits observed	98.73m ATD

Holocene natural observed not truncated	101.82m ATD
Pleistocene natural observed not truncated	98.73m ATD
Extent of modern truncation	Probable top soil removal prior to laying ballast to consolidate rail track.
Georchaeological sequence	**Dating Evidence, Finds, and Samples**
Pale brown silty sand [13] at 98.73m ATD	Dating: Early Holocene/late Pleistocene (?) Finds: none Samples: Monolith <7>, and bulk <12>
Reddish woody peat [12], possibly alder carr at 99.33m OD	Dating: Mesolithic (?) Finds: none Samples: Monoliths <6> and <7>, and bulks <12> and <14>
Mid brown clay peat [11], transitional phase, clear lower boundary with woody peat but diffuse upper boundary with overlying alluvium. Inundated wetland. Surface at 99.51m ATD	Dating: Mesolithic (?) Finds: none Samples: Monoliths <5> and <6>, and bulk <15>
Brownish grey, silty clay, occasional woodchips alluvial overbank deposit with occasional organic input from peat erosion or vegetation growth. Inundated wetland. Surface of [10] at 99.96m ATD	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monoliths <4>, <5> and <6>, and bulks <16>, <17> and <18>
Olive grey silty clay, oxidising to yellow grey, rare root channels, alluvial overbank deposit [9] at 100.17m ATD	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monolith <4>, and bulk <19>
Mid grey silty clay, soft, oxidising to yellow grey, occasional root channels, occasional tuffa like pockets, alluvial overbank deposit [8] at 100.44m ATD	Dating: Iron Age to historic (?) Finds: none Samples: Monoliths <3> and <4>, and bulk <20>
Olive grey silty clay, Fe stained, rare root channels, rare subangular flint, alluvial overbank deposit [7] at100.64m OD	Dating: Iron Age to historic (?) Finds: none Samples: Monolith <3>, and bulk <21>
Mid grey slightly reddish, frequent rootlets, occasional silt filled root channels, Fe staining around rooting, soft and friable, possible buried sub soil horizon [6] at 100.98	Dating: Iron Age to historic (?) Finds: none Samples: Monoliths <2> and <3>, and bulk <10>
Dark grey organic clay, clear upper and lower boundary, slightly irregular,	Dating: Iron Age to historic (?) Finds: none

Geoarchaeological remains (cont.)	Dating Evidence, Finds, and Samples (cont.)
possible buried top soil horizon [5] at 100.98m ATD, very thin (< 50mm)	Samples: none
Mid grey slightly reddish, frequent rootlets, occasional silt filled root channels, Fe staining around rooting, soft and friable, possible buried sub soil horizon [4] at 101.25m ATD	Dating: Iron Age to historic (?) Finds: none Samples: Monolith <2>, and bulk <11>
Yellow grey silty clay, occasional tuffa-like pale yellow silt pockets, possible fill of stream/scour channel [3] at 101.23m ATD, probably a localised deposit	Dating: Iron Age to historic (?) Finds: none Samples: Monoliths <1> and <2>, and bulk <10>
Blue grey silty clay, heavy manganese staining, floodplain deposit [2] at 101.58m ATD	Dating: Iron Age to historic (?) Finds: none Samples: Monoliths <1> and <2>, and bulk <9>
Blue grey silty clay, floodplain deposit [1] at 101.82m ATD	Dating: Iron Age to historic (?) Finds: none Samples: Monolith <1>, and bulk <8>
Interpretation and summary	
The trench revealed a sequence of alluvial deposits from 98.51m ATD in the base of the trench to 101.82m ATD beneath c 500mm of modern made ground at the top. Gravels were recorded 20–30 cm below the base of the trench having been exposed in a hand dug sondage. Above the gravels, the exposed alluvial sequence consisted of c 0.45m thick band of pale brown silty sand indicative of fluvial deposits banked against a gravel high or mid channel bars. This was overlain by c. 1.00m of woody peat and clay peats, and then various layers of alluvial silty clays (c. 2.4m thick) with possible buried soil horizons towards the top of the sequence. The organic deposits indicated wooded wetlands to vegetated mudflats, which were later inundated by the overbank silty clay alluvium. No finds were recorded. The height of the gravel surface in Trench 1 suggests it is located on a gravel high or channel bar island.	

8.2 Trench 2

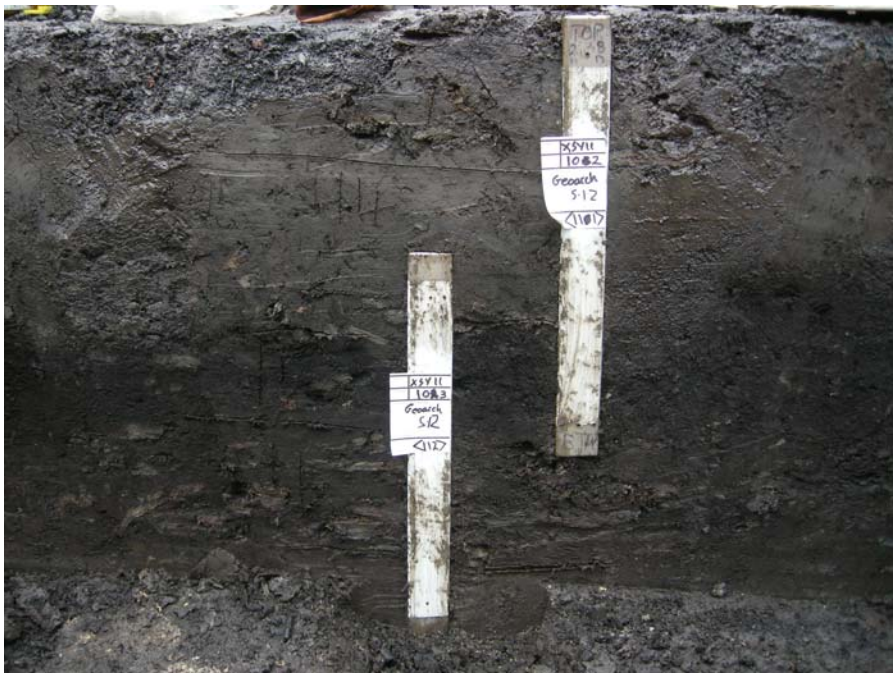

Photo 2, Looking north-east, Column samples <111> and <112> in third step.

Trench 2	
Location	East side – tunnel approach
Dimensions	8m x 8m x 4m
London Survey grid co-ordinates	92315, 34606
OS National grid co-ordinates	542004, 180146
Modern Ground Level/top of the slab	101.18m ATD
Modern subsurface deposits	Subsurface deposits were composed of 20th-century ballast dump/make up layers for the railway.
Level of base of archaeologically important natural deposits observed	96.96m ATD (hand augered to 96.96m ATD)
Holocene natural observed not truncated	100.73m ATD
Pleistocene natural observed not truncated	96.96m ATD
Extent of modern truncation	Probable top soil removal prior to laying ballast to consolidate rail track.

Geoarchaeological remains	Dating Evidence, Finds, and Samples
Silty sand, pale blue [107] at 96.96m ATD	Dating: Early Holocene/late Pleistocene (?) Finds: none Samples: Grab <125>
Woody peat, dark brown [108] at 97.62m ATD	Dating: Mesolithic (?) Finds: none Samples: Bulks <124> and <125>
Light grey silty clay, soft, occasional to rare wood chips to top, alluvial overbank deposit [106] at 97.84m ATD.	Dating: Mesolithic (?) Finds: none Samples: Monolith <119>
Dark slightly reddish brown peat, occasional to frequent wood chips, large natural number running horizontally, wooded wetland [105] at 98.37m ATD	Dating: Mesolithic (?) Finds: none Samples: Monolith <119>, and bulks <122> and <123>
Greyish brown peaty clay, occasional wood chips, rare large timber pieces, inundated wetland [104] at 98.73m ATD	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monoliths <112> and <118>, and bulks <117>, <120> and <121>
Woody peat, slightly clayey, dark brown to black, frequent wood, twig to branch sized, lower boundary diffuse and graded [103] at 99.17m ATD	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monolith <112>, and bulks <115>, <116> and <117>
Greyish brown peaty clay, frequent wood chips and occasional timber, soft, clear slightly undulating lower boundary. Inundated wetland [102] at 99.46m ATD	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monoliths <104>, <111> and <112>, and bulks <113>, and <114>
Light grey blue silty clay, soft, homogenous, no visible inclusions, sharp boundary with underlying peat showing little disturbance or erosion. Alluvial overbank deposit [101] at 99.96m OD	Dating: Iron Age to historic (?) Finds: none Samples: Monoliths <103> and <104>, and bulks <108>, <109> and <110>
Firm to friable silty clay, mid grey mottled light brown, occasional to frequent Fe staining around root holes, occasional to rare CaCO3, Weathered subsoil or accretionary floodplain soil [100] at 100.73m ATD	Dating: Iron Age to historic (?) Finds: none Samples: Monoliths <100>, <103> and <104>, and bulks <101>, <102>, <105>, <106> and <107>
Interpretation and summary	
The trench has revealed a sequence of alluvial deposits from 96.95m OD in the slot at base of the trench to 99.07m OD, beneath c 300mm of modern made ground at the top. Silt sand was recorded at the base indicating fluvial sand accumulating	

Interpretation and summary (cont.)
around a gravel high or forming a mid channel bar. Above the sand was recorded c. 2.5m of organic clay to peat. Between some of the peat units were bands of blue grey silty clay indicating periods of inundation within the dominant wooded wetland to vegetated mudflat environment. The upper alluvial sequence consisted of c. 1.5m silty clays that probably represent the seasonal flood deposits of the River Thames. No finds were recorded. The height of the surface of the sands is low compared to the other trenches and suggests this location lies within a low lying channel or marginal channel area, which would have been inundated by the effects of rising relative sea level (RSL) earlier than other higher areas.

