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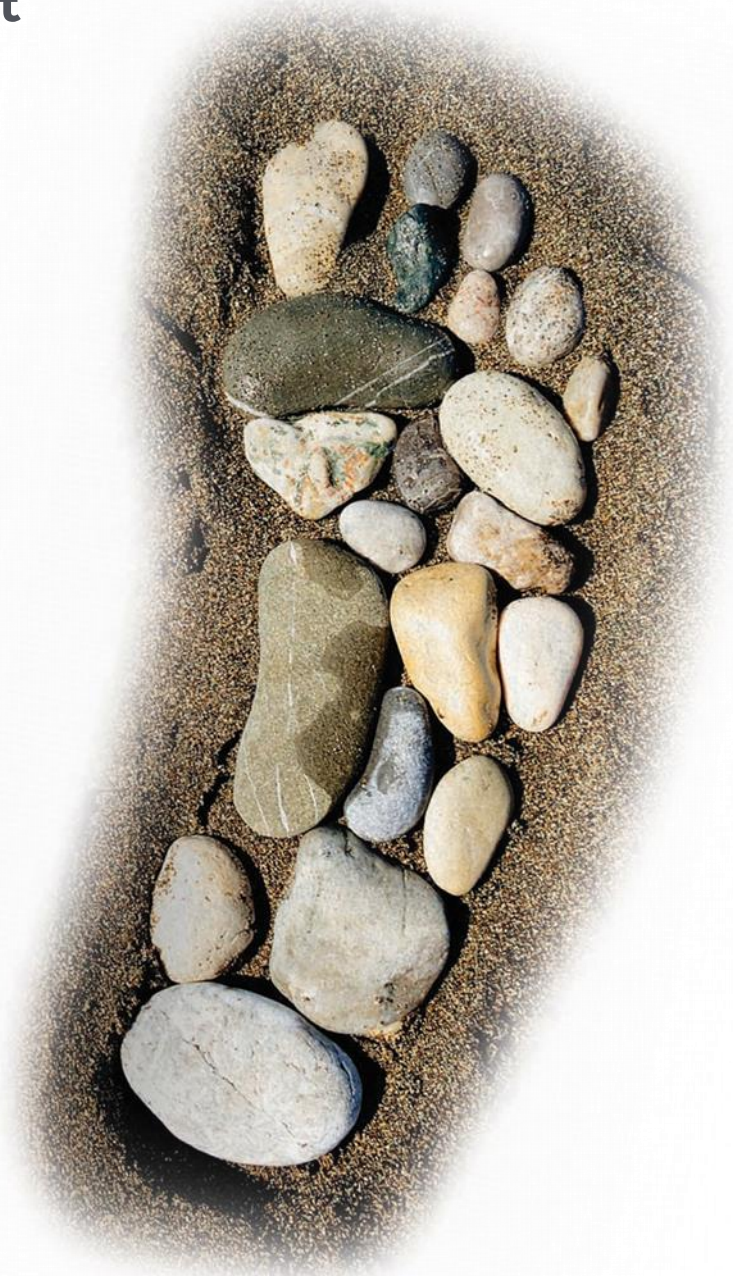
CANNING TOWN PHASE 3,LONDON BOROUGH OF NEWHAM

Geoarchaeological Deposit Model Report



NGR: TQ 3960 8135

Site Code: WOU18

Date: 27th July 2018

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DOCUMENT HISTORY:

REVISION	DATE	PREPARED BY	SIGNED	APPROVED BY	SIGNED	REASON FOR ISSUE
v1	27/07/18	D.S. Young		C.R. Batchelor		First edition

CONTENTS

1. NON-TECHNICAL SUMMARY

A programme of geoarchaeological monitoring and deposit modelling was carried out at the Canning Town Phase 3 site in order to: (1) clarify the nature of the sub-surface stratigraphy; (2) clarify the nature, depth and extent of any alluvium and peat deposits; and (3) make recommendations for any further palaeoenvironmental or archaeological investigations. In order to address these aims, a total of five geotechnical boreholes were monitored and described in the field, and these new boreholes were integrated with data from the site and surrounding area, in order to produce a deposit model of the major depositional units.

The results of the geoarchaeological deposit modelling demonstrate that the site occupies both an elevated gravel island to the north/northwest, and the deeper Gravel topography of one or more (possibly Late Devensian/Early Holocene) channels to the west and southeast. Both of these features appear to be extensions of those identified during previous geoarchaeological investigations in this area. The new deposit model has significantly improved our understanding of these features; the palaeochannel appears to extend in a south-easterly direction across the west and south of the Canning Town Phase 3 site, although the sediments infilling it are relatively coarse-grained, inorganic, and of negligible palaeoenvironmental potential. On this basis, no further environmental archaeological assessment of the sequences at the site is recommended.

The crest of the Gravel island or eyot in the northern area of the site is higher than has previously been identified in this area (0.39m OD), including at 20 Fords Park Road (-0.2m OD; Nicholls *et al.*, 2013), where evidence of Mesolithic and Bronze Age occupation was identified. The Gravel high at the present site is considered to have increased archaeological potential, since such an elevated Gravel island would have represented an area of higher, drier ground raised up above the floodplain and former channel. This greater archaeological potential is considered to be limited to where the Gravel surface rises up above *ca.* -1m OD, and further archaeological investigation of this area of the site is recommended.

2. INTRODUCTION

2.1 Site context

This report summarises the findings arising out of the geoarchaeological fieldwork and deposit modelling undertaken by Quaternary Scientific (University of Reading) in connection with the proposed development of the site at Canning Town Phase 3, London Borough of Newham (National Grid Reference (NGR); *centred on* TQ 3960 8135; Figures 1 & 2). Quaternary Scientific were commissioned by RPS to undertake the geoarchaeological investigations. The site is located in the lower valley of the River Lea, to the east of the river and close to the confluence of the Lea with the River Thames. At its closest point, the western boundary of the site is within *ca*. 100m of the present-day channel of the Lea, at a point where the river, known here as Bow Creek, follows a very convoluted meandering course. The mouth of Bow Creek, at its confluence with the Thames, lies *ca*. 300m to the southeast of the site. The British Geological Survey (1:50,000 Sheet 257 Romford 1996) shows the site underlain by Alluvium, described as comprising mainly sand, silt and clay with some gravel, resting on London Clay bedrock. In fact, the Holocene alluvium of the Lower Thames and its tributaries is almost everywhere underlain by Late Devensian Late Glacial Gravels (in the Thames valley, the Shepperton Gravel of Gibbard, 1985, 1994; in the Lea valley, the Lea Valley Gravel of Gibbard, 1994), and this gravel is widely recorded in boreholes in the vicinity of Canning Town.

The site lies within the area that has been investigated in the Lea Valley Mapping Project (Corcoran *et al.*, 2011; see Figure 1). In this project the Lea Valley has been divided into Landscape Zones (LZ) characterised by their Holocene landscape history, based largely on sedimentary evidence derived from borehole records. The present site lies at the interface between Corcoran *et al.*'s Landscape Zones 1.1a, 1.3 and 1.5. Corcoran *et al.* (2011) suggest that an area of higher ground, formed by sands rising to *ca*. 0.5m OD, underlies the interface between zones LZ1.3 and LZ1.5. In LZ1.3 peat has been identified overlying these sands, interleaved between alluvial clay units, whilst in LZ1.1 the alluvial deposits are described as commonly clayey and generally *ca*. 4m thick, but with only very occasional evidence of peat (Corcoran *et al.*, 2011). In this zone, 'the surface of the floodplain gravel undulates between *ca*. -3 and -5m OD. The deposit sequence is consistent with in-channel sediments, suggesting that the zone has always been an area of active channels. Consequently marginal marshland and wetland deposits did not develop across the zone, and where such environments did take hold, channel activity and river scour are likely to have eroded these deposits.' (Corcoran *et al.*, 2011: p48).

It should be recognised however that although the examination of the borehole evidence by Corcoran *et al.* (2011) appears to have been thoroughly comprehensive (in total over 2000 BGS borehole records were incorporated into the Lea Valley Mapping Project database), the distribution of these boreholes is very uneven (see Corcoran *et al.* 2011 Figure 15) relative to the scale of the variability that characterises the Holocene alluvial sequence and the surface of the Lea Valley and Shepperton Gravels on which it rests.

No site-specific geotechnical borehole data is available for the Canning Town Phase 3 site. However, geoarchaeological investigations have been undertaken immediately to the north, at the Phase 1 (Green & Young, 2012) and Phase 2 (Young, 2014) sites (see Figure 1). The results of the investigation of the Phase 2 site indicated that the Gravel surface is highest in its south-eastern corner (adjacent to the northern part of the present site), where it lies at between -1.24 and -0.65m OD; from here the Gravel surface falls towards the west, to between -2.38 and -3.71m OD, and towards the north, to between -1.94 and -4.47m OD. At the Phase 1 site (Green & Young, 2012) the Gravel was recorded at between *ca*. -2.81 and -0.5m OD, falling from south to north. The topography here was thus indicative of an east-west aligned palaeochannel lying towards the north of the Phase 1 and Phase 2 sites, with a second palaeochannel aligned broadly north-south, its main axis lying to the west of the Phase 2 site (and potentially in the western area of the present site). The deposit models from these sites thus indicate that whilst the Gravel surface towards the north of the Phase 1 and 2 sites lies within the range identified by Corcoran *et al*. (2011), towards the south of this area much higher Gravel surfaces are recorded at between *ca*. -1.5 and -0.5m OD.

In general, the alluvium at the Phase 1 site was inorganic, consisting of a single unit of silty or sandy clay, with occasional pockets of peat and pockets and bands of Gravel (Green & Young, 2012). Notably, the tripartite sequence of Upper and Lower Alluvium separated by a peat horizon recorded elsewhere beneath the floodplain of the Thames and its tributaries was absent here, consistent with the findings of Corcoran *et al*. (2011). The Alluvium at the Phase 2 site was also largely inorganic; here however, peat was recorded in one borehole within the Phase 2 site, and a programme of environmental archaeological assessment was undertaken in order to investigate the peat at the site in more detail (Young, 2014). Subsequently, peat was also recorded in two new geoarchaeological boreholes; although all three peat horizons were recorded at different elevations (-1.24 to -1.94, -3.63 to -3.87 and -0.37 and -1.16m OD), radiocarbon dating demonstrated that the peat began accumulating during the middle to late Neolithic, beginning no more than 700 years later in borehole QBH2 (4155 to 4410 cal BP) than in QBH1 (4825 to 4855 cal BP).

