Channel Tunnel Rail Link

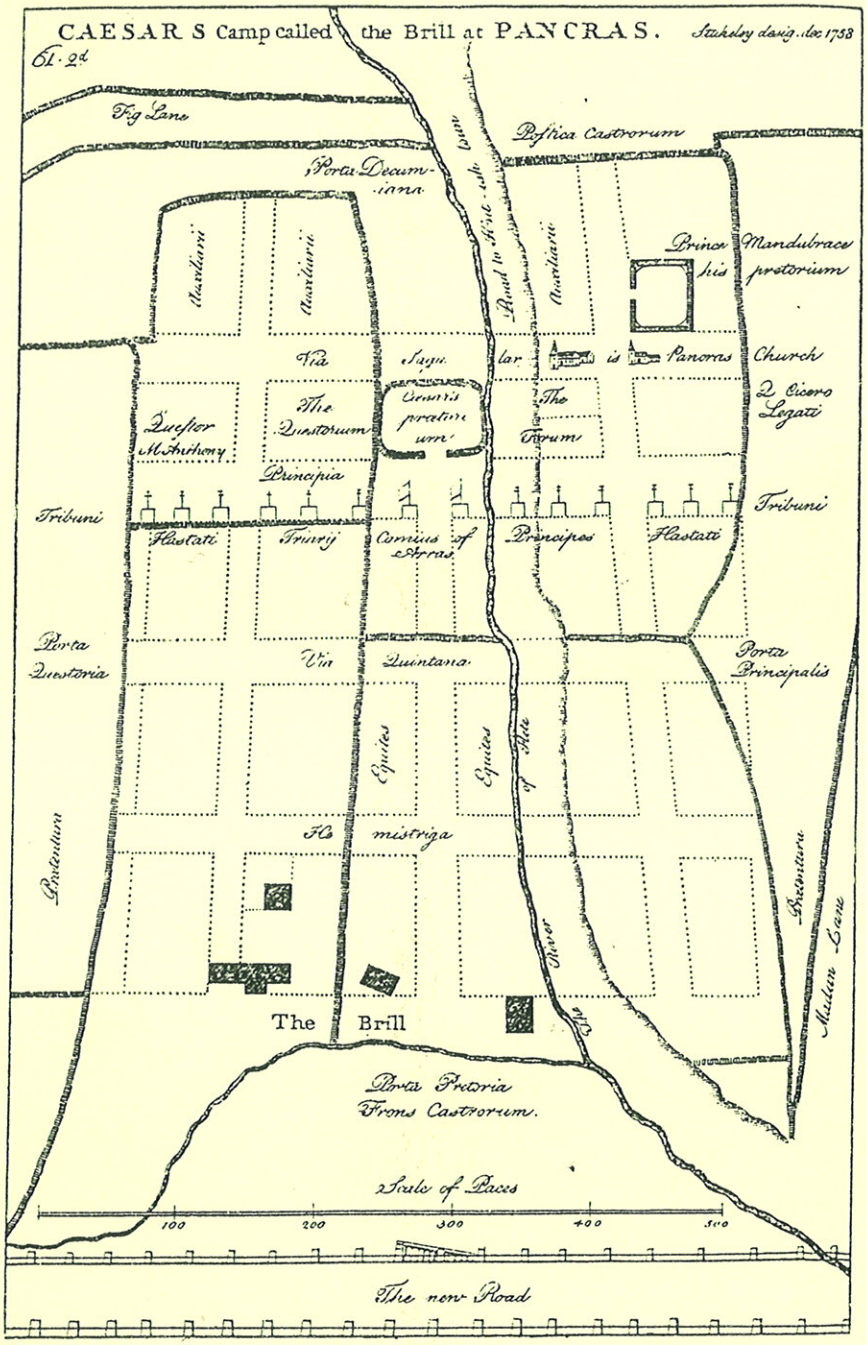
# *St Pancras Terminus*

## *Promoters Developed Scheme and Associated Works*

### Archaeological Evaluation and Watching Brief

**Task Nos 10412, 10506 (Museum of London Code SPN 95)**

January 1997




This report has been prepared by

OXFORD ARCHAEOLOGICAL UNIT for
Union Railways Limited

# Channel Tunnel Rail Link
# Environmental Assessment
# Cultural and Historic Effects

## *St Pancras Terminus* *(OS TQ 300835)*
## *Promoters Developed Scheme and Associated Works*

**Task Nos 10412, 10506 (Museum of London Code SPN 95)**
Archaeological Evaluation and Watching Brief

**January 1997**

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**Archaeological evaluation and watching brief**

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Union Railways Limited
Channel Tunnel Rail Link
St Pancras Terminus

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***Summary:*** *A recording watching brief with evaluation trenching was carried out during an extensive programme of geotechnical investigations in the area of St Pancras Station, London Borough of Camden, including railway land to the north and east, totalling around 60 hectares. The investigation arises from landtake and engineering requirements arising from the proposed use of St Pancras as the London terminus of the Channel Tunnel Rail Link.*

*The land is currently in railway use with restrictions on access for safety reasons. URL adopted a pragmatic approach to field evaluation, tailored to an assessment of archaeological potential, including three trenches under archaeological control (42 $m^2$) and a recording watching brief on a further 74 geotechnical pits (100 $m^2$). In order to achieve maximum benefit from this approach, geoarchaeological analysis was aimed at reconstructing the general historic topography, and thereby predicting locations where the residue of any significant medieval or earlier deposit inferred by evironmental assessment might survive outside of the immediate sites of investigation.*

*Results support the findings of environmental assessment that the survey area included historic farmland related to the medieval village of St Pancras. It was to be severed in the 19th century by the construction of the Regents Canal, and was affected in different ways by two major railway developments: truncated to the east by the East Coast Main Line and sidings; buried to the west by the Midland Main Line and sidings. To the south of the canal the effects of the railways are more localised. The historic landscape appears to be one of settlement on mixed geology in the floor of the Fleet valley.*

*The assessment finds that the more significant effects on the archaeological resource are:*

*1 wet environments in the central railway lands affected by cut-and-cover tunnelling and other engineering;*
*2 St Pancras village and extension graveyard east of church affected by cut-and-cover underground tunnelling;*
*3 the historic channel of the River Fleet affected by the Thameslink station, terminus links, services and ancillary works*
*4 agricultural land on gravels adjoining the Fleet.*

*The impacts are assessed as capable of mitigation by record.*

# 1 BACKGROUND TO THE INVESTIGATION

1.1 Introduction (Fig. 1)

1.1.1 i. The Oxford Archaeological Unit undertook an archaeological investigation and watching brief on land at St Pancras in the London Borough of Camden between October and December 1995 on behalf of Union Railways Ltd (URL), together with a geoarchaeological assessment and an enhanced topographical survey (Appendices 1 and 2).

ii. The fieldwork was done under the umbrella of an extensive programme of geotechnical investigations commissioned by URL, covering an area of about 60 hectares at and around St Pancras Station and land to the north and east (Fig. 1). The evaluation forms part of a wider programme of archaeological investigation along the line of the Channel Tunnel Rail Link, the aim of which is to assess the effects of the construction of the new railway upon the cultural heritage.

1.1.2 The fieldwork was undertaken to a Scope of Works agreed with English Heritage. In general the aims were to detect any significant archaeological deposits in a historic landscape which had been affected by cut-and-fill operation relating to canals, railways, roads, industrial and business complexes and residential buildings. The Scope of Works predicted that such deposits would concentrate in the line of the valley of the River Fleet, which historically drained the land to the north, and whose residual channel runs in a culvert beneath Pancras Road.

**1.2 Reasons for the investigation**

1.2.1 HM Government proposes under Act of Parliament to support the use of St Pancras as the London terminus of CTRL. The project involves substantial ground disturbance arising from cuttings, cut-and-cover tunnelling, bored tunnelling, a new underground station, underground walkways, other terminus works and infrastructure changes.

1.2.2 An Environmental Statement has been prepared by Environmental Resource Management (1994), which examines the impact of the project on the natural and built environment along the proposed route of CTRL. OAU was one of fourteen specialist consultants and provided detailed archaeological input to this statement (CTRL Assessment of Historic and Cultural Effects, November 1994, henceforward URL 1994). This identifies many sites along the route with special known or potential archaeological sensitivity. URL 1994 allows for archaeological evaluation of these sites so that detailed strategies for archaeological mitigation may be prepared. The principal archaeological features known for the present survey area are summarised below (1.5), details of which are presented in Volume 1 of URL 1994.

1.2.3 URL 1994 identifies the importance of the medieval village of St Pancras, its extension churchyard, and the valley of the River Fleet downstream of the village, also its parish lands to the NE, E and SE (see 1.5 below).

## 1.3 Construction work on the St Pancras site

1.3.1 The archaeological evaluation is assessed against the information provided by URL on the proposed engineering impact. This is set out in the Reference Design south of canal (*CTRL Environmental Statement*, (November 1994) *Main Report*; Annex 1 'Project Description' Vol 1 Section 5; Annex 4 'The London Terminus and alignment in London and Essex', Vol 1). For the area north of the canal the evaluation is assessed against the Promoters' Developed Scheme as presented in *CTRL Supplementary Environmental Statement* (December 1995) 'St Pancras Approaches Promoters' Scheme and Associated Works'.

1.3.2 The route of CTRL enters the Survey Area in bored tunnel, changing to a combination of above-ground track and cut-and-cover tunnel before joining the existing tracks of the Midland Main Line into the proposed international terminus at St Pancras (Fig. 7). Additionally there are four single-track connections, a West Coast Main Line Connection (via the North London Line), an East Coast Mainline Connection, a North London Line connection and a diverted route for the North London Incline from the East Coast Main Line.

1.3.3 The terminus of CTRL as described in the Channel Tunnel Rail Link Supplement to the Environmental Statement St Pancras Approach: Promoters Developed Scheme and Associated Works, December 1995, requires the removal of the existing brick-arched railway viaduct north of the Goods Way-Pancras Road junction, and also the solid filled viaduct which supports the northern part of the main station deck. They are to be replaced by the international station with an extended deck and train shed above, and a new terminus complex at existing ground level. The existing Midlands Main Line platforms are to be displaced to the west, there will be three additional CTRL Domestic platforms extending the train deck to the east, and there is also to be some realignment of the Midlands Main Line to the north. Substantial below-ground disturbance will arise from the creation of an underground station for Thameslink railway beneath the international terminus, and paired tunnels linking to the East Coast Main Line. Further extensive ground disturbance will arise from passenger links to Kings Cross Station, including a new underground Northern Ticket Hall.

1.3.4 Ancillary engineering is also proposed; elements with potential archaeological impact include the Metropolitan and Circle Line ticket hall under Euston Road; highway works; Belle Isle electricity feeder station; Camden Sewer Diversion).

## 1.4 Geology and land use

1.4.1 The geology of the survey area is described in the Geoarchaeological Assessment (Appendix 1). Bedrock is London Clay. Pleistocene deposits are recorded locally but none in the survey area, nor are Holocene deposits recorded, although it is acknowledged that areas of river gravels, whether Thames or Fleet, could exist. This section of the valley of the River Fleet has not been closely investigated geologically, and exposures from the present work have provided new insight on local alluvial and colluvial deposits.

1.4.2 i. Much of the south end of the survey area is occupied by the two 19th-century stations of Kings Cross and St Pancras. St Pancras is more elevated because its approaching tracks pass over rather than under the Regent's Canal, which has major implications for the survival of archaeological deposits arising from a difference of around 5 m in vertical alignment between the two railway termini. The remaining modern landuse exhibits railway and post-railway industrial usage, with limited residential occupation between the two stations to the south. The line of the Regents Canal bisects the area, flanked on the west by Camley Street Natural Park, and by St Pancras church and churchyard.

ii. The structure of the Goods Way gas holders is a significant landmark, their substructure affecting underground deposits. To the north-east the canyon-like cutting of the East Coast Main Line illustrates the extensive ground disturbance which has arisen from the need to reduce the railway lands to the grade of the incoming tracks.

## 1.5 Archaeological background

i. The archaeological background is addressed in URL 1994 Vol 1, 4.2.2; significant factors are the recorded flooding of the river Fleet and numerous springs or wells. York Way which flanks the east side of the study area is alleged to be Roman or earlier from its alignment: it forms the boundary to the parishes of St Pancras and Islington, and Roman finds and building materials recorded from the study area have been suggested as evidence of a Roman settlement, perhaps a villa. Earthworks embracing St Pancras village and the medieval settlement of Brill were interpreted by William Stukeley in 1758 as a Roman Camp.

ii. A reference to a landholding by St Pauls Cathedral in Domesday has been taken to imply an early origin for the church, which may have been the centre of a mid-Saxon estate. Forty houses are recorded in the 13th century, evidently 'decayed' by the 16th century, and earthworks of St Pancras and Brill are suggested as having been incorporated in London's Civil War defences in the 17th century. Map regression of the boundaries illustrated by Stukely is difficult because of the rapid sub-urbanisation of the Brill area, where most of his rectangularity resided, and there is relatively little within the survey area itself which might offer the chance to confirm the dating of the less regular boundaries which he illustrates (cover illustration).

iii. Stukeley's reference to brickfields preempts many references on subsequent maps. The study area had been transformed from a rural resort into emergent suburbia by the building of the New (Euston) Road in 1756, which brought an isolation hospital and housing, then again by the Regents Canal which brought industry and a gas works. Finally came the railways from 1851, which as will be seen had the effect of re-working a large proportion of the historic landscape and thereby providing the principal challenge for the present investigation.

## 2 AIMS OF THE FIELD INVESTIGATION

2.1 The aim of the investigation was to gather sufficient information to establish the presence or absence, extent, condition, character, quality and date of any archaeological remains within the area of the evaluation. More specifically it aimed:

- to determine whether any deposits of palaeo-environmental interest associated with the River Fleet and other water courses are present, and to assess their potential for analysis;
- to determine the potential of any archaeological features and deposit for the study of past environment and economy;
- to determine the potential for survival of Roman remains associated with the River Fleet;
- to note the presence and location of 18th and 19th-century residential dwellings;
- To assess the local, regional, national and international importance of such remains, and the potential for further archaeological fieldwork to fulfil local, regional and national research objectives.

In order to achieve these objectives it was necessary to carry out a desk-based assessment, for which the geoarchaeological tasks are presented within Appendix 1, and the pre-railways topographical survey in Appendix 2.

## 3 EXPLANATION OF THE APPROACH AND METHOD

### 3.1 General

3.1.1 Approaches and methods were as follows:

- A geotechnical contractor (Foundation Exploration Services (FES), principal contractor) had been commissioned by URL to carry out a geotechnical investigation.

- The work required access to areas not under direct control of URL, and such access was negotiated by URL to accommodate existing users. In one area the geotechnical work was postponed indefinitely and is excluded from this report.

- URL's geotechnical investigation comprised ninety-seven Observation Pits and Test Pits, in addition to an extensive programme of boreholes.

- Observation Pits were hand-dug and shored for access, and in this category were included the two pits and one trench which were excavated for archaeological purposes. Test Pits were unshored, thus potentially available for access to a depth of only 1.2 m below ground level; of necessity this meant that their value as a source of archaeological information was limited to some extent.

- Subject to access and Personal Track Safety Training certification, 33 Observation

Pits and 43 Test Pits were accessible for recording archaeologically by OAU/GSF.

- The three purposive archaeological investigations were sited to provide sample points on a transect across the presumed course of the River Fleet (Figs 1a (right); 2; 3-4) .

- The location of all geotechnical pits and boreholes relevant to the archaeological assessment are illustrated on Figure 2. Locations were fixed in three dimensions by a GPS survey undertaken by URL. Pits were numbered in a continuous series; those with A suffixes indicate relocation normally because of an obstruction; however suffixes A, B and C were used to identify the three bays of the purposive archaeological trench OT3745.

### 3.2 Method of investigation of purposive Archaeological Observation Trenches and Pits

Investigation of the three purposive trenches was in general in accord with the Scope of Works. However, site conditions and the need to establish a safe method of working in accord with the Construction (Design and Maintenance Regulations required that individual methods of working needed to be implemented for each trench (see Section 4 below)

### 3.3 Geotechnical Observation Pits

This category of pit was excavated by hand from the ground surface, in many cases to a regular 2.4 m square plan. Support (hydraulic frames and trench sheets) was installed as soon as the trench had reached a safe depth (normally 1.2 m), in each case leaving out one or more sheets to provide for observation of strata during and at completion of excavation. The depth of trenches depended on the geotechnical objective. Some observation pits designed to answer specific engineering questions were carried out to a different plan, and where relevant these are described.

### 3.4 Geotechnical Test Pits

This category of pit was dug by the general contractor using a mechanical digger with a 600 mm toothed bucket, following hand investigation for potential hazards. The trenches were dug to a depth deemed safe for personal access, normally about 1.2 m, whereupon the superficial deposits were recorded archaeologically in tandem with geotechnical recording. The trench was then deepened progressively, monitoring individual bucketfuls of upcast on the spoil heap, and where possible reconstructing the vertical sequence of deposits by taking successive cubes of sediment from these. Where appropriate these were retained for environmental analysis, and to inform any potential archaeological inference to be gained from the grading of the clay with depth. In many cases the decision to extend deeper or to curtail a trench was taken in consultation with OAU.

### 3.5 Boreholes

Boreholes were not monitored archaeologically, assessment being done on completed geotechnical logs.

## 4 RESULTS

### 4.1 Archaeological (purposive) Trench OP3741A (Figs 1a (right), 2, 3, 5)

4.1.1 *Method*

i. Trench OP3741 was placed as close as possible to the line of the Fleet river, in an area where below-ground construction works for the new undercroft will impact on any surviving archaeological deposits. OP3741A represents a revised location after OP3741 had encountered obstructions.

ii. The trench measured 2.3 m x 2.3 m (approximately 2 m x 2 m with shoring installed), and was positioned on the pavement at the junction of Pancras Road, Midland Road and Brill Place. Its revised location was constrained by a number of factors related primarily to the need to maintain safe usage of the adjacent road and pavement, and to avoid known services and the abutment of a former railway bridge. The trench was excavated entirely by hand by the general contractor under archaeological supervision. Shuttering was installed at c. 1.4 m from the pavement surface The trench was then excavated to 3 m and the shuttering lowered. Final cleaning was undertaken by OAU staff.