8.3 Trench 3

Photo 3 Looking east, sampling of upper alluvial deposits.

Trench 3	
Location	East side – tunnel approach
Dimensions	8m x 7m x 4m
London Survey grid co-ordinates	92459, 34548
OS National grid co-ordinates	542150, 180093
Modern Ground Level/top of the slab	101.35m ATD
Modern subsurface deposits	Subsurface deposits were composed of 20th-century ballast dump/make up layers for the railway.
Level of base of archaeologically	96.928m ATD

important natural deposits observed	
Holocene natural observed not truncated	100.55m OD
Pleistocene natural observed not truncated	96.928m ATD
Extent of modern truncation	Probable top soil removal prior to laying ballast to consolidate rail track.
Geoarchaeological remains	**Dating Evidence, Finds, and Samples**
Pale grey to mid grey silty fine sand [31] at 96.92m ATD.	Dating: Early Holocene/late Pleistocene (?) Finds: None Samples: None
Red brown, friable, woody peat, occasional wood, small to large, possible oak log. Woodland wetland [30] at 98.05	Dating: Mesolithic (?) Finds: none Samples: Monoliths <62> and ,69>, and bulks <66>, <67> and <68>
Mid grey silty clay, occasional pockets of lighter silty clay, occasional medium sized wood, soft [29] at 98.34m ATD. Vegetated mudflat but more likely alluvium with eroded peat inclusions, suggested by this context filling a scour or small channel.	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monoliths <60>, <61> and <62>, and bulks <63>, <64> and <65>
Red brown, slightly clayey peat diffuse lower boundary, occasional to frequent large wood. Waterlogged wooded environment [28] at 98.90m ATD	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monoliths <59> and <61>, and bulks <58>
Black to dark brown peat, humified [27] at 99.10m ATD. Wooded wetland.	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monolith <48> and <49>, and bulks <56> and <57>
Blue grey silty clay, rare pockets of CaCO3 to top, massive structure, occasional Fe staining around rootlets. Towards scour/channel it is has small fragments of organics and a more irregular eroded lower boundary. Alluvial overbank deposit with eroded organic inclusions [26] at 100.14m ATD	Dating: Iron Age to historic (?) Finds: none Samples: Monoliths <46>, <47> and <48>, and bulks <50>, <51>, <52>, <53>, <54> and <55>
Brown grey to dark brown grey silty clay, friable, slightly organic to top, visible rootlets to top. Ephemeral buried topsoil [25] at 100.55m ATD	Dating: Iron Age to historic (?) Finds: none Samples: Monolith <45>, and bulk <47>

Interpretation and summary
The trench has revealed a sequence of alluvial deposits from 96.92m ATD in the slot at the base of the trench to 100.55m OD, beneath c 800mm of modern made ground at the top. Silt and fine sand was recorded at the base indicating the infilling of a river course as the channel migrated across the floodplain. Above the sand c. 2.2m of organic clay to peat was recorded. Between some of the peat units were bands of blue grey silty clay indicating periods of inundation within the dominant wooded wetland to vegetated mudflat environment. The upper alluvial sequence consisted of c. 1.5m of silty clays that probably represent the seasonal flood deposits of the River Thames. No finds were recorded. The elevation of the surface of the sands is similar to Trench 2 and suggests this location lies within a low lying channel or marginal channel area, which would have been inundated by a rise in RSL (relative sea level rise) earlier than other higher areas. The low lying or channel marginal location is further suggested by possible prehistoric and historic channels or scour events in the overlying organic sequences.

8.4 Trench 4

Photo 4, Looking east, sampling of transition between upper clay and lower peats.

Trench 4	
Location	East side – tunnel approach
Dimensions	9m x 8m x 4m
London Survey grid co-ordinates	92609, 34521
OS National grid co-ordinates	542300, 180069
Modern Ground Level/top of the slab	101.50m OD
Modern subsurface deposits	Subsurface deposits were composed of 20th-century ballast dump/make up layers for the railway.
Level of base of archaeologically important natural deposits observed	97.60m OD
Holocene natural observed not truncated	100.93m OD
Pleistocene natural observed not truncated	97.60m OD
Extent of modern truncation	Probable top soil removal prior to laying ballast to consolidate rail track.
Geoarchaeological remains	**Dating Evidence, Finds, and Samples**
Pale greenish grey fine to medium silty sand, soft [24] at 97.60m ATD	Dating: Early Holocene/late Pleistocene (?) Finds: None Samples: Monolith <43>
Woody peat, dark red brown black, occasional to frequent and large to small wood chips. Pale brown grey clay band to base of trench. Alder carr peats [23] at 98.50m OD	Dating: Mesolithic (?) Finds: none Samples: Monolith <38>, and bulks <41>, <42> and <44>
Red to orange brown woody clayey peat, frequent yellow wood remains <5cm in diameter. Wooded wetland [22] at 98.80m ATD	Dating: Mesolithic (?) Finds: none Samples: Monolith <37>, and bulk <40>
Irregular upper and lower boundaries. Grey to brown grey organic clay to silty clay, occasional yellow wood remains. Vegetated mudflat transition between peats [21] at 99.00m ATD	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monolith <37>, and bulk <39>
Red brown woody peat, occasional small to medium wood remains (red and yellow). Mixed alder Carr wooded	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monolith <29>, and bulk <36>

Geoarchaeological remains (cont.)	Dating Evidence, Finds, and Samples (cont.)
wetland [20] at 99.20m ATD	
Grey brown fibrous to reedy peaty clay, frequent yellow round wood, frequent reed/grass remains. Vegetated mudflat [19] at 99.35m ATD	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monolith <39>, and bulk <35>
Red brown woody peat, occasional small to medium wood remains, spongy. Wooded wetland (red) [18] at 99.55m ATD	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monolith <29>, and bulks <33> and <34>
Brown grey silty clay, occasional to frequent organics, rooting <2cm diameter, soft occasional pockets of CaCO3. Vegetated mudflats [17] at 99.85m ATD	Dating: Neolithic to Bronze Age (?) Finds: none Samples: Monolith <28>, and bulks <31> and <32>
Soft blue grey manganese stained silty clay, oxidised to brownish grey, rare small pockets of CaCO3, rare small flecks of organics.Gleyed clays, intertidal slightly vegetated mudflats [16] at 100.45m ATD	Dating: Iron Age to historic (?) Finds: none Samples: Monolith <24>, and bulk <27>
Soft blue grey manganese stained silty clay, oxidised to pale yellow grey, homogenous but developing blocky soil structure.Leached sub soil horizon [15] at 100.60m ATD	Dating: Iron Age to historic (?) Finds: none Samples: Monoliths <23> and <24>, and bulk <26>
Greyish brown to blue grey clayey silt, friable, soft, occasional to rare subrounded stone <2cm, rare rooting, frequent small white flecks not discernable as mollusc fragments but maybe, buried historic soil [14] at 100.93m ATD	Dating: Iron Age to historic Finds: none Samples: Monolith <23>, and bulk <25>
Interpretation and summary	
The trench has revealed a sequence of alluvial deposits from 97.60m ATD in the slot at base of the trench to 100.93m OD beneath c 600mm of modern made ground at the top. Silty sand was recorded at the base indicating fluvial sand accumulating around a gravel high or forming a mid channel bar. Above the sand was recorded c. 2.1m of organic clay to peat. Between some of the peat units were bands of organic clay indicating periods of inundation and vegetated mudflat development. The upper alluvial sequence consisted of c. 1.0m of silty clays that represent the seasonal flood deposits of the River Thames. No finds were recorded. The elevation of the surface of the sands is higher than trench 2 and 3 but lower than trench 1 suggests this location lies on edge of a low lying channel bar or gravel island.	

9 Assessment of results against original expectations and review of evaluation strategy

GLAAS guidelines (English Heritage, 1998) require an assessment of the success of the evaluation 'in order to illustrate what level of confidence can be placed on the information that will provide the basis of the mitigation strategy'. The recommendations suggest that there should be:

> *Assessment of results against original expectations (using criteria for assessing national importance of period, relative completeness, condition, rarity and group value)(Guidance Paper V, 4 7).*

Department of the Environment guidelines for assessing the importance of individual monuments for possible Scheduling include the following criteria: *Period*; *Rarity*; *Documentation*; *Survival/Condition*; *Fragility/Vulnerability*; *Diversity*; and *Potential*. The guide lines stresses that 'these criteria should not be regarded as definitive; rather they are indicators which contribute to a wider judgement based on the individual circumstances of a case'.

Criterion 1: period

In the absence of datable finds the chronological sequence cannot be certain until a series of radiocarbon dating has been undertaken. Bulk samples were taken at 0.1m to 0.2m intervals, respecting context boundaries, and can be processed to retrieve seeds or other plant macro-fossils for radiocarbon dating. However, taken as a whole the archaeological deposit sequences of the trenches possibly span from the early Mesolithic to the later historic, with the possibility of some recent truncation of the later historic sequence. The basal natural deposits represent late Pleistocene to early Holocene fluvial sands. At this time the palaeo-landscape would have been dominated by a braided river regime. The higher sands, of mid channel bars or banked against gravel highs present in Trench 1 and 4 would have provided higher drier ground for at least the early Mesolithic. The overlying peats are likely to be of a later Mesolithic date. The thick units of woody peat to organic clays are thought to be of a Neolithic to Bronze Age date whilst the overlying alluvial silty clays are likely to be of an Iron Age to historic date. Evidence of stabilised soil horizons developing on the surface of the alluvial clays may be attributable to Post-Medieval drainage and land reclamation.

Criterion 2: rarity

The geoarchaeological sequence recorded on the site is typical of the Thames floodplain sequence, and therefore cannot be viewed as rare.

