LAND AT 46 PONTON ROAD, NINE ELMS, LONDON BOROUGH OF WANDSWORTH (SITE CODE: PNT15): GEOARCHAEOLOGICAL DEPOSIT MODEL REPORT

D.S. Young
Quaternary Scientific (QUEST), *School of Human and Environmental Sciences, University of Reading, Whiteknights, PO Box 227, Reading, RG6 6AB, UK*

INTRODUCTION

This report summarises the findings arising out of the geoarchaeological deposit modelling undertaken by Quaternary Scientific (University of Reading) in connection with the proposed development of land at 46 Ponton Road, Nine Elms, London Borough of Wandsworth (Site Code: PNT15; National Grid Reference: *centred on* TQ 296 773; Figure 1). Following the recommendations made in the archaeological desk-based assessment for the site (CgMs Consulting, 2015) Quaternary Scientific were commissioned to undertake the geoarchaeological investigations. The site is located on the floodplain of the River Thames, approximately 300m to the south of the modern waterfront (Figure 1). The site is mapped by the British Geological Society (BGS) as lying towards the main axis of a substantial former channel, where the superficial geology is recorded as alluvium overlying London Clay bedrock (1:50,000 Sheet 270 South London 1998). Previous geoarchaeological investigations to the west and southwest of the site (Dawson *et al*., 2009; Morley, 2009; Corcoran *et al*., 2007; Branch *et al*., 2010) have revealed that a number of channels, bisecting areas of higher gravel 'islands' (eyots), existed in the Battersea area during the Late Devensian/early Holocene. The same channel on which the site is thought to lie has been identified to the southwest (Morley, 2009; see Figure 1) as the Battersea Channel, a subsidiary channel of the Thames that at this location is aligned approximately SW-NE. Recent investigations (Morley, 2009) indicate that the channel was active until at least the early Holocene, the main channel accommodating a network of smaller channels, within which a sequence of Shepperton Gravel, Alluvium and Peat (radiocarbon dated to the Mesolithic period) accumulated. By the Roman period the Battersea Channel had been reduced to a narrow creek, due to a combination of climate alterations, changes in sea level and the impacts of human intervention (Morley, 2009).

The existing models for this area indicate that the 46 Ponton Road and 40-42 Ponton Road (Young, 2015; immediately to the east of the present area of investigation) sites lie within the area of low-lying Late Devensian/early Holocene topography identified as the Battersea Channel. However, the results of the deposit modelling at 40-42 Ponton Road (Young, 2015) indicate that the Gravel surface in this area generally lies at between 1.2 and 1.7m OD, with

a surface in one borehole towards the northeastern area of the site of 0.34m OD. Given the elevation and nature of the Gravel, it was interpreted as the Kempton Park Gravel of Gibbard (1985), representing either a north-easterly extension of the eyot recorded to the southwest, or a separate gravel high (eyot) in this area.

At the Wandsworth Road and Pascal Street site (Sainsbury's Nine Elms; Young *et al*., 2013), *ca*. 150m to the east, a channel was identified in the eastern area of the site, aligned approximately southwest-northeast and which may have formed part of the Battersea Channel, either as a tributary joining the main channel from the southeast, or as part of a network of channels on the floor of the Battersea Channel itself. Within this channel the Shepperton Gravel surface was recorded at between *ca*. -2.5 and -3.0m OD, consistent with investigations at the 120-146 Stewarts Road site (Figure 1; Morley, 2009), where a channel was identified within which the Gravel surface was recorded at between *ca*. -2.8 and -3.0m OD.

At the Wandsworth Road and Pascal Street site the gravel was overlain by Alluvium, in places containing Peat. Where Peat was recorded is was present between *ca*. -1.0 and 0.5m OD, and was between 0.10 and 0.60m thick. Radiocarbon dating of the Peat horizon here demonstrated that accumulation commenced during the Middle Bronze Age (3460 to 3360 cal BP), and that cessation occurred during the Late Bronze Age/Early Iron Age (3150-2930 cal BP). During the accumulation of the Peat, the pollen and seed remains were indicative of an alder carr dominated environment on the Peat surface, with mixed deciduous woodland on the dryland. No definitive evidence for human activity was recorded within the Peat; however, a possible decline in lime woodland may be associated with human activity. Significantly, the Peat horizon at the Wandsworth Road and Pascal Street site is later, and recorded at a higher elevation than those at the Stewarts Road and Battersea Power Station sites. At 120-146 Stewarts Road (Morley, 2009) Peat was recorded between *ca*. -1.25 and -1.75m OD. The upper part of this horizon was subsequently radiocarbon dated to 7670-7510 cal BP (the Mesolithic cultural period). At the Battersea Power Station (Branch *et al*., 2010) Peat horizons radiocarbon dated to the Middle Neolithic (5320 to 4960 cal BP) and Middle Bronze Age (4000 to 3690 cal BP) were identified at -2.09 to -2.16 and -1.52 to -1.56m OD respectively. Relatively few palaeobotanical records are available for this part of the Middle Thames Valley; however, at the Battersea Power Station site the presence of mixed coniferous/deciduous woodland is indicated during the Late Mesolithic and Early Neolithic, with evidence for woodland clearance and cultivation at some point during the Late Mesolithic/Early Neolithic transition (Branch *et al*., 2010). During the Middle Neolithic and

through to the Early Bronze Age open, mixed oak and lime woodland is indicated on the dryland, with alder and willow on the wetland surface with evidence for periods of cultivation on the dryland (Branch *et al*., 2010).

The aim of the deposit modelling exercise at the 46 Ponton Road site was to (1) clarify the nature of the sub-surface stratigraphy, in particular the presence and thickness of Alluvium (including Peat) across the site, and (2) to evaluate the potential of the sedimentary sequences for reconstructing the environmental history of the site and its environs. In order to achieve this aim, a programme of deposit modelling based on existing geotechnical boreholes at the site was undertaken by Quaternary Scientific.