Peat formation has been recorded elsewhere within Landscape Zone 1.1, including at the A13 Ironbridge-Canning Town route immediately to the northwest (Stafford *et al*., 2012; see Figure 1), where peat and alluvial deposits were recorded dating from the middle Neolithic to middle Bronze Age between *ca*. -0.8 and -2.3m OD. Although recorded at variable elevations, the peat horizons at the Canning Town Phase 2 site thus fall within the period of peat accumulation recorded by Stafford *et al*. (2012). Here, the pollen record was indicative of an alder carr-dominated wetland surface with an understorey of sedges, grasses and ferns, with oak, lime and hazel on the dryland. No evidence for human activity was recorded in the pollen assemblages (Stafford *et al.,* 2012).

2.2 Geoarchaeological, palaeoenvironmental and archaeological significance

As outlined within the Written Scheme of Investigation (WSI) for the site (Young, 2018), the existing records from the general area of the site thus indicate important variations in the height of the Gravel surface, and the type, thickness and character of the subsequent alluvial deposits within the

vicinity of the site. Such variations are significant as they represent different environmental conditions that would have existed in a given location. For example: (1) the varying surface of the Gravel may represent the location of pre-Holocene river terraces, former channels and bars; (2) the presence of peaty or highly organic alluvium may represent former terrestrial or semi-terrestrial land-surfaces, and (3) the various alluvial units represent periods of changing hydrological conditions. Thus by studying the sub-surface stratigraphy across the site in greater detail, it will be possible to build an understanding of the former landscapes and environmental changes that took place across space and time.

Organic-rich sediments (in particular peat) also have high potential to provide a detailed reconstruction of past environments on both the wetland and dryland. In particular, they provide the potential to increase knowledge and understanding of the interactions between hydrology, human activity, vegetation succession and climate. Significant vegetation changes include the Mesolithic/Neolithic decline of elm woodland, the Neolithic colonisation and decline of yew woodland; the Late Neolithic/Early Bronze Age growth of elm on Peat, and the general decline of wetland and dryland woodland during the Bronze Age. Such investigations are carried out through the assessment/analysis of palaeoecological remains (e.g. pollen, plant macrofossils & insects) and radiocarbon dating.

Finally, areas of high gravel topography, soils and peat represent potential areas that might have been utilised or even occupied by prehistoric people, evidence of which may be preserved in the archaeological (e.g. features and structures) and palaeoenvironmental record (e.g. changes in vegetation composition). As described above, the Gravel surface may be relatively high in the area of the site, perhaps lying as high as -0.5m OD; such high Gravel topography is of increased archaeological potential, as evidenced at the nearby Fords Park Road (GLHER/ELO10265; see below). In discussing the archaeological and palaeoenvironmental potential of Landscape Zone LZ1.1, Corcoran *et al*. (2011 p.49) note that although borehole data is good for this part of the lower Lea valley, '...only four archaeological interventions have taken place, leading to a lack of cultural evidence in general and contributing to the lack of dating evidence available for the zone.'

Although Corcoran *et al*. (2011) believe that the chance of significant archaeological or palaeoenvironmental evidence surviving in their Landscape Zone LZ1.1 is low, it should be noted that such evidence has been recorded at localities close to the present site: at Canning Town Phase 2 (see above; Young, 2014), Caxton Works (Young & Batchelor, 2014a), St Luke's Square (Weale, 2008; Wicks, 2008) and 105-107 Tarling Road (Batchelor & Young, 2014b) immediately to the east, middle Neolithic to Middle Bronze Age peat horizons were identified, with evidence for the well-documented Neolithic lime decline at St Luke's Square and evidence of human activity (in the form of woodland clearance) at Tarling Road. In addition, at Dock Road (GLHER/ELO7446) *ca*. 200m to the south of the present site, a radiocarbon date from organic material in alluvial silts indicated deposition in the Late Neolithic or Early Bronze Age; at Victoria Dock Road (Barnett *et al*., 2010) immediately to the southeast, peat horizons radiocarbon dated to the Late Neolithic through to Late Bronze Age were recorded; and at 20 Fords Park Road (Nicholls *et al*., 2013) *ca*.

300m to the northeast evidence of Mesolithic and Bronze age occupation was identified on an upstanding 'island' of sandy sediment at about -0.2m OD.

2.3 Aims and objectives

Further borehole records are required to enhance our understanding of the sub-surface stratigraphy of the Canning Town Phase 3 site, and for any further assessment/analysis of the deposits (if necessary). Five significant research aims relevant to the geoarchaeological investigations at the site were therefore outlined within the WSI for the site (Young, 2018):

1. To clarify the nature of the sub-surface stratigraphy across the site;
2. To clarify the nature, depth and extent of any alluvium and peat deposits;
3. To investigate whether the sequences contain any artefact or ecofact evidence for prehistoric or historic human activity;
4. To investigate whether the sequences contain any evidence for natural and/or anthropogenic changes to the landscape (wetland and dryland);
5. To integrate the new geoarchaeological record with other recent work in the local area for publication in an academic journal.

In order to address the first two of these aims, the following objectives are proposed:

1. To monitor a minimum of four geotechnical boreholes, evenly distributed across the site (see Figure 2);
2. To collect samples suitable for any further palaeoenvironmental assessment, where possible/necessary;
3. To use the stratigraphic data from the new locations, and existing records to produce a deposit model of the major depositional units across the site;
4. To make recommendations for any further geoarchaeological and palaeoenvironmental assessment/analysis (where necessary).

Aims 3 to 5 will be addressed through laboratory-based assessment/analysis, the potential for which will be confirmed after achieving Aims 1 and 2.

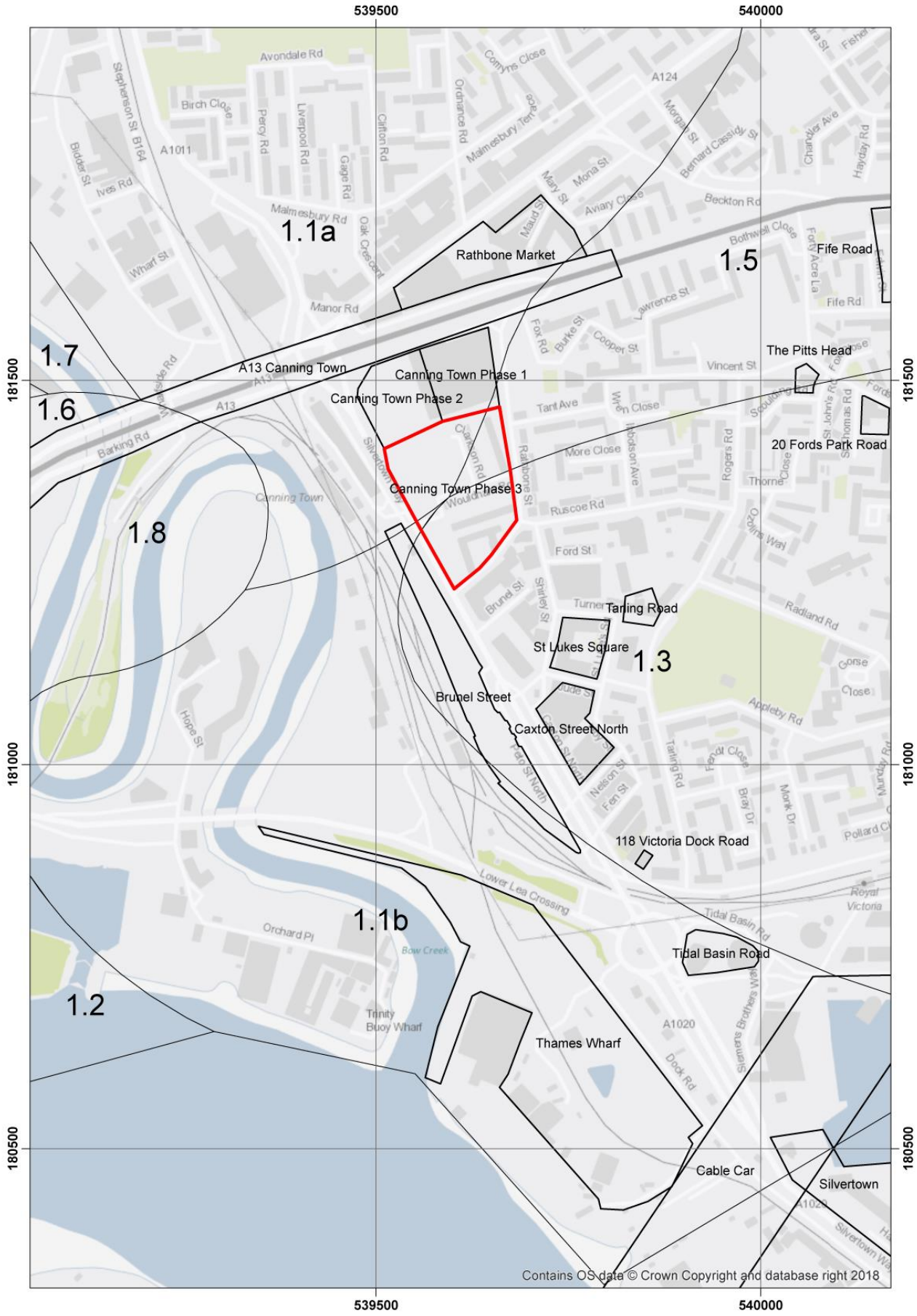
539500
540000
181500
181000
180500
1.1a
1.1b
1.2
1.3
1.5
1.6
1.7
1.8
Rathbone Market
A13 Canning Town
Canning Town Phase 1
Canning Town Phase 2
Canning Town Phase 3
Taning Road
St Lukes Square
Brunel Street
Caxton Street North
118 Victoria Dock Road
Tidal Basin Road
Thames Wharf
Cable Car
Silvertown
Fife Road
The Pitts Head
20 Fords Park Road
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Figure 1: Location of Canning Town Phase 3, London Borough of Newham and other nearby sites mentioned in the text: Canning Town Phase 1 (CTR12; Green & Young, 2012); Canning Town Phase 2 (Young, 2016); Rathbone Market (RBO10; Young *et al*., 2013); A13 Ironbridge-Canning Town (Stafford, 2012); Tidal Basin Road (Young & Batchelor, 2013b); 118 Victoria Dock Road (Barnett *et al*., 2010); Brunel Street Works (Batchelor & Young, 2018); the Cable Car route (Batchelor *et al*., 2012); Silvertown (BWC96; Wilkinson *et al*., 2000); The Pitts Head (PHD12; Batchelor *et al*., 2013); 20 Fords Park Road (FDP07; Nicholls *et al*., 2013); Fife Road (FIH12; Killock, 2012); St Luke's Square (LUC07; Weale, 2008; Wicks, 2008); 105-107 Tarling Road (Batchelor & Young, 2014b) and Caxton Street North (Young & Batchelor, 2014a). Landscape Zones for the Lower Lea Valley Mapping Project (Corcoran *et al*., 2011) also shown (data provided by MoLA).