4.1.2 *OP3741A Description* (Fig. 3)

The deposits encountered comprised mainly 19th- and 20th-century infill above a brick culvert [13] which was running diagonally across the trench from SW to NE at 2.8 m below the present pavement level. In the NW and SE corners of the trench were found the remains of brick footings [11 & 12], surviving *in situ* under deposits of loose brick and mortar rubble. The brickwork in the NW corner [12] consisted of three courses of bricks bonded to an overlying layer of stone slabs clearly representing a floor. The SE corner showed six courses of surviving brickwork [11] with the lower three courses offset, apparently representing a wall foundation. The cellar footings were set in London Clay whose surviving surface was 2.7 m below the present pavement. Both structures were cut by the foundation trench [14] for the brick culvert.

4.1.3 *OP3741A Interpretation*

i. The brick foundations 11 and 12 are likely to be the remains of cellar associated with terraced housing from the first half of the 19th century. The presumed cellar floor 12 is 2.3 m below ground level, and this suggests that the earlier 19th-century ground level was similar to that of today. Terraced housing in this area appears on maps of St Pancras from 1834 onwards; a street level of 16.94 m OD on a map of 1848 can be compared with the modern ground level of 17.49 m OD.

ii. There was no trace of Fleet river deposits in the trench, and it is unclear whether any existed here. If they did, brickearth could have been removed when the area was used as brickfields before 1834. Further truncation of deposits is likely to have taken place during the construction of the house cellars.

**Table 1: OP3741 Context Summary**

| Cxt. No. | Type | Width m (Length) | Depth mm | Finds | Comment |
|---|---|---|---|---|---|
| 1 | layer | | 600 | none | modern concrete |
| 2 | layer | | 600-700 | 2s TPW 1800-1900<br>1s CREA 1770-1900<br>brick | 19th cent. dump |
| 3 | layer | | 100-300 | none | 19th cent. made ground |
| 4 | layer | | 300-400 | 5s 1800-1900 | 19th cent. made ground |
| 5 | fill of 14 | | up to 300 | none | redeposited clay |
| 6 | fill of 14 | 1.2 | 1000 | none | backfill of sewer trench 14 |
| 7 | layer | | 700 | none | brick & mortar rubble |
| 8 | cut | | | | as 14 |
| 9 | layer | | 500-600 | none | brick & mortar rubble |
| 10 | cut | | | | as 14 |
| 11 | structure | 0.5 + | 400 | none | brick footing for cellar wall |
| 12 | structure | 1.0 + | 300 | none | brick footing for cellar floor |
| 13 | structure | 1.1 + | ? | none | brick sewer culvert |
| 14 | cut | 1.7 | 1100 + | | trench for 13 |
| 15 | layer | | ? | none | London Clay |

## 4.2 Archaeological (purposive) Trench OP3743 (Figs 2, 3a, 5)

4.2.1 *OP3743 Background*

i. Trench 3743 was located in the cellar of 105 Pancras Road on the western side of the street under the arches of St Pancras railway terminus. The cellar was about 4.5 m square and had been used to store bicycle parts. Its floor was a little under 3 m below the street level. Information from a borehole in Pancras Road (Borehole 97, Soil Mechanics) had indicated about 3.7 m of deposits above the natural London Clay in this area, with the lower deposits apparently comprising silts of the River Fleet. There was therefore a presumption that truncated Fleet valley deposits, with possible evidence of pre-industrial occupation, might have survived under the basements of properties fronting Pancras Road.

ii. The trench was positioned centrally within the basement to avoid the foundation trenches of the viaduct.

4.2.2 *OP3743 Methods*

i. Following the removal of the concrete in the original 2 m by 1 m trench, a sondage was excavated by the OAU to assess the survival of deposits. This ascertained over 0.5 m of relatively modern made ground with a ceramic pipe (sewer or drain) running more or less centrally along the trench. Groundwater was encountered about 0.6 m down and the examination of lower deposits was not possible. Provision was therefore made for breaking out a extra 0.5 m strip along the northern side of the trench to avoid the pipe, and the installation of an electric submersible pump for drainage.

ii. The excavation of the trench extension and the removal of made ground deposits as far down as the ceramic pipe was undertaken by the principal contractor. The remaining work was undertaken by OAU staff. Deeper excavation was confined to the northern side of the pipe, with the exception of a sump in the SW corner of the trench.

iii. The strong flow of groundwater inconvenienced the excavations to a considerable degree. Excavation was undertaken using a spade and cleaning could only be rudimentary under the circumstances. Natural London Clay was reached at about 1.1 m below the floor.

4.2.3 *OP3743 Description* (Fig. 3a)

Under the basement floor was a deposit of loose mid grey brown sandy silt with abundant brick rubble [2]. This overlay a glazed ceramic pipe [3] which appeared to be intact and was not disturbed, and deeper excavations continued on the northern side. The pipe was set in a shallow trench cut into layer [4]. This was a friable, strongly coloured, red-brown sandy silt which contained large quantities of small decayed fired clay fragments (probably brick and tile), as well as more complete brick and tile fragments, small ceramic pieces (four sherds of 18th-century pottery) and fragments of oyster shells . There were also occasional fragments of waterlogged wood within the deposit. Layer 4 had a sharp interface with the layer below, an uncohesive fractured clay containing brick rubble [5]. In the NW corner of the trench a concentration of brick rubble suggested a possible rudimentary drain and indeed this was where the greatest flow of water was concentrated. In the NE corner layer 5 sealed a hard stone or concrete surface [6] which was considered likely to be the capping of a drain structure, but this could not be verified. Elsewhere layer 5 overlay a stiff grey clay [7] which formed quite a hard, clean surface.

4.2.4 *OP3743 Interpretation*

i. The trench showed exclusively post-medieval deposits over London Clay which was encountered at about 1.1 m below basement level. The surface of the Clay was approximately horizontal and there was no suggestion of a dip eastward towards the centre of the Fleet. The height of the London Clay, at 12.75 m OD, is considerably lower than in Trench 3741 to the north-west; this was possibly because OP3743 is closer to the line of the Fleet River, but as with Trench OP3741, it is also possible that the clay and any overlying river deposits had been

truncated by the recorded brickfields and later housing.

ii. The sandy silt of layer 4 suggested that it might originally have been fluvially derived, but the deposit had clearly been reworked and was no longer *in situ*. Below it, the clay with brick is similarly likely to have been redeposited (rather than being an *in situ* deposit with brick compressed into it). However, the lack of inclusions other than relatively large brick fragments suggested that the deposit had not been extensively reworked. At a depth of 3.5 m below street level, and within 10 m of the historic line of the Fleet, local disturbance is probably the most reasonable interpretation, perhaps overcutting in the construction of the station viaduct.

**Table 2: Trench OP3743, Context Summary**

| Cxt | Type | Width | Depth | Finds | Comment |
|---|---|---|---|---|---|
| 1 | layer | | 200 | none | modern concrete |
| 2 | layer | | 300 | 2s TPW 18-1900<br>2s PMR 17-1800<br>CBM | dumping |
| 3 | pipe | 0.1 | 100 | none | drain/sewer |
| 4 | layer | | 350 | 4s TPW 18-1900<br>2s PMR 17-1800<br>1s EST 18-1900<br>CBM | dumping |
| 5 | layer | | 300 | none | dumping/disturbed natural |
| 6 | drain | 0.3+ | ? | none | under 5, top exposed |
| 7 | natural | | ? | none | London Clay |

### 4.3 Archaeological (purposive) Trench OT3745 (modules A-C) (Figs 2, 4, 4a, 5)

4.3.1 *OT3745 Background*

i. The original proposal for a single 30 m trench was modified to make use of 3 No 9 m trenches forming a T-shape in plan. Certain potential archaeological advantages of the revised proposal were recognised.

ii. The aim of the trenching was to investigate deposits relating to the River Fleet, and to the field system of St Pancras village. The trench position coincides with an area of proposed cut-and-cover construction which will impact on any surviving archaeological deposits.

4.3.2 *OT3745 Method*

i. Trench OT3745A Module A1 (the northern 4.5 m of the initial 2 m wide trench) was the first to be started and was excavated by hand by the general contractor to

the top of the first archaeologically significant horizon (Context 6) about 500 mm below the surface of the car park. This was a yellowish brown silt-clay, interpreted as a naturally deposited 'Brickearth' or `Brickearth-like' deposit. A modern (ie. late 19th-/early 20th-century) pit in the NW corner of the module was also excavated under archaeological instruction in order to establish the nature of the underlying deposit. This was a compact gravel, which was again interpreted as a natural deposit. The modern pit was subsequently extended and deepened to 1.2 m to facilitate examination and recording. Module A2 was not excavated at this stage so as to allow a mechanical excavator access to deepen Module A1 if this should be required. (In the event this was not done until all the archaeological trenches had been recorded.)

ii. Trench OT3745C Module C1 (the south-western 4 m) was then broken out and excavated by hand by the general contractor. There was a plastic pipe (possibly a functioning water pipe) 0.8 m from the end of the trench, and excavation continued up to, but not beyond, this feature. A disused sewer pipe crossing the centre of the module was, however, removed. The module revealed modern concrete and other disturbances directly overlying natural gravel. These deposits were hand-excavated to 1.2 m. In view of the absence of archaeological deposits this module was then mechanically deepened to 1.5 m and shored in order to allow inspection of the gravels and underlying London Clay. This sondage was later deepened to 3 m for geotechnical recording.

iii. The second module of Trench A (A2) was then excavated by the general contractor as far as the top of the `Brickearth'. The trench revealed a brick-lined pit and associated deeply cut brick structures. These were partially emptied to 460 mm depth. Groundwater within the brick-lined pit at this level was considered to be potentially contaminated.

iv. The general contractor then excavated the southern module of Trench B. This was shown to be heavily disturbed by a steel and concrete stanchion and a trench for an iron pipe. In view of this it was decided to excavate only a 1 metre strip of the second module to assess the degree of overall disturbance. The second module was also disturbed by overlying (though not deeply intrusive) concrete and there was also some water seepage. In view of this it was decided to abandon the second metre strip and add a metre to the NW side of Trench A instead which was known to be less disturbed. This was excavated by the general contractor as far as a possible soil horizon (rather than to the top of the `Brickearth' as in the rest of the trench) and left for archaeological excavation.

v. Module C2 of OT3745C was then broken out and excavated to the top of the `Brickearth' which was found at the same level as in OT3745A. This module was positioned about 1 m from Module 1 to avoid the hazard of the deep geotechnical hole.

vi. Upon completion of the archaeological works the northern modules of OT3745A and B were hand excavated to 1.2 m by the general contractor, and then

mechanically excavated to 3 m for geotechnical recording.

### 4.3.3 OT3745A Description (Fig. 4)

*i. General stratigraphy*

The modern tarmac and made ground [1] overlay a general dark layer containing abundant brick rubble with charcoal patches [4]. This overlay a light yellowish grey silt with fewer inclusions [5] (at 0.4 - 0.46 m below present ground level). Although it had a very irregular interface with 4 and showed some penetration by 19th/20th century disturbances, layer 5 contained very little cultural material itself. It directly overlay a compact light yellowish brown silt-clay which appeared to be an undisturbed 'Brickearth' deposit [6], 0.2 - 0.3 m thick , which in turn sealed compact flinty gravel [7]. A sample from deposit 6 contained fruit pips, which are most likely to represent late contamination into the top of the deposit (see Appendix 3).

*ii. Brick structures*

The southern part of the trench revealed brick structures (8, 12 and 16) which appeared to be cut through layer 4 as well as the underlying deposits. Feature 8 was a rectangular structure of uncertain function. Its fill contained an assortment of rubbish including wood and rusty items of electrical equipment. The abutting structures 12 and 16 were only partly revealed.

**Table 3: Observation Trench 3745A, Context Information**

| Cxt No. | Type | Width (Length) | Depth | Finds | Comment. |
|---|---|---|---|---|---|
| 1 | layer | trench | 400 | Plastic<br>2s BORDG 1550-1750<br>1s PMFR 1640-1800<br>4s 1800-1900 | modern tarmac, hardcore & concrete |
| 2 | fill of 3 | 0.65 (1.3) | 350 | 1s MOCHA 1750-1900<br>4s TPW 1800-1900 | |
| 3 | pit | 0.65 (1.3) | 350 | | 19th cent. |
| 4 | layer | | 200-250 | Plastic<br>25s from 1640-1700 to 1800-1900 | 19th cent. dumping |
| 5 | layer | | 150-200 | tile | ploughsoil? |
| 6 | layer | | 200-300 | 1s KNG 1230-1350 | 'Brickearth' |
| 7 | layer | | 550-650 | | Terrace Gravel |
| 8 | structure | 1.40 (3.20) | 460+ | | 20th cent. inspection pit? |
| 9 | fill of 8 | 1.40 (3.20) | 460+ | none kept | . |

| | | | | | |
|---|---|---|---|---|---|
| 10 | fill of 11 | | | none | fill behind structure 8 |
| 11 | pit | 1.50 (3.30) | 500 + | | construction cut for 8 |
| 12 | structure | ? | 720 | | brick-built pit |
| 13 | fill of 14 | | | none | concrete fill behind wall 12 |
| 14 | pit | ? | 720 | | construction cut for 12 |
| 15 | fill of 12 | | 600 | none kept | |
| 16 | layer | | 150 | none | concrete surface abutting 8 |

### 4.3.4 OT3745B Description

*i. General stratigraphy*

The modern tarmac overlay a substantial concrete raft [1], up to 0.3 m thick, which covered the trench. In the central part this was associated with a massive concrete footing reinforced with steel girders [18]. At the northern end of the trench the concrete directly overlay a greyish brown silt-clay [8] which contained brick fragments and appeared to be a disturbed or redeposited `Brickearth'. This overlay the `natural Brickearth' [16] which, while showing some brick and charcoal intrusions, was generally clean. At the southern end, however, beyond the iron water pipe trench, were intervening deposits. Under a thin deposit of debris [2] was encountered a patchy mortar floor showing impressions of flagstones [3] (which had presumably been removed once the floor had gone out of use). This deposit partly overlay a limestone flagstone [4] at the eastern edge of the trench. The lowest layer above the disturbed `Brickearth' [8] was a dark silty sand containing small fragments of brick, oyster shells (both fragmentary and complete), clay pipe fragments, and occasional cartridge caps [5].

*ii. Possible culvert trench 7*

This was a linear feature crossing the southern end of the trench. It was 0.92 m wide with vertical sides and was excavated to 0.83 m (1.3 m below the present ground surface) without the bottom being reached. It was sealed by layer 5 and its series of fills consisting of deposits of clay mixed with gravel lower down (fills 6, 12, 13 & 14), suggested essentially redeposited `Brickearth' and natural gravel.

*iii. Other features*

There were three shallow features of unclear but probably minor significance. Feature 10 was an irregular pit, 0.18 m, deep without finds. Features 22 and 24 were both sealed by layer 8; 22 being a small possible post-hole containing pot and brick and 24 an irregular hollow containing some green-glazed pot and glass.

**Table 4: Observation Trench 3745B, Contextual Information**

| Cxt No. | Type | Width m (Length) | Depth mm | Finds (No.) | Comment |
|---|---|---|---|---|---|
| 1 | layer | | 300 | | concrete raft |

| Cxt No. | Type | Width m (Length) | Depth mm | Finds (No.) | Comment |
|---|---|---|---|---|---|
| 2 | layer | c 1.00 (c 1.50) | 10 | | debris over 3 |
| 3 | floor | c 1.00 (c 2.00) | | | mortar surface with flagstone impressions |
| 4 | flagstone | 1.06 | 40 | | single limestone flagstone |
| 5 | layer | 0.70 | 40 | 32s from 1550-1750 to 1800-1900' cartridge caps | floor make-up? |
| 6 | fill of 7 | 0.92 | up to 400 | 15s from 1770 to 1900 | upper fill |
| 7 | pipe trench? | 0.92 | 830+ | | vertically sided, not bottomed |
| 8 | layer | | 80 | | redeposited/disturbed clay |
| 9 | layer | | | | `Brickearth' |
| 10 | pit? | 0.65 | 180 | | irregular hollow |
| 11 | fill of 10 | | up to 100 | none | upper fill |
| 12 | fill of 7 | | up to 250 | 9s from 1600-1700 to 1800-1900 | |
| 13 | fill of 7 | | 300 | | |
| 14 | fill of 7 | | 250 | 1s 1800-1900 bone | lowest excavated fill |
| 15 | fill of 10 | | 80 | none | lower fill |
| 16 | layer | | 230 | | disturbed/ploughed ? `Brickearth' |
| 17 | tarmac | | 100-200 | 1s 1600-1800 | over concrete 1 |
| 18 | steel stanchion | | | | set in concrete 1 |
| 19 | concrete plinth | | | | unexcavated |
| 20 | | | | | not used |
| 21 | | | | | not used |
| 22 | post-hole | 0.22 | 190 | | |
| 23 | fill of 22 | 0.22 | 190 | brick oyster | |
| 24 | pit? | 0.28 | 120 | | irregular |

| Cxt No. | Type | Width m (Length) | Depth mm | Finds (No.) | Comment |
|---|---|---|---|---|---|
| 25 | fill of 24 | 0.28 | 120 | 1s SAIN 1250-1500 | |
| 26 | cut | 0.95 | 190 | | modern disturbance through concrete 1 |
| 27 | fill of 26 | 0.95 | 190 | none | |
| 28 | pipe trench | 0.28 | 130 | | contains plastic pipe |
| 29 | fill of 28 | 0.28 | 130 | | |
| 30 | cut | 1.50 | ? | | pit for concrete plinth 18 |
| 31 | cut | ? | ? | | pit for concrete plinth 19 |

### 4.3.5 OT3745C Description (Fig. 4a)

*i. General Stratigraphy*

There was no surviving archaeological stratigraphy in this trench, the natural 'Brickearth' being found directly under 0.2 - 0.3 m of modern concrete and hardcore. In the SW module the 'Brickearth' [7 & 8] barely survived, having been disturbed by a concrete raft [5] and a sewer pipe trench [4]. Under these disturbances was encountered flinty gravels [9, 10, 11 & 12] to 1.5 m below the present ground surface, with London Clay lower down. In the NE module the 'Brickearth' extended the full 5 m of the trench and was excavated in a sondage 2 x 2 m square and 0.2 m deep to expose the top of the underlying Gravel.