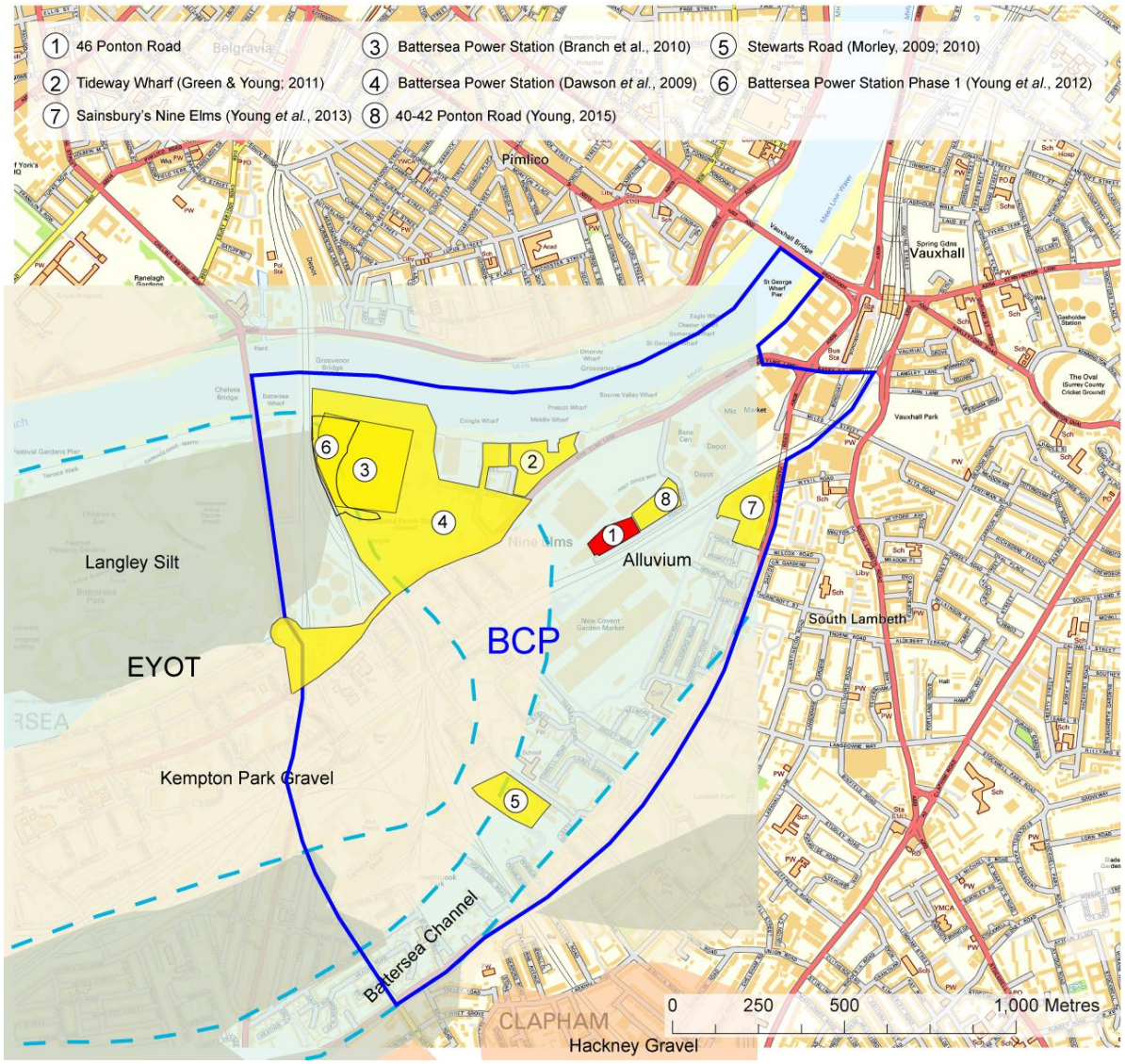

Figure 1: Location of (1) 46 Ponton Road, Nine Elms, London Borough of Wandsworth (Site Code: PNT15) and other geoarchaeological investigations [(2) to (8)] within the area of the Battersea Channel Project (BCP; blue outline). Superficial geology is shown as mapped by the British Geological Survey, Dawson *et al*. (2009) and Corcoran *et al*. (2007). *Contains Ordnance Survey data © Crown copyright and database right [2012]*