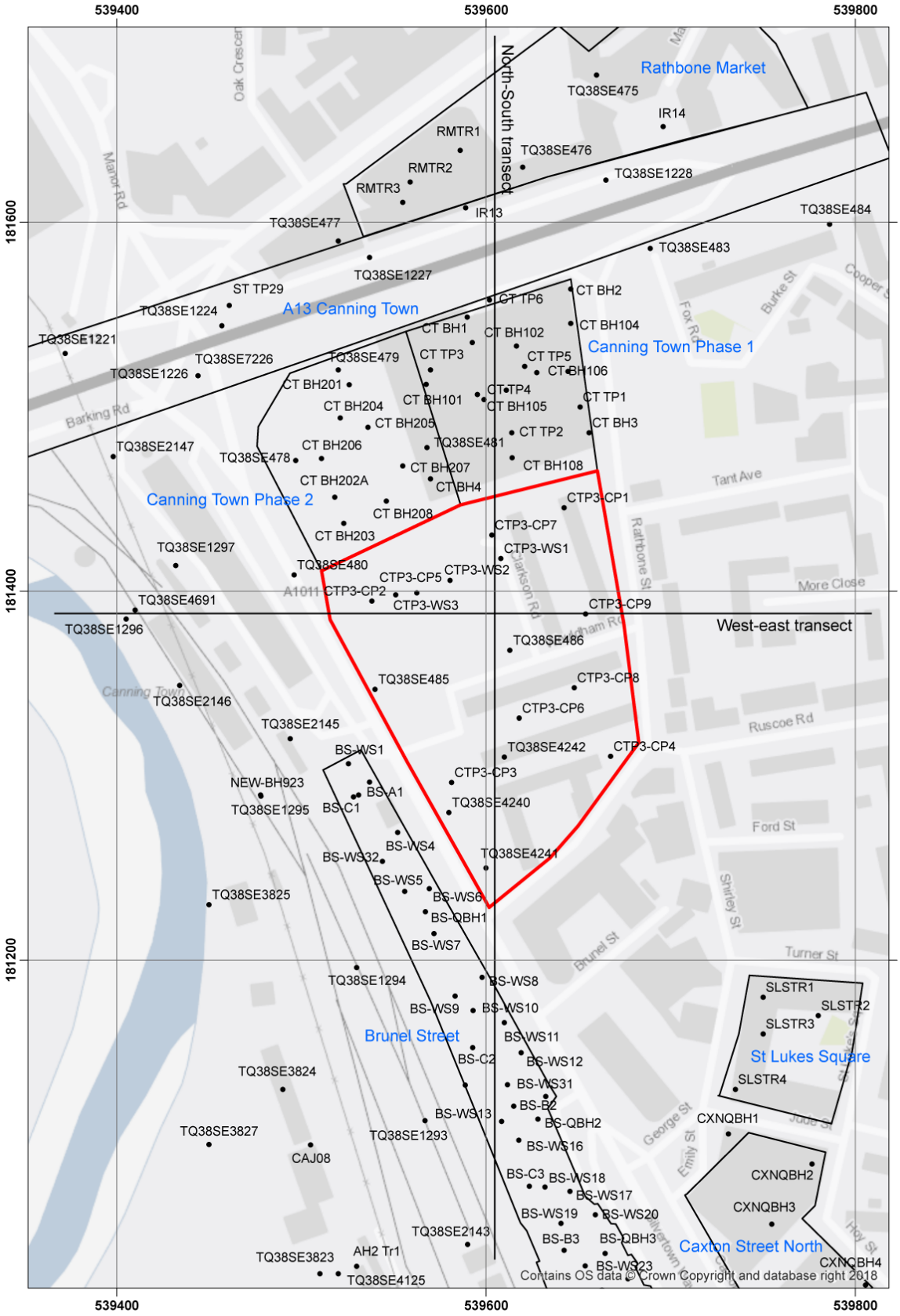

Figure 2: Location of the new boreholes at Canning Town Phase 3, London Borough of Newham and the data used in the deposit models, including those from other sites shown in Figure 1 and the BGS archive. Location of the north-south and west-east transects also shown.

3. METHODS

3.1 Field investigations and lithostratigraphic descriptions

During the geotechnical investigations at the site a total of nine cable percussion (CTP3-CP1 to CP9) and three window samples (CTP3-WS1 to WS3) were put down at the site by MLM Group in June and July 2018 (see Table 1 and Figure 2). Of these, two cable percussion boreholes (CTP3-CP3 and CTP3-CP6) and the three window samples (CTP3-WS1 to WS3) were monitored and described in the field by Quaternary Scientific. These boreholes were selected in order to observe a good distribution of boreholes across the site.

Field-based lithostratigraphic description of the monitored boreholes was carried out using standard procedures for recording unconsolidated sediment and peat, noting the physical properties (colour), composition (gravel, sand, clay, silt and organic matter) and inclusions (e.g. artefacts). The procedure involved: (1) cleaning the samples with a spatula or scalpel blade and distilled water to remove surface contaminants; (2) recording the physical properties, most notably colour; (3) recording the composition e.g. gravel, fine sand, silt and clay; (4) recording the degree of peat humification, and (5) recording the unit boundaries e.g. sharp or diffuse. The descriptions for these boreholes are displayed in Tables 2 to 6.

Table 1: Spatial data for the boreholes used in the deposit model at Canning Town Phase 3, London Borough of Newham.

Name	Easting	Northing	Elevation (m OD)
CTP3-CP1	539642.40	181445.34	1.56
CTP3-CP2	539538.14	181394.75	2.12
CTP3-CP3	539581.41	181296.43	2.40
CTP3-CP4	539667.45	181310.53	1.88
CTP3-CP5	539562.48	181399.27	2.06
CTP3-CP6	539618.03	181331.21	2.07
CTP3-CP7	539603.18	181430.57	2.05
CTP3-CP8	539647.87	181347.74	1.93
CTP3-CP9	539654.09	181387.81	1.67
CTP3-WS1	539608.11	181417.89	1.95
CTP3-WS2	539580.47	181406.07	2.04
CTP3-WS3	539551.07	181398.06	2.07

3.2 Deposit modelling

The deposit model for the site was based on a review of the 12 new borehole records, and 121 borehole records from the Quaternary Scientific database. These boreholes incorporate those form the BGS borehole archive (http://mapapps2.bgs.ac.uk/geoindex/home.html) and geotechnical, geoarchaeological and archaeological data from nearby sites (see Figures 1 and 2). The deposit modelling procedure followed the general guidelines of Carey *et al.* (2018). Sedimentary units from the boreholes were classified into six groups: (1) Bedrock, (2) Gravel, (3) Lower Alluvium. (4) Peat, (5) Upper Alluvium and (6) Made Ground. The classified data for groups 1-

6 were then input into a database within the RockWorks 16 geological utilities software, the output from which was displayed using ArcMAP 10. North-south and west-east borehole transects are displayed in Figures 3 and 4. Models of surface height were generated for the Gravel, Lower Alluvium, Peat and Upper Alluvium using an Inverse Distance Weighted algorithm (Figures 5 to 7 and 9). Thickness of the Peat (Figure 8), total Holocene alluvium (incorporating the Lower Alluvium, Peat and Upper Alluvium; Figure 10) and Made Ground (Figure 11) were also modelled (also using an Inverse Distance Weighted algorithm).

Because the boreholes are not uniformly distributed over the area of investigation, the reliability of the models generated using RockWorks is variable. In general, reliability improves from outlying areas where the models are largely supported by scattered archival records towards the core area of commissioned boreholes. Because of the 'smoothing' effect of the modelling procedure, the modelled levels of stratigraphic contacts may differ slightly from the levels recorded in borehole logs and section drawings. As a consequence of this the modelling procedure has been manually adjusted so that only those areas for which sufficient stratigraphic data is present will be modelled. In order to achieve this, a maximum distance cut-off filter equivalent to a 50m radius around each record is applied to all deposit models from the site.

4. RESULTS, INTERPRETATION & DISCUSSION OF THE LITHOSTRATIGRAPHIC DESCRIPTIONS AND DEPOSIT MODELLING

The results of the deposit modelling are displayed in Figures 3 to 11. North-south and west-east borehole transects are displayed in Figures 3 and 4 respectively, whilst Figures 5 to 11 are surface elevation and thickness models for each of the main stratigraphic units across the site and the wider area. No peat was recorded within the area of the Canning town Phase 3 site; however, the models of the surface and thickness of this unit where it has been identified in the wider area are shown for reference. The results of the deposit modelling indicate that the number and spread of the logs is sufficient to permit modelling with a high level of certainty across the site.

The full sequence of sediments recorded in the boreholes comprises:

Made Ground
Upper Alluvium – widely present
Lower Alluvium – locally present towards the west and southeast
Gravel – widely present; rises to the north/notheast

4.1 Gravel

Overlying the bedrock London Clay at the site is a horizon of sandy gravel. This unit was recorded in all 12 boreholes and is considered to represent the Lea Valley Gravel of Gibbard (1994), deposited during the Devensian Late Glacial (15,000 to 10,000 years before present) and comprising the sands and gravels of a high-energy braided river system which, while it was active, would have been characterised by longitudinal gravel bars and intervening low-water channels in which finer-grained sediments might have been deposited. Such a relief pattern would have been present on the valley floor at the beginning of the Holocene when a lower-energy fluvial regime was being established. The surface of the Gravel within the area of the site is highly variable, recorded at between -3.6 (CP3) and 0.39m OD (WS2). The deposit model (Figure 5) indicates that the Gravel rises towards the north of the site, recorded at its highest in the area of boreholes WS1 and WS2 (0.35 and 0.39m OD respectively); from here it falls in all directions, indicating that the crest of this high point lies within the site itself. It falls sharply to -3.07m OD in the area of CP8 to the east, to -2.48m OD to the west in the area of CP2, and to the south to -3.6m OD in the area of CP3. It falls to -0.54m OD in the area of CP1 to the north.

The topography of the gravel surface in the area of the site thus indicates that it occupies both an elevated gravel island, and the deeper topography of one or more (possibly Late Devensian/Early Holocene) channels. Both of these features are extensions of those identified at the Phase 1 (Green & Young, 2012) and Phase 2 (Young, 2014) sites immediately to the north (see Figures 1 and 5), including the broadly north-south aligned palaeochannel to the west of the Phase 1 site, and the Gravel high identified to the southeast of Phase 2. The new model, in conjunction with the work undertaken at the Brunel Street Works site (Batchelor & Young, 2018) significantly improves our understanding of these features. The palaeochannel appears to extend in a south-easterly

direction across the south of the Canning Town Phase 3 site, between the Gravel highs identified to the north of the present site, and towards the centre of Brunel Street Works to the southwest (see Figure 5).