Criterion 3: documentation

Documentary research is not relevant to the site as the majority of the sequence is prehistoric. However, the upper stable soil horizons, that may have formed due to local drainage, could be related to dated mapping illustrating the construction of drainage ditches and riverside revetments

Criterion 4: group value

Taken as an individual site the floodplain deposits are unlikely to hold much value if considered in isolation. However, if the deposits and the palaeoenvironmental material these deposits are likely to preserve are viewed within the wider context of the Thames floodplain, the information could contribute to the development of a basin wide model for the evolution of the Thames Holocene floodplain. Subtle differences in the topographic template, the sediment profile and the palaeoenvironmental remains can be compared with other Crossrail sequences to investigate changes in the wider floodplain landscape due to anthropogenic and climatic forcing.

Criterion 5: survival/condition

The evaluation trenches have demonstrated that relatively full sequences of natural Holocene deposits survive across the site. The good state of preservation is largely due to the absence of any major development on the site in the late-20th century, and overburden covering the site from the Railway development.

Criterion 6: fragility

The subsurface sediments should be considered relatively robust left as they are and with little direct impact. The main threat to the sequences will be from any dewatering works on site or adjacent to site. Waterlogged sediments provide good preservation environments for artefacts and palaeoenvironmental remains. However, once water levels drop and the sediments dry out the remains with quickly deteriorate and the quality of the resource will drastically reduce. Dewatering can also cause differential settlement and vertical disturbances to the previously waterlogged sediments.

Criterion 7: diversity

Given its consistency, state of preservation and potential group value it is likely that the sequence extends across the site. Diversity would be represented mainly by possible changes in landscape position, whether within the channel, on the margins or on one of a number of localised floodplain islands identified within this and previous work.

Criterion 8: potential

The potential of the site is associated with the possibility of the deposit sequences recorded and sampled to shed further light on the ecological and landscape story of these early prehistoric to historic channel proximal locations; river banks, wetlands and wooded islands. Such locations would have been ideal settings for early human hunting and gathering base camps. From the records and samples future work will be able to infer differing environmental configurations across the landscape and investigate how such environmental variables would have influenced past populations utilising the Thames River and the adjacent floodplain. In addition to this, such floodplain sites with a mosaic of different channel, wetland or dry island environments would have been sensitive to local and regional environmental and landscape changes. Such sensitivity would allow larger themes concerning climate change and the effect of RSL on river

levels and vegetation to be investigated alongside the potential indirect evidence of human induced vegetation and landscape change that such sequences could record. When viewed in isolation such data has the potential to further our knowledge of the development of the past landscape in this eastern part of the Crossrail project. However, when this data is combined with the archaeological findings from the wider span of the Late East data set the information from this site can be placed in a fuller and more varied spatial and chronological context. Evidence for past human activity can then be placed in a context of changing landscape conditions, showing how the evolution of the floodplain landscape influenced human behaviour, settlement patterns and the exploitation of this landscape.

The evaluation methodology has allowed a representative sample of the buried site stratigraphy to be assessed and the results appear to be consistent trench to trench, giving a good confidence rating.

10 Statement of potential archaeology

The trial trench evaluation of the site has shown that there is good geoarchaeological survival of early prehistoric to historic alluvial sediments. Furthermore, it seems likely that this deposit sequence survives over much of the remaining, unexcavated areas of the site. However, in the absence of any archaeological remains recovered from the peat (i.e. prehistoric trackways or timbers) and the environment represented by the upper alluvial silts and clays (e.g. mud flats to water meadows) likely to only provide chance finds but not real evidence for human activity; the potential for archaeological remains is considered low.

As a result of the evaluation there is potential for the recorded sequences and retained samples to provide further understanding of the sub-surface stratigraphy along this part of the Late East Crossrail route. Assessment of the samples recovered during the evaluation has not been included in this report as the samples need to be considered in conjunction with other sample sets taken from different alluvial sites along the Late East route. This will allow a holistic but targeted approach to the investigation of distinctive deposit sequences. Once all fieldwork has been completed samples sets can be selected for further work based on topographic location, likely chronological resolution and deposit succession variations.

The potential high resolution, site specific palaeoenvironmental data sets provided by sites such as this need to be integrated and synthesised into its wider environmental context in order to support and expand existing regional models (Devoy 1977, 1979, 1980, 1982, 2000, Bates and Whittaker 2004). The data set produced by the Late East portion of the Crossrail project will enable estuary and Lower Thames focused large scale models of the evolution of the Thames landscape to be linked to archaeological sites in the middle and upper portion of the Thames Valley. In addition site specific studies placed within larger data sets will aid in the refinement of broad models of landscape change that combine a regional overview with site specific studies. Broad regional models need to be populated with high resolution data sets from site specific studies in order to bring into focus a human scale understanding of the effects of the regional climatic and landscape shifts. A human scale view is essential to understanding how the changing landscape would have influenced human behaviour, their exploitation of the landscape and therefore larger questions of changing settlement patterns.

The archaeological remains are assessed as being of local significance in terms of the development of this part of London, increasing to regional significance when placed within the wider context of the Late East data set.

11 Realisation of original research objectives and aims

The original research aims set out in Section 6 and statements explaining how the results of the trial trench evaluation inform or contribute to our understanding of the individual research objectives are discussed below.

- *What is the development of the local landscape and topography of the Thames floodplain from prehistory to the medieval period?*

The sequence is typified by basal sands grading up from the underlying gravels, overlain by peats and sealed by alluvial clays. The elevation of the surface of the Pleistocene / Early Holocene sands indicates that discrete landscape features such as the floodplain islands exist alongside lower areas of migrating channels. Prehistoric and potentially historic channels are evident. The top of the upper alluvial clays were likely truncated in the past but showed later possible medieval to historic soil development before the addition of made ground.

- *Are peat deposits present? If so, at what level(s) and at what date did they form?*

Peat deposits were located between 99.51m ATD to 98.73m ATD in Trench 1, 99.46m ATD to 96.96m ATD in Trench 2, 99.10m ATD to 96.92m ATD in Trench 3 and 99.55m ATD to 97.60m ATD in Trench 4. There were typified by upper reedy peats and lower wood peats, with occasional thin minerogenic bands. The lower peats are likely of a Mesolithic date whilst the upper peats are likely of a Neolithic to Bronze Age date.

- *Is there evidence for stream channel, lakes, etc in the floodplain gravel surface?*

Shepperton gravels were only reached in Trench 1. The basal natural deposit, seen in section in all of the other trenches represents late Pleistocene to Early Holocene fluvial sands. The height of the sands present in Trench 2 and 3 would suggest they were on in the low lying braid plain and later floodplain of a channel.

- *Is there any evidence for prehistoric activity? If prehistoric remains are present, what is their character and what can be learned about the exploitation of the floodplain by prehistoric groups? In particular, is there any evidence for Mesolithic activity at the base of the alluvium/surface of the gravels?*

No direct evidence of prehistoric activity was found but indirect evidence of human activity such as vegetation clearance or early agriculture may be present in the palaeoenvironmental remains.

- *Is there any evidence for timber trackways or other structures of later prehistoric date?*

No evidence of timber trackways or other structures of later prehistoric date were found.

- *Is there any evidence for Roman activity, in particular for reclamation or flood defences, and marine transgression and regression?*

No evidence of reclamation or flood defences were found.

- *Is there any evidence for the medieval manor house of Sudbury within the Connaught Tunnel West Worksite?*

n/a

- *What can be learned about the process of land reclamation and management of the area from the medieval period until the construction of the docks?*

No archaeological structures or artefacts were recorded within the alluvial deposits of this period. Palaeoenvironmental preservation should be good. Pollen and macro-botanical remains could record indirect or direct evidence of human activity on the floodplain at this time. Ostracod and diatoms evidence may suggest whether the conditions of the site itself, concerning level of water logging or salinity, was suitable for crops or pastureland. Within Trenches 1, 3 and 4 a buried soil horizon was identified around c. 100m ATD. Stabilisation such as this could be attributed to Post-Medieval drainage and land reclamation.

- *What is the evidence for the development of the area in connection with the Docks during the 19th century?*

n/a

- *Are any features present that can be related to the initial construction of the North Woolwich Railway in the 1840s?*

n/a

- *What evidence is there for modifications to the Connaught Tunnel over time?*

n/a

- *Is there any evidence for the 19th-century vicarage, associated with St. Mark's Church, within the Connaught Tunnel East Worksite?*

n/a

12 Conclusions

12.1 Late Pleistocene / Early Holocene (12,000 - 10,000 BP)

The surface of the Shepperton gravel was encountered in Trench 1 only, but was not seen in section. The Shepperton gravel was laid down at the end of the Devensian glaciation and formed an undulatory landscape with gravel 'highs' criss-crossed by a network of smaller channels, with point and mid-channel bars forming in the coarse grained bedload of the cold climate river. The palaeolandscape would have been dominated by the braided river regime. The basal natural deposit, seen in section in all of the trenches represents late Pleistocene to Early Holocene fluvial sands. These sands would have formed as mid channel bars or banked against gravel highs. The height of the sands present in Trench 1 and 4 would have provided higher drier ground for at least the early Mesolithic. The gravels have little or no potential for palaeoenvironmental reconstruction.

12.2 Mesolithic (10,000BP - 4,000 BC)

Towards the beginning of the Holocene, around 11,000 – 10,000 BP, early Mesolithic hunter gathers migrated northwards, following the pattern of climatic amelioration which ultimately allowed for a more hospitable environment in the northern hemisphere. These early groups of highly skilled hunters and fishers manufactured and utilised specialised flint and bone tools. Such human groups would have been attracted towards the diverse and accessible resources of the floodplain environment.