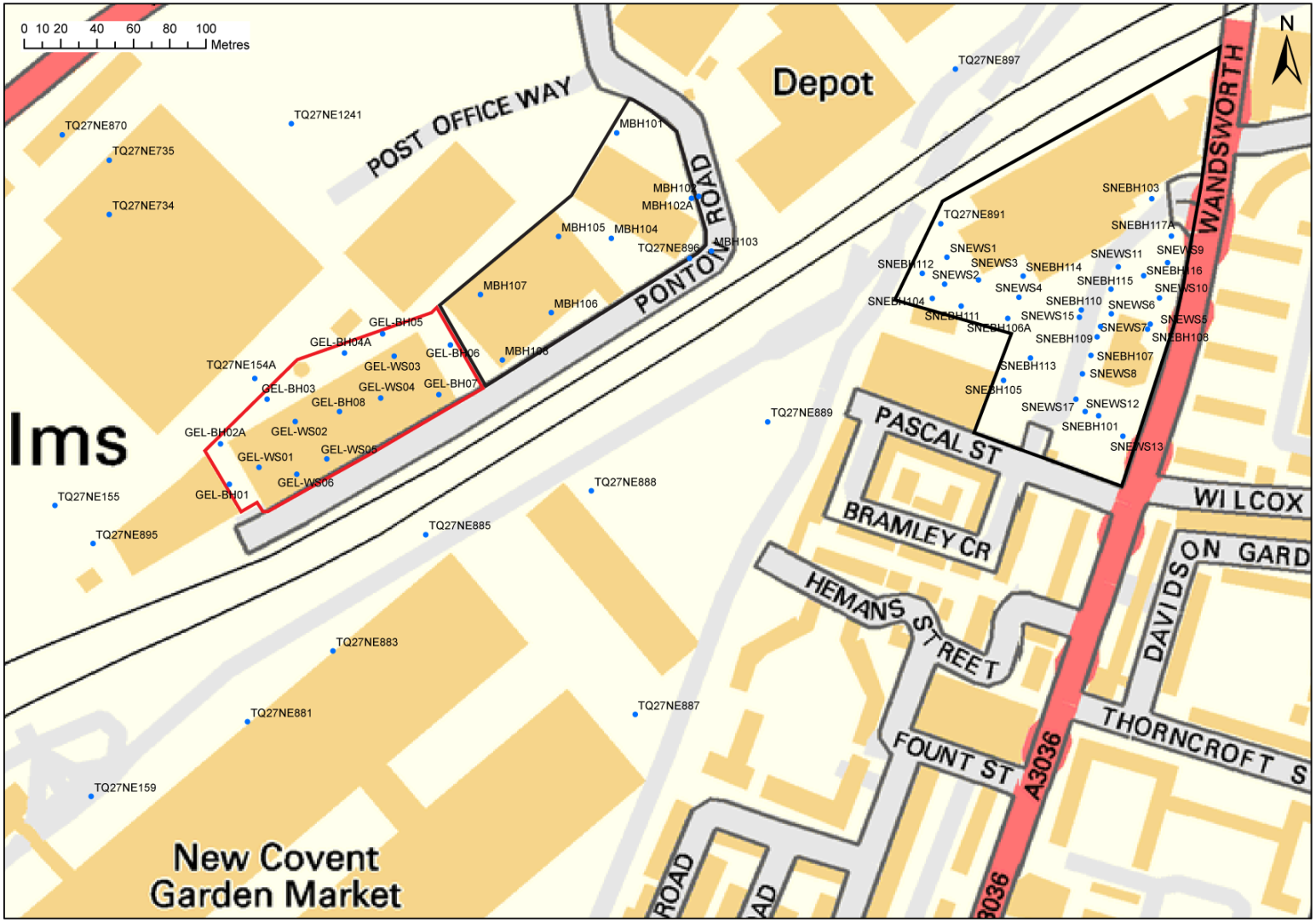

Figure 2: Detailed site map incorporating the location of the new geotechnical boreholes at 46 Ponton Road (red outline; prefix GEL-), existing BGS borehole records and geotechnical boreholes at 40-42 Ponton Road (Young, 2015) and Wandsworth Road and Pascal Street (Young *et al*., 2013). *Contains Ordnance Survey data © Crown copyright and database right [2012]*

METHODS

Deposit modelling

The deposit model was based on a review of 71 borehole records, incorporating the 14 new geotechnical boreholes from 46 Ponton Road (GEL-), 31 boreholes from Wandsworth Road & Pascal Street (SNE; Young *et al*., 2013), nine boreholes from 40-42 Ponton Road (MBH; Young, 2015) and 17 BGS archive boreholes (see Table 1 and Figure 2). Sedimentary units from the boreholes were classified into four groupings: (1) Gravel; (2) Peat; (3) Alluvium, and (4) Made Ground. The classified data for groups 1-4 were then input into a database with the RockWorks 16 geological utilities software. Models of surface height (using a nearest neighbour routine) were generated for the Gravel and Alluvium (Figures 3 and 4), with thickness models for the Alluvium, Peat and Made Ground (Figures 5 to 7) (also using a nearest neighbour routine). 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; within the area of the 46 Ponton Road site the distribution and concentration of boreholes is particularly good. 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.

In addition, the reliability of individual models is affected by the quality of the stratigraphic records which in turn are affected by the nature of the sediments and/or their post-depositional disturbance during previous stages of development on the site. 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 100m radius around each borehole is applied to all deposit models except the Peat, where a maximum distance cut-off filter equivalent to a 25m radius is applied, since these horizons are present in only a limited number of boreholes. In addition, it is important to recognise that at least four sets of boreholes are represented, put down at different times and recorded using different descriptive terms and subject to differing technical constraints in terms of recorded detail including the exact levels of the stratigraphic boundaries.

Table 1: Borehole attributes for those records used in the deposit model, 46 Ponton Road, Nine Elms, London Borough of Wandsworth.

Name	Easting	Northing	Elevation
46 Ponton Road (Geotechnical Engineering Limited (2014)			
GEL-BH01	529565.9	177301.7	5.23
GEL-BH02A	529561	177324	5.26
GEL-BH03	529586.6	177348.4	5.14
GEL-BH04A	529629.3	177373.9	5.07
GEL-BH05	529650.3	177384.5	5.11
GEL-BH06	529687.5	177378.4	4.90
GEL-BH07	529681.2	177350.9	4.43
GEL-BH08	529626.5	177341.6	5.53
GEL-WS01	529582.2	177311	5.44
GEL-WS02	529602.2	177336.1	5.53
GEL-WS03	529656.6	177372.1	5.52
GEL-WS04	529649.1	177349	5.53
GEL-WS05	529619.6	177315.6	5.51
GEL-WS06	529602.9	177307.2	5.52
40-42 Ponton Road (Young, 2015)			
MBH101	529779	177495	4.77
MBH102	529824	177460	4.66
MBH102A	529820	177459	4.66
MBH103	529831	177430	4.84
MBH104	529776	177437	5.20
MBH105	529747	177438	5.20
MBH106	529743	177396	5.20
MBH107	529704	177406	5.20
MBH108	529716	177370	5.20
Wandsworth Road & Pascal Street (Young et al*., 2013)*			
SNEWS1	529960.4	177426.5	2.91
SNEWS2	529959	177411.8	2.87
SNEWS3	529977.8	177414.1	2.78
SNEWS4	529999.9	177404.6	2.76
SNEWS5	530070.6	177387	3.00
SNEWS6	530050.7	177395.4	2.88
SNEWS7	530043	177382.8	2.96
SNEWS8	530035	177362.4	2.91
SNEWS9	530081.7	177423.5	2.98
SNEWS10	530077.2	177404.1	2.85
SNEWS11	530054.6	177421.4	2.76
SNEWS12	530043.7	177339.3	3.07
SNEWS13	530057	177328.2	3.17
SNEWS15	530034.2	177397.6	2.87
SNEWS17	530031.2	177348.4	2.94