The crest of the Gravel high at the present site is higher than was identified at the Canning Town Phase 1 and 2 sites, where surfaces of between -0.65 and -0.5m OD were recorded, and at 20 Fords Park Road (-0.2m OD; Nicholls *et al.*, 2013). Such an elevated Gravel surface is of increased archaeological potential, since it would have represented an area of higher, drier ground adjacent to the floodplain and former channel. This is particularly significant given the archaeological remains at 20 Fords Park Road (Nicholls *et al.*, 2013) *ca.* 300m to the northeast, where evidence of Mesolithic and Bronze age occupation was identified on an upstanding 'island' of sandy sediment. The Gravel surfaces recorded at the present site are therefore consistent with the location of the site at the boundary between Corcoran *et al.*'s (2011) Landscape Zones 1.1a, 1.3 and 1.5. The deeper Gravel topography to the west and south of the site is more similar to that of LZ1.1a, whilst the higher, drier ground to the north shows similarities to LZs 1.3 and 1.5.

4.2 Lower Alluvium

Recorded overlying the lower Gravel topography in selected boreholes towards the west and south of the site is a unit of generally silt or sand-rich alluvium, considered equivalent to the Lower Alluvium recorded elsewhere in the Lower Thames Valley and its tributaries. This unit rests directly on the Gravel, its surface falling towards the south and west (see Figure 6). Its surface is highly variable, recorded and between -2.6 (CP3) and -0.38m OD (WS3). The Lower Alluvium was absent towards the north, where the Gravel surface rises above -0.4m OD, and it most likely only accumulated within the lower Gravel topography of the former channel.

Elsewhere in the Lower Thames Valley the deposits of the Lower Alluvium are described as a predominantly silty or clayey deposit, tending to become increasingly sandy downward, and often containing detrital organic material and Mollusca. The sediments of the Lower Alluvium are indicative of deposition during the Early to Mid-Holocene, when the main course of the river was probably confined to a single meandering channel. During this period, the surface of the Gravel was progressively buried beneath the sandy and silty flood deposits of the river. The richly-organic nature of the Lower Alluvium suggests that this was a period during which the valley floor was occupied by a network of actively shifting channels, with a drainage pattern on the floodplain that was still largely determined by the relief on the surface of the underlying Gravel.

A unit of peat is often recorded in the Lower Thames Valley, forming part of a tripartite alluvial sequence consisting of Lower Alluvium, Peat and Upper Alluvium. However, no peat was recorded within the present site, consistent with Corcoran *et al.*'s (2011) description of Landscape Zone 1.1a as consistent with in-channel sediments, where marginal marshland and wetland deposits did not develop, or subsequent channel activity and river scour has eroded these deposits. Localised peat horizons have been identified not far from the present site, including at Canning Town Phase 2 (Young, 2014) and the A13 Ironbridge-Canning Town route (Stafford *et al.*, 2012) to the north. To

the south more widespread, thicker peat horizons have been identified in the area of Caxton Works (Young & Batchelor, 2014a), St Luke's Square (Weale, 2008; Wicks, 2008) and 105-107 Tarling Road (Batchelor & Young, 2014b). The surface and thickness of the peat in the wider area of the site is shown in Figures 7 and 8.

4.3 Upper Alluvium

The clay-rich Upper Alluvium rests on the Lower Alluvium (where recorded) or the Gravel, and was recorded in all but one borehole (CP7). The sediments of the Upper Alluvium are indicative of deposition within low energy fluvial and/or semi-aquatic conditions on the floodplain during the Middle to Late Holocene. The high mineral content of the sediments may reflect increased sediment loads resulting from intensification of agricultural land use from the later prehistoric period onward, combined with the effects of rising sea level. The deposits of the Upper Alluvium are described as predominantly silty or clayey, with occasional organic lenses and gravel clasts. The surface of this unit is recorded at between -0.24 (CP5) and 1.47m OD (WS3) (Figure 9), although its natural level (where it has not been truncated by the overlying Made Ground) is probably relatively even.

The Total Alluvium thickness (incorporating the Lower and Upper Alluvium) is displayed in Figure 10. The thickness of the alluvial sequence tends to reflect the topography of the Gravel surface, with greater thicknesses recorded in areas of lower Gravel towards the west, east and south (*ca.* 2-4m), and less than 1m recorded overlying the Gravel high in the northern area of site.

4.4 Made Ground

Between 0.2 (CP1) and 2.5m (CP3/CP7) of Made Ground caps the alluvial sequence across the site (Figure 11). The Made Ground is generally thinner where the Gravel surface rises towards the north of the site (0.6 to 1m) in the area of WS1 and WS2.

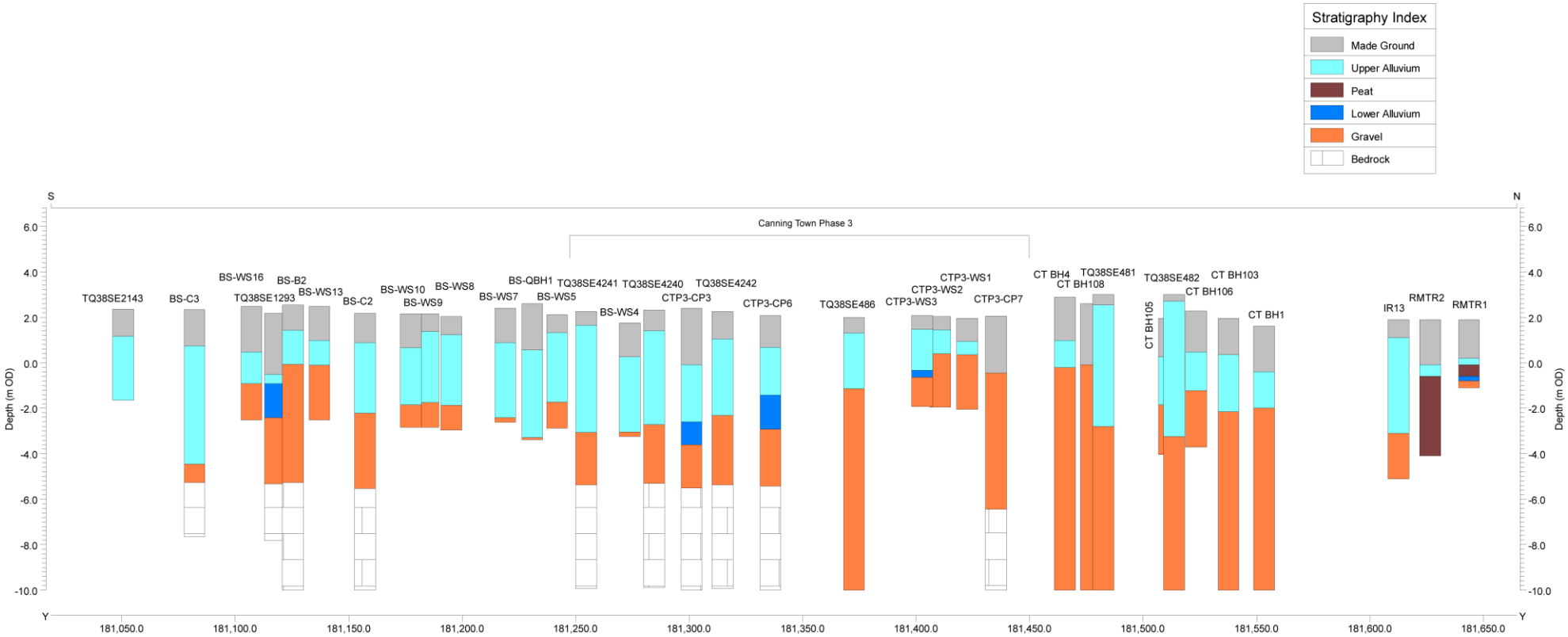

Figure 3: North-south transect of boreholes across the site and wider area (see Figure 2 for alignment).

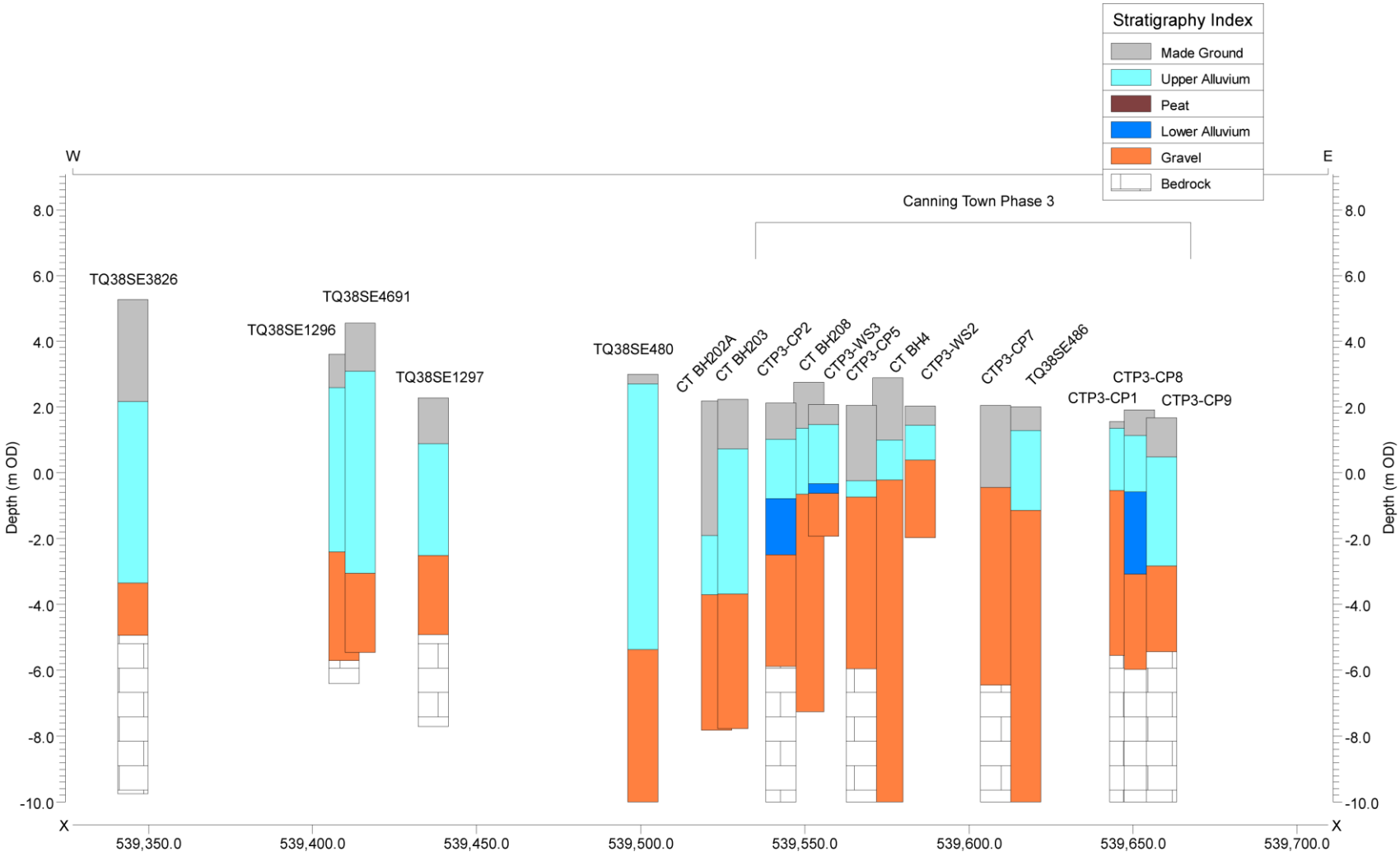

Figure 4: West-east transect of boreholes across the site and the wider area (see Figure 2 for alignment).