*ii. Disused sewer pipe 3*

The sewer pipe (which was a glazed ceramic pipe) in feature 4 was removed by hand. It was clearly relatively modern but its interest lay in the large quantities of cartridge percussion caps which came from its dark silty fill, indicating that it had been associated with the 19th century ammunition manufactory (see below 7.3). Its relationship with the concrete raft [5] was not possible to determine, but it is possible that it too was contemporary.

*iii. Brick-lined pit 14*

The corner of a brick-lined pit was exposed in the SE corner of the trench. It was filled with a very loose dark sandy silt containing abundant fragments of decayed wood and mortar.

*iii. Other pits 19, 23, 25 & 27 and possible post-hole 21*

A relatively large number of pits were encountered. All were shallow and of unknown purpose. 23 and 27 were markedly sub-rectangular in plan with flat bases, 25 was oval, and 19 more or less circular. Their fills were all brown or greyish brown and brick fragments came from all the pits and pottery from 25 and 27. The possible post-hole 21 had a light yellowish brown fill and was thought

perhaps to be a natural feature.

**Table 5: Observation Trench 3745C, Context Summary**

| Cxt No. | Type | Width m (Length) | Depth mm | Finds (No.) | Comment |
|---|---|---|---|---|---|
| 1 | layer | | 250 | | modern tarmac & concrete rubble |
| 2 | fill of 4 | 0.40 | 400 | none | backfill of sewer pipe trench |
| 3 | fill of 4 | | | cartridge caps | fill of sewer pipe |
| 4 | pipe trench | 0.40 | 400 | | contains ceramic sewer pipe. 19th/20th cent. |
| 5 | concrete raft | 1.00 | 150 | none | modern |
| 6 | layer | c 1.30 | 500 | | redeposited gravel under 5 |
| 7 | layer | | 120-140 | pot brick | disturbed `Brickearth' |
| 8 | layer | | 200 | none | disturbed `Brickearth' |
| 9 | layer | | 600 | none | upper part of Terrace Gravel |
| 10 | layer | | 300 | none | Terrace Gravel |
| 11 | layer | | 400 | none | Terrace Gravel |
| 12 | layer | | 250 | none | Terrace Gravel |
| 13 | layer | | | | London Clay |
| 14 | structure | ? | ? | | brick-lined cellar/ inspection pit |
| 15 | fill of 14 | ? | ? | Cu alloy | |
| 16 | fill of 17 | ? | ? | | mortar infill behind 14 |
| 17 | pit | ? | ? | | construction pit for 14 |
| 18 | fill of 19 | 0.25 | 120 | none | |
| 19 | pit/post-hole | 0.25 | 120 | | |
| 20 | fill of 21 | 0.18 | 80 | none | |
| 21 | post-hole? | 0.18 | 80 | | |
| 22 | fill of 23 | 0.25 (1.00) | 140 | | |
| 23 | pit | 0.25 (1.00) | 140 | | modern |
| 24 | fill of 25 | 0.45 (0.5) | 120 | pot | |

| Cxt No. | Type | Width m (Length) | Depth mm | Finds (No.) | Comment |
|---|---|---|---|---|---|
| 25 | pit | 0.45 (0.5) | 120 | | modern |
| 26 | fill of 27 | 0.60 (1.20) | 120 | pot<br>bone | |
| 27 | pit | 0.60 (1.20) | 120 | | modern |

### 4.3.6 Interpretation

i. The geotechnical logs from existing boreholes nearby had indicated 2.2 - 2.4 m of 'made ground' over London Clay (Boreholes 7838/45, 48, 49), but this may now have to be reconsidered. Trench OT3745 showed that the London Clay was overlain by two natural deposits: gravels topped by a brickearth or brickearth-like deposit of silt-clay typical of brickearths seen widely capping periglacial gravel terraces in the City of London. For a discussion of the significance of these deposits, see Section 5.2 (also Appendix 1).

ii. The description of Layer [5] above the brickearth [6] in OT3745A, ie its greyer colour, irregular interface, and very little cultural material itself, infers a natural preindustrial soil profile, unique in the present St Pancras survey, and surprisingly little affected by the construction of the ammunition factory (para 4.3.3, i.; a floated sample contained modern waste with fruit seeds, Appendix 3, 3745A/6 <3>). From experience of similar deposits throughout the Thames Valley, it was considered by the excavator to have been affected, not simply by weathering and biological action, but also by ploughing.

iii. This inference is upheld by the assemblage of finds at this level in the three subtrenches, ie low levels of pottery from the 13th-century onward, the earlier material being the most fragmentary and abraded. The presence of low levels of abraded pottery is characteristic of medieval fields which have been subject to cultivation, where pottery is often introduced by transporting manure from a settlement, which in this case might be either Brill or St Pancras. The medieval pottery was too small for certain identification, but one sherd would appear to be a regional import from Kingston, Surrey, and another is described (less certainly) as possibly from Saintonge in south-west France.

iv. Other layers or structures present were either dumping layers (19th-century) such as 3745A/4 or brick walls and concrete bases associated with the 19th-century munitions factory or the 20th-century motor works (e.g. 3745A/7; 3745C/14). Cartridge caps from the former were recovered from the excavation trenches, and are reported on separately in 7.3 below. 3745B/7 was considered likely to be a 19th-century culvert trench, although this was not demonstrated. The lack of building rubble made it less likely to be the robber trench of a wall. No obvious traces were found of the housing known to have existed on the site in the first half

of the 19th century, and this suggests that most traces of this period had been removed by conversion to industrial use or by later levelling.

## 5 ARCHAEOLOGICAL ANALYSIS OF GEOTECHNICAL PITS AND BOREHOLES (Fig. 2; Table 6)

### 5.1 Introduction

i. Outside the area of the purposive archaeological trenches the archaeological assessment is based on a review of the OAU archaeological and geoarchaeological field data against the final geotechnical logs (Table 6).

ii. The analysis of the geotechnical test pits is presented firstly as a series of four key transects (A-D; Fig. 5 and Appendix 1). Relevant borehole data (current and historic) has also been included and is plotted onto the transects. The locations of the transects appear on Figure 2. Where OAU/GSF records appear to differ from geotechnical logs, preference has been given to the former because of their specifically archaeological orientation; any such cases are explained below, but it should be stressed that conflict occurred infrequently (Table 6).

iii. Following the analysis of the transects, three areas are described and discussed further under the following heads because of their special complexity: the area north of Regents Canal (the Railway Lands); the former areas of St Pancras settlement and Agar Town; the former area of Brill Hamlet.

### 5.2 Transect A - west to east (oblique) across the valley of the former Fleet river (Figs. 2, 5)

i. This transect across the Fleet coincides with a line of major below-ground impact in the proposed new development, although it should be noted that the oblique section could make the river valley appear wider than is actually the case.

ii. Beginning at the east end of the transect, Trench OT3745A showed the top of London Clay at 15.47 m OD, overlain by natural gravel and then brickearth deposits (see Section 4.3.3). The London Clay had therefore not been truncated in recent times. Both the gravel and brickearth deposits are interpreted as being of fluvial origin, relating to a former course of the Fleet river. The gravel represents a high-energy fluvial environment, while the brickearth is indicative of a change to slower-moving water and eventually to marshy ground (Appendix 1, 4.2.1). Some wind-blown sediment may have become incorporated into the brickearth at this time.

iii. Moving westwards, into the centre of the transect, the top of the London Clay is considerably lower, at 12.2 to 12.8 m OD (boreholes SA3721, BH97). Again some areas of the clay have not been truncated in recent times, as is shown by the

All measurements in metres.

| Hole Number | Top level of geological deposit 1 (London Clay) | Thickness of geological deposit 2 (Gravel) | Thickness of geological deposit 3 (Brickearth) | Geological deposits desription/remarks | Thickness of pre-railway deposit(s) | Pre-railway deposits desciption | Thickness of railway period and later deposits | Railway and later deposits, description/remarks |
|---|---|---|---|---|---|---|---|---|
| 3708 | 0 | 0 | 0 | | 0 | | 0.7 | Turf and makeup |
| 3730 | 0 | 0 | 0 | | 0 | | 1.8 | Makeup |
| 3731a | 20.6 | 0 | 0 | London Clay | 0 | | 1.1 | Makeup |
| 3732 | 0 | 0 | 0 | | 0 | | 3 | Makeup |
| 3733 | 0 | 0 | 0 | | 0 | | 3.1 | Makeup |
| 3734 | 0 | 0 | 0 | | 0 | | 3 | Makeup |
| 3735 | 0 | 0 | 0 | | 0 | | 3 | Makeup |
| 3736 | 25.7 | 0 | 0 | London Clay | 0 | | 1.1 | Makeup |
| 3737 | 27.6 | 0 | 0 | London Clay | 0 | | 0.9 | Makeup |
| 3738 | 0 | 0 | 0 | | 0 | | 0.25 | Makeup |
| 3738a | 26.98 | 0 | 0 | London Clay | 1.2 | Pond Deposit (0.7m thick) above lower Pond Deposit (c. 0.5m thick) | 0.5 | Makeup |
| 3739 | 26.4 | 0 | 0 | London Clay | 0 | | 1.1 | Makeup |
| 3740 | 0 | 0 | 0 | | 0 | | 1.65 | Makeup |
| 3741a | 0 | 0 | 0 | | 0 | | 2.95 | Makeup |
| 3742 | 0 | 0 | 0 | | 0 | | 1.2 | Makeup |
| 3743 | 12.7 | 0 | 0 | London Clay | 0 | | 1.05 | Makeup |
| 3745a | 15.57 | 0.55 | 0.3 | London Clay, Gravel, Brickearth | 0 | | 0.5 | Makeup |
| 3745b | 15.51 | 0.7 | 0.35 | London Clay, Gravel, Brickearth | 0 | | 0.5 | Makeup |
| 3745c | 15.47 | 1 | 0.2 | London Clay, Gravel, Brickearth | 0 | | 0.3 | Makeup |
| 3746 | 0 | 0 | 0 | | 0 | | 0.8 | Makeup |
| 3748 | 0 | 0 | 0 | | 0 | | 3 | Makeup |
| 3749 | 0 | 0 | 0 | | 0 | | 3 | Makeup |
| 3750 | 0 | 0 | 0 | | 0 | | 3 | Makeup |
| 3751 | 13 | 0 | 0 | London Clay | 0 | | 0.9 | Makeup |
| 3752 | 0 | 0 | 0 | | 0 | | 0 | |
| 3757 | 0 | 0 | 0 | | 0 | | 6 | Makeup |
| 3760 | 0 | 0 | 0 | | 0 | | 0.25 | Makeup |
| 3760a | 0 | 0 | 0 | | 0 | | 0.63 | Makeup |
| 3761 | 0 | 0 | 0 | | 0 | | 4 | Makeup |
| 3762 | 0 | 0 | 0 | | 0 | | 4 | Makeup |
| 3762b | 0 | 0 | 0 | | 0 | | 4 | Makeup |
| 3763 | 0 | 0 | 0 | | 0 | | 2.1 | Makeup |

Table 6- St Pancras 1995: Archaeological and geoarchaeological results from geotechnical observations.

All measurements in metres.

| Hole Number | Top level of geological deposit 1 (London Clay) | Thickness of geological deposit 2 (Gravel) | Thickness of geological deposit 3 (Brickearth) | Geological deposits desription/remarks | Thickness of pre-railway deposit(s) | Pre-railway deposits desciption | Thickness of railway period and later deposits | Railway and later deposits, description/remarks |
|---|---|---|---|---|---|---|---|---|
| 3771 | 0 | 0 | 0 | | 0 | | 3 | Makeup |
| 3772 | 19.87 | 0 | 0 | London Clay | 0 | | 1.65 | Makeup |
| 3773 | 19.62 | 0 | 0 | London Clay | 0 | | 1.9 | Makeup |
| 3774 | 19.63 | 0 | 0 | London Clay | 0 | | 1.8 | Makeup |
| 3775 | 19.53 | 0 | 0 | London Clay | 0 | | 1.85 | Makeup |
| 3776 | 19.41 | 0 | 0 | London Clay | 0 | | 1.9 | Makeup |
| 3777 | 19.33 | 0 | 0 | London Clay | 0 | | 1.9 | Makeup |
| 3781 | 24.07 | 0 | 0 | London Clay | 0 | | 3.7 | Makeup |
| 3803 | 29.63 | 0 | 0 | London Clay | 0.5 | Possible Pond Deposit | 0.7 | Makeup |
| 3804 | 28.07 | 0 | 0 | London Clay | 0 | | 1.5 | Makeup |
| 3805 | 27.9 | 0 | 0 | London Clay | 0 | | 1.4 | Makeup |
| 3806 | 28.89 | 0 | 0 | London Clay | 0 | | 1.1 | Makeup |
| 3810 | 25.19 | 0 | 0 | London Clay | 0.6 | Possible Pond Deposit | 0.7 | Makeup |
| 3817 | 0 | 0 | 0 | | 0 | | 3.3 | Makeup |
| 3818 | 0 | 0 | 0 | | 0 | | 3 | Makeup |
| 3820 | 0 | 0 | 0 | | 0 | | 4.5 | Makeup |
| 3822 | 23.2 | 0 | 0 | London Clay | 0 | | 1.4 | Makeup |
| 3825 | 0 | 0 | 0 | | 0 | | 2.2 | Makeup |
| 3837 | 19.24 | 0 | 0 | London Clay | 0 | | 2.3 | Makeup |
| 3840 | 15.22 | 0 | 0 | London Clay | 0 | | 1.05 | Makeup |
| 3842 | 19.07 | 0 | 0 | London Clay | 0 | | 2.1 | Makeup |
| 3843 | 15.39 | 0 | 0 | London Clay | 0 | | 1.1 | Makeup |
| 3844 | 17.86 | 0 | 0 | London Clay | 0.5 | Organic Silt | 2.8 | Makeup |
| 3845 | 18.34 | 0 | 0 | London Clay | 0 | | 2 | Makeup |
| 3846 | 15.18 | 0 | 0London | Clay | 0 | | 1.05 | Makeup |
| 3852a | 14.63 | 0 | 0 | London Clay | 0 | | 1.3 | Makeup |
| 3853 | 14.97 | 0 | 0 | London Clay | 0 | | 0.55 | Makeup |
| 3854 | 14.88 | 0 | 0 | London Clay | 0 | | 0.55 | Makeup |
| 3857 | 30.9 | 0 | 0 | London Clay | 0 | | 3.5 | Makeup |
| 3858 | 0 | 0 | 0 | | 0 | | 3.4 | Makeup |
| 3859 | 17.21 | 0 | 0 | London Clay | 0 | | 0.8 | Makeup |
| 3860 | 16.01 | 0 | 0 | London Clay | 0 | | 2.2 | Makeup |
| 3860a | 0 | 0 | 0 | | 0 | | 0.6 | Makeup |
| 3861 | 16.98 | 0 | 0 | London Clay | 0 | | 0.7 | Makeup |
| 3862 | 15.4 | 0 | 0 | London Clay | 0.6 | Post Medieval Pit? | 2.2 | Makeup |
| 3881 | 28.79 | 0 | 0 | London Clay | 0 | | 0.6 | Makeup |

Table 6 (cont)- St Pancras 1995: Archaeological and geoarchaeological results from geotechnical observations.

All measurements in metres.

| Hole Number | Top level of geological deposit 1 (London Clay) | Thickness of geological deposit 2 (Gravel) | Thickness of geological deposit 3 (Brickearth) | Geological deposits desription/remarks | Thickness of pre-railway deposit(s) | Pre-railway deposits desciption | Thickness of railway period and later deposits | Railway and later deposits, description/remarks |
|---|---|---|---|---|---|---|---|---|
| 3882 | 27.67 | 0 | 0 | London Clay | 0 | | 1.7 | Makeup |
| 3883 | 28.72 | 0 | 0 | London Clay | 0 | | 0.5 | Makeup |
| 3884 | 22.19 | 0 | 0 | London Clay | 0 | | 1.4 | Makeup |
| 3885 | 21.6 | 0 | 0 | London Clay | 0 | | 1.8 | Makeup |
| 3886 | 25.26 | 0 | 0 | London Clay | 0 | | 0.4 | Makeup |
| 3887 | 22.53 | 0 | 0 | London Clay | 0 | | 0.9 | Makeup |
| 3888 | 23.41 | 0 | 0 | London Clay | 0 | | 0.8 | Makeup |
| 3889 | 17.38 | 0 | 0 | London Clay | 0 | | 0.6 | Makeup |
| 3890 | 23.83 | 0 | 0 | London Clay | 0 | | 1.05 | Makeup |
| 3891 | 24.31 | 0 | 0 | London Clay | 0 | | 0.8 | Makeup |
| 3892 | 24.56 | 0 | 0 | London Clay | 0 | | 1.2 | Makeup |
| 3893 | 23.22 | 0 | 0 | London Clay | 0 | | 1.3 | Makeup |
| 3895 | 24.22 | 0 | 0 | London Clay | 0 | | 2.1 | Makeup |
| 3896 | 23.8 | 0 | 0 | London Clay | 0.7 | Organic Silts | 1.3 | Makeup |
| 3897 | 23.16 | 0 | 0 | London Clay | 0.6 | Organic Silts | 1.8 | Makeup |
| 3898 | 22.87 | 0 | 0 | London Clay | 1.2 | Organic Silts (0.5m thick) above gleyed clay (0.7m thick) | 1.1 | Makeup |
| 3899 | 23.66 | 0 | 0 | London Clay | 0.3 | Organic Clay | 1.2 | Makeup |
| 5000 | 24.63 | 0 | 0 | London Clay | 0.2 | Organic Mottled Clay | 1.2 | Makeup |
| 5005 | 0 | 0 | 0 | | 0 | | 1.1 | Makeup |
| 5010 | 16.51 | 0.8 | 0 | London Clay, Gravel | 1 | Friable Dark Grey Silt (19th C. sludge pit?) | 0.7 | Makeup |
| 5014 | 0 | 0 | 0 | | 0 | | 1.2 | Makeup |
| 5014a | 0 | 0 | 0 | | 0 | | 1.2 | Makeup |

Table 6 (cont)- St Pancras 1995: Archaeological and geoarchaeological results from geotechnical observations.

overlying deposits present in boreholes SA3770 and SA3721. In SA3770, a green-brown clay was present from 12.27 m to 13.87 m, and was overlain by a light brown clay to 14.37 - both deposits were mottled either grey or brown and an organic odour was noted, as were pockets of black material within the lower deposit. Borehole SA3770 showed brown and grey mottled clay from 12.83 to 14.43 m OD.

iv. A fluvial origin is again most likely for all of these deposits - all are described as slightly sandy, and this coarse fraction suggests a moving water environment. The pockets of black material may mean that some peat is present, although this cannot be confirmed. It is probable that these deposits represent a fluvial event later than the brickearth and gravel described above - a reasonable model, though admittedly based on limited evidence, would be that the gravel and brickearth were formed at a higher level which was then cut through by the river. The clay deposits were then deposited at a later date within the deeper cut (see above 4.3.6, Appendix 1, 4.3).

v. One further deposit of note overlay the fluvially deposited clay in borehole SA3721. This was a grey-black sandy clay with wood fragments and an organic odour, the top of the deposit being at 15.87 m OD. Although described as containing brick gravel, this does not preclude it being a pre-industrial archaeological deposit - the presence of oyster shells is consistent with this interpretation.

vi. At the west end of the transect the London Clay is again higher, at 14.3 m, suggesting ground rising on the west side of the river valley, and the clay here was no doubt originally higher, having been truncated by an early 19th-century cellar (OP3741, see Section 4.1.2-3). In this case all of the made ground is likely to have been railway period or later, and interestingly shows no significant rise from 1848, and possibly some truncation of the upper part of the sequence (Fig. 5).