Name	Easting	Northing	Elevation
SNEBH101	530036.3	177341.7	2.93
SNEBH103	530073	177458.9	2.74
SNEBH104	529952.4	177403.9	2.94
SNEBH105	529991.4	177358.9	2.73
SNEBH106A	529993.8	177392.9	2.87
SNEBH107	530039.5	177372.7	3.00
SNEBH108	530072	177389.7	2.99
SNEBH109	530044.9	177388.4	2.93
SNEBH110	530033.2	177393.6	2.92
SNEBH111	529968.2	177399.8	2.92
SNEBH112	529946.9	177417.7	2.90
SNEBH113	530006.3	177371.1	2.71
SNEBH114	530002.2	177416.2	2.82
SNEBH115	530050.5	177409	2.82
SNEBH116	530068.4	177416.5	2.87
SNEBH117A	530083.8	177438.3	2.96
BGS archive boreholes			
TQ27NE897	529965	177530	4.27
TQ27NE891	529957	177445	2.59
TQ27NE896	529819	177426	4.88
TQ27NE889	529862	177336	2.59
TQ27NE1241	529600	177500	3.16
TQ27NE888	529765	177298	2.74
TQ27NE885	529674	177274	3.96
TQ27NE883	529623	177210	2.44
TQ27NE895	529491	177269	3.05
TQ27NE155	529470	177290	3.51
TQ27NE881	529576	177171	2.74
TQ27NE887	529789	177175	2.44
TQ27NE159	529490	177130	3.66
TQ27NE734	529500	177450	0.76
TQ27NE735	529500	177480	0.58
TQ27NE153	529410	177450	4.72
TQ27NE870	529474	177494	4.57

RESULTS AND INTERPRETATION OF THE LITHOSTRATIGRAPHIC DESCRIPTIONS AND DEPOSIT MODELLING

The results of the geoarchaeological investigations have permitted a programme of deposit modelling of the surface elevation and thickness of each major stratigraphic unit recorded at the site and in the wider area (Figures 3 to 7).

The basal unit in the area of the site is a horizon of sand and gravel, the surface of which lies at between -1.47 (GEL-BH08) and 0.34m OD (GEL-BH03). The Gravel surface is uneven within the area of the site, but is generally lower towards the centre and northwest, where it is recorded at -1.47 (GEL-BH08), -0.43 (GEL-BH04A) and -0.99m OD (GEL-BH02A). The Gravel rises towards the east to between -0.1 (GEL-BH06) and 0.11m OD (GEL-BH05), and towards the west to 0.23m OD in GEL-BH01 (see Figure 3). The majority of the Gravel recorded at the site is considered to represent the Shepperton Gravel of Gibbard (1985), deposited during the Late Devensian (*ca*. 10-15,000 years BP) in a high energy braided river environment. Where it rises towards the east and west and lies above *ca*. 0m OD, the Gravel is considered to equate to the Kempton Park Gravel of Gibbard (1985), most likely deposited during the Early or Middle Devensian (*ca*. 30-120,000 years BP). Where the lower surfaces of the Shepperton Gravel are recorded towards the centre of the site, these are considered to represent a palaeochannel that formed part of, or was subsidiary to, the Late Devensian/early Holocene Battersea Channel.

In the majority of boreholes the Gravel is overlain by a horizon of silty or sandy (and in places gravelly) clay Alluvium, the surface of which lies at between 0.03 (GEL-BH08) and 1.07m OD (GEL-BH04A) (see Figure 4). This horizon was most likely deposited on the floodplain at a distance from any active channels. The thickness of Alluvium recorded is influenced by both the level of the underlying Gravel and the extent of truncation by the overlying Made Ground, with thicknesses of between 0.5 and 1.5m recorded (Figure 5). In two boreholes the Gravel is directly overlain by Made Ground (GEL-BH03 and GEL-BH05). There is no indication within the Alluvium at the site of any Peat or organic horizons such as that recorded at Wandsworth Road and Pascal Street (Young *et al*., 2013), where thicknesses of up to 0.6m were recorded (see Figure 6). The sequence across the site is capped by substantial thicknesses of Made Ground (3-5m; see Figure 7), so that the modern surface elevation of the site lies at between *ca*. 5 and 5.5m OD.