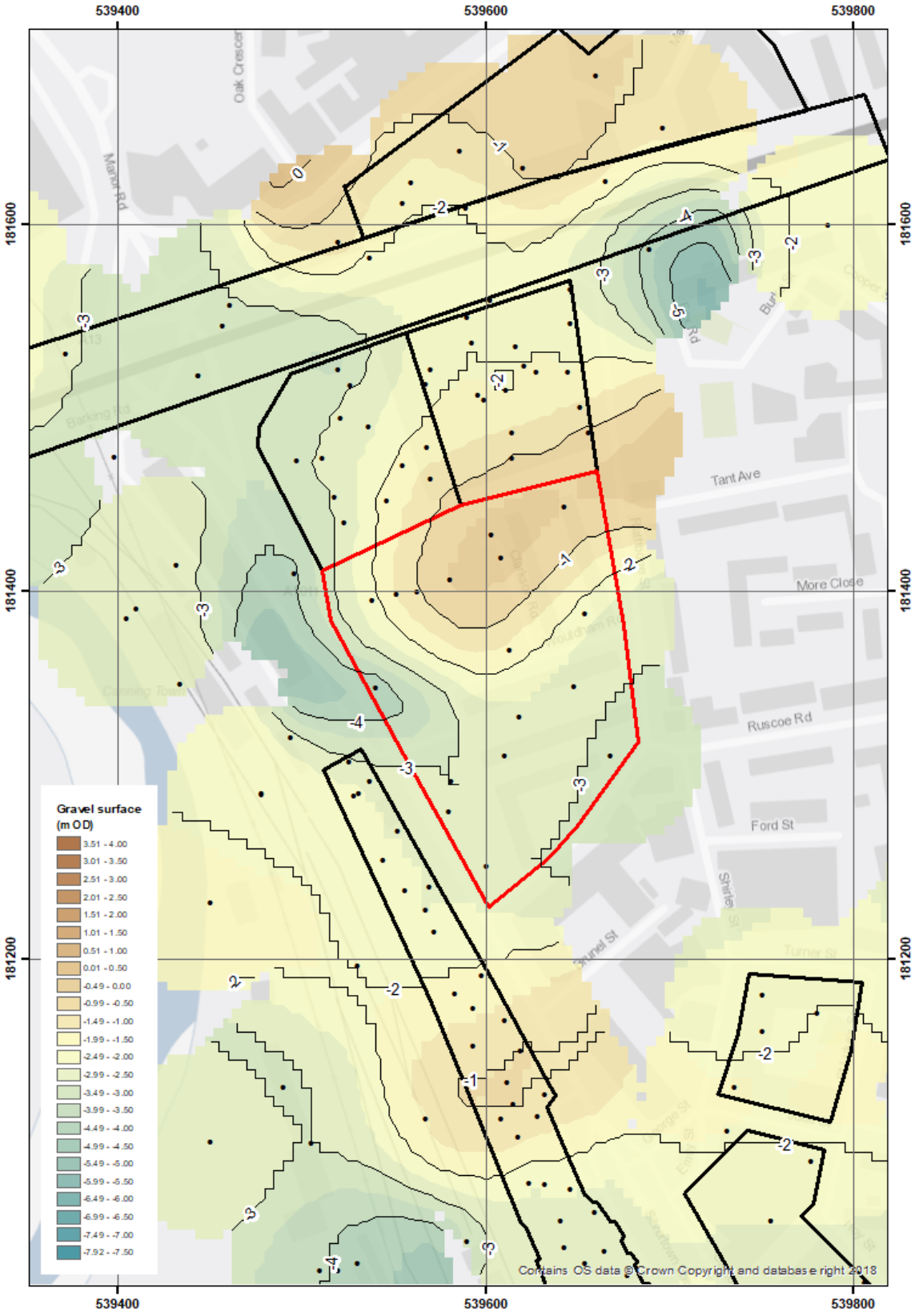

Figure 5: Top of the Gravel (m OD)

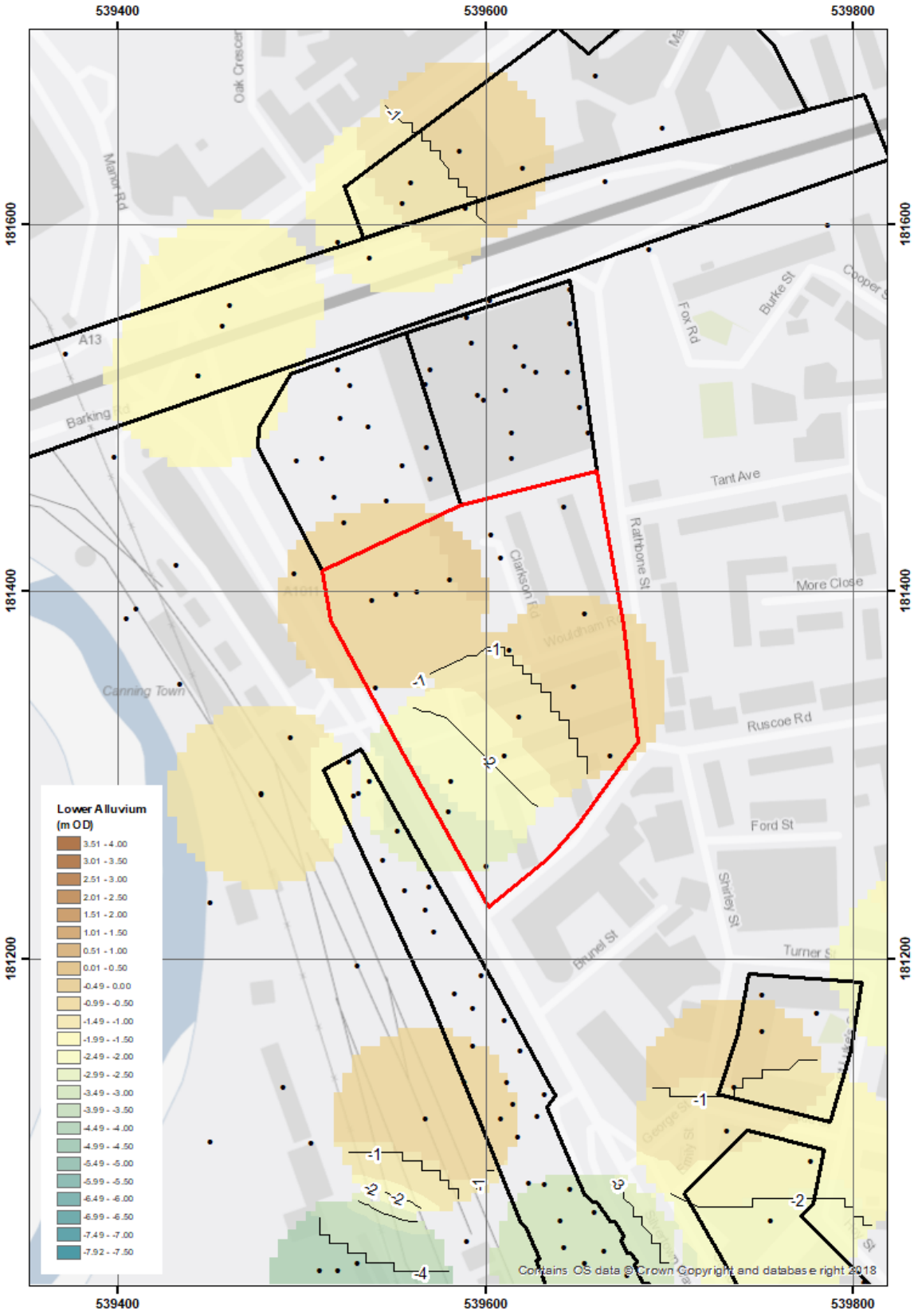

Figure 6: Top of the Lower Alluvium (m OD)