The elevation of the sands in Trenches 1 and 4, 98.73m ATD and 97.6m ATD respectively, suggest that these are situated on low floodplain islands or on the margins of higher larger islands. Approximately 400m to the north east of Trench 1, at Royal Docks Community School (Mola 1998), two sand and gravel islands were identified at 100.5 and 99.8m ATD. At Royal Docks Community School the human activity is of a Neolithic to Bronze Age date and the gravel eyots were at least a metre higher than those recorded in Trenches 1 and 4 suggesting that those on site at Connaught Tunnel may have been dry and therefore subject to temporary or seasonal settlement during the Mesolithic only. Approximately, 200m towards the north-west of Trench 2 and the north east of Trench 4 additional island areas were previously identified during the City Airport DLR extension (Morley and Scaife in prep). The surface of these islands lie between c. 97.5 and 97.25m ATD. Discrete floodplain islands such as these would have been likely places for temporary base camps utilised by past humans in order to access and exploit the diverse and rich nearby resources of the floodplain.

Trenches 2 and 3 appear to be located within lower lying channel areas around 96.95 and 96.92m ATD. It is likely that the woody peats overlying the sands formed during the late Mesolithic. Marine regression during this period altered the river regime and allowed a drier wooded landscape to develop. The anastomising river network that criss-crossed the floodplain would have begun to silt up and the main river channel would have migrated across the floodplain driven by changing levels of water run-off, sediment supply and vegetation.

No direct evidence for human activity was recorded within the trenches but in a similar landscape position (although at a higher elevation and a later prehistoric date) on an island at the Royal Docks Community School excavation (Mola1998); ard marks, cooking hearths and flint scatters were recorded on the surface of the sands. Therefore, early prehistoric and more ephemeral human activity amy have been present here. Combining the trench sections with borehole data from previous phases of work would enable the construction of a topographic model of the development of these island locales within the context of those previously found in the vicinity. Radiocarbon dating of any suitable botanical remains within the surface of the sands or the overlying peats would enable these island locations to be placed within a chronological framework in respect to contemporary human activity identified at sites nearby. The silty sand deposits within the deeper channel areas (Trenches 2 and 3) are unlikely to contain well preserved botanical remains such as plant macro-fossils or pollen. However, they may preserve ostracods or diatoms, which could indicate local river regime changes and wider climatic trends involving the extent of marine influence on the channel. The surface of the sands within Trench 1 and 4, on the higher island areas, may preserve ephemeral soil development, despite little evidence being seen of soil development in trench sections. Such soils may preserve pollen and plant macro-fossils that would enable the reconstruction of the surrounding environment for this period and may provided indirect evidence of human occupation. The overlying peats will have good preservation of palaeoenvironmental material such as pollen, diatoms, ostracods, plant macrofossils and insects. The potential of the peat for reconstructing the marked vegetation change it represents and potential for indirect evidence of human exploitation is good.

12.3 Neolithic to Bronze Age (4,000-600 BC)

These sediments comprise a variable sequence of peat to organic clay, with rare bands of alluvial silty clay. Owing to the elevation and stratigraphic position of the peat units it is likely that they correlate with Devoy's (1979) Tilbury III/IV regressive events. The peat can be variable in the amount of minerogenic content and this is likely due to fluctuations in RSL causing inundation of the floodplain during minor transgression events, or localised flood events during periods of peak discharge.

During this time the site was likely a heavily vegetated area of the floodplain consisting of alder-carr marshland. The lower island feature recorded in Trench 4 and the higher island edge recorded in Trench 1 would have become vegetated at different points, likely beginning at the lower island in Trench 4, and the local hydrology and topography would have dictated the density and composition of the vegetation.

Clayey peats and organic clays recorded in the upper portion of the sequence appear to indicate that estuarine expansion associated with Devoy's (1979) Thames IV event may have led to localized channel activity that intermittently flooded the Middle Bronze Age woodland. A small channel was partially visible from 98.34m ATD in Trench 3. It was filled with a grey silty clay containing wood chips and occasional pockets of peat. This deposit is also seen in Trench 2 as a horizontal band of overbank flooding. It seems likely that the organic inclusions within this deposit represent erosion of the underlying peat surface as this small channel weaved its way through the dense vegetation.

Organic but increasingly minerogenic deposits are also recorded in Trenches 1 and 4, situated on the island areas. These deposits are more organic than probable contemporary deposits in Trenches 2 and 3 and the change is more gradual. It is likely that the nearby channel's effect lessened in these slightly higher drier areas and that instead of local conditions dictating the environment more regional trends dominated. The trend in question being the move from a terrestrial or semi terrestrial alder-carr woodland environment to complete inundation of the woodland by rising RSL.

On the whole, the peat is unlikely to have much potential for the recovery of archaeological remains as the vegetation would have been too dense and waterlogged to be engaged in subsistence activities within it. However, the small channel could have been used to navigate the thick woodland and the potential of human activity and finds (e.g. trackways or timber platforms) in the vicinity of channels is higher. The organic and waterlogged nature of these deposits will provide good preservation for palaeoenvironmental remains and radiocarbon dating. Pollen and plant macro-fossils will be useful to investigate the heterogeneous mix of woodland types that existed across the differing landscape forms. In addition diatom, ostracod and insects should also be well preserved and will provide data on the nature of the channel, the palaeoecology and the influence of intertidal conditions.

12.4 Iron Age to Historic (600 BC–1800 AD)

Following a rise in RSL associated with Devoy's (1979) Thames IV estuarine expansion event, which is recorded across the area as a whole from about 2600 Cal BP, the floodplain landscape changed dramatically as it was inundated by the rising river levels. Generally, the occasionally organic but predominantly minerogenic silty clays are representative of the late prehistoric, medieval and historic period. This sedimentation occurred as overbank flooding or through slow moving shallow water on the marginal floodplain of the River Thames. This environment is likely to have formed a much more open, level environment increasingly dominated by herbs and grasses. This kind of environment was likely similar to a water meadow environment where the constant flooding of the land leads to the gradual accumulation of a silty soil. This suggestion of an accretionary floodplain soil is lent support by the fact that root casts and iron staining were observed in the deposits, especially in Trench 2. The alluvial clay in Trench 2 appears to have been least truncated with the survival of upper weathered alluvial deposits and very little made ground (less than 0.5m). A late prehistoric to early historic channel may have drained the floodplain in the area of Trench 3, at 100.14m ATD. The irregular surface of the underlying peats and inclusion of eroded organic pockets in the overlying silty clays suggests a channel or scour event.

The potential for archaeology is low, and is confined to chance finds that have been dumped on the saltmarsh and mudflat environments. Palaeoenvironmental preservation should be good. Pollen and macro-botanical remains could record indirect or direct evidence of human activity on the floodplain. Ostracod and diatoms evidence may suggest whether the conditions of the site itself, concerning level of water logging or salinity, was suitable for crops or pastureland. Within Trenches 1, 3 and 4 a buried soil horizon was identified around c. 100m ATD. Stabilisation such as this could be attributed to Post-Medieval drainage and land reclamation.

12.5 Modern (1800 AD –present)

Overlying and truncating all sediments on both the west and east sections of the site was a series of dumps and make-up layers associated with the railway development. These layers of modern made-ground are generally heterogeneous in nature and in most areas are for the purposes of making up and leveling an area prior to the laying of rail track. The deposits are 0.5 to 1.5m in thickness.

13 Recommendations for appropriate mitigation strategy

A significant area within the Connaught Tunnel surface rail alignment has now been evaluated to reveal extant deep, natural palaeo-environmental sequences across the site and two main landscape forms; the higher gravel areas (trenches 1 and 4) and the lower lying channel areas (trenches 2 and 3). The Project Archaeologist will produce fully comprehensive recommendations for further work during the main works phase. Until this time preliminary recommendations for this site are given below.

The recommendations as a whole will form a post-ex assessment with a view to follow with a high temporal resolution analysis of the palaeo-environmental samples taken on site. The broad scope of which will be to aid the reconstruction of the past environments and inform our understanding of the landscape development of the Connaught Tunnel site, with a view to improve our understanding or regional models and local conditions.

The assessment of the palaeo-environmental preservation and potential of the sequences sampled will focus upon the two main landscape types found on site; the higher gravel areas (trenches 1 and 4) and the lower lying channel areas (trenches 2 and 3). In order to assess the palaeo-environmental potential a preliminary chronological framework must be established. It is recommended that samples from the top of the sand or base of the overlying peat are processed for viable radio carbon dating material (botanical remains such as seeds etc) on both of the two higher gravel areas (trenches 1 and 4); and one each from the top and bottom of the peat from only one of the low lying channel sequences (trenches 2 or 3) and sent for AMS radio carbon dating. This will be carried out with a view to possibly supplement these radiocarbon dates with ones from the top of the peat on both of the two higher gravel areas (trenches 1 and 4) or other locations as part of the analysis phase.

A low temporal resolution multi-proxy palaeo-environmental assessment is recommended at both or the two higher gravel areas (trenches 1 and 4) and at one of the low lying channel sequences (trenches 2 or 3) with a view to following this up with a high resolution multi-proxy palaeo-environmental analysis at the single low lying channel sequence and potentially only one of the higher gravel areas' sequences. The low temporal resolution multi-proxy palaeo-environmental assessment should include a minimum of 12 pollen samples, 12 diatom samples and 8 ostracod samples at each of the sequences assessed, along with the botanical assessment of a selected number of the associated bulk samples taken.

The surface of the sands may preserve ephemeral soil development, along with pollen and plant macro-fossils that would enable the reconstruction of the surrounding environment for this potential Mesolithic land surface and may provided indirect evidence of human occupation. The ostracods or diatoms could indicate local river regime changes and wider climatic trends involving the extent of marine influence on the channel deposits.

The will preserve pollen, diatoms, ostracods, and plant macrofossils and possibly and is vital for reconstructing the marked vegetation change it represents and the heterogeneous mix of woodland types that existed across the differing landscape forms. and may provide indirect evidence of human exploitation. Pollen and macro-botanical remains within the upper silty clays could record indirect or direct evidence of historic

human activity on the floodplain. Ostracod and diatoms evidence may suggest whether the conditions of the site itself, concerning level of water logging or salinity, was suitable for crops or pastureland and whether the possible Post-Medieval stabilisation evident in trenches 1, 3 and 4 can be attributed to drainage and land reclamation.