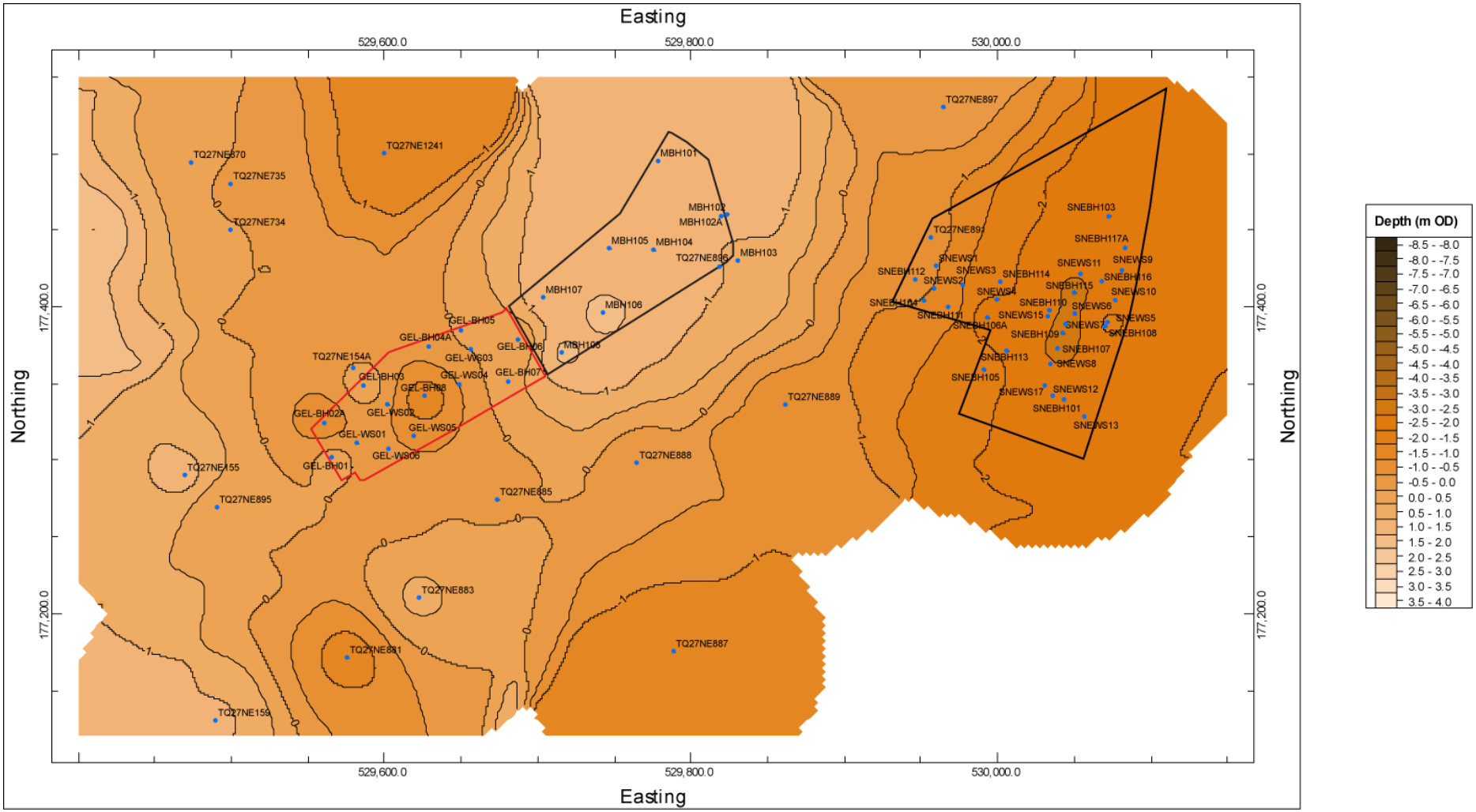

Figure 3: Top of the Gravel (m OD)

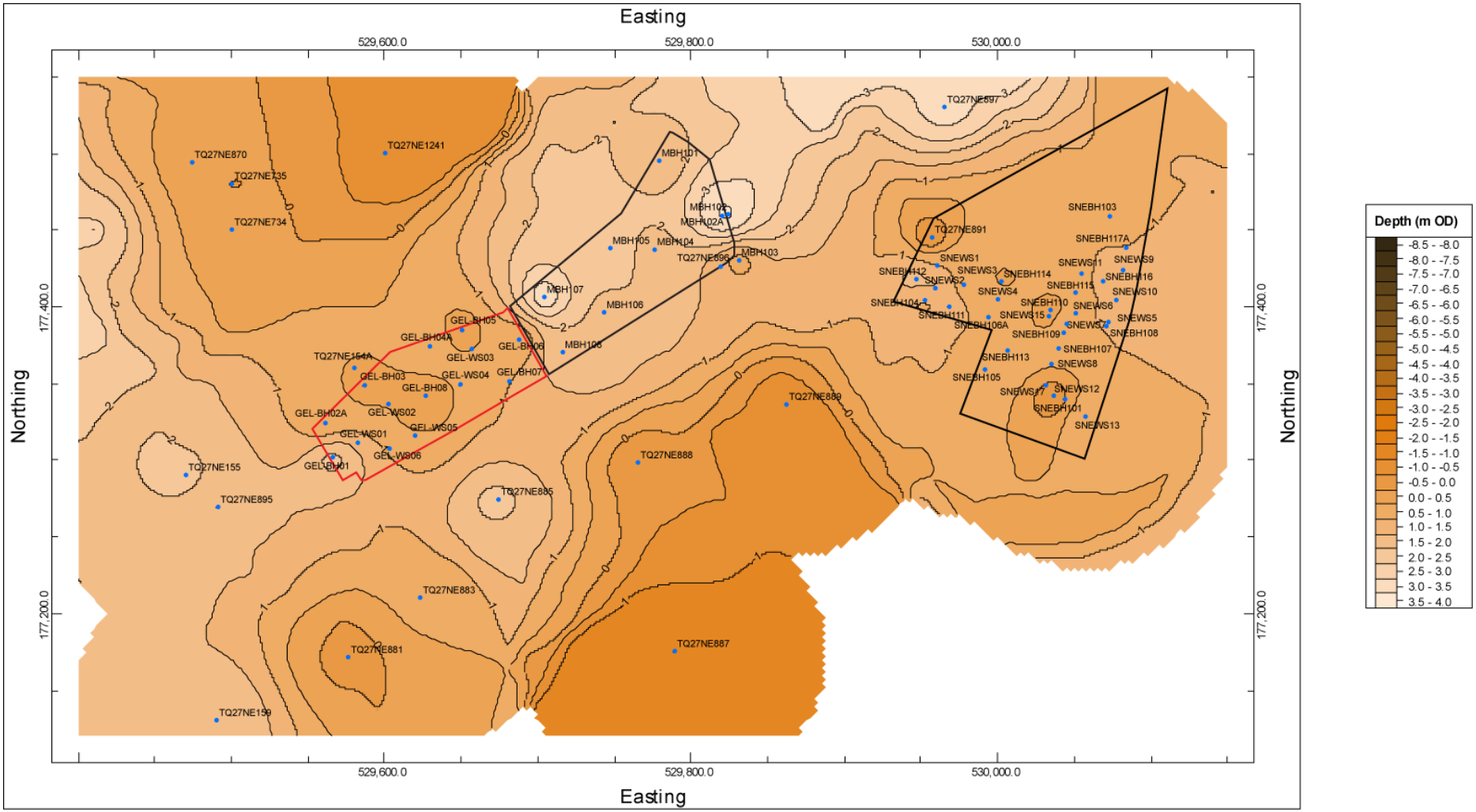

Figure 4: Top of the Alluvium / Base of the Made Ground (m OD)