5.3 **Transect B - Trench OT3745A to Regent's Canal** (Figs 2; Appendix 1 Fig A2)

i. This transect extends from the car park at Wellers Court north through the former Milk Dock and its access cutting. The 1848 street levels are well above modern ground levels on much of this transect, and it is thus clear that there has been considerable truncation since the mid-19th century (Commissioners of Sewers map 1848-51, see Appendix 2). The heights recorded for London Clay also give the same impression, in that the untruncated clay level in OT3745A (OD 15.47 m) is higher than in any of the other pits between it and the canal on this transect, while the pre-Great Northern Railway land profile shows that the ground originally rose progressively from south to north (Figure 9; Appendix 2). Just north of the canal, a (probably not truncated) level for London Clay of 21.67 m was recorded in Borehole BH 82. This considerable differential clearly reflects the downcutting in

the middle part of this transect needed to bring a track from the Great Northern main line into the Milk Dock (see Appendix 2).

ii. Also recorded in Borehole 82 was a layer of grey and black sandy, silty clay overlying the London Clay to 22.52 m OD. The description is similar to the fluvially-deposited clay discussed above, and could represent a small watercourse crossing the area, perhaps draining westwards towards the Fleet river.

**5.4 Transect C - Northern Railway Lands - Regents Canal to York Way** (Figs 2, 5)
(Note: at SW end of this transect, Figure 5 illustrates a projected Transect C1, which is discussed separately under 6.10 below).

i. The recorded heights of London Clay along Transect C rise gently from south-west to north-east, from 24.1 m OD in OP3781 to 24.65 m OD in TP5000, probably reflecting the original topography of the area. North-west of TP5000, however, both ground level and London Clay fall away on a linear gradient of about 1:100, so that at TP3884, just north of London Way, it is some 6.5 m below the 1848 level, and 10 m where it met the main line (SR3754). The north-western area of the Railway Lands has therefore been heavily truncated.

ii. The most notable feature of this transect is that two test pits and one borehole contained deposits of clay or clay/silt which varied from black to blue-grey in colour, and which directly overlay the London Clay. The details of these deposits are as follows:

TP3895: 24.02 to 24.62 m OD - recorded as locally mottled grey clay on geotechnical log and interpreted as London Clay Grade IV - OAU and GSF records show possible alluvium

24.62 to 24.92 - recorded as grey speckled black clay with flint and brick gravel on geotechnical log and interpreted as made ground. OAU and GSF records show possible alluvium - brick gravel may therefore be intrusive.

SA3878: 24.12 to 24.72 m OD - Green-grey speckled black clay. Interpreted on geotechnical log as 'head'.

TP5000: 23.63 to 24.93 - Organic clay recorded by OAU. Geotechnical log records grey mottled clay but only to 24.23, interpreted as 'head'. Black clay above this to 24.83 is interpreted as made ground. The organic clay was sampled and examined for palaeo-environmental data by Dr Mark Robinson, but no definite interpretation was possible (Appendix 3, see discussion below).

iii. The interpretation of these clay deposits as `head' is problematic in that this is normally taken to mean deposits formed by colluvial processes or by solifluction. However, the geoarchaeological assessment indicates the possibility of a fluvial origin, and it is noticeable that these clays are very similar in description to other local deposits for which a fluvial origin is postulated on the evidence of peat-like deposits which are characteristic of fluvial deposits but not of solifluction deposits (e.g. see 5.2, Transect A; 5.5 Transect D). The preferred interpretation here is that the clay was laid down by a low-energy fluvial environment (the presence of a coarse fraction in the deposits indicates moving water). It is more difficult to estimate whether the clay was laid down at the same time as that recorded on Transect A - this is certainly a possibility though the Transect C deposits could also be earlier. In general, the evidence presently available is insufficient to pursue this argument further.

iv. Finally on Transect C it is notable that there is a considerable depth of made ground to the SW in OP3781 where the clay is falling away (presumably dipping towards the Fleet). Topographically this area is an extension to the embankment ramp which carries the Midland main line to the canal viaduct, and the made ground must represents infilling to create this former siding at the grade of the main line. It is presumably illustrative of the scale of filling which forms the main line embankment south from here as far as St Pancras churchyard.

**5.5 Transect D - Northern Railway Lands, south-north section** (Figs 2; Appendix 1, Fig. A3)

i. Only one pre-railways level approximates to this transect, 30.8 m OD on the line of York Way near north end of transect.

ii. Starting at the south end, clay deposits similar to those described for Transect C (above) were recorded both in TP3898 (from 21.97 to 22.87 m OD) and in TP3899 (from 22.96 to 23.96 m OD). Pockets of peat and some organic debris were present within the clay in TP3898, and possibly also in TP3899 (recorded as `pockets of soft black organic clay'). As in Transect C, the geotechnical logs interpret both of these deposits as `head'. An alternative interpretation has been set out above under Transect C (5.4), and in the present case this is preferred because peat is an unlikely component of colluvial `head'.

iii. Working northwards the fluvial deposits appear to be truncated, ie TP3886, 3890 and 3891 showed only London Clay. This may reflect terracing of the natural slope of the land to form the railway yards, because although TP3882 showed only made ground (the pit stopped at the top of London Clay), the adjacent SA3718 drilled through the embankment carrying the North London Line recorded London Clay at 28.54 m. This level approaches the 1848 level of 30.8 m OD on Maiden Lane near the north end of the transect, and may therefore reflect a buried

profile unaffected by the railways.

iv. This plausible identification of a pre-railway ground level at this north end of the survey area is important, because it is the highest contour on which there is corroborative information, and offers a remote datum for interpreting a group of exposures of alluvial or head deposits in the area of the Horse Infirmary (see below 6.1.5).

## 6 DEPOSIT SURVIVAL IN THE SURVEY AREA (Fig. 6)

The archaeological findings have been shown above to conform with the geoarchaeological and historical topography assessments as presented in transects across the survey area. The present account is designed to extrapolate from the transects to argue the spatial aspect of deposit survival, with particular reference to those parts of the survey area where there is little corroborative data, ie the central part of the Railway Lands, St Pancras village and the site of the former hamlet of Brill.

### 6.1 Northern railway lands

For convenience of reference, and to assist a general synthesis of results from the geoarchaeology and historical topography, this account builds clockwise around the Railway Lands starting from the north-east, drawing inferences from Geoarchaeological Transects B, C and D, ending with the least understood central area.

*6.1.1 Deposit survival in ECML cutting from Copenhagen portal to line of York Way viaduct* (Figs 5 (Transect C), 6, 9)

i. Pits in this area include OP3730, 3731, 3731A, 3885; TP3884, 3887. A review of the geotechnical logs confirms that in each case a variety of railway structures was abutted by make-up ranging from Victorian crushed brick to modern ballast. Where London Clay was encountered it was sometimes of a high stiffness (Grade II in OP3731A) arising from truncation of all lesser grades, but this was not consistent, and proved not to be useful for discriminating the extent of truncation. The findings of the historic topography survey confirm however that this now ravine-like area arises from downcutting by the railways (45 feet at Copenhagen Portal, 14 m).

ii. It is noteworthy that the pre-railways profile illustrated by the deposited drawing of `1852' is slightly undulating (Fig. 9). A dip in this area corresponds to a slight dip in the 1848 levels along Maiden Lane, at a point where a brook seems to issue and run into the survey area. This is a potential water-source for the `fluvial deposits' identified in Transect C (5.4 above).

*6.1.2 Deposit survival in the area of the former Potato Dock* (Figs 6, 9)

i. Five observation trenches in the area of the former Potato Dock/Market gave information on the potential survival of archaeological deposits, particularly the impact which the railways had had on the original topography.

ii. Three of the trenches came down onto the brick crowns of sections of railway tunnel. Two (OP3820, OP3825) showed disturbed clay infill with 19th-century finds which appear therefore to have been constructed by cut-and-cover techniques. The third (OP3822) located a tunnel crown under undisturbed London Clay, and had clearly been bored, and hence could have preserved a historic land surface above it.

iii. Hunter and Thorne (1990, 51) indicate that the original tunnel of 1851-2 was supplemented with a second opened in February 1878, and a third opened in June 1892. The location of the pits suggests that OP3820 was seeing the eastern bore, OP3825 the central bore and OP3822 the west bore. It is not clear that this is the order in which the tunnels were originally constructed, ie working from east to west, although it appears that the two air vent shafts correspond with the east (ie possibly first) bore. In adding tunnels progressively westwards the cut-and-cover technique would have brought new cuttings increasingly into conflict with structures associated with the Midland Shed, the former temporary passenger terminus of 1851. This raises a question over the date of the roof structures here. Hunter and Thorne (1990, 103-4 and Figure 63) imply that the present roof was built by Andrew Handyside in 1888, but Duckworth and Jones (1988) imply that the spandrels are the originals, and perhaps in their original locations. The inference from the archaeology is perhaps that the potato dock overall was put out of action for the duration of tunnelling of both 1878 and 1892, and it is possible that the roof structures were either dismantled or shored up during these operations. Certainly the bored tunnel had less than 2 m thickness of London Clay above its heading as it ran beneath the potato dock main siding, which must presumably therefore have been closed for safety during tunnelling.

iv. The final two observation pits in this area were to the east (OP3817 and OP3818), and came down into deep cellars. These were presumably the 'cellar space for storage' of the thirty-nine small warehouses built in 1864-5, and it is possible that the lowered roadway between them and Maiden Land/York Way was designed to service the cellar space.

v. Of particular interest in this area was the possibility of finding undisturbed ground surface. Clearly this was ruled out over the cut-and-cover tunnels. OP3822 above the bored tunnel showed the top of London Clay, but at a level (OD 23.12) which could indicate that it had been truncated for the incline rising from the main line level to the terminus/potato dock level (Maiden Lane here was at 24.68 m OD in 1848). The most convincing datum for surviving surface to the

London Clay comes however from borehole BH 82 (see Transect B), where a fluvially-deposited clay was recorded at 22.52, which is suggested as a small watercourse, and might (like the possible brook to the north (6.1.1) have been entering the survey area from the east. It is affected by two manholes for proposed diversion of the Camden Sewer.

vi. It is concluded therefore that archaeological deposits may survive beneath the southern parts of the Potato Dock in a narrow strip between the storage basements and the cut-and-cover main-line tunnels, and probably more extensively to the west of the cut-and-cover tunnels, but northward may have been progressively truncated in creating a gradient from the main line.

*6.1.3 Deposit survival in the area of the Great Northern Granary (now National Freight Depot) and former coal drops* (Fig. 6)

i. This area is excluded from the proposed terminus works, and the level of geotechnical data is low. Four canal docks entered the south side of the granary complex at basement level, whence goods were lifted through flaps up to the ground floor of the buildings, the level of the Great Northern tracks. OAU has no datum on the granary floor, but it can be predicted that ground disturbance will have arisen from: the canal docks; foundations of the six-storey building; from the track and platform arrangements within the granary. There may also have been some incutting to the north of the granary to create an incline from the main line cutting.

ii. In the area of the Eastern and Western Coal-drops there was another canal basin, which communicated with the same arm of the canal, ie below the lock (Hunter and Thorne Fig 31). Other ground disturbance will have arisen from excavation to create a bagging and distribution level beneath the coal-drops, which is still evident in the ramp down from Wharf Road. The estimate of area of truncation on Fig. 6 is indicative, not based on survey. This area is shown as a 'Brick Fields' with two 'wash mills' on the Great Northern proposals map deposited in 1852. The association with brickworking does not necessarily imply extraction of clay over the entire plot, since some areas were no doubt used for firing the bricks, but it may nevertheless be extensively disturbed in the pre-railway period.

*6.1.4 Deposit survival in area of Galliford's Yard* (Figs 5 (Transect C) and 6)

The pits in this area include TP3895-9, 5000, 5014A. Those along the south edge of Galliford's yard (TP 3896-7) show a substantial depth of superficial deposits above the London Clay (see Transects C and D, also Appendix 3, TP3896). Map regression suggests that this could be the relict line of a field boundary (Roque; 1801 map), perhaps the course of the brook suggested under 6.1.1 above. There is a low terrace forming the south edge of this area, probably resulting from levelling down of the railway yard to the south, which is therefore likely to have been truncated.

*6.1.5 Deposit survival along the line of Wharf Road (including Horse Infirmary area)*(Figs 5 (Transect C), 6)

i. This group of pits includes TP3738A, 3739 and 3810. The first and third of this sequence were sampled for environmental purposes (see Appendix 3, para 4) and the superficial deposits may be interpreted as the residue of a field boundary which came to divide the Great Northern Railway Lands to the east, the Midland Railway to the west. Survival of superficial deposits suggests the land had not been truncated to any great extent, which is corroborated by the similarity of the surviving level of Wharf Road with the values provided by the enhanced topographical survey for Agar Town (see 6.2.1 below, and Appendix 2).

ii. So it is reasonable to conclude that this western edge of the Kings Cross Railway Lands was roughly at original level at its south end, opposite Agar Town. Moving north on this line, pits in the north-west corner of the Railway Lands showed similar alluvial deposits at a higher level (around 28 m OD), which may reflect the steady rise of the clayland topography northward (again described as `head', TP3804, 3805). The land here, including the Horse Infirmary, stands above the general level of the yard, and might therefore have contributed to modelling the topographical development of the area if it could be demonstrated that the adjoining embankment of the North London Line (operational by 1851) had sealed a recognisable buried ground surface before the Great Northern Railway developed its yards. This proved to be difficult. TP3803 had a deposits showing humified plant material at 30.05 m OD, otherwise indistinguishable from the weathered London Clay at 29.6 m OD. The only comparable evidence of a pre-railways land level is that discussed above under Transect D on borehole and topographical evidence at sites 250 m to the east. The level of 30.8 m OD in 1848 for Maiden Lane is closely comparable, and the Horse Infirmary therefore may represent the best exposure of a pre-railways buried surface in this otherwise remote part of the survey area.

iii. It is concluded therefore that there are cases where alluvial deposits coincide with topographical evidence of pre-railways features, but that the link could not be firmly established by clearly characterising a buried soil profile.

*6.1.6 Deposit survival on Midland Main Line and former sidings, west of above* (Figs 1a, 5, 6)

Because of the limited effects of the proposals on the Midland Main Line and former sidings north of the Canal, there were relatively fewer pits. Transect C shows OP3781 to the south-west against the canal wall (see also Fig. 1a (left)), and comparison with TP3737 at the north end close to the North London Line bridge is instructive in showing that the land-raising over the site of Agar Town (2 m estimated in Appendix 2) had thinned to effectively nothing at the north end of the former yards, indicating that the deposit represented a ramping up of the main line

to the canal viaduct.

*6.1.7 Deposit survival in central area of Railway Lands* (Figs 5 (Transects C), 6, Appendix 1(Transect D))
This area is most remote from pre-railways topographical data. Inferences depend on the archaeological conclusions from Transects C and D (above, 5.4, 5.5; Fig. 5). The deposits capping the London Clay here are distinctive within the wider survey area, and the conclusion of a fluvial origin could imply a complex of field boundaries channelling water from a brook (see 6.1.1, 6.1.2 above).