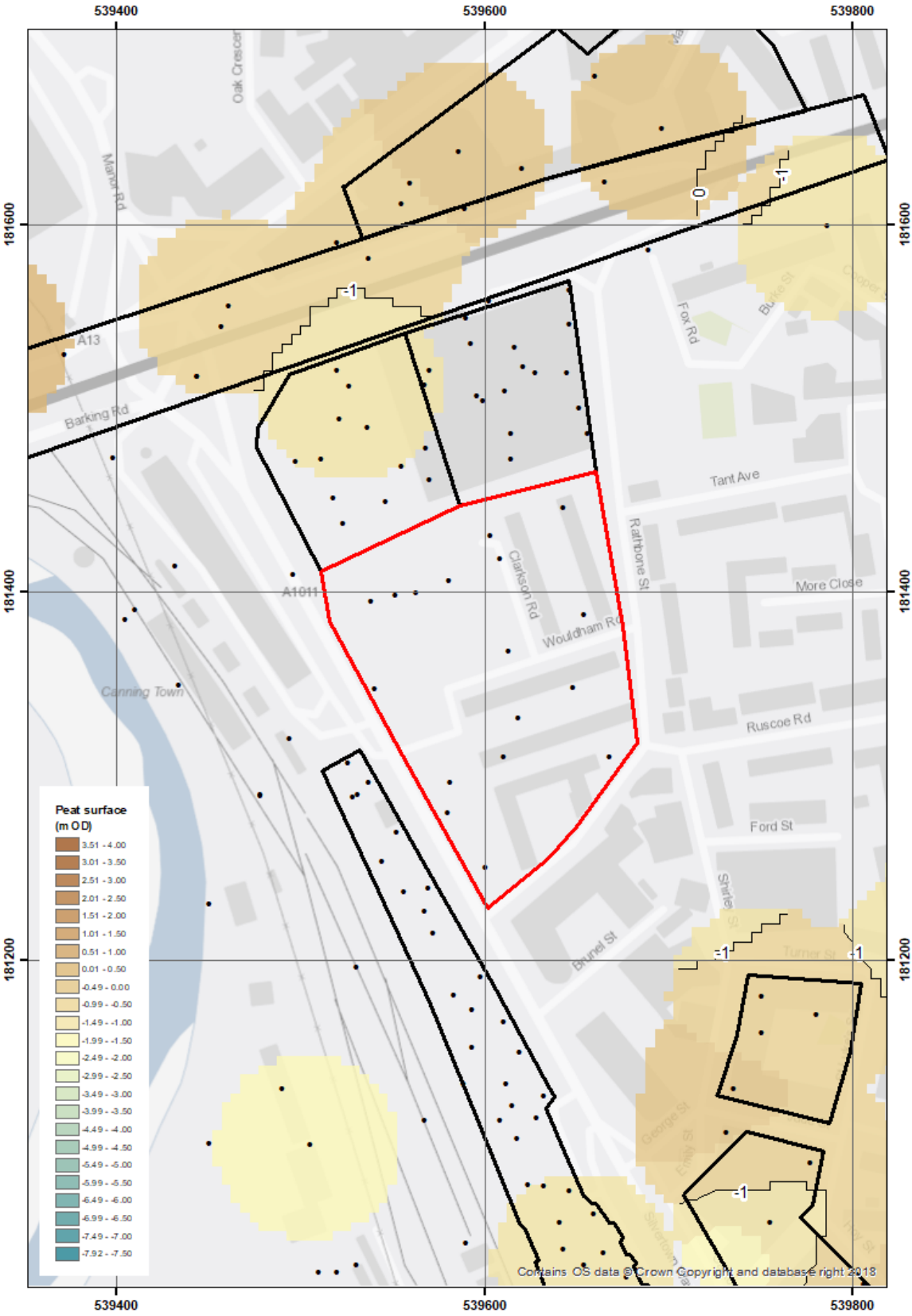

Figure 7: Top of the Peat in the wider area (m OD)

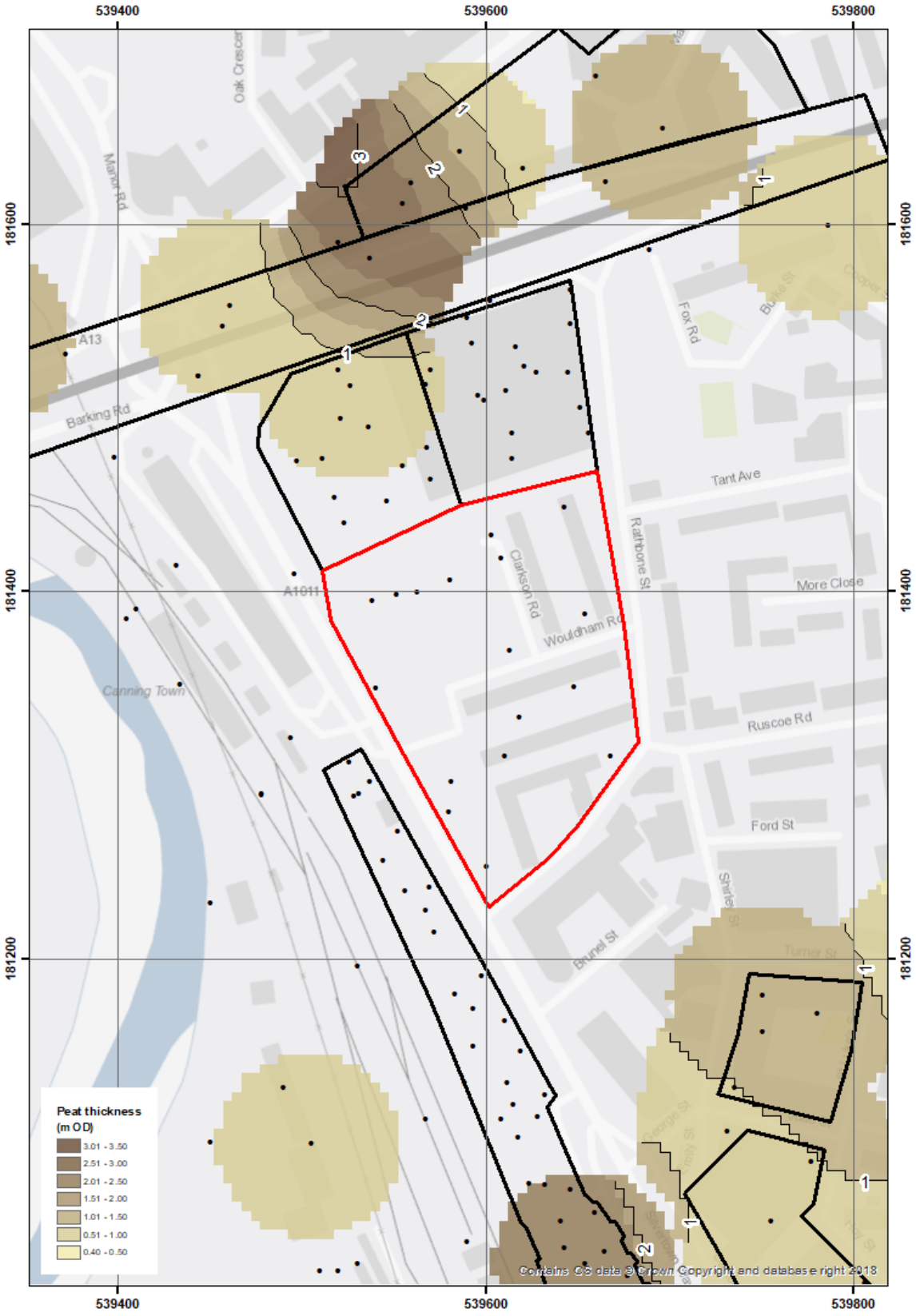

Figure 8: Thickness of the Peat in the wider area (m)

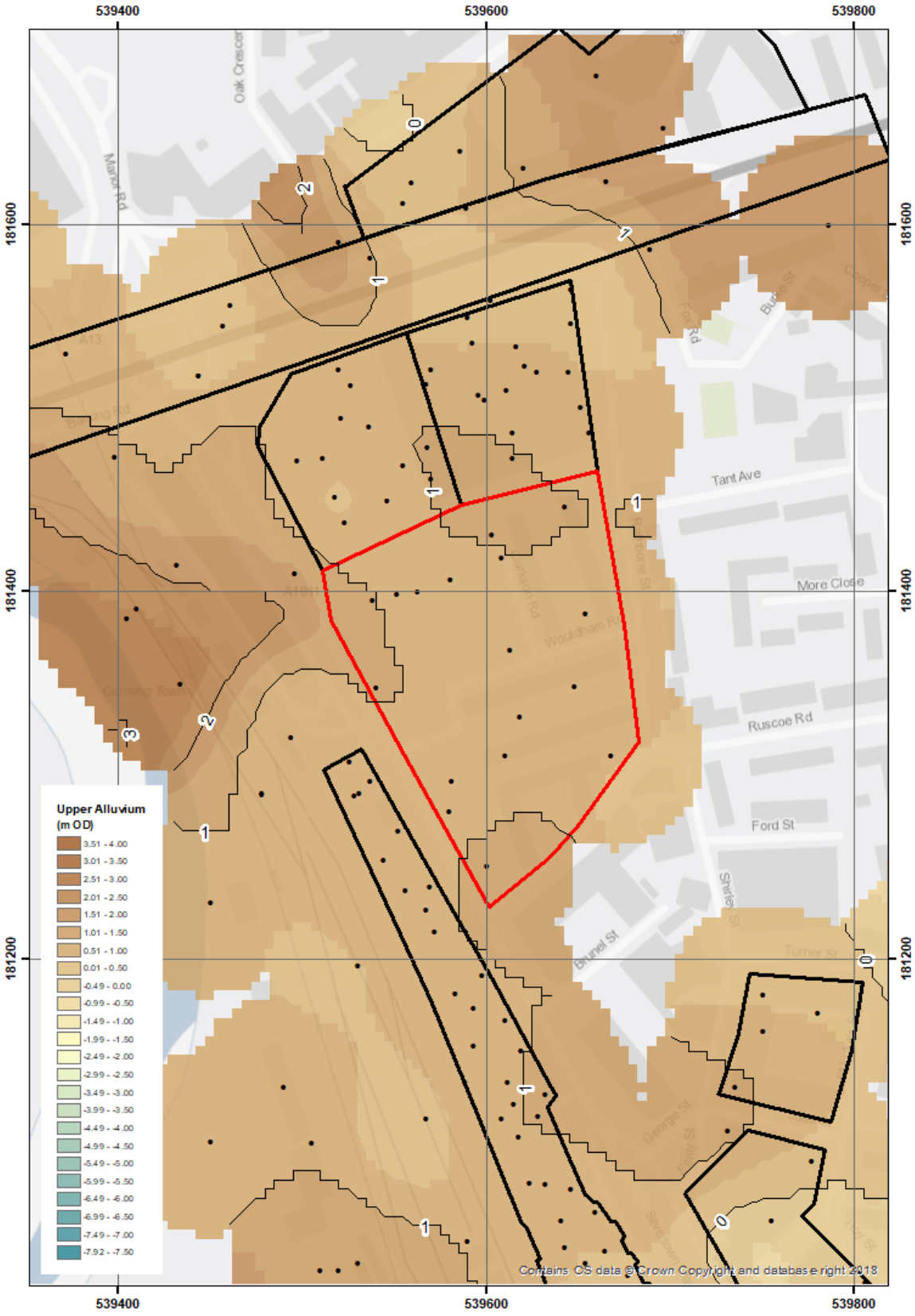

Figure 9: Top of the Upper Alluvium (m OD)