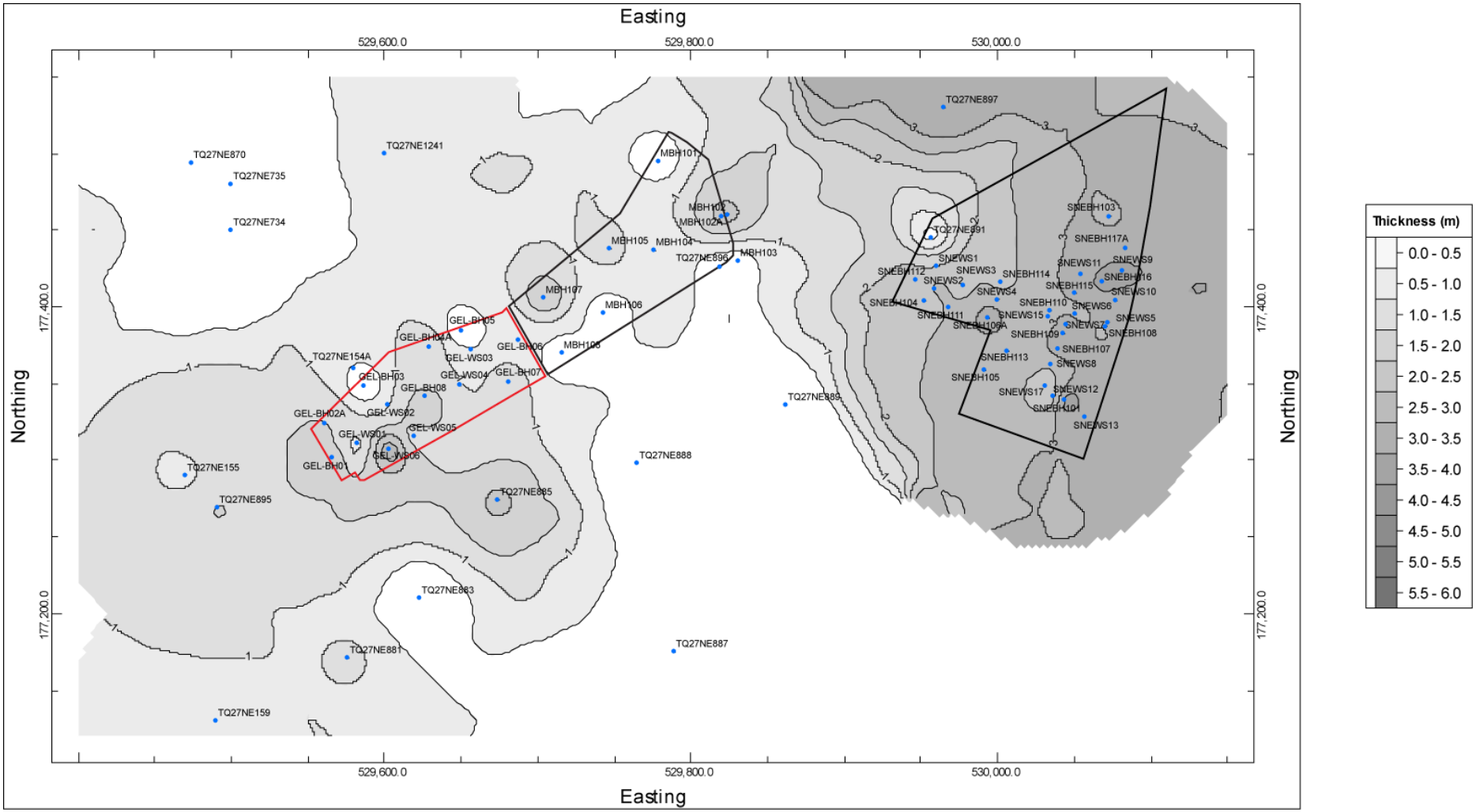

Figure 5: Thickness of the Alluvium (m)