**6.2 Deposit survival in other parts of survey area**

*6.2.1 Deposit survival in former areas of St Pancras settlement and Agar Town* (Figs 5, 6)

i. URL 1994 notes the archaeological potential of the area around St Pancras Old Church, and of the 19th-century slum settlement of Agar Town (OAU November 1994: 4.3.3.2-3), but owing to the difficulty in finding available locations for test pits, this area was not well investigated during the ground investigations reported on here. In order to place the findings in a geoarchaeological context an additional Transect C1 has been added to Figure 5, which matches the relationship of Transect C to the line of the Fleet, in this case 150 m down-valley.

ii. Observation pit OP3860 was excavated against the cemetery wall of Old St Pancras Church. This demonstrated an earlier retaining wall of brick construction which underlies the existing wall. All other recorded deposits were, however, 19th-century or later made ground above the London Clay at 16.06 m OD.

iii. Inside the adjoining Railway viaduct arches, observation pit OP3889 went through concrete and 19th-century fill to London Clay at 17.4 m OD. This relatively low level for the clay may in part reflect cutting down to achieve headroom inside the vault, because the borehole evidence immediately to the north in the area of the former extension graveyard showed clay at higher levels (see below). Better survival is seen in the southern arches of the viaduct, where TP3862 encountered layers of clay associated with a 9" brick wall and a brick-lined well at 17.2 m OD, all cut through a layer of dumped material, with London Clay at 15.3 m. The inference here is that industrial land had been reclaimed prior to construction of late 18th-century or early 19th-century houses, which may survive well. The poorer survival at the north end of the viaduct may arise because a relatively level vertical alignment of the railway had necessitated cutting into the slope of the land. It is important to note that the Fleet valley here (on the basis of the gradient of Pancras Road which follows the line of the river) is falling at a gradient of about 1:200, and only flattens out south of the point where the railway passes over it (to about 1:1400).

iv. Returning to the former graveyard area, Borehole SA3717A showed the surface

of London Clay at 20.41 m OD. In this case it was covered by an intermediate layer of 1.5 m of sandy clay which contained gravel, ash and brick. A further 3 m of very rubbly made ground formed the upper part of the sequence, which was presumably the continuation of the main line embankment noted in Transect C above. An intermediate layer like that in SA3717A was noted in other boreholes within the bounds of the former graveyard: SA3758 (between 20.14 and 21.54 m OD); SA3726 (18.52 to 21.97 m OD); SW3725 (19.64 to 20.24 m OD); SA3783 (18.93 to 20.73 m OD). The closest comparative pre-railway (1848) ground level is on the line of (now) Camley Street at 21.34 m OD (conversion factor supplied by OS, see Appendix 2), and suggests perhaps that the intermediate deposits in the boreholes represent demolition and construction deposits of the 1850s overlying the graveyard and any medieval village deposits. Early 19th-century housing on (then) Cambridge Street was swept away for the construction of the railway embankment, and graves affected by the cut-and-cover construction of the (now) Thameslink underground line were removed for reburial.

v. It is unclear if graveyard clearance extended beyond the corridor directly affected by the cut-and-cover work, and the area of the former village where it is sealed by the main line embankment represents one of the major uncertainties at St Pancras. Only one observation pit (OP3752) was excavated in this area, and this was not monitored archaeologically before the trench was curtailed at 3 m depth (21.7 m OD) having achieved its geotechnical objectives (C Place of URL visited and photographed the trench). In retrospect it can however be seen from the boreholes that at this depth it was unlikely to have shown anything but embankment fill. The intermediate layer may therefore include deposits of the medieval village in addition to its brief usage as a graveyard; it is unlikely that such deposits would have been recognised in the a borehole survey, although the drillers had been alerted to the potential interest in bone at this level.

*6.2.2 Deposit survival in former area of Brill hamlet and hospitals* (Fig. 6)

i. The area once occupied by the medieval and post-medieval hamlet of Brill, and crossed by both the Fleet and Brill rivers, was noted as an area of archaeological potential (URL 1994: 4.3.3.5). There were few test pits and boreholes in this area (all but one test pit in St Pancras Station were at station deck level and never reached archaeology) and the only notable deposit was a dark grey mottled black organic clay in borehole SR 3729, from 13.08 to 13.88 m OD. The description tallies well with deposits further north in the valley of the Fleet river which were interpreted as fluvial (see Fig 5 (Transect A), 5.2).

ii. Test pits OP3749, and OP3750 were above the existing Metropolitan and Circle line ticket hall, and showed at least 3 m of made ground, much of it being re-deposited clay; this would be cut-and-cover infill of the underground station, and London Clay was not reached.

iii. Observation pit OP3751 showed detail of the external basement area of the Great Northern Hotel cut into London Clay. The construction included spur footings evidently to brace the external revetment of the basement area; set into the floor was a wooden barrel which had apparently functioned as either a rainwater gully or a sump for pumping groundwater during construction work.

iv. These observations add to the findings of Transect A (above 5.2). They infer that, in the substantial areas where St Pancras Station is of solid fill construction (shown green on Fig 6, see also URL 1994, Vol 4, Fig B2), including most of the north end, part of the west side and much of the forecourt, there could be preservation of deposits like that shown by borehole SR3729. These are added to the extensive areas of potentially good survival as illustrated by the archaeological trench OT3745, where good preservation of a buried soil is noted (4.3, 5.2) .

## 7 SPECIALIST REPORTS

### 7.1 Medieval and Post-medieval Pottery Assessment by Lucy Whittingham

i. This assemblage is primarily post-medieval in date with a total of 135 sherds (2.1 kg) retrieved from 23 contexts. Twenty one contexts produced post-medieval pottery of an 18th to 19th-century date with occasional 17th century wares also present. Two of the contexts can be dated as medieval, producing solely pottery of a mid 13th to mid 14th-century date.

ii. The majority of the sherds are well preserved and of a reasonable size suggesting that the post medieval site stratigraphy is not particularly disturbed. The medieval sherds are, however, very small (2 g) and abraded and therefore unlikely to be primary in their location.

iii. Three early medieval sherds are found in this assemblage; a quartz gritted and shell tempered cooking pot sherd (EMSH?), a Kingston Type Ware sherd and what is possibly an imported Saintonge Ware sherd. The identification of these very small, abraded sherds must be treated with some caution. The quartz and shell tempered sherd occurs as residual material in an 18th-century context (3860/-/5). The Kingston Ware sherd is found in context 3745/A/6 and the possible Saintonge Ware in context 3745/B/25. Their size and condition could result from ploughing of the deposit.

iv. 87% of the total assemblage is comprised of later post-medieval wares which include Transfer Printed Ware, Creamware and Pearlware cups and plates, Red Earthenware cooking vessels and flower pots, English Stoneware bottles, Scratch Blue decorated white stoneware jars and Tin Glazed Earthenware chamber pots and ointment pots. The same twenty one contexts also produced a small amount (10%) of earlier post medieval material. This is comprised of 17th to early 18th-century Surrey/Hampshire Border Ware pipkins, Metropolitan Slipware dishes, Glazed Red

Earthenware storage jars (PMR and PMFR) and Staffordshire Slipware dishes.

v. This ceramic assemblage is of limited interest except as a record of the types of pottery found in this location. Since the majority of the pottery is late post-medieval and the products of well documented industries there is little to be gained from further detailed study of this assemblage.

vi. The fabric codes used for pottery identification are those established by the Museum of London, Dept of Urban Archaeology and expanded by Orton (Orton 1988).

## 7.2 Small finds by Leigh Allen

There were four iron objects recovered from the excavations in the St Pancras area. Three of these were nails the fourth was an unidentifiable strip.

**Strip, iron, incomplete.**
Rectangular strip of iron, with a rectangular cross section, broken at both ends: L:40 mm; Ctx 3745/B/5.

**Nail**, iron, incomplete.
A very corroded iron nail, the head is incomplete, the shank has a square cross section the tip is missing: L:57 mm; Ctx: 3745/B/5

**Nail**, iron, incomplete
A very corroded iron nail, the head is incomplete, the shank has a square cross section the tip is missing: L:56 mm; Ctx: 3745/B/5

**Nail/spike**, iron, complete
Large nail or spike with a circular flanged head, the shank has a square cross section: L:128 mm; Ctx: 3743/-/2

## 7.3 Cartridge caps and the Kings Cross Cartridge Works by Brian Gilmour, Royal Armouries

### 7.3.1 *Introduction*

The site of a former London ammunition factory situated between Kings Cross and St Pancras Railway Stations was the subject of an evaluation and watching brief and limited archaeological investigation by the Oxford Archaeological Unit in October 1995, in advance of development. Several finds of copper alloy were submitted to the present author for possible identification and risk assessment, as they were clearly the remains of cartridge cases of some kind. Preliminary examination of these cartridge remains suggested that they were too corroded to pose any safety threat.

7.3.2 *The site*

i. Apart from the few remnants of cartridge cases found during this archaeological work the only clue to the identity of the site was the 1st Series Ordnance Survey map for this area of 1874 which marks the site as a `Cartridge and Percussion Cap Manufactory'. The building is shown backing onto Upper Edmund Street beside Kings Cross Station to the east, although it was clearly entered from the west through an archway in a row of terrace houses fronting onto what was then called Old Saint Pancras Road to the west (location see Figure 2, OP3745). In 1874 the site of the cartridge works was further bounded by an alleyway, St Pancras walk, to the north-east and a printing works, which in turn fronted a short side street, Wellers Court, to the north-west.

ii. Kelly's Post Office London directory for 1874 identifies the cartridge works as being operated by Eley Brothers who were based a mile or so to the south at 254 Grays Inn Road. Entries for other years shows that this use of this site was quite short-lived, listed as Eley brothers ammunition factory from 1873 to 1878. The address is given as 8, Old Pancras Road (variously listed also as St Pancras or simply Pancras Road during the last half of the 19th century). Given the short timespan of occupation as an ammunition works, the 1874 publication of the detailed Ordnance Survey map for this area was fortuitous for the identification of this use of the site.

iii. In 1872 the site of 8 Old Pancras Road is listed as being occupied by a tobacconist which suggests that the area behind may have been developed by Eley Brothers specifically for the setting up of a new cartridge making works after the publication of Kelly's Directory for 1872 and before publication the following year. On the 1874 OS map the covered area of the cartridge works is shown as being approximately 50 m square, and occupying much of the area behind the Old St Pancras Road street frontage.

iv. Eley Brothers is reported to have undergone a major expansion in 1874 although it would appear from the evidence of this site that this phase may have begun a year or so beforehand. There were clearly a number of changes which occurred over the previous 10 years or so. In 1861 Eley Brothers were based in Calthorpe Place (between Grays Inn and Farringdon Roads) but by 1866 the main offices had moved to 254 Grays Inn Road. As yet it is not clear why the Eley cartridge and percussion cap works at Kings Cross only lasted for six years ( although search through the records of the present Eley company might shed light on this). Possibly the site was found to be less suitable than was thought and the close proximity of an ammunition factory to the main passenger parts of Kings Cross Station only some 40 m away may have been a factor.

v. For some years after 1878 No 8, Old St Pancras Rd is not listed as having an occupier and so presumably the works was unoccupied for a time. The premises

appear to have been given over for use as a commercial vehicle garage by 1907 when the occupiers were the London Omnibus Co. Ltd who in the following few years were succeeded by the Vanguard Motor Bus Company and the FIAT Motor Cab Company.

7.3.3 *The finds*

i. A few finds were made on the site which relate to its use as a cartridge manufacturing works and these would appear to relate to different stages in the manufacturing process. Most useful for the identification of the products of the factory were the recovery of the two very corroded but more or less complete cartridge heads, although part of one of these appears to have become detached during burial. The more complete of these was examined first of all by eye which revealed it to be of a type pre-dating the modern one piece, drawn brass cartridge case construction. It was clearly of a composite construction with copper alloy components attached to an iron base in the shape of a washer. Remains of cardboard and paper elements to the construction can also be seen.

ii. This overall composite form of construction was used for two types of cartridge in the 1870's, those made for the Snider and Martini-Henry rifles and, although the complete cartridges were rather different, the size and construction of the head was very similar and an identical pierced iron disc was used in each case. A fairly reliable identification of the more complete surviving heads was made possible by comparing it with surviving complete Snider and Martini-Henry cartridges of this period. Apart from the head, little remained of the original cartridge, but what appeared to be the remnants of paper fixed to the outside of a sheet brass tube suggests that this was the Snider form, made for the 0.577 inch calibre Snider rifle, although both Snider and Martini-Henry cartridges seem likely to have been made by this factory.

iii. To further identify its method of construction, type and possibly also its date more exactly, this more complete cartridge cap was then mounted in resin, sectioned and the internal structure examined. From this the composite construction became much clearer. The washer-shaped iron ring was found to be totally corroded although it is likely to have originally been made from Low Moor wrought iron ( produced at the foundry near Leeds) which is known to have been used for cartridge making at this time. Attached to this iron ring were two sheet brass cups one inside the other, the inner being about twice the height of the outer. Inside the base of the inner cup was a compressed cardboard ring which survived fairly well, and between this was the battered remains of the main tube of the cartridge case which consisted of thin brass around the outside of which cartridge paper (hence the name ) was fixed.

iv. The compressed cardboard disc and other parts were attached to the iron ring by means of the brass cap chamber which also acted as a rivet. After the main

composite body of the cartridge was put together, the case was completed by the insertion of the copper primer cap which was pushed in to place. Before this was done the inner side of this cap was coated with the primer material, mercury fulminate, and the inner anvil - against which the fulminate coated surface would be detonated - put into place. In this case the anvil consisted of a shield shaped piece of brass which would appear to predate the iron anvil used for this type of cartridge from about 1875. Further work would be needed to confirm this although the iron base ring was introduced to replace the earlier, weaker, brass base ring of the Mark 3 Snider cartridge in 1867 (giving the Mark 4 Type). The calibre of 0.577 inch was introduced in 1866 and continued in use into the early 20th century.

v. The second cartridge cap was missing all traces of its tube and therefore could belong to a Snider or a Martini-Henry type of cartridge. The other find consisted of the remains of several brass caps, both of the 0.577 inch as well as a smaller calibre. Also found were the remains of more brass inner chamber pieces and copper caps, none of which seem to have been used in assembly of cartridges.

## 8 KEY GEOARCHAEOLOGICAL CHARACTERISTICS, SUMMARY OF RESULTS AND ARCHAEOLOGICAL CONCLUSIONS (Fig. 8)

Geoarchaeological assessment, watching brief and limited evaluation have provided a context for the archaeological picture of the survey area as presented in URL 1994 (Fig 4.8), which had itself focused on the history of the Fleet river, the Roman and early medieval settlement pattern and 19th-century expansion of industry, housing etc. The findings confirm the prediction that 20th-century disturbance is relatively light, and at the same time add considerably to understanding of 19th-century developments. The new archaeological insights may be considered under the general zones presented previously (OAU 1994, Fig 4.8).

### 8.1 Area A - Canal and Railway Lands (above 6.1; Fig 8)

i. *Area Ai*

One potential tributary of the river Fleet has been identified from topographical data, possibly another from a borehole log. Several small exposures suggest the mapped tributary may have been the source of undated fluvial deposits in a relatively flat area in the centre of the Railway lands. The exposures were sufficient to confirm that this was extensive, but would not necessarily have identified archaeological dating evidence of the Roman or Saxon activity predicted previously (OAU 1994, 4.3.3.2). The dumping predicted previously proved to be limited to hardcore related to the railway yards, while an extensive area forming the east side of this Zone was instead characterised by truncation of all deposits before application of similar hardcore. Survival of significant railway remains (circular engine shed) could not be ruled out (shown on URL 1994, Fig 4.5).

ii. *Area A ii* (above 6.1.6; Fig. 8)
The site of Agar Town is shown to be well protected by a cushion of fill, and will be unaffected on available information of proposed engineering.

iii. *Area A iii* (above 6.1.2; Fig. 8)
The assumption of previous destruction of deposits by the canal and railway tunnels was not contradicted, except in the case of the western of the three Gasworks tunnels which was shown to have been bored.

iv. *Area A iv Gasworks area*
The presumption of extensive disturbance in the gasworks area was generally upheld by fieldwork results.

8.2 **Area B - St Pancras Village Centre** (above, 6.2.1; Fig. 8)
i. *Area B i*
Evaluation and assessment has shown that the site of the extension graveyard partially destroyed in the 1850s (URL 1994, Figs 4.1-5) has been buried beneath over 3 m of railway embankment, and although no bone was reported in the borehole logs, any remaining graves and any deposits of the Saxon and medieval village into which the graves had been cut will be well preserved, both probably represented by a thick deposit recorded in each of four boreholes.

ii. *Area B ii*
Here the part of the former village mapped in 1801 immediately south of the churchyard has been truncated by the viaduct and coal-drops. This probably arises because the viaduct had been terraced into the slope along Pancras Road, since further south some horizontal stratigraphy of the predicted pre-railways housing had survived beneath the internal floor of one of the undercroft arches. There is no new information on the Fleet channel as it passes the village site, and it is likely that any waterlogged organic deposits will be affected only at the south end of the area where the channel impinges on the site of the proposed Thameslink underground station (10.1.4).

8.3 **Zone C: area of St Pancras Station** ( above 5.2, 6.2.2; Figs 5A, 8)
Inferences on the presumed river channels and early settlement predicted in URL 1994 (Zone C) are drawn from borehole data in the context of geoarchaeological Transect A. Undated silty deposits (possibly with organic remains) recorded in several places may arise from a broader meandering character of the river at the point where its gradient had changed, with settlement as predicted. Some information on a 19th-century street frontage was recovered archaeologically.

8.4 **Zone D: area of Kings Cross Station** (above 5.2, 6.2.2; Figs 5A, 8)

*Area Di*

i. Evaluation provided an important datum for modelling settlement in the well preserved pre-industrial ground surface between the stations, which constitutes a relatively large example of an 'island of earlier deposits' as predicted (URL 1994 Zone D). It is argued that the limited medieval pottery relates to manuring of a cultivated area on what is the only true buried soil (locally disturbed) which was exposed anywhere in the study area. This soil was of a character which could have been used for medieval agriculture, and the distribution of similar data from boreholes might argue that the deposit conformed to the shape of an enclosure mapped in 1746 (Roque's map) and now bounded to the east by Cheney Road.

ii. *Area Dii*

There was no new insight into the smallpox hospital or any graveyard; the basement of the Great Northern Hotel was shown to have truncated all deposits in part of this area.

## 9 ASSESSMENT OF SIGNIFICANCE AND ARCHAEOLOGICAL POTENTIAL

The principal areas of deposit survival identified above can be used to reassess significance and archaeological potential in the survey area (Fig. 8)

9.1 **The central part of the Railway Lands** (Fig. 8, reassessed Zone Ai)

On the evidence of the limited exposures, the identified deposits do not relate to predicted settlement as such. They have the potential for yielding evidence on the palaeo-environment of this land, and of comparing it with results from a contrasting gravel subsoil on the floodplain of the Fleet (English Heritage 1991, 38). Their significance must be judged in the light of the uncertainty as to whether they could be associated with a datable pattern of enclosures given the difficult soils, set against the absence of any comparable archaeological deposits in the district. On the minimal available evidence the significance of the deposits are of local significance or local to district significance.