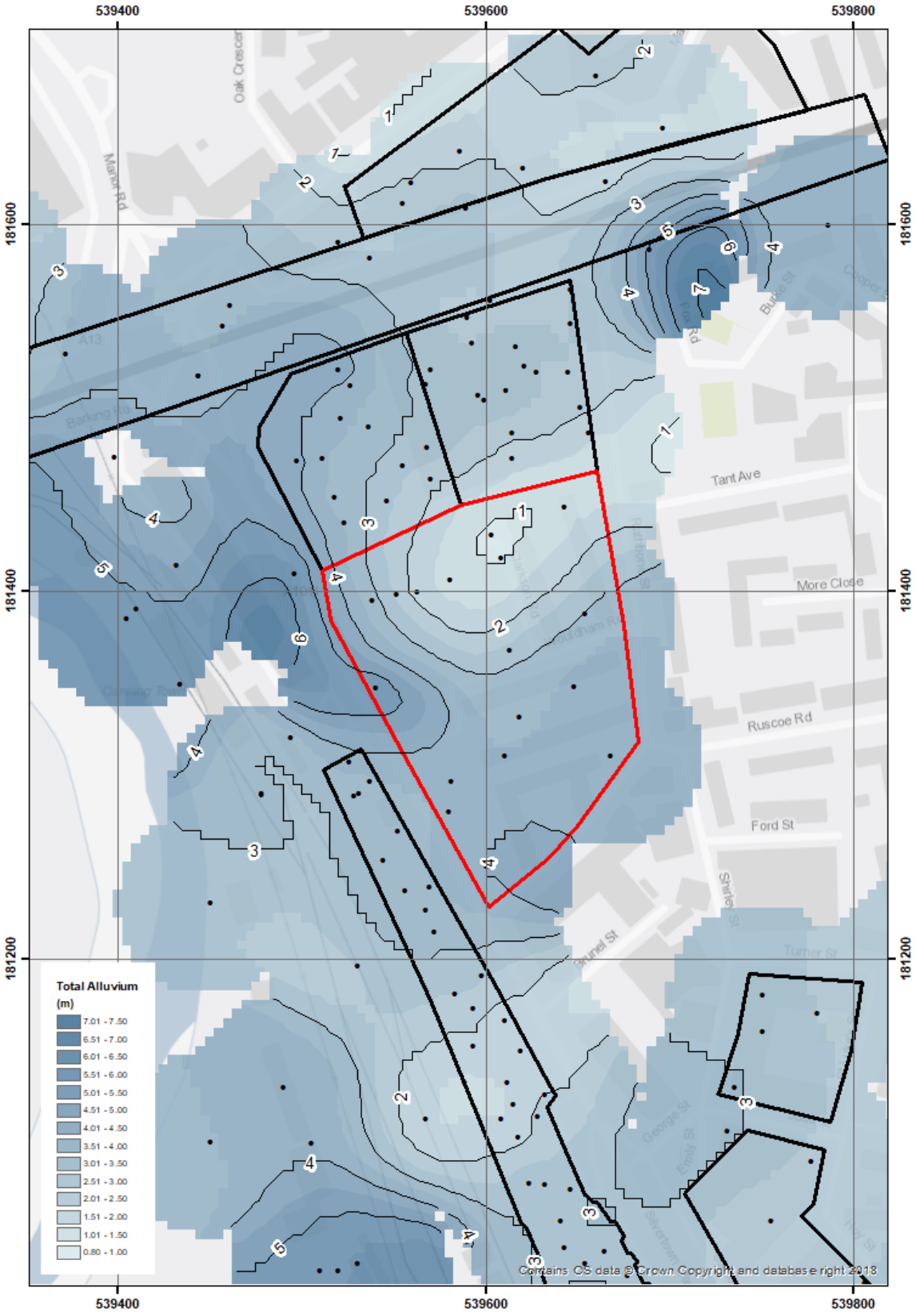

Figure 10: Thickness of the Total Alluvium (Lower Alluvium, Peat and Upper Alluvium) (m)

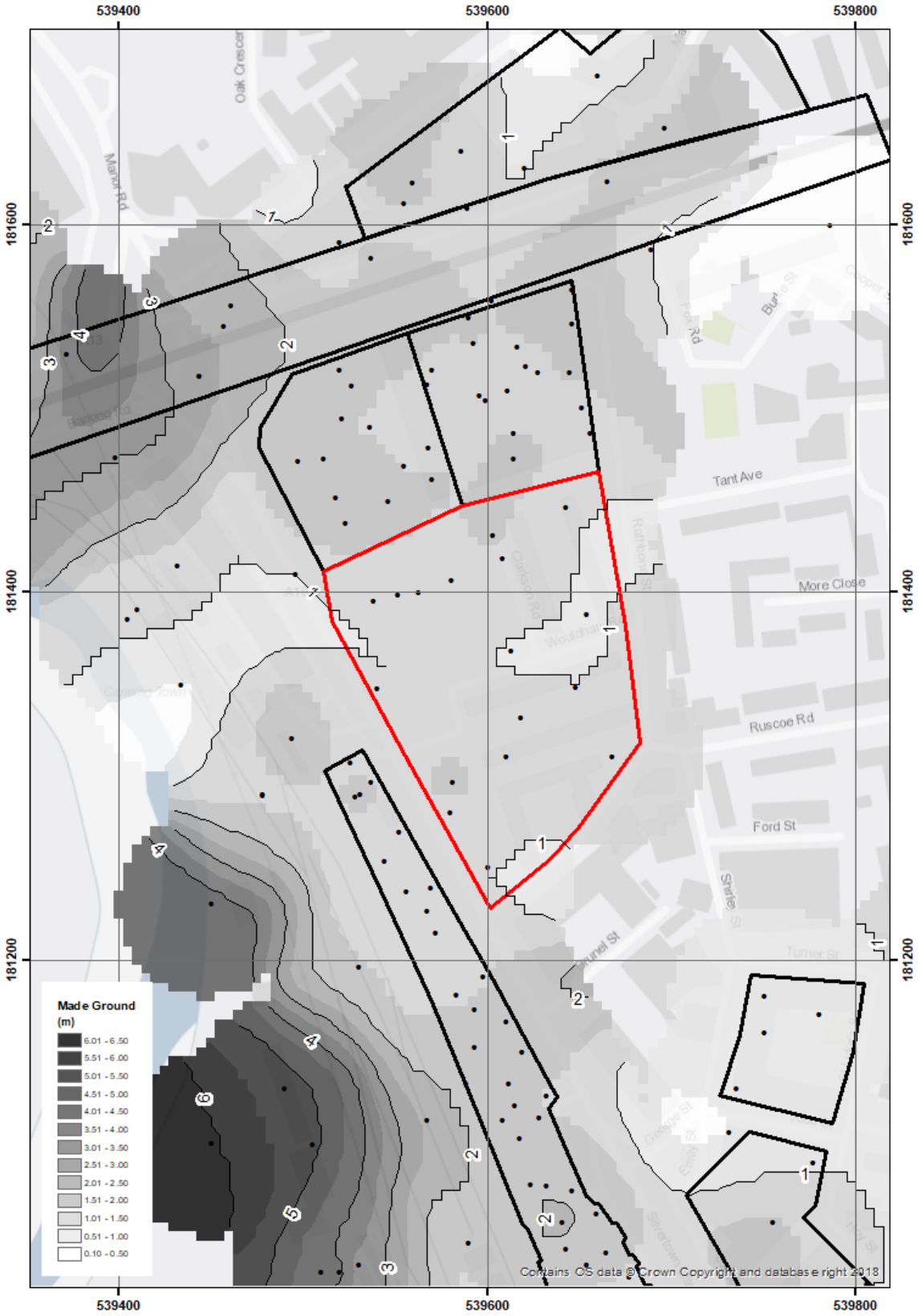

Figure 11: Thickness of Made Ground (m)

Table 2: Field-based lithostratigraphic description of borehole CTP3-CP3, Canning Town Phase 3, London Borough of Newham.

Depth (m OD)	Depth (m bgl)	Description	Stratigraphic group
2.40 to 1.50	0.00 to 0.90	Concrete and brick rubble.	MADE GROUND
1.50 to -0.10	0.90 to 2.50	Brick, gravel and concrete fragments in a grey silty clay matrix.	
-0.10 to -1.10	2.50 to 3.50	As3 Ag1; blue grey silty clay with some black mottling. Diffuse contact in to:	UPPER ALLUVIUM
-1.10 to -2.60	3.50 to 5.00	As3 Ag1 Dh+; blue grey silty clay with a trace of detrital herbaceous material. Diffuse contact in to:	
-2.60 to -3.60	5.00 to 6.00	As2 Ag2 Dh+: blue grey silt and clay with a trace of detrital herbaceous material. Some fine horizontal beds of detrital herbaceous material. Sharp contact in to:	LOWER ALLUVIUM
-3.60 to -4.60	6.00 to 7.00	Gg3 Ga1; orange sandy gravel. Clasts are mainly flint, sub-angular to well-rounded, up to 30mm in diameter.	LEA VALLEY GRAVEL

Table 3: Field-based lithostratigraphic description of borehole CTP3-CP6, Canning Town Phase 3, London Borough of Newham.

Depth (m OD)	Depth (m bgl)	Description	Stratigraphic group
2.07 to 0.67	0.00 to 1.40	Concrete and brick rubble in a brown sandy clay matrix.	MADE GROUND
0.67 to -0.93	1.40 to 3.00	As3 Ag1; greyish brown silty clay with some iron staining. Diffuse contact in to:	UPPER ALLUVIUM
-0.93 to -1.43	3.00 to 3.50	As2 Ag2; grey silt and clay with some iron staining. Diffuse contact in to:	LOWER ALLUVIUM
-1.43 to -1.93	3.50 to 4.00	Ga3 Ag1; grey silty sand.	

Table 4: Field-based lithostratigraphic description of borehole CTP3-WS1, Canning Town Phase 3, London Borough of Newham.

Depth (m OD)	Depth (m bgl)	Description	Stratigraphic group
1.95 to 0.95	0.00 to 1.00	Tarmac hardstanding over brick, concrete and mortar in brown sandy clay matrix.	MADE GROUND
0.95 to 0.35	1.00 to 1.60	As3 Ag1; brown silty clay with some iron staining. Diffuse contact in to:	UPPER ALLUVIUM
0.35 to 0.15	1.60 to 1.80	As2 Gg2 Ga+; greyish brown clay and gravel with a trace of sand. Clasts are mainly flint, sub-angular to well-rounded, up to 20mm in diameter. Sharp contact in to:	LEA VALLEY GRAVEL
0.15 to -0.25	1.80 to 2.20	Gg3 Ga1 As+; orange sandy gravel with a trace of clay. Clasts are mainly flint, sub-angular to well-rounded, up to 20mm in diameter. Sharp contact in to:	
-0.25 to -1.95	2.20 to 3.90	Gg2 Ga2; yellow sand and gravel. Clasts are mainly flint, rounded to well-rounded, up to 30mm in diameter. Diffuse contact in to:	
-1.95 to -2.05	3.90 to 4.00	Gg3 Ga1; brown sandy gravel. Clasts are mainly flint, sub-angular to well-rounded, up to 20mm in diameter.	

Table 5: Field-based lithostratigraphic description of borehole CTP3-WS2, Canning Town Phase 3, London Borough of Newham.