As part of the assessment or more likely as part of the future analysis phase the trench sections should be combined with borehole data from previous phases of work thus enabling the construction of a topographic model of the development of these island locales within the context of those previously found in the vicinity (Morley and Scaife in prep).

14 Publication and dissemination proposals

The initial evaluation results will be disseminated via this report and the supporting site archive of samples and records (including digital data). Any publication proposals will be considered in the wider context of archaeological potential and results within the scheme.

15 Archive deposition

The site archive containing original records and finds will be stored temporarily with MOLA pending a future decision over the longer-term archive deposition and public access process for the wider Crossrail project.

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18 NMR OASIS archaeological report form

18.1 OASIS ID: molas1-127702

Project details

Project name	Crossrail Connaught Tunnel
Short description of the project	This report presents the results of a field evaluation carried out by the Museum of London Archaeology (MOLA) on the site of Connaught Tunnel, London E16, in the London Borough of Newham. This report was commissioned from MOLA by Crossrail Ltd. The sequence in the four trenches excavated is typified by basal sands grading up from the underlying gravels, overlain by peats and sealed by alluvial clays. The elevation of the surface of the Pleistocene / Early Holocene sands to the base of the sequence indicates that Trenches 1 and 4 are likely to be on the margins of discrete landscape features such as floodplain islands previously indicated around Custom House and others suggested around London City Airport. Trenches 2 and 3 appear to be within lower areas of migrating channels. The peat deposits contained discrete bands of organic clays; the thickness, position and number of which varied between the trenches and indicates different landscape positions or hydrology, with prehistoric and potentially historic channels evident in Trench 3. The top of the upper alluvial clays were likely to have been truncated in the past within some of the trenches and the thickness of the overlying made ground varied between the trenches. Trenches 1, 3 and 4 appeared to have been truncated but showed later possibly medieval to historic soil development before the addition of made ground. The alluvial clay in Trench 2 appears to have been least truncated with the survival of upper weathered alluvial deposits and very little made ground.
Project dates	Start: 05-12-2011 End: 18-04-2012
Any associated project reference codes	XSY11 - Sitecode
Type of project	Field evaluation
Site status	Local Authority Designated Archaeological Area
Current Land use	Transport and Utilities 2 - Other transport infrastructure
Monument type	EYOT Early Mesolithic

Project location

Country	England
Site location	GREATER LONDON NEWHAM NEWHAM Crossrail Connaught Tunnel
Postcode	E16
Study area	12000.00 Square metres
Site coordinates	TQ 42093 80103 51.5014733783 0.047435625653 51 30 05 N 000 02 50 E Point
Height OD / Depth	Min: -3.00m Max: 3.00m

Project creators

Name of Organisation	MOLA
Project brief originator	Crossrail
Project design originator	Crossrail
Project director/manager	David Divers
Project supervisor	Isca Howell
Type of sponsor/funding body	Crossrail Ltd

Project archives

Physical Archive Exists?	No
Digital Archive recipient	LAARC

Digital Media available	'Images raster / digital photography','Survey'
Paper Archive recipient	LAARC
Paper Media available	'Notebook - Excavation',' Research',' General Notes','Photograph','Report','Section','Survey '

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	C263 ARCHAEOLOGY LATE EAST Fieldwork Report Geoarchaeological Evaluation Connaught Tunnel - XSY11
Author(s)/Editor(s)	Yendell, V
Date	2012
Issuer or publisher	MOLA
Place of issue or publication	London
Description	A4 ring bound report