*significance: local to district.*
*potential (on available evidence): low*

9.2 **The extension graveyard of St Pancras** (Fig. 8, reassessed Zone Bi)

i. Reassessment in this area arises from the logs of four boreholes (no deposit was seen directly), but these seem to corroborate the geoarchaeological model for the general area. At levels corresponding to a local 1848 ground level, similar deposits are recorded in all four logs, and are conjectured to include the remains of railway construction, graveyard fill and any medieval village deposits.

ii. The significance of such deposits could only reasonably be evaluated by deep excavation which has not proved practicable so close to the operational railway. Assessment of archaeological significance thus depends on the documentary,

topographical and archaeological inference that the church represents the nucleus of a Saxon estate, which by the 13th century had forty houses (URL 1994). If any element of this settlement existed on this site it is likely to have been partially affected but not destroyed by graves of the extension graveyard, and the deposit overall has group value in relation to the adjoining churchyard. Removal of affected graves for reburial is likely to further disturb any Saxon or medieval element of the deposit, which on the evidence of this evaluation could be one of the few surviving deposits of the putative village adjoining the churchyard.

iii. Archaeological potential of this deposit arises from the extent to which the impact will affect deposits which might answer significant archaeological questions. The surviving graveyard would at most be a small sample of an already incomplete 19th-century population, potential assessed as low; village deposits have higher potential because of their group value in relation to the church.

*archaeological significance of the 19th-century burial ground is local, significance of any surviving Saxon and medieval village is potentially regional.*

9.3 **The valley of the Fleet south of medieval village** (Fig. 8, reassessed areas of Zones Bii, C and Di)

i. Deposits of the Fleet valley are demonstrated by Archaeological Transect A, coinciding with the area of impact by the engineering requirements of CTRL. Part of the affected area has been evaluated, and although locally disturbed, on limited pottery evidence it could have been affected by manuring related to medieval cultivation. The absence of similar valley deposits in the district means that they are potentially of more than local significance in plotting the extent of arable land of a Saxon and medieval village in relation to its river, in the immediate hinterland of early London, contrasted with a clay area of the parish (9.1 above). There is potential for recording a series of profiles to confirm the extent of the gravel subsoil and any pattern of enclosure ditches, and recording a continuous section of the deposit from Kings Cross to the Fleet. Potential is therefore moderate because of the extensive area affected.

ii. Archaeological significance of the presumed Fleet channel itself can only be assessed on the inference of possibly fluvial deposits from borehole logs, set against the 19th-century disturbance which was found to have affected the sites of both relevant archaeological trenches. In the light of the locally unparalleled geomorphology of the valley floor at this point, significance is assessed as uncertain but potentially more than local. The extent of engineering overall offers the possibility of creating a reliable reconstructive geoarchaeological model of the width of the flood plain and its river channel, transcending any localised and even relatively extensive disturbance by intrusive features (brick and tile workings, domestic housing, main services and railway works), in a district where nothing similar exists.

*Archaeological potential: medium to high*

**9.4 Post Medieval and Industrial deposits** (Fig. 8, various Zones, A B and D):

i. Significant later structures lie within the area of impact. The extension graveyard east of St Pancras church has been assessed above as a group with possible village deposits under reassessed Zone B1 (9.2).

ii. In the Railway Lands the circular engine shed lies in the line of a cut-and cover tunnel, possibly including its turntable; its survival is not ruled out by the test pitting. It would be of local archaeological significance. It falls within the reassessed area of Zone A1.

iii. Finally the site of an 18th-century smallpox hospital at Kings Cross. 18th-century hospitals and poorhouses often had cemeteries, and on the evidence of deposit survival at OT3745A, B, and C, any cemetery here could be well preserved, although it should be stressed that a cemetery was not identified during the Environmental Assessment. If present its archaeological significance will depend on the number of burials and the quality of survival for demographical and palaeopathological study: this cannot be assessed, but may be more than local. The potentially surviving parts of it fall within the reassessed area of Zone D1.

## 10 ASSESSMENT OF IMPACT TO THE ARCHAEOLOGICAL RESOURCE

### 10.1 Engineering of terminus: Impacts and Archaeological Effects (Figure 7)

10.1.1 *Reference provisions*

Annex 1 to the Environmental Statement describes the terminus construction work, which for purposes of assessment has been broken down into four major elements. Each element is subdivided, and not all subdivisions have significant archaeological impact. The principal impacts are assessed below for their archaeological effects. Where an impact identified in the Reference Scheme is amended by the PDS requirement, this is prefixed below with (PDS). Principal areas of archaeological effects are shown on Figure 7.

*Legend* * *indicates potential archaeological effect*
*? indicated uncertain on basis of information available to OAU*

10.1.2 *Enabling and advance works*

Annex 1 to the Environmental Statement refers under 4.5 and 4.6.1 to enabling works and construction sites. Addendum A1.1.2 deals specifically with enabling works for the maintenance of gas supplies in the dismantling of British Gas facilities, affecting the land-take of existing and proposed roads. Annex 1, 4.6.1, refers under *Construction Sites* to the subdivision of the route into works packages, including works at St Pancras for which arrangements have yet to be finalised.

10.1.3 *St Pancras Station works and rail links*

| | | |
|---|---|---|
| i | | Works to existing train shed |
| ii | ** | New extension to above |
| iii | | Fitting out |
| iv | | International and domestic platforms to CTRL |
| v | ** | (PDS) International to E Coast Main Line link |
| vi | * | (PDS) International to W Coast ML link, via North London Line |
| vii | ? | (PDS) Remodelling of Midland Main Line |

(ii) Of the above, the extension to the existing train shed (ii) will have considerable impact, mainly on areas known principally for post medieval housing in Reassessed Zones B and C. This impact will be wider than that arising from the substructure of the station (ie the Thameslink provisions, see 10.1.4 below), and may have significant but still low effects outside the Thameslink box.

(v, vi PDS) On the basis of drawings assessed, the impact of the links to other main lines will be limited, provided embankments are constructed on the surface of existing railway make up. The foreseeable impact is the downcutting required for a box tunnel (PDS amendment) carrying the CTRL International Up and the Domestic Down lines crossing beneath their respective Down and Up lines. A small part or all of the footprint of this box tunnel lies within reassessed Archaeological Area Ai.

(vii PDS) Remodelling of the Midland Main Line will involve moving tracks, and would have some effect if it involved substantial lowering of the vertical alignment in Area Aii (Fig. 8), but on the information available the moved tracks will be mainly above the cut-and-cover construction of the Thameslink tunnel where it passes Agar Town, and there would therefore be no new archaeological effect.

**ii, v, vi, vii: low or uncertain archaeological effects, mitigable by record**

10.1.4 *Thameslink enabling works*

| | | |
|---|---|---|
| i | *** | Station Box structure |
| ii | *** | Burrowing junction structure |
| iii | *** | Low level passenger concourse |
| iv | | New crossover in the Clerkenwell Tunnel |
| v | *** | (PDS) Structure of cross-site connections to Great Northern Line |

(i) The Station Box (i) will run across the predicted channel of the Fleet river to the maximum depth of channel deposits known from geotechnical logs. Its predominant archaeological effect will be in the area where the channel is already presumed to be affected by main services, such as the Fleet sewer, but it will extend southwest into an area of silty deposits which (on available evidence) may include flood deposits of the Fleet, potentially with archaeological deposits

(Revised Zone C, resource not fully characterised on the basis of extant information).

**i: significant potential archaeological effect, mitigable by archaeological record**

(ii) At the north end of the Thameslink box, the burrowing junction (ii) for the connections to the Great Northern Line will require the staged construction of a new section of Thameslink tunnel and side connections, all in cut-and-cover construction, all within Revised Archaeological Zone Bi (extension graveyard of St Pancras Church).

**ii: significant potential archaeological effect, mitigable by archaeological record**

(iii) Linking the underground station to Kings Cross is a passenger concourse again built at the level of the Fleet channel floor. It will affect all deposits in a transect of the presumed channel.

**iii: significant potential archaeological effect, mitigable by archaeological record**

(v) PDS cross-site connections to the Great Northern line will leave the burrowing junction (ii above) in bored tunnel with no archaeological effect to a point in the railway lands, where the tunnelling changes to cut-and-cover. Here the archaeological deposits of Revised Zone Ai will be impacted, which are of low importance except as a landscape contrast to the well preserved cultivated deposits in Zone D.

**v: probably mainly low archaeological effect, mitigable by record**

10.1.5 *Ancillary works*

| | | |
|---|---|---|
| i | | Station control and incident centre |
| ii | * | Car parking |
| iii | * | External works |
| iv | | Potential relocation of Red Star parcels facility |
| v | ? | Power supplies |
| vi | ** | Highway works |

(ii, iii) Paving proposed under external works (iii) would have an extensive impact on buried pre-industrial land surface as evaluated. Under (ii), the *Addendum* to the Environmental Statement para 2.1 describes uncertainties on the arrangements for car parking at the terminus, but assumes a 750-space car park of which a proportion would be between Kings Cross and St Pancras stations.

(iv) No site is identified for any potential relocation of the Red Star parcels facility.

(v, vi) Proposed roads are shown of Figure 7. Together with power supplies (v) and proposals for maintaining continuity of gas supplies during decommissioning of British Gas facilities (ES Addendum A1.1.2), the highway links will involve severance which will have archaeological effects within the reassessed archaeological zones, potentially affecting any resource which may be associated with the preindustrial land surface as evaluated in Revised Archaeological Zone D1 (Fig 8). The lowering by up to 3 m of Goods Way and Camley Street will possibly involve Victorian deposits ramping up to a former canal and railway structures, but may also impact on a buried pre-industrial landsurface beneath. The widening of Euston Road is likely to be in disturbed levels and have no significant effect. None of these effects is likely to be mitigable by design, but mitigable by recording action. Finally the Belle Isle electricity feeder station is in an area heavy truncation, and has no effect.

A related impact is the proposed diversion of the Fleet sewer. This will have a major severance effect on deposits of the Fleet channel and valley floor, again probably not mitigable by design, but mitigable by recording action.

**ii-vi effects low to moderate, mitigable by design/recording action**

10.1.6 *Interchange works*

| | | |
|---|---|---|
| i | ** | Northern ticket hall |
| ii | ** | Subway connections between N Ticket Hall and St Pancras |
| iii | | Subways to Piccadilly and Victoria Lines |
| iv | | Subway to Northern Line |
| v | ** | Subway between Northern Ticket Hall and Existing (Western Ticket Hall) |
| vi | ** | Subway from existing (Western) ticket hall to St Pancras Undercroft (Southern End) |
| vii | ** | New Metropolitan Line/Circle Line Ticket Hall and subway across Euston Road |
| viii | | Fitting out |

(i, vii) Two areas of ground disturbance for below-ground ticket halls will have substantial impact, the Northern Ticket Hall affecting an area shown from evaluation to have extensive and relatively undisturbed areas of a pre-industrial agricultural deposit and geomorphology unparalleled in the survey area. Archaeological effect assessed as moderate, not mitigable by design, mitigable by archaeological investigation and record.

(ii, v, vi) Subways will have a significant severance effect where cut-and-cover techniques are used in previously undisturbed areas within reassessed Zone D. On the evidence of assessment the effects could be moderate, not mitigable by design, mitigable by archaeological record.

**i, ii, v-vii: Effects probably moderate, mitigable by archaeological record**

10.2 **Additional Provisions arising from PDS: Impacts and archaeological effects**
Following Parliament's adoption of the Promoter's Developed Scheme (PDS), many of the impacts in the Railway Lands are effectively mitigated by design. Four such PDS impacts have been referred to above, alongside the general assessment of the Reference Design (see 10.1.3 v-vii, 10.1.4 v). The following further PDS impacts have been assessed:

| | | |
|---|---|---|
| i | | Realignment of York Way |
| ii | * | Permanent relocation of York Way services, including diversion of Camden Sewer |
| iii | | Access road from realigned York Way to Randalls Road |
| iv | | Access road from realigned York Way to Tarmac Batching Plant (subject to Planning Consent) |
| v | * | Midland Main line siding and relocation of Tarmac Batching Plant to NW triangle (subject to Planning Consent) |

(i, ii, iii) The realignment of York Way will have negligible archaeological effect over most of its length, deposits having been truncated by several metres already. It will have a slight impact where it veers away form York Road at its south end, where the access road (iii) to Randalls Road will affect a small island of potentially surviving deposits above the bored western tunnel of the ECML, so limited as to be insignificant. The main foreseeable impact will be from two manholes for the Camden Sewer realignment, which affect deposits between the Granary, Wharf Road (6.1.2, Fig 6) identified in Borehole log BH 82)

(iv, v) The Tarmac concrete batching plant relocation requires an access road which is almost exclusively on land assessed as heavily truncated. There is no information on the potential site of relocated offices and laboratories within the NW triangle, but these again fall outside reassessed Zone Ai. The siding required for supply of aggregate will have only superficial effect on an area with no known deposits (former Midland sidings, 6.1.6), and the only foreseeable effect here is the cut for the proposed aggregate conveyor which extends across the line of Wharf Road and will sever alluvial deposits (6.1.5).

**ii and v: minor effect, mitigable by record**

## 11 CONCLUSIONS

The conclusion of this evaluation is that an outline archaeological model of the survey area has been constructed from available evidence, which identifies a number of significant deposits and predicts the existence of others, at a variable but in many cases an acceptable level of confidence, and which can form the basis of an assessment of significance of such deposits in a national framework, and their archaeological potential. The evaluation has set out a number of archaeological effects of the engineering work arising from the requirements of the proposed the Promoters Developed Scheme, and has concluded that on available evidence such

effects can be mitigated by recording action, although some effects cannot be assessed on available evidence. The scale of such mitigative recording action might be reduced by careful engineering design and by additional information arising from field evaluation in specific areas.

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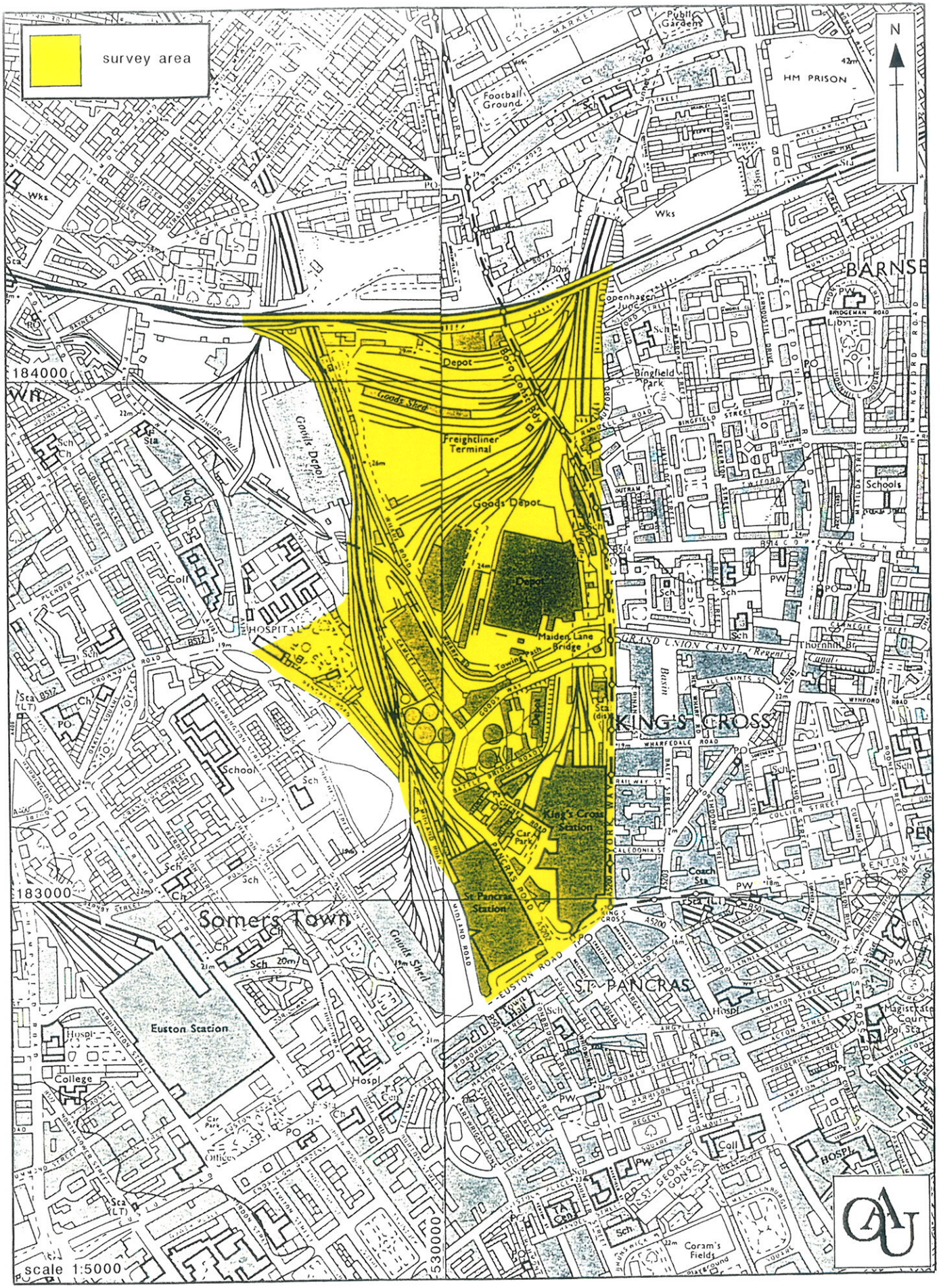



St Pancras survey area

figure 1

**Railway yard landscape**

*Undated deposits survive beneath the hardcore heaps of Galliford's yard, cut away to the east as the tracks dip beneath the York Road viaduct.*