Depth (m OD)	Depth (m bgl)	Description	Stratigraphic group
2.04 to 1.44	0.00 to 0.60	Tarmac hardstanding over brick, concrete and mortar in brown sandy clay matrix.	MADE GROUND
1.44 to 0.39	0.60 to 1.65	As3 Ag1; greyish brown silty clay with some iron staining particularly in worm/root hollows. Sharp contact in to:	UPPER ALLUVIUM
0.39 to 0.04	1.65 to 2.00	Gg3 Ga1 As+; brown sandy gravel with a trace of clay. Clasts are mainly flint, sub-angular to well-rounded, up to 40mm in diameter. Diffuse contact in to:	LEA VALLEY GRAVEL
0.04 to -1.96	2.00 to 4.00	Gg3 Ga1; greyish brown sandy gravel. Clasts are mainly flint, sub-angular to well-rounded, average 30mm but some cobbles up to 70mm in diameter.	

Table 6: Field-based lithostratigraphic description of borehole CTP3-WS3, Canning Town Phase 3, London Borough of Newham.

Depth (m OD)	Depth (m bgl)	Description	Stratigraphic group
2.07 to 1.47	0.00 to 0.60	Tarmac hardstanding over brick, concrete and mortar in brown sandy clay matrix.	MADE GROUND
1.47 to 0.07	0.60 to 2.00	As3 Ag1; greyish brown silty clay with some iron staining. Diffuse contact in to:	UPPER ALLUVIUM
0.07 to 1.62	2.00 to 2.45	Ag2 As2; brown silt and clay. Iron pan at base of this unit. Diffuse contact in to:	
1.62 to -0.63	2.45 to 2.70	Ag3 As1; blueish grey clayey silt. Sharp contact in to:	LOWER ALLUVIUM
-0.63 to -0.93	2.70 to 3,00	Gg3 Ga1; orangey brown sandy gravel. Clasts are mainly flint, sub-angular to well-rounded, up to 40mm in diameter. Diffuse contact in to:	LEA VALLEY GRAVEL
-0.93 to -1.93	3.00 to 4.00	Gg3 Ga1; brown sandy gravel. Clasts are mainly flint, sub-angular to well-rounded, up to 20mm in diameter.	

5. CONCLUSIONS & RECOMMENDATIONS

A programme of geoarchaeological monitoring and deposit modelling was carried out at the Canning Town Phase 3 site in order to: (1) clarify the nature of the sub-surface stratigraphy; (2) clarify the nature, depth and extent of any alluvium and peat deposits; and (3) make recommendations for any further palaeoenvironmental or archaeological investigations at the site (if necessary). In order to address these aims, a total of five geotechnical boreholes were monitored and described in the field. These new boreholes were integrated with stratigraphic data from the remaining geotechnical logs and data from the surrounding area, in order to produce a deposit model of the major depositional units across the site.

The results of the geoarchaeological deposit modelling demonstrate that the site occupies both an elevated gravel island to the north/northwest, and the deeper topography of one or more (possibly Late Devensian/Early Holocene) channels to the west and southeast. Both of these features appear to be extensions of those identified during previous geoarchaeological investigations in this area, including at the Canning Town Phase 1 (Green & Young, 2012) and Phase 2 (Young, 2014) sites immediately to the north, and at Brunel Street Works to the southwest (Batchelor & Young, 2018). The new deposit model has thus significantly improved our understanding of these features. The palaeochannel appears to extend in a south-easterly direction across the west and south of the Canning Town Phase 3 site, although the sediments infilling it are relatively coarse-grained, inorganic, and of negligible palaeoenvironmental potential. On this basis, no further environmental archaeological assessment of the sequences at the site is recommended.

The crest of the Gravel island or eyot in the northern area of the site meanwhile is higher than has previously been identified in this area (0.39m OD), including at 20 Fords Park Road (-0.2m OD; Nicholls *et al.*, 2013). At 20 Fords Park Road evidence of Mesolithic and Bronze Age occupation was identified on this upstanding 'island' of sandy sediment, and the Gravel high at the present site is considered to have increased archaeological potential, since such an elevated Gravel island would have represented an area of higher, drier ground raised up above the floodplain and former channel. This greater archaeological potential is considered to be limited to where the Gravel surface rises up above *ca.* -1m OD (see Figure 12), and further archaeological investigation of this area of the site is recommended.

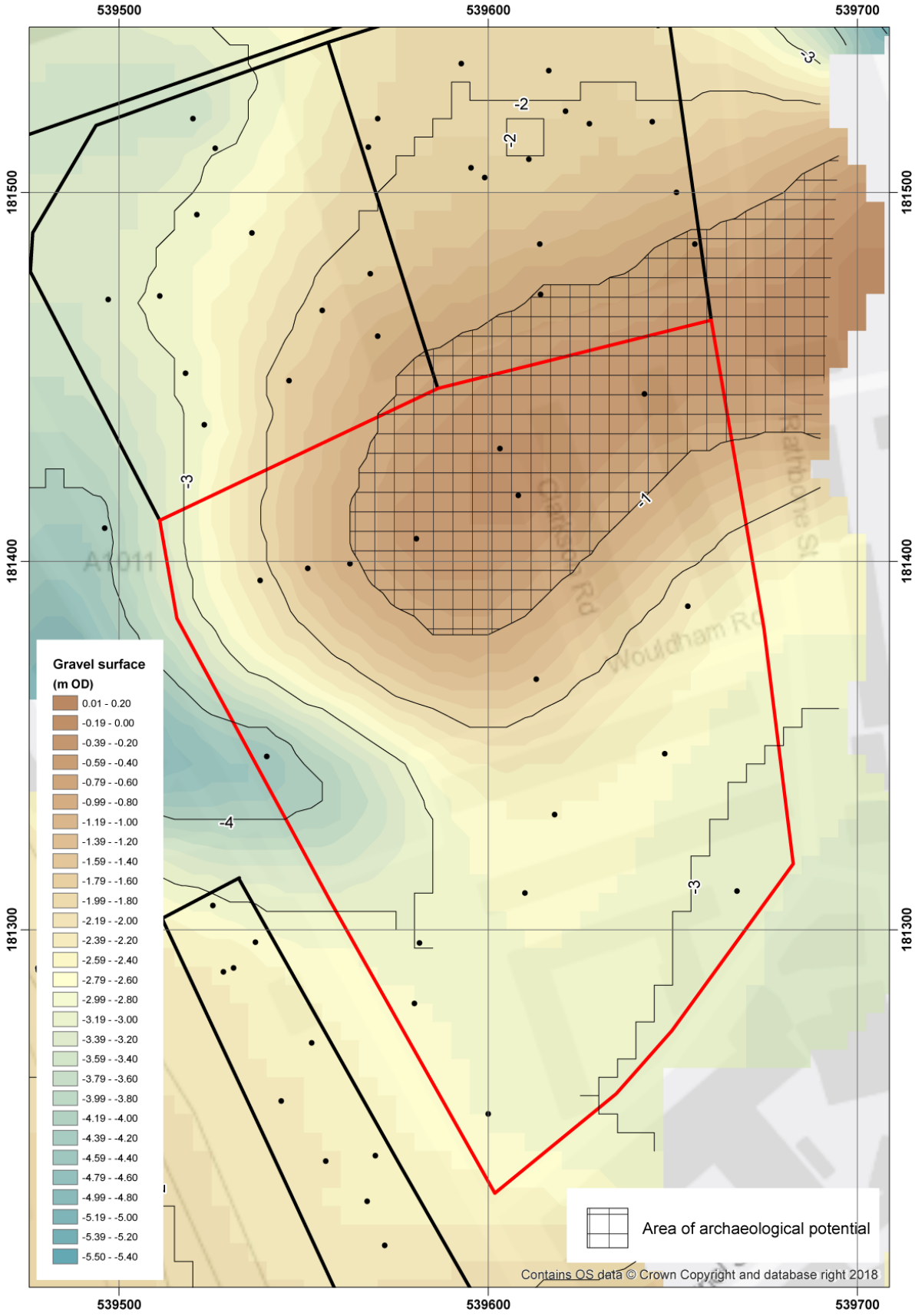

Figure 12: Proposed area of archaeological potential at the Canning Town Phase 3, London Borough of Newham site.

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7. APPENDIX 1: OASIS

OASIS ID: quaterna1-324031

Project details

Project name	Canning Town Phase 3
Short description of the project	A programme of geoarchaeological monitoring and deposit modelling was carried out at the Canning Town Phase 3 site in order to clarify the nature of the sub-surface stratigraphy, and the nature, depth and extent of any alluvium and peat deposits. In order to address these aims, a total of five geotechnical boreholes were monitored and described in the field, and a programme of deposit modelling undertaken. The results of the geoarchaeological deposit modelling demonstrate that the site occupies both an elevated gravel island to the north/northwest, and the deeper Gravel topography of one or more (possibly Late Devensian/Early Holocene) channels to the west and southeast. Both of these features appear to be extensions of those identified during previous geoarchaeological investigations in this area. The new deposit model has significantly improved our understanding of these features; the palaeochannel appears to extend in a south-easterly direction across the west and south of the Canning Town Phase 3 site, although the sediments infilling it are relatively coarse-grained, inorganic, and of negligible palaeoenvironmental potential. On this basis, no further environmental archaeological assessment of the sequences at the site is recommended. The crest of the Gravel island or eyot in the northern area of the site is higher than has previously been identified in this area (0.39m OD), including at 20 Fords Park Road (-0.2m OD; Nicholls et al., 2013), where evidence of Mesolithic and Bronze Age occupation was identified. The Gravel high at the present site is considered to have increased archaeological potential, since such an elevated Gravel island would have represented an area of higher, drier ground raised up above the floodplain and former channel. This greater archaeological potential is considered to be limited to where the Gravel surface rises up above ca. -1m OD, and further archaeological investigation of this area of the site is recommended.
Project dates	Start: 01-01-2018 End: 27-07-2018
Previous/future work	No / Not known
Any associated project reference	WOU18 - Sitecode

codes	
Type of project	Environmental assessment
Survey techniques	Landscape

Project location

Country	England
Site location	GREATER LONDON NEWHAM CANNING TOWN Canning Town Phase 3 (Hallsville Quarter)
Postcode	E16 1EG
Site coordinates	TQ 3960 8135 51.513302852835 0.012031426084 51 30 47 N 000 00 43 E Point

Project creators

Name of Organisation	Quaternary Scientific (QUEST)
Project brief originator	RPS
Project design originator	D.S. Young
Project director/manager	D.S. Young
Project supervisor	D.S. Young
Type of sponsor/funding body	Developer

Project archives

Physical Archive Exists?	No
Digital Archive Exists?	No
Paper Archive recipient	LAARC
Paper Contents	"Stratigraphic"
Paper Media	"Report"

available	
Entered by	Daniel Young (d.s.young@reading.ac.uk)
Entered on	27 July 2018