Entered by	Virgil Yendell (vyendell@mola.org.uk)
Entered on	30 May 2012

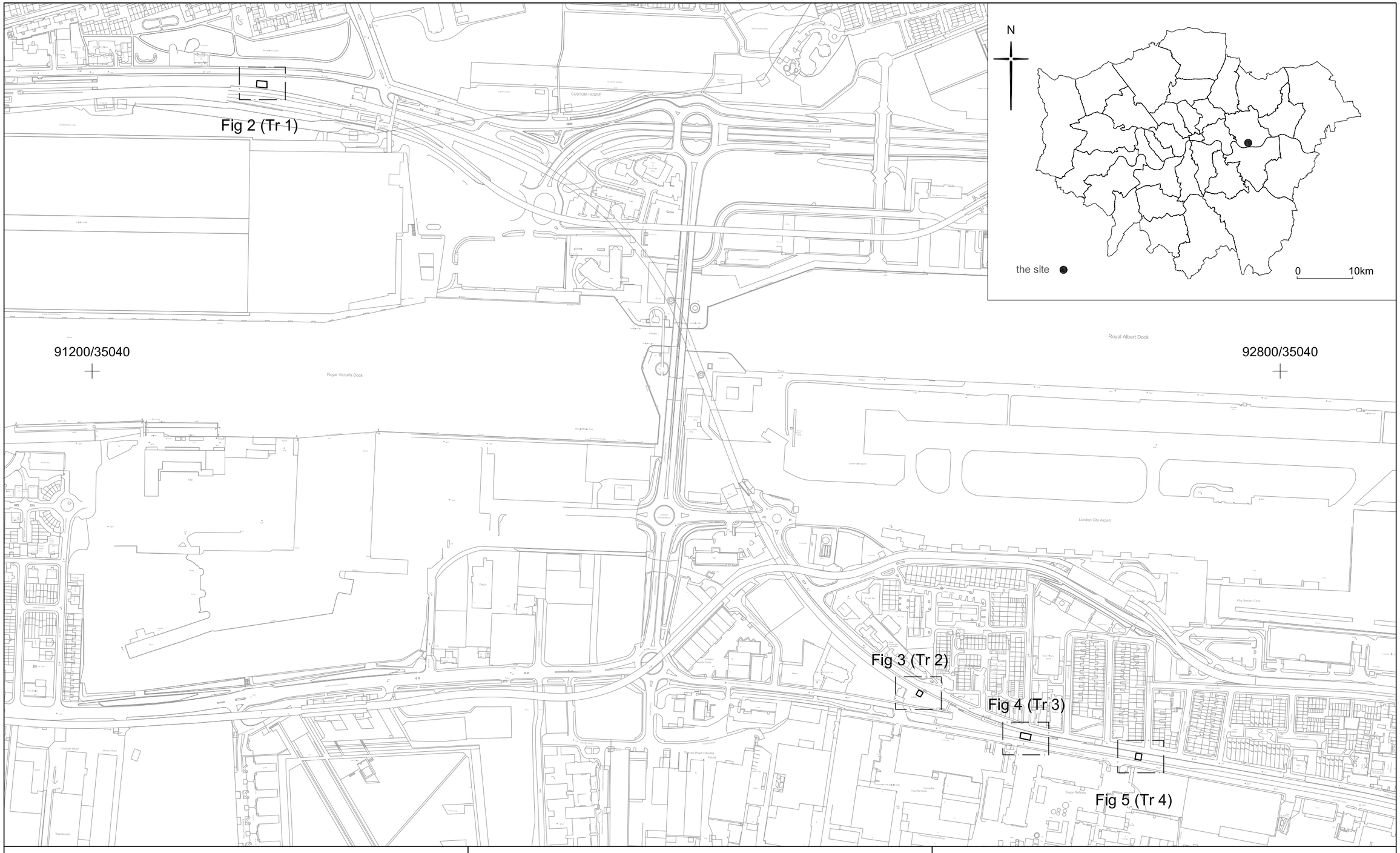

Fig 1 Site location

Trench edge

Location of additional figures

1:5000 @ A3

0 250m

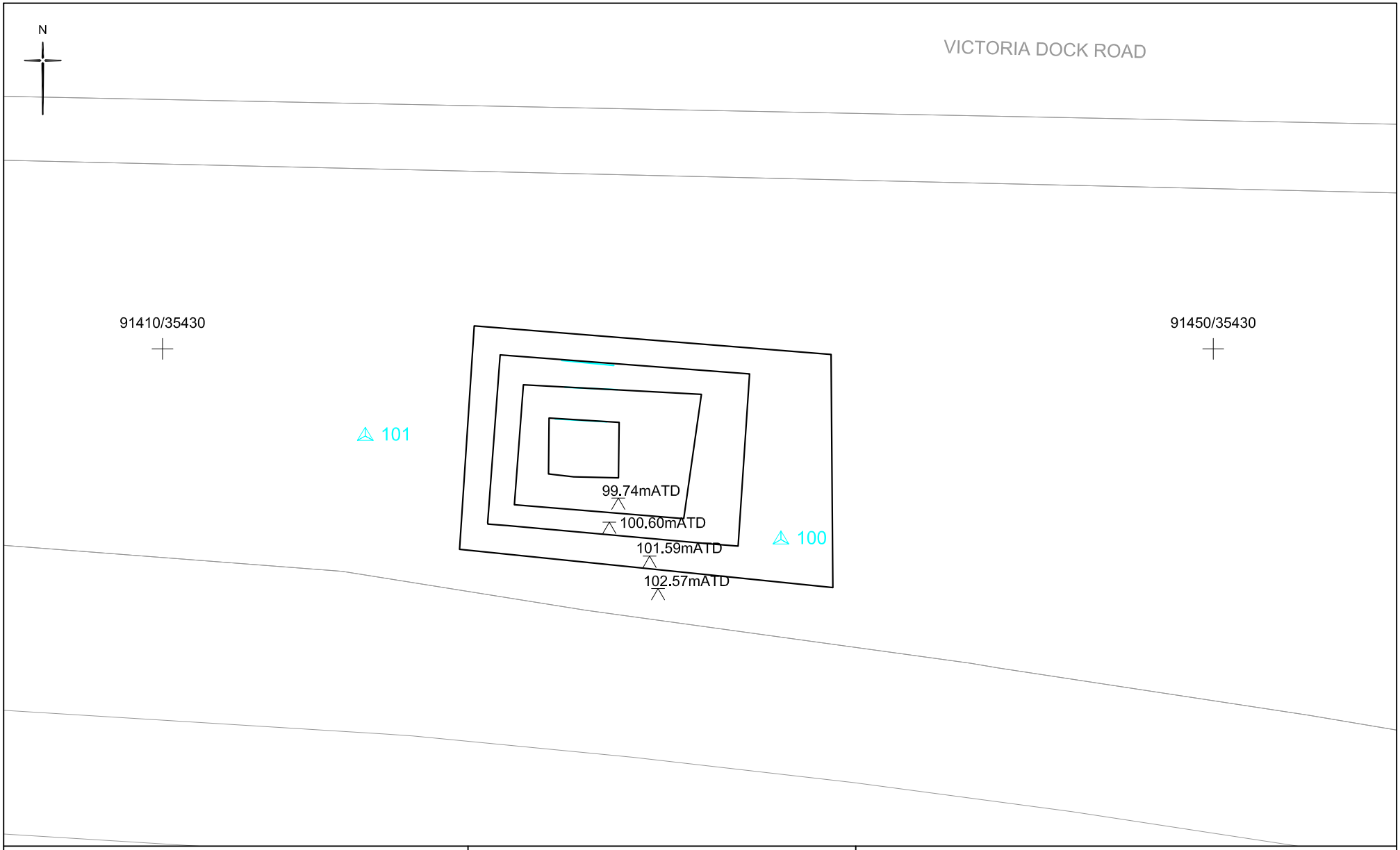

Fig 2 Plan of Trench 1

Trench edge
10.24mOD TBMs
100 GPS derived contol
102.57mATD GPS derived levels

1:200 @ A4

0 10m