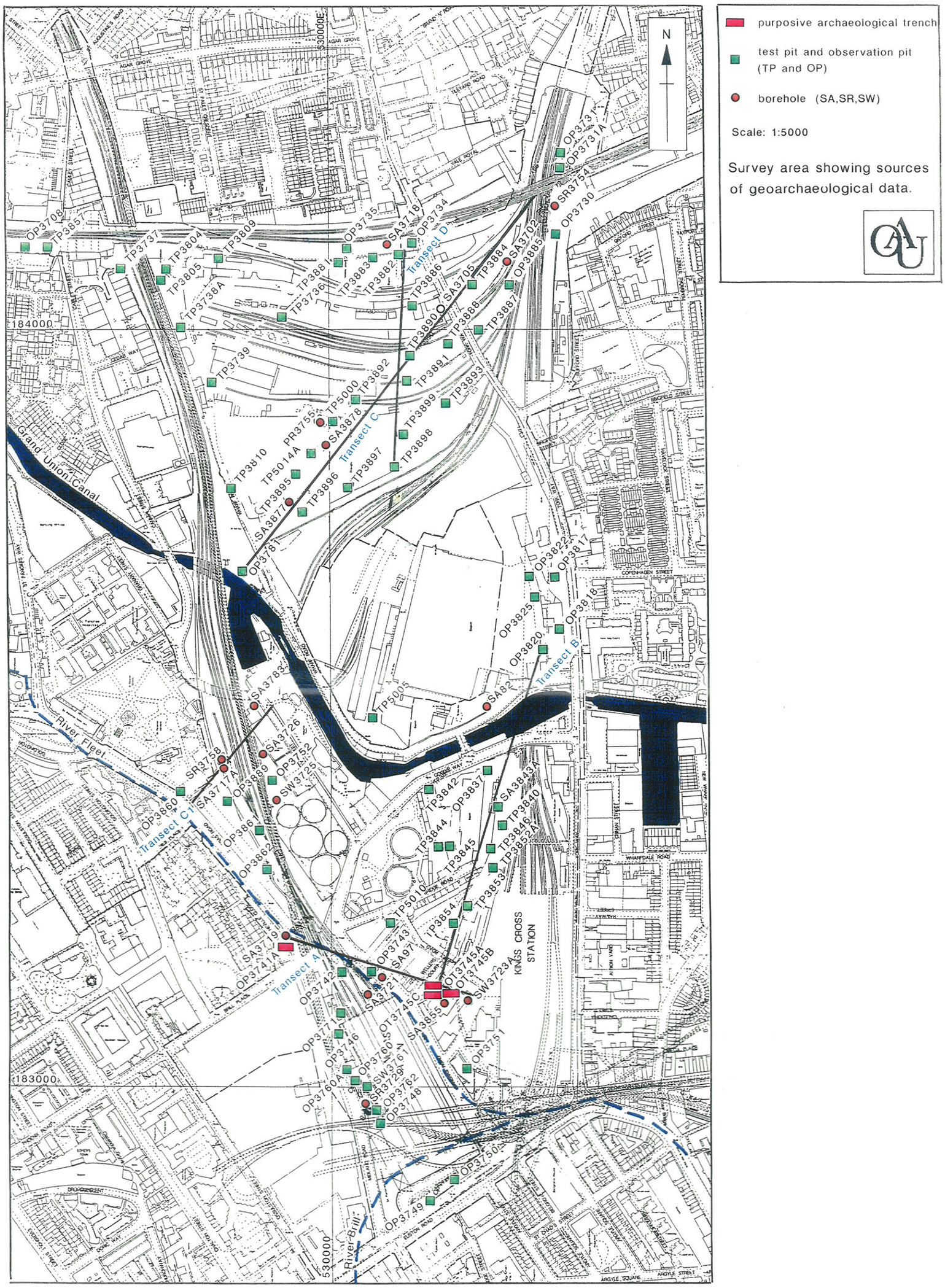
**Archaeological trenching**

*Observation pit OP3741A showed clay levels rising west of R. Fleet cut by Victorian cellar foundation and a later brick sewer.*

**Monitoring of Geotechnical Survey**

*OAU and GSF recorded exposures in over eighty locations, spread over sixty hectares of mainly industrial land.*