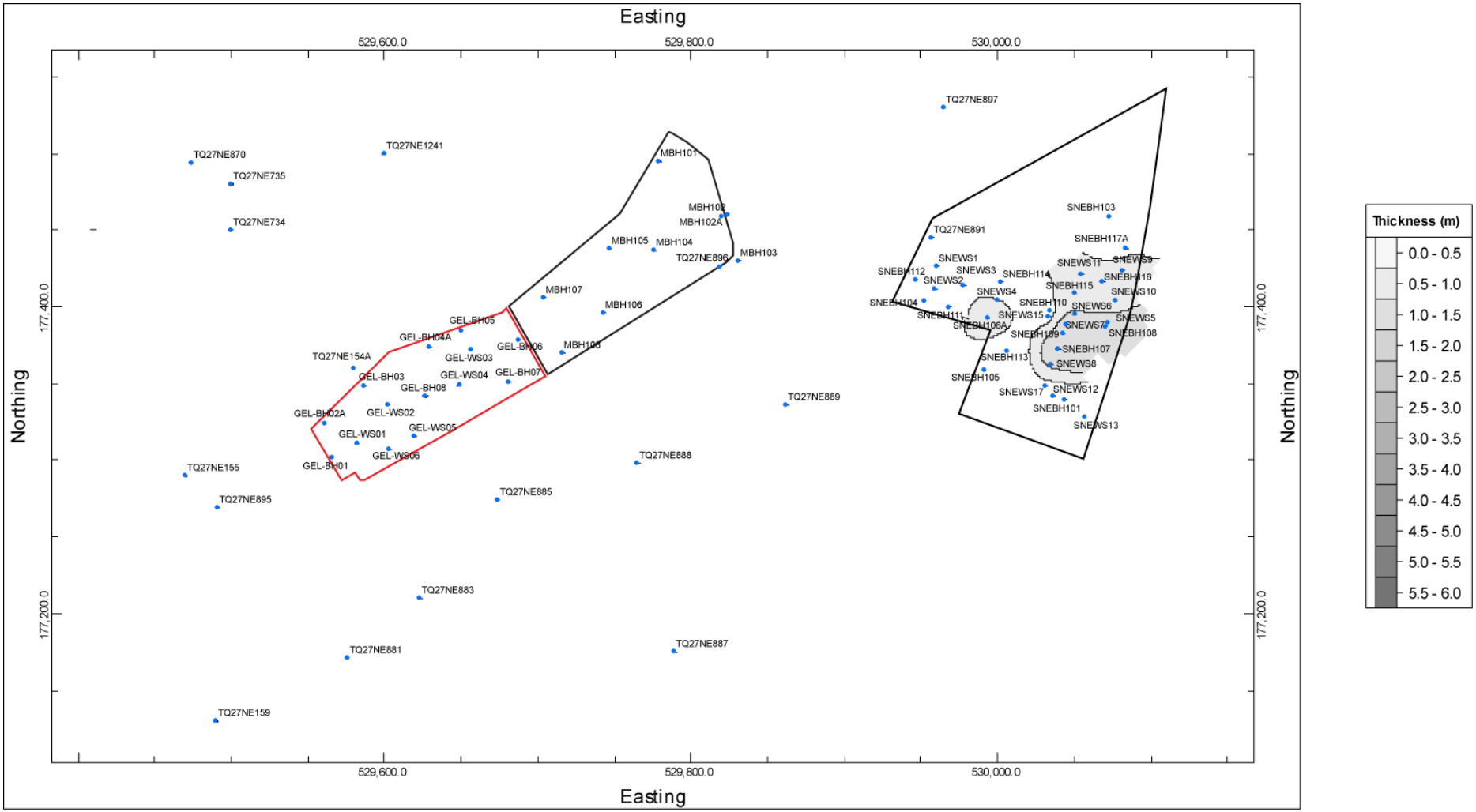

Figure 6: Thickness of the Peat (m)

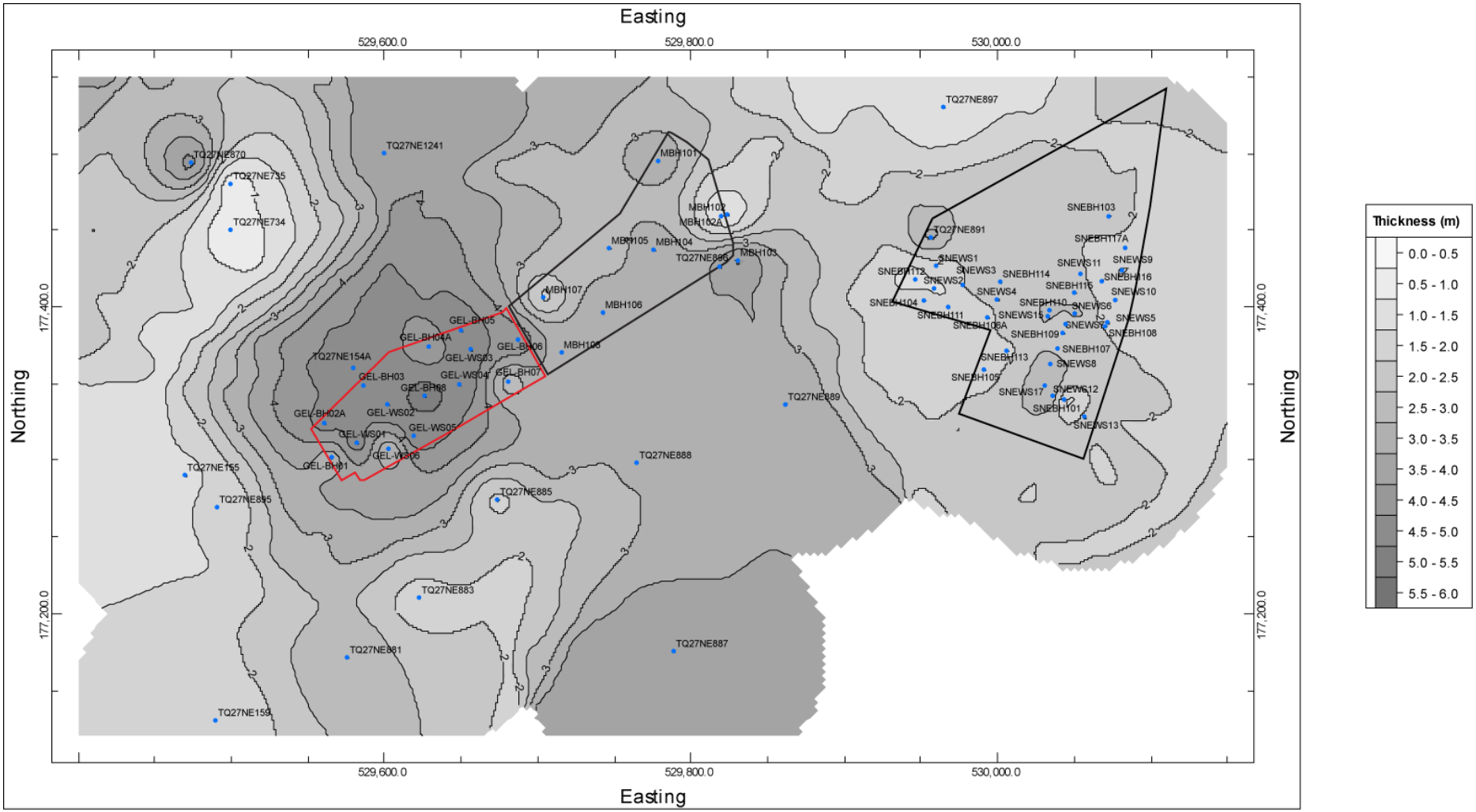

Figure 7: Thickness of the Made Ground (m)