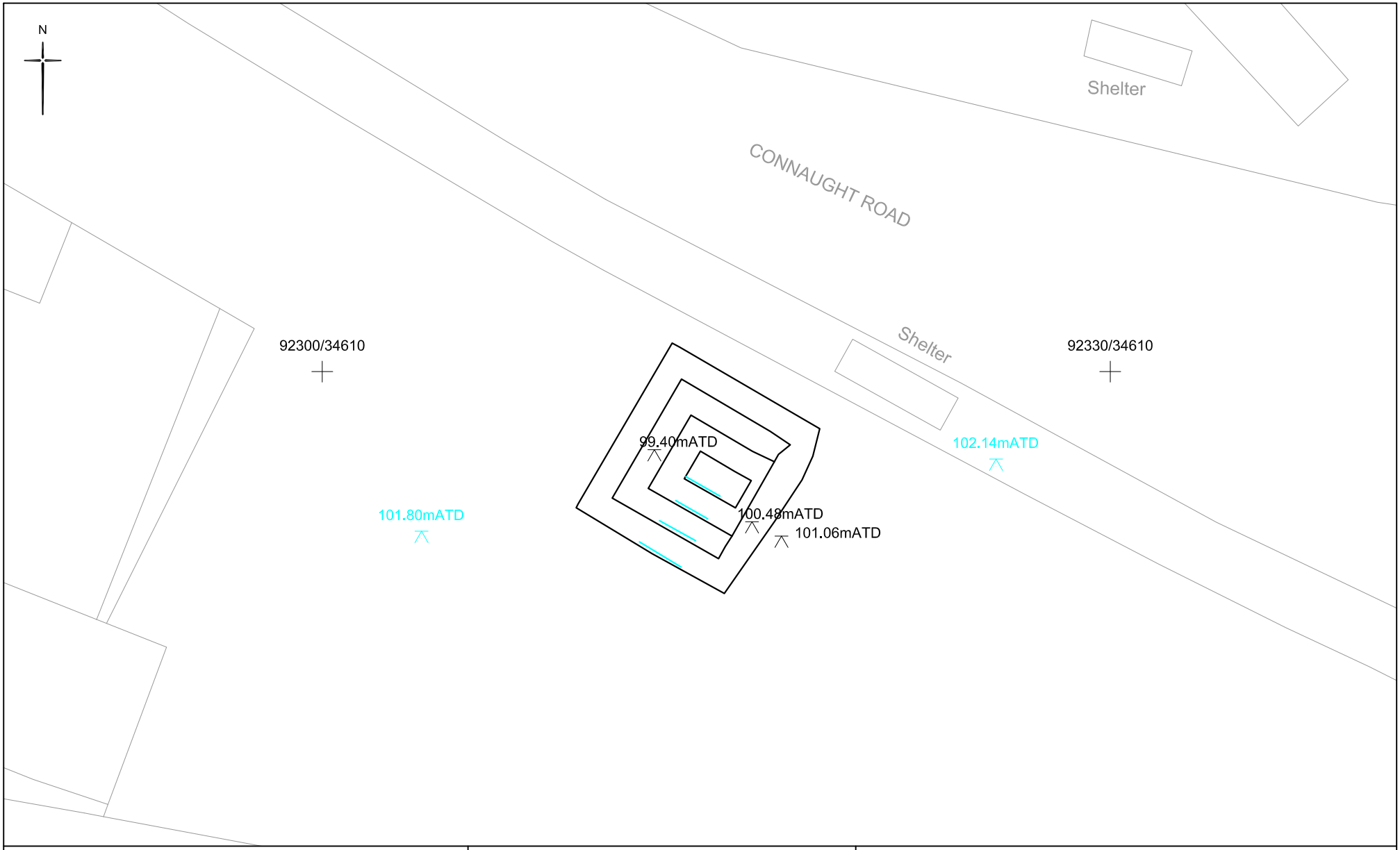

Fig 3 Plan of trench 2

Trench edge
Section location
10.24mOD TBMs
102.57mATD GPS derived levels

1:200 @ A4

0 10m

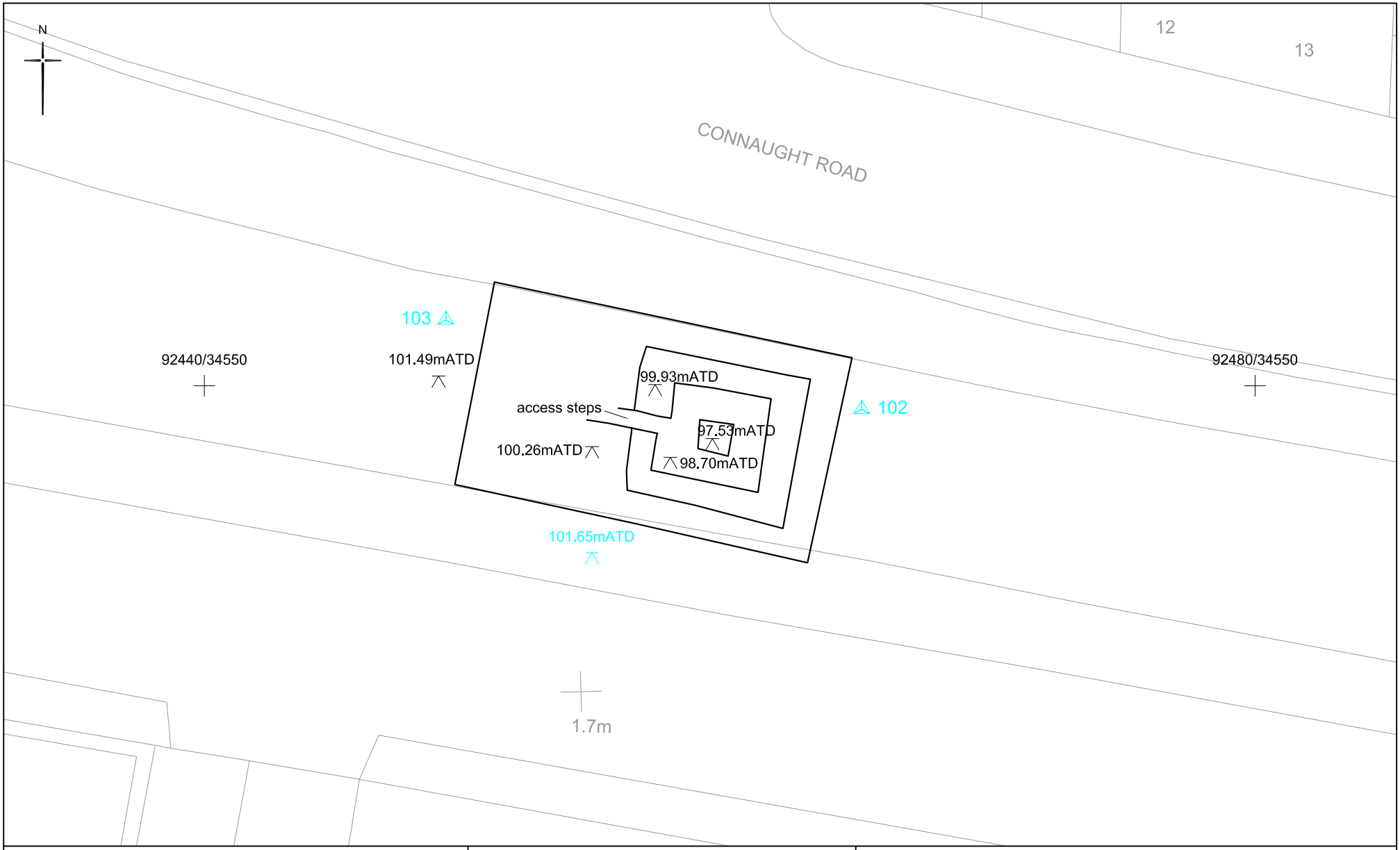

Fig 4 Plan of trench 3

Trench edge

10.24mOD TBMs

100 GPS derived contol

102.57mATD GPS derived levels

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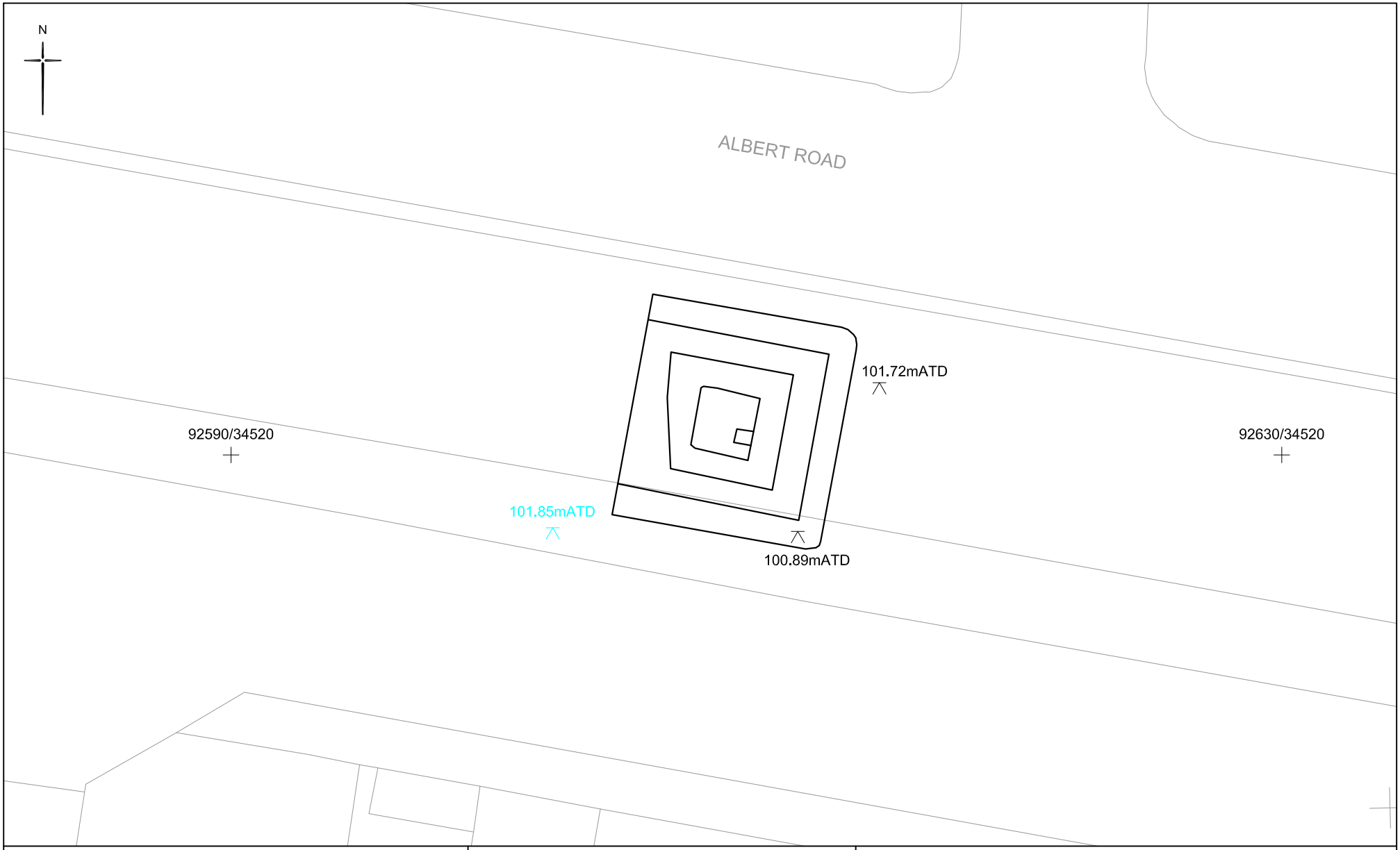