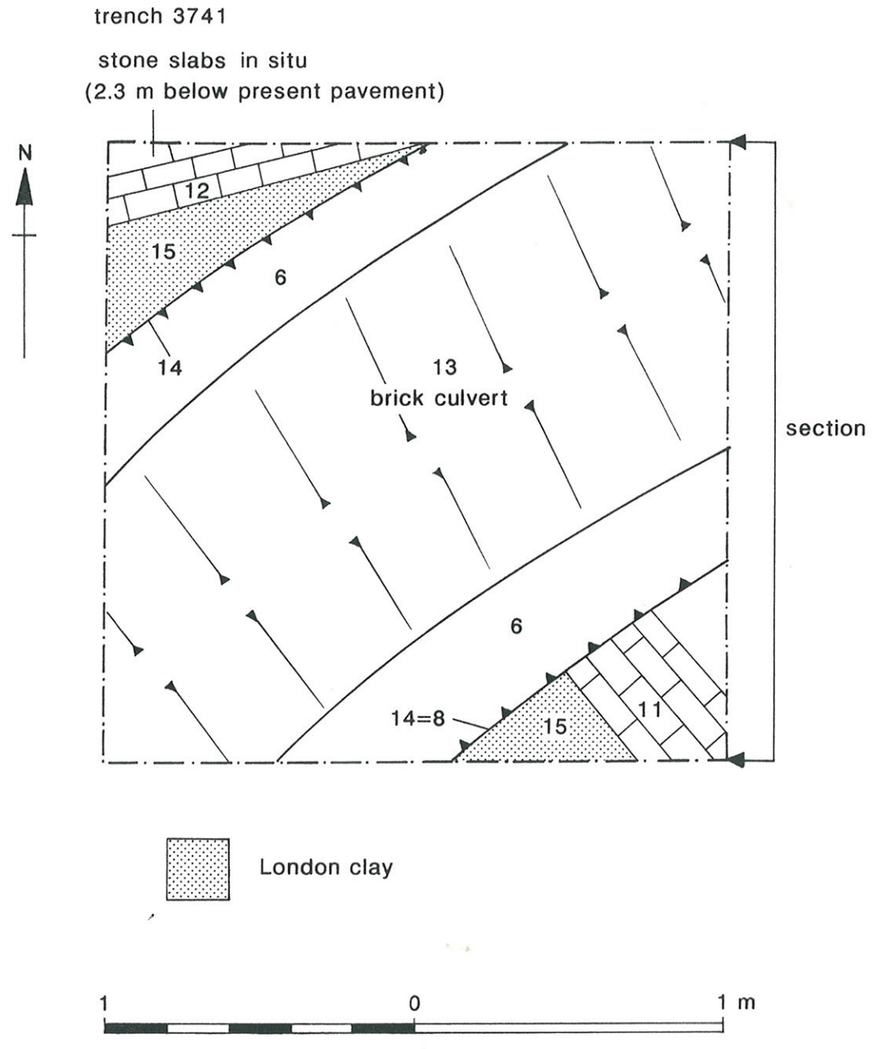
figure 1a: Views of Survey Area

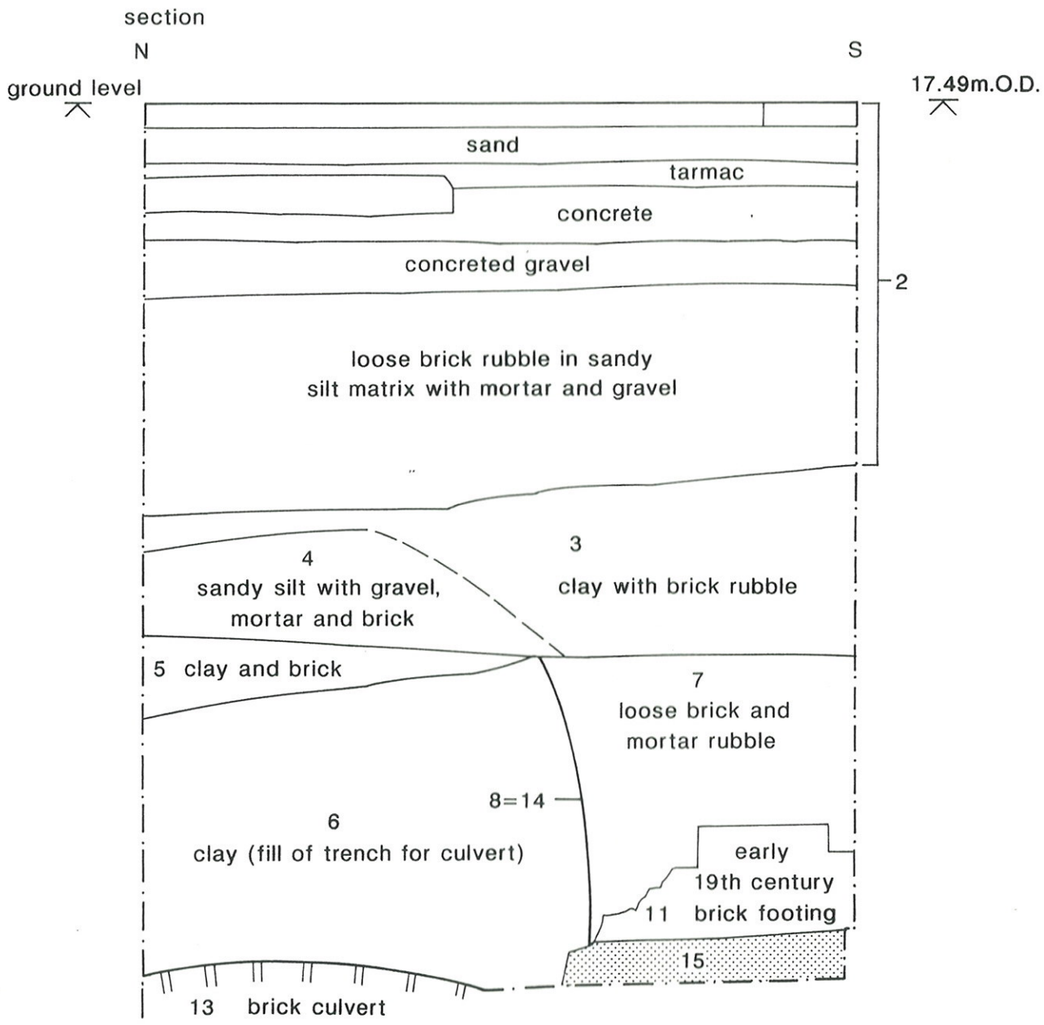



Based on D-CF-490-064-000839-00



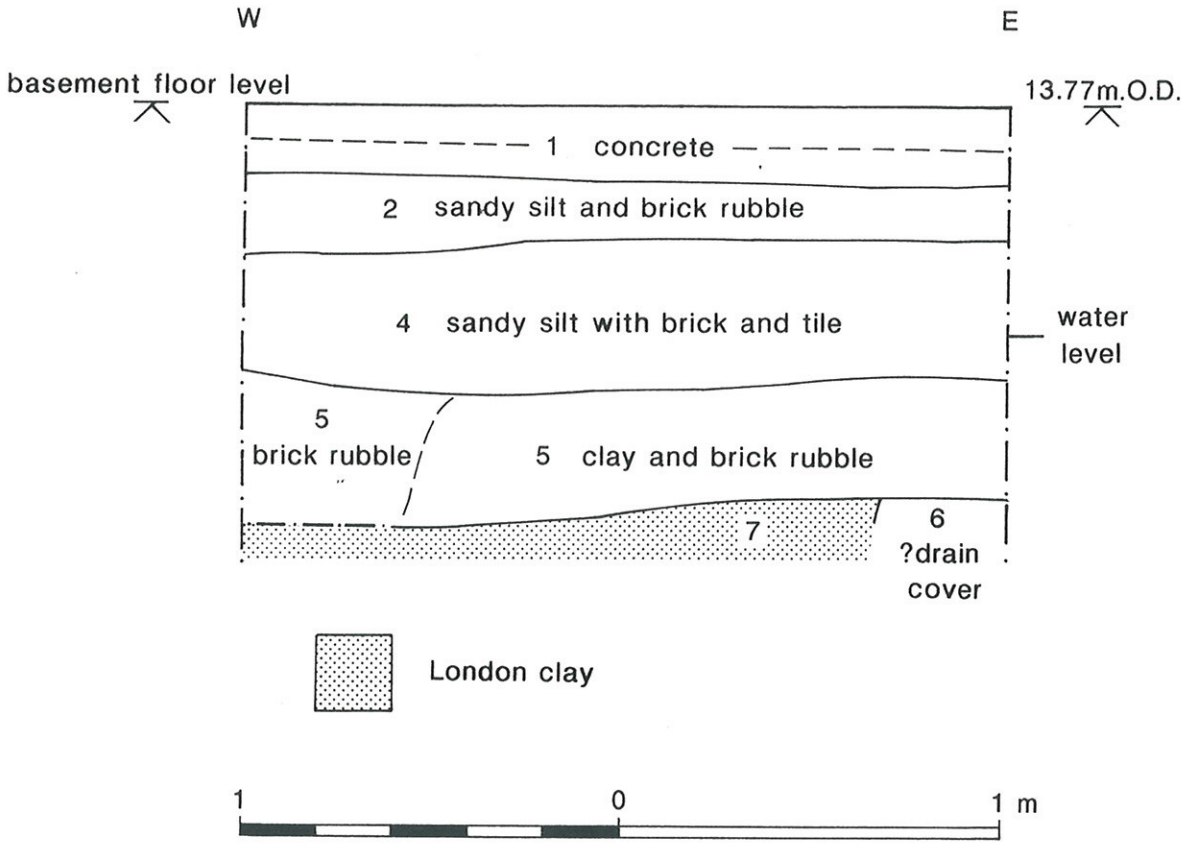
figure 2



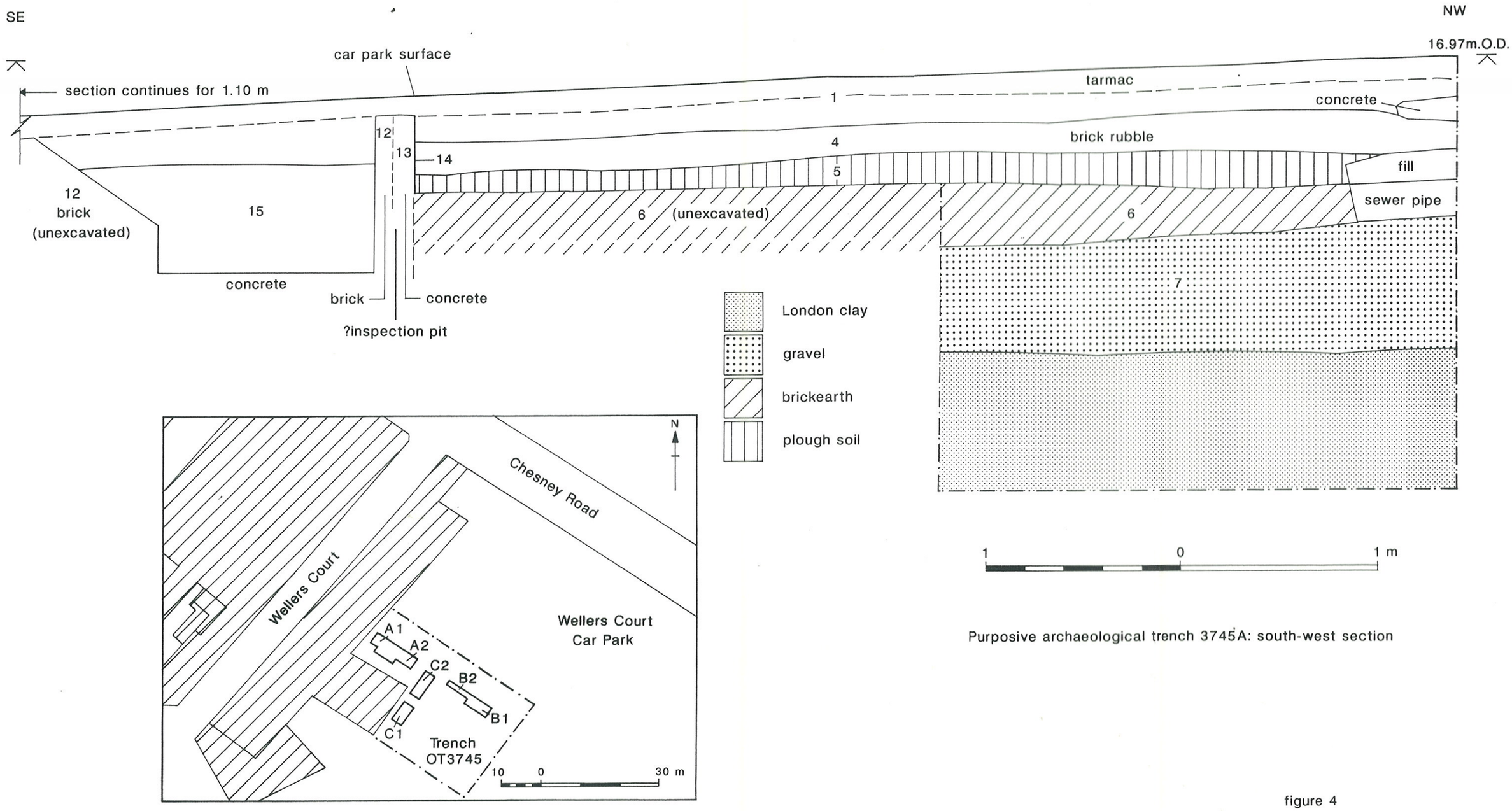

Purposive archaeological trench 3741: plan and section

figure 3



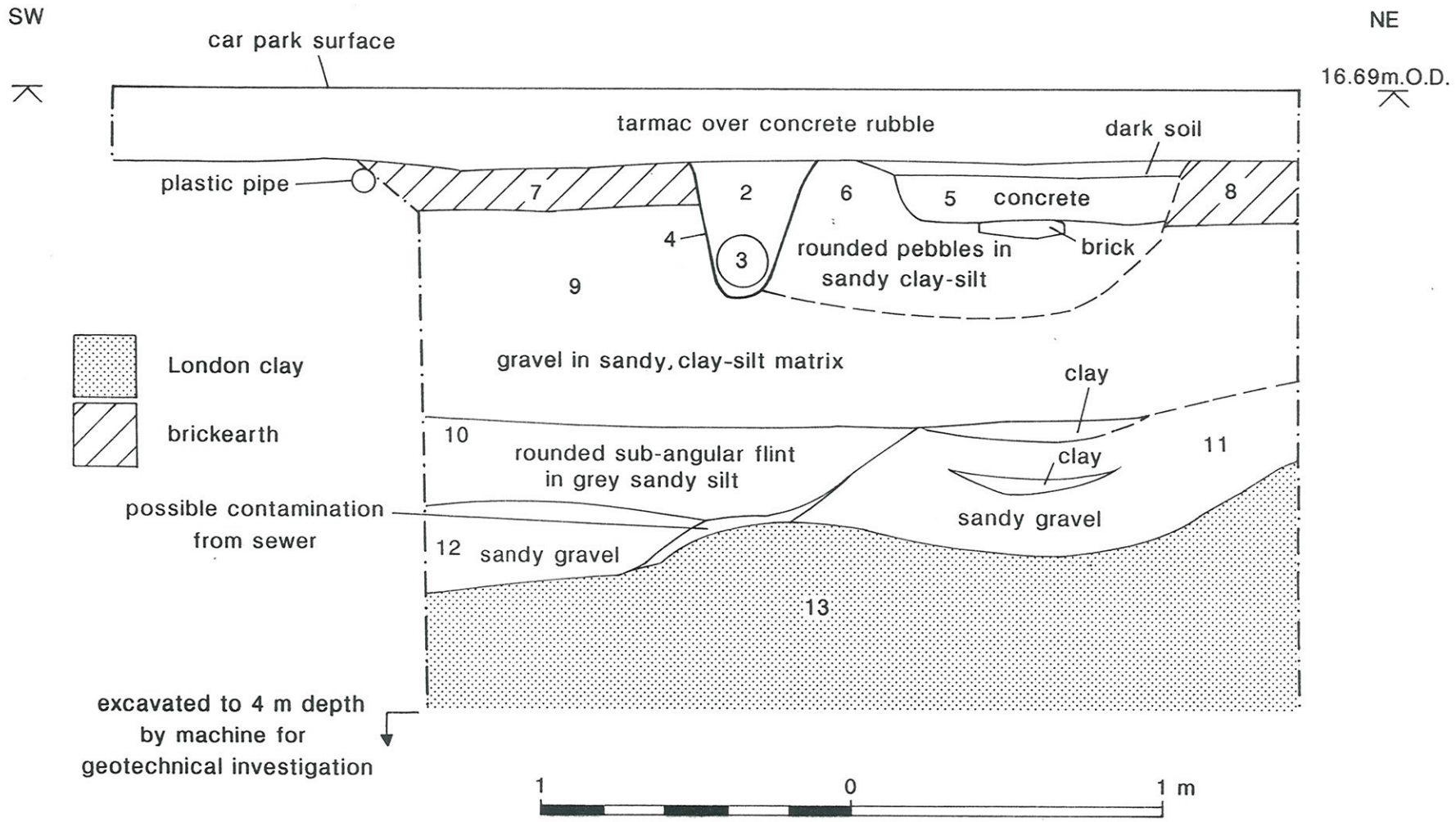

Purposive archaeological trench 3743: north section

figure 3a



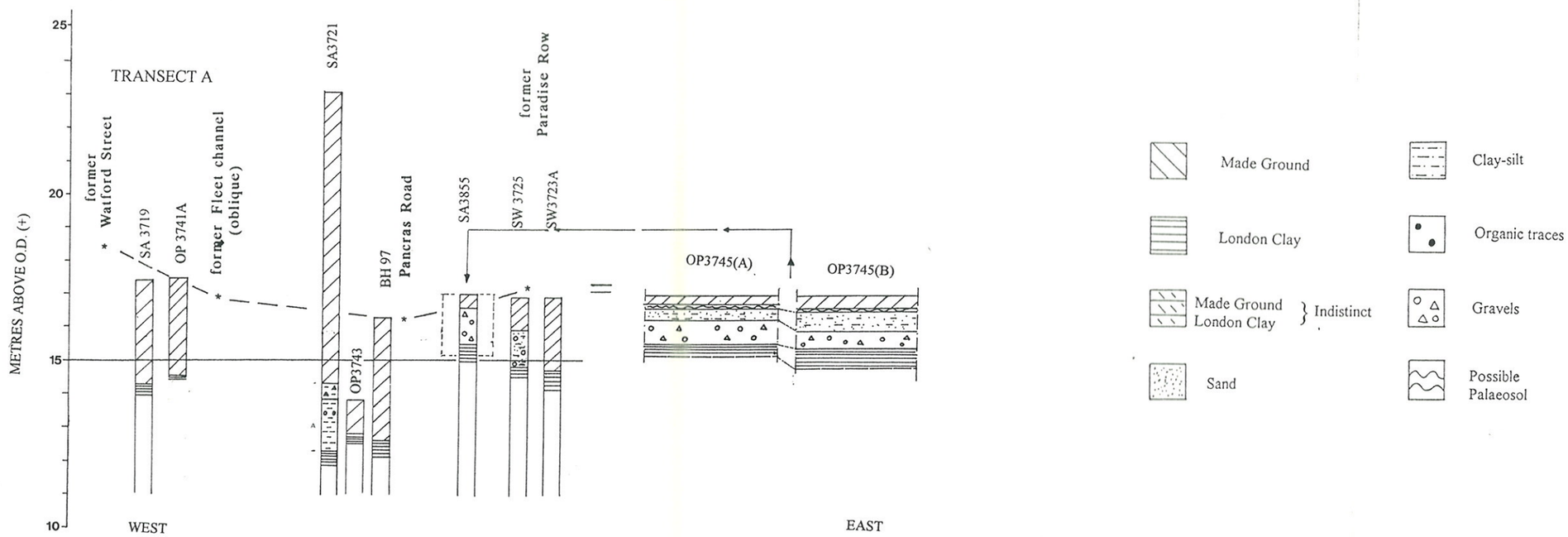

Purposive archaeological trench 3745A: south-west section

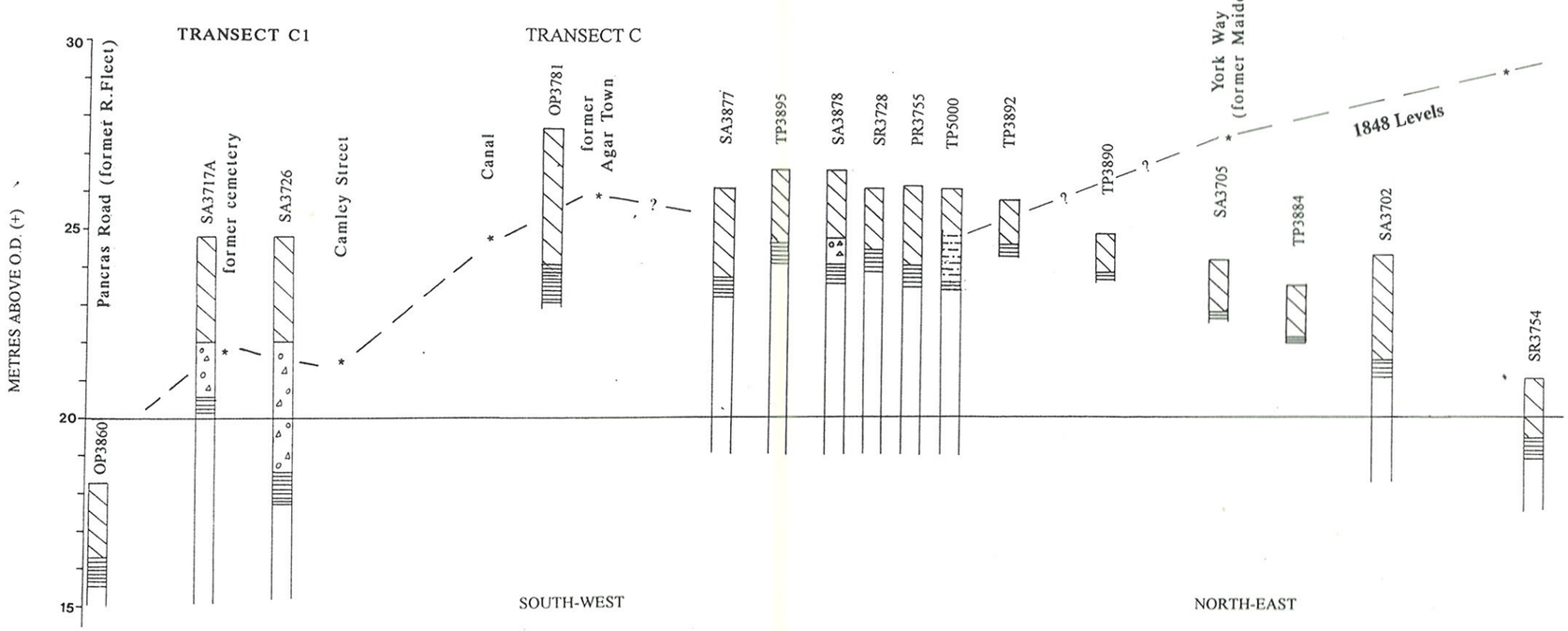
figure 4




Purposive archaeological trench 3745C: north-west section

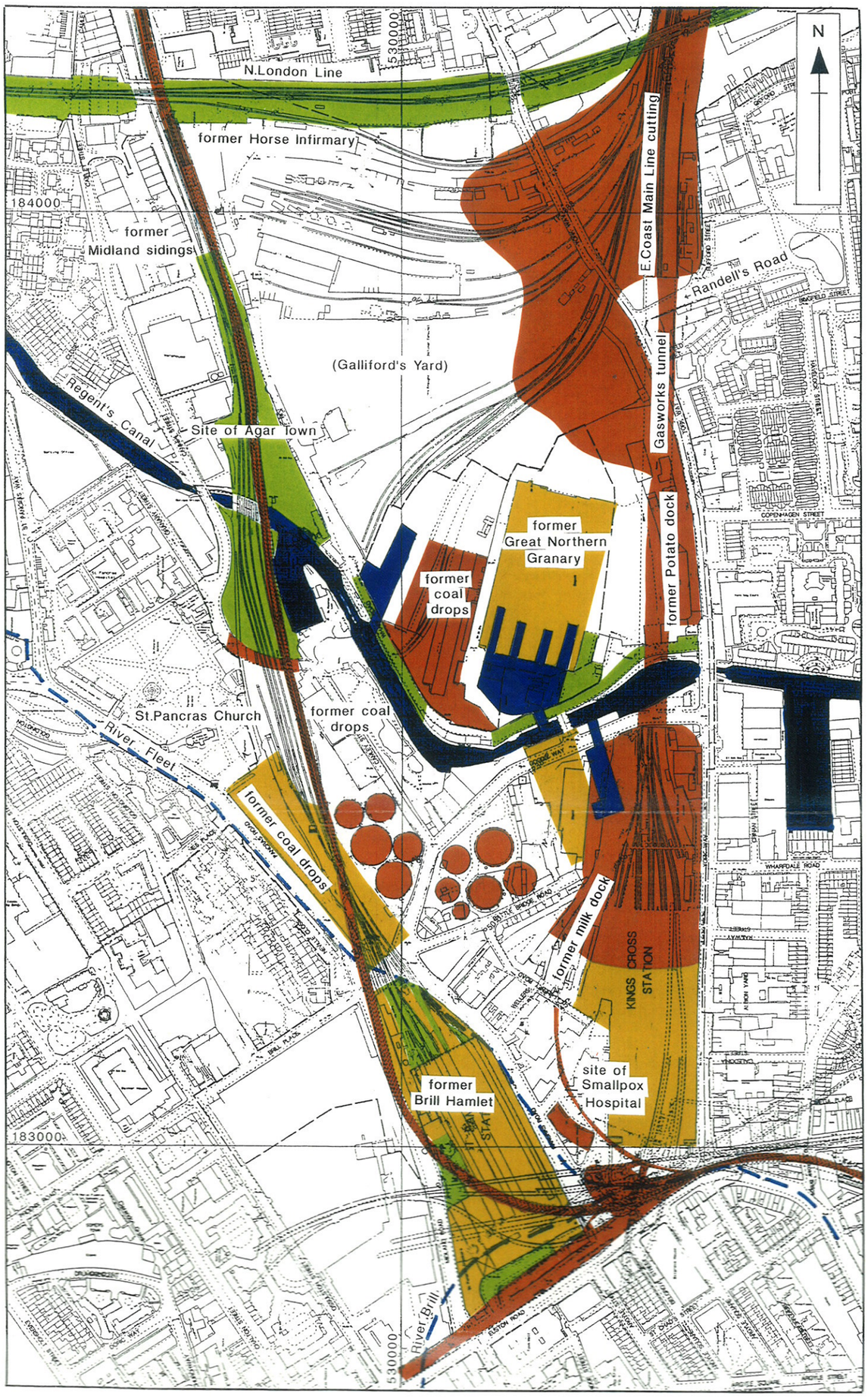
figure 4a




Geoarchaeological transects A, C and C1 across Fleet Valley.
For Transects B and D see Appendix 1, Figures A2 and A3.

figure 5




Estimated extent of known industrial ground disturbance which has destroyed deposits to a depth of over 1 m below projected pre-Railways ground level.

- total disturbance, industrial/railways
- extensive disturbance, industrial/railways
- total disturbance, canals

Estimated extent of Railways fill

- deposits over 1 m thick

Scale: 1:5000

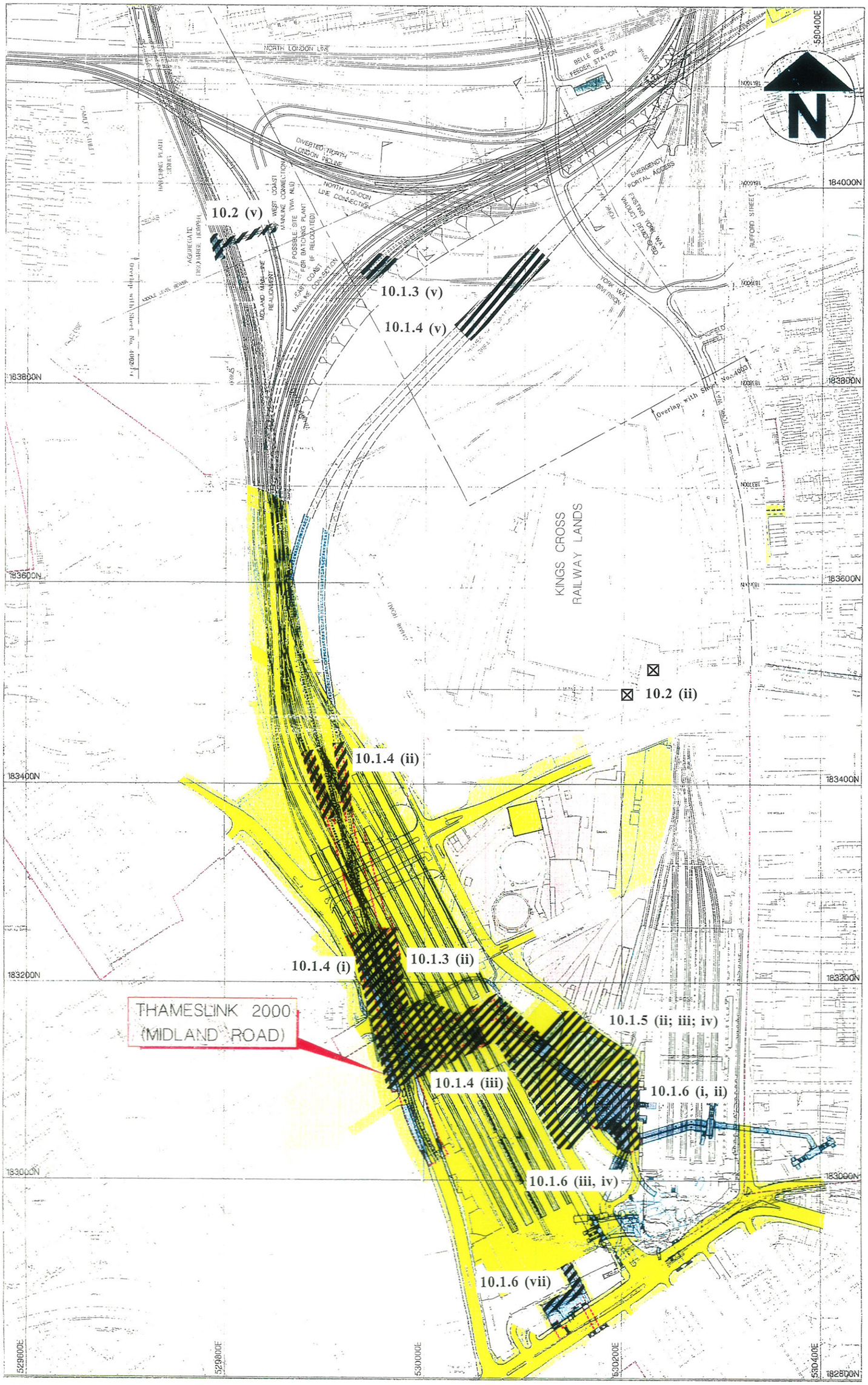
Plan of survey area showing estimated extent of truncation/filling affecting the pre-industrial surface (pre-industrial surface based on projection from 1848 data, truncation based on geotechnical results and map regression).

Based on D-CF-490-064-000839-00



figure 6

Figure 7: Significant impacts in Areas of Archaeological Potential.




union RAILWAYS

LEGEND

- Above ground construction
- Sub-surface construction
- Temporary landtake for construction
- Temporary construction area
- Bored tunnel or underpinning
- Cut and cover construction
- Conservation area

NOTES

1. THE DETAILS SHOWN REFLECT THE INTERPRETATION OF THE REFERENCE DESIGN, NOT THE LIMITS OF DEVIATION OF THE PARLIAMENTARY WORKS.
2. PROVISION IS REQUIRED TO ACCOMMODATE 750 CAR PARKING BAYS AND THE INCIDENT AND CONTROL CENTRE. THE LOCATION OF THESE PERMANENT LANDTAKE AREAS HAVE NOT YET BEEN FINALISED AND ARE NOT SHOWN ON THE DRAWING.
3. WHERE ABOVE GROUND CONSTRUCTION AREAS COINCIDE WITH SUB-SURFACE CONSTRUCTION THE ABOVE GROUND CONSTRUCTION AREAS ARE SHOWN.
4. THE PERMANENT WAY ALIGNMENT REFERENCE DATUM HAS BEEN ADOPTED ON THIS DRAWING.

Extensive or total destruction of archaeological deposits in areas assessed as having archaeological potential

| REV. | DESCRIPTION | DATE |
|---|---|---|
| 0E | INCORPORATED COMMENTS INCORPORATED | 07/03/05 |
| 0D | TEMPORARY LANDTAKE EXTENDED | 01/03/05 |
| 0C | UPDATED IN LINE WITH TEN-1 ALIGNMENT | NOV 04 |
| 0B | ALIGNMENTS UPDATED LANDTAKE ADJUSTED TO SUIT | 29/03/04 |
| 0A | GENERAL UPDATES & AMENDMENTS | 02/03/04 |

FOR INFORMATION ONLY

Union Railways Limited



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