DISCUSSION, CONCLUSIONS & RECOMMENDATIONS

The aim of the deposit modelling exercise at the 46 Ponton Road site was to (1) clarify the nature of the sub-surface stratigraphy, in particular the presence and thickness of Alluvium (including Peat) across the site, and (2) to evaluate the potential of the sedimentary sequences for reconstructing the environmental history of the site and its environs. In order to achieve this aim, a programme of deposit modelling of the surface elevation and thickness of the major stratigraphic units at the site was carried out. Previous geoarchaeological investigations in the Battersea area (Dawson *et al*., 2009; Morley, 2009; Corcoran *et al*., 2007; Branch *et al*., 2010) have revealed that a number of channels, bisecting areas of higher gravel 'islands' (eyots), existed in the Battersea area during the Late Devensian/early Holocene. The existing models for this area indicate that the 46 Ponton Road site, and the 40-42 Ponton Road site immediately to the east (Young, 2015) lie within the area of low-lying Late Devensian/early Holocene topography identified as the Battersea Channel. However, previous work at the 40-42 Ponton Road site (Young, 2015) indicated that this site lay on a remnant of the Kempton Park Gravel, representing either a north-easterly extension of the eyot recorded to the southwest or a separate gravel high (eyot) in this area.

The results of the investigations at the present site and the wider deposit model (see Figure 3) indicate that much of the 46 Ponton Road site lies in an area of low-lying Shepperton Gravel topography, recorded at between -1.47 and -0.43m OD towards the centre and northwest of the site. This area of the site is thus considered part of or subsidiary to the Battersea Channel, separated from the low-lying topography (*ca*. -0.5 to -3.0m OD) at the Wandsworth Road & Pascal Street site (Young *et al*., 2013) by the Gravel high identified at 40-42 Ponton Road (*ca*. 1.2 and 1.7m OD). This wider model suggests that the Gravel high in the area of 40-42 Ponton Road is separated from the larger area of Kempton Park Gravel identified to the south west (see Figure 1).

Despite the low-lying nature of the Gravel across much of the 46 Ponton Road site, no organic horizons or Peat were recorded within the overlying Alluvium, which here consisted of predominantly silty or sandy clay with occasional gravel clasts and was present in thicknesses of between 0.5 and 1.5m. The surface of the Alluvium lies at between 0.03 and 1.07m OD across the site, the overlying Made Ground having truncated much of the Alluvium in some areas of the site.

In the absence of any Peat or organic horizons at the 46 Ponton Road site, no further geoarchaeological or environmental archaeological investigations are recommended.

REFERENCES

Branch, N., Green, C., Batchelor, R., Young, D., Elias, S., Cameron, N. and Athersuch, J. (2010) A tale of two power stations: environmental archaeological investigations at Battersea and Lots Road. *London Archaeologist*, **12(10)**: 267-273.

Corcoran, J., Jeffries, N. and Mackinder, A. (2007) Riverside topography and the Red House tavern: excavations at Chelsea Bridge Wharf. *London Archaeologist* **11**(8): 212-217.

CgMs Consulting (2015) Archaeological Desk Based Assessment. 46 Ponton Road, Battersea, London SW8. *CgMs Consulting Unpublished Desk Based Assessment, August 2015.*

Dawson, H., Molina-Burguera, G. and Morley, M. (2009) Battersea Power Station, Battersea, London Borough of Wandsworth. Archaeological desk-based assessment. *Museum of London Archaeology Service Unpublished Report June 2009.*

Green, C. and Young, D.S. (2011) A report on the geoarchaeological borehole investigations and deposit modelling at Tideway Wharf, 87 Kirtling Street, Nine Elms, London Borough of Wandsworth. *Quaternary Scientific Unpublished Report April 2011.*

Geotechnical Engineering Limited (2014) 46 Ponton Road, Nine Elms, London. Factual Report on Ground Investigation. Prepared for Railway Pension Nominees Ltd, Report Ref: 29342. *Unpublished Geotechnical Report, July 2014.*

Gibbard, P.L. (1985) *Pleistocene History of the Lower Thames Valley*. Cambridge University Press, Cambridge.

Morley, M. (2009) The Battersea Channel: Investigations of a possible former course of the River Thames? *London Archaeologist* **12** No. 7/ Winter 2009/2010.

Young, D.S., Batchelor, C.R. and Green, C.P. (2012) Battersea Power Station Phase 1, London Borough of Wandsworth (NGR: TQ 290 775): Geoarchaeological fieldwork report. *Quaternary Scientific (QUEST) Unpublished Report June 2012; Project Number 195/12.*

Young, D.S., Batchelor, C.R. and Green, C.P. (2013) Land at Wandsworth Road and Pascal Street, Nine Elms, London Borough of Lambeth (NGR: TQ 3003 7747): Environmental

Archaeological Assessment Report. *Quaternary Scientific unpublished Report, May 2013.*

Young, D.S. (2015) Land at 40-42 Ponton Road, Nine Elms, London Borough of Wandsworth (Site Code: PON15): Geoarchaeological fieldwork and deposit model report. *Quaternary Scientific (QUEST) Unpublished Report February 2015; Project Number 048/14.*