Fig 5 Plan of trench 4

Trench edge

10.24mOD TBMs

102.57mATD GPS derived levels

1:200 @ A4

0 10m

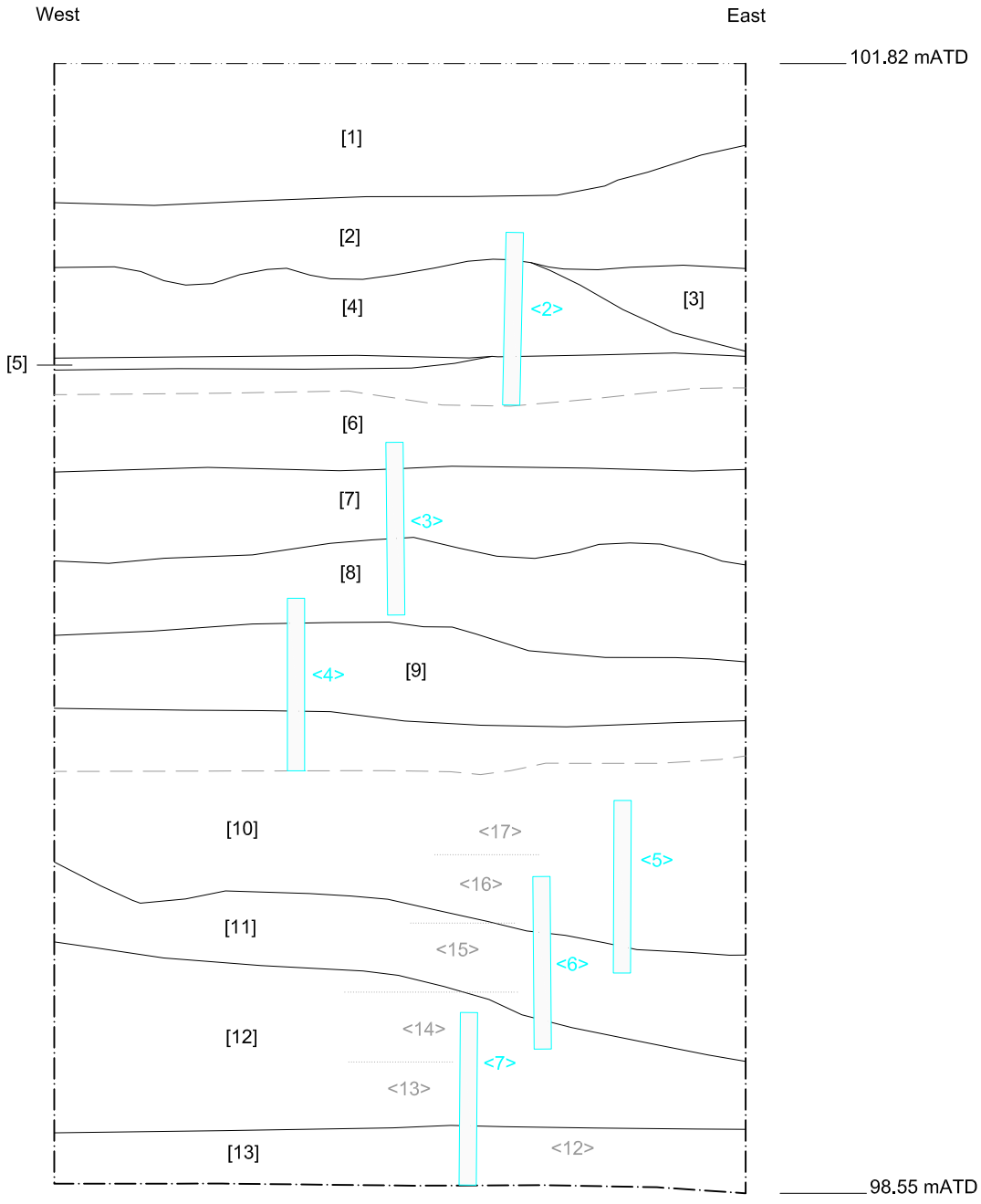

Fig 6 Trench 1 composite section

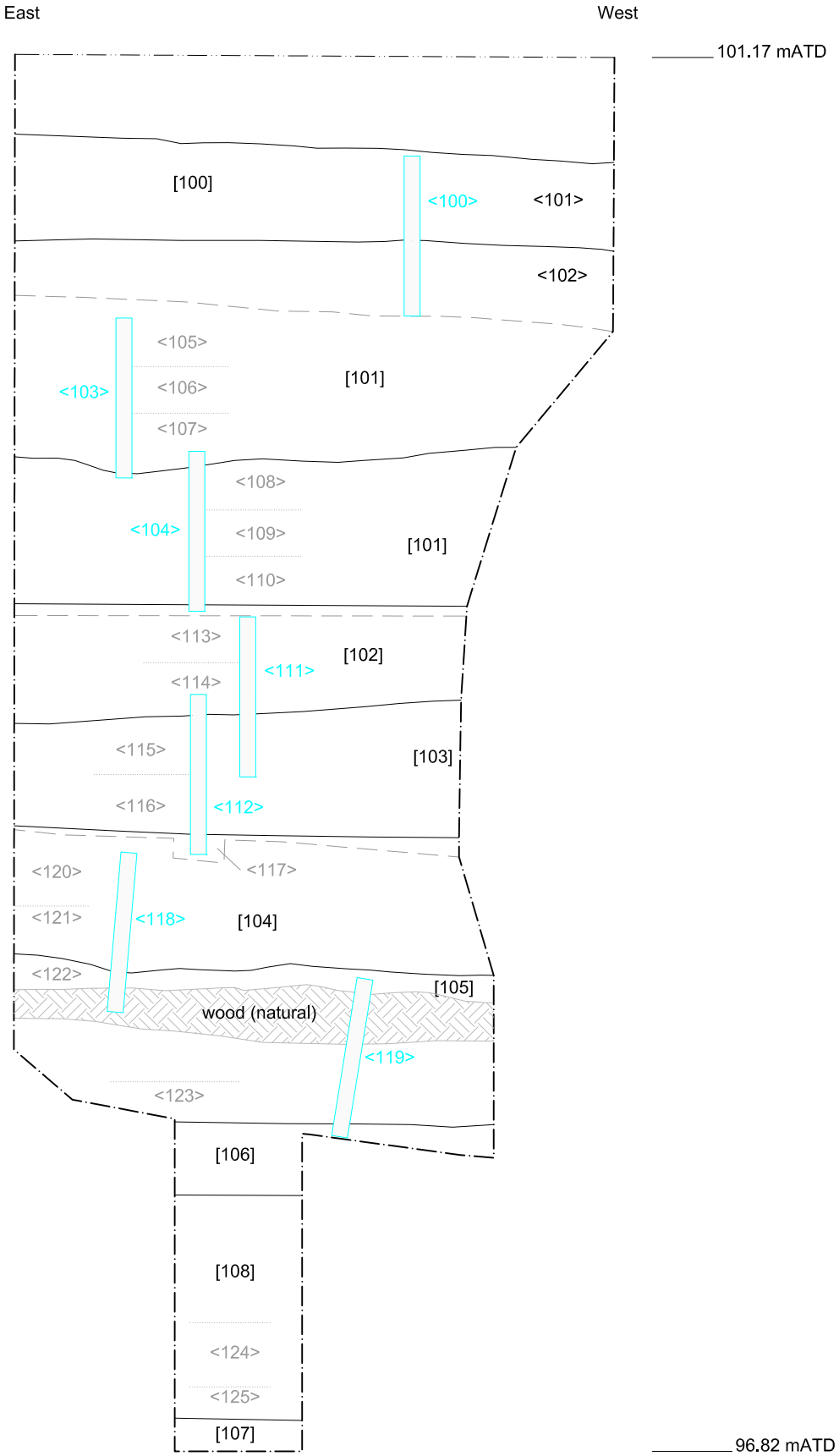

Fig 7 Trench 2 composite section

Edge of section
Modern truncation
[11] Archaeological contexts
<100> Bulk sample positions
<100> Geoarchaeological sample tins

1:20 @ A4

0 1m

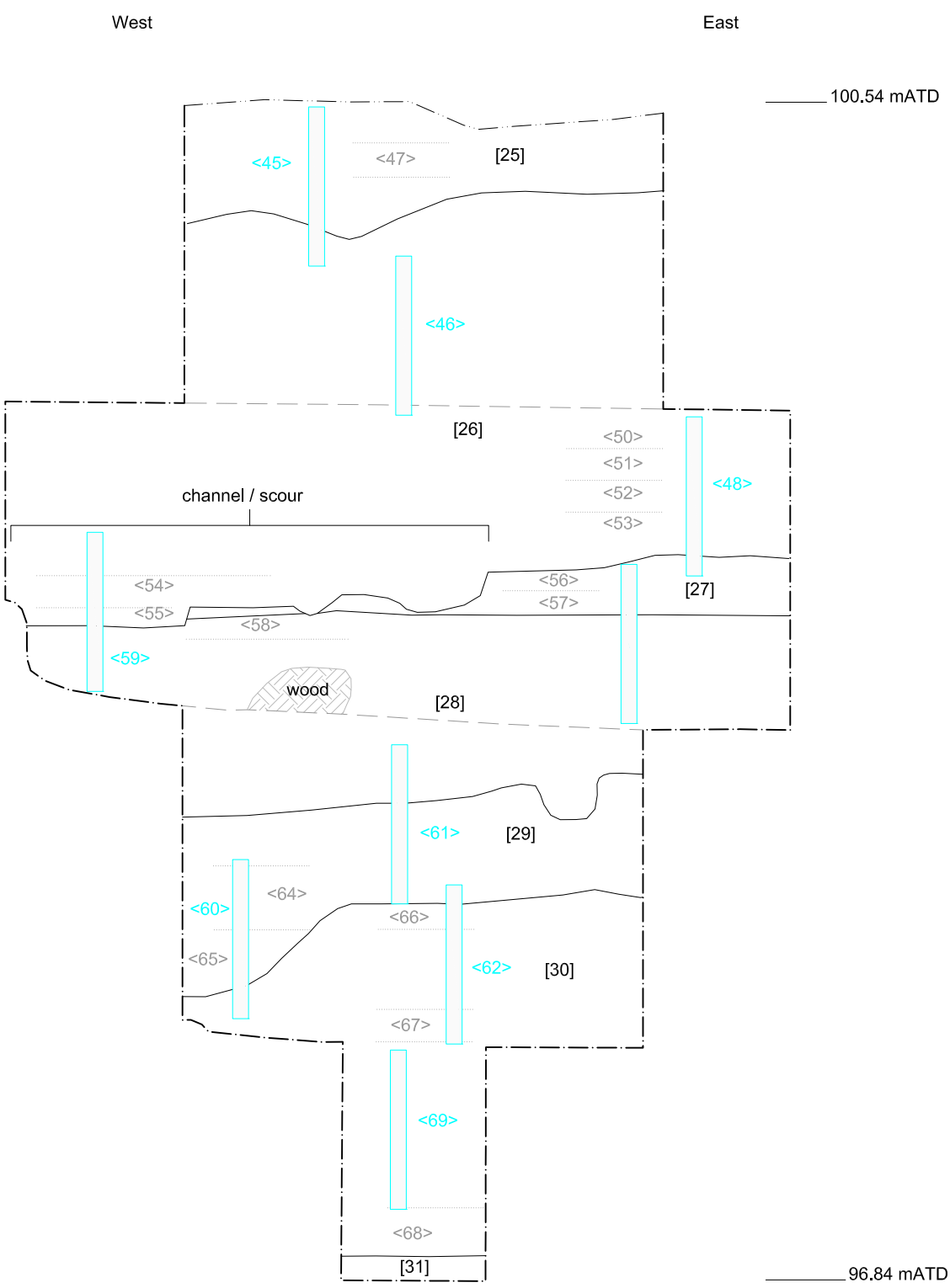

Fig 8 Trench 3 composite section

Edge of section
Modern truncation
[11] Archaeological contexts
<100> Bulk sample positions
<100> Geoarchaeological sample tins

1:20 @ A4

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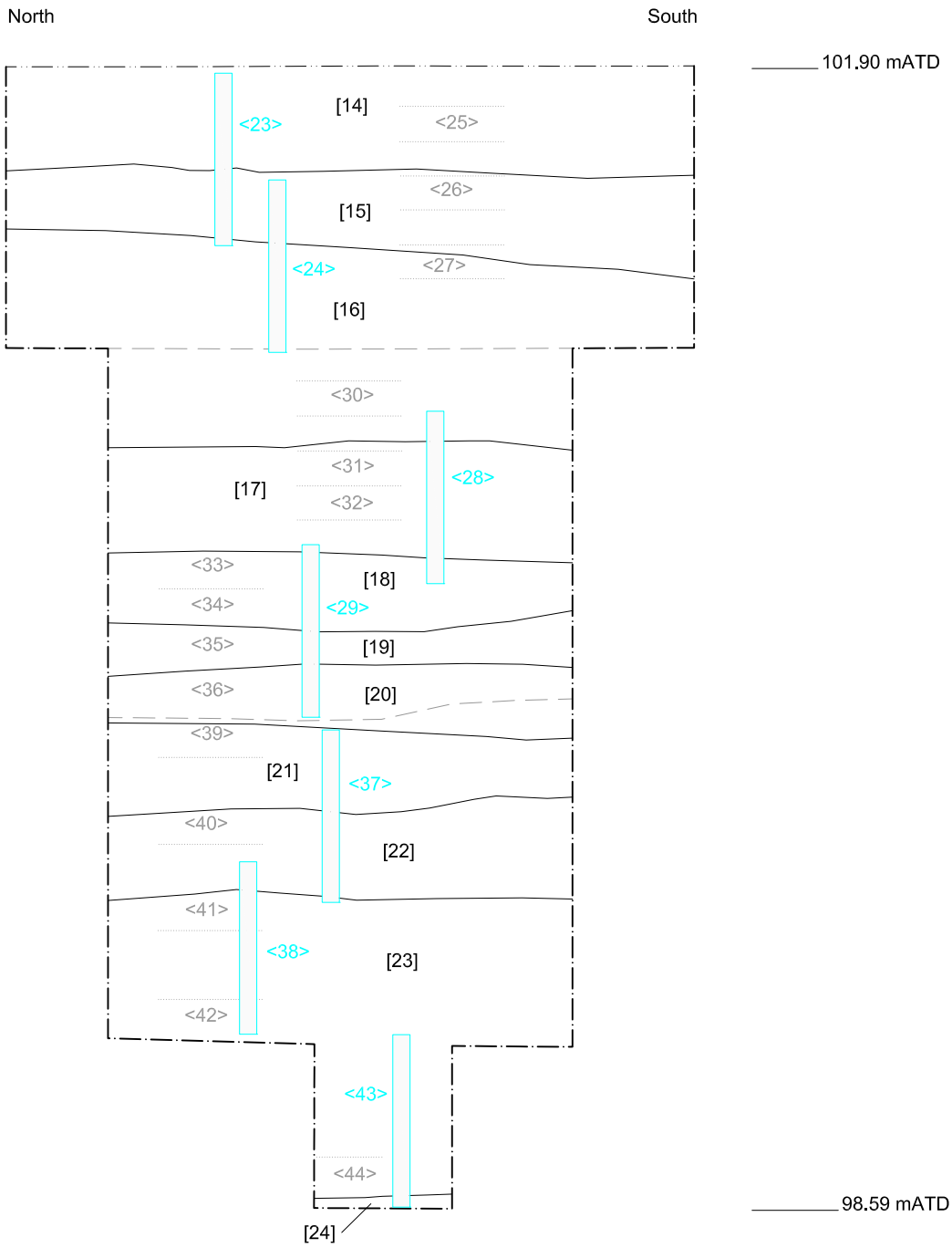

Fig 9 Trench 4 composite section

Edge of section
Modern truncation
[11] Archaeological contexts
<100> Bulk sample positions
<100> Geoarchaeological sample tins

1:20 @ A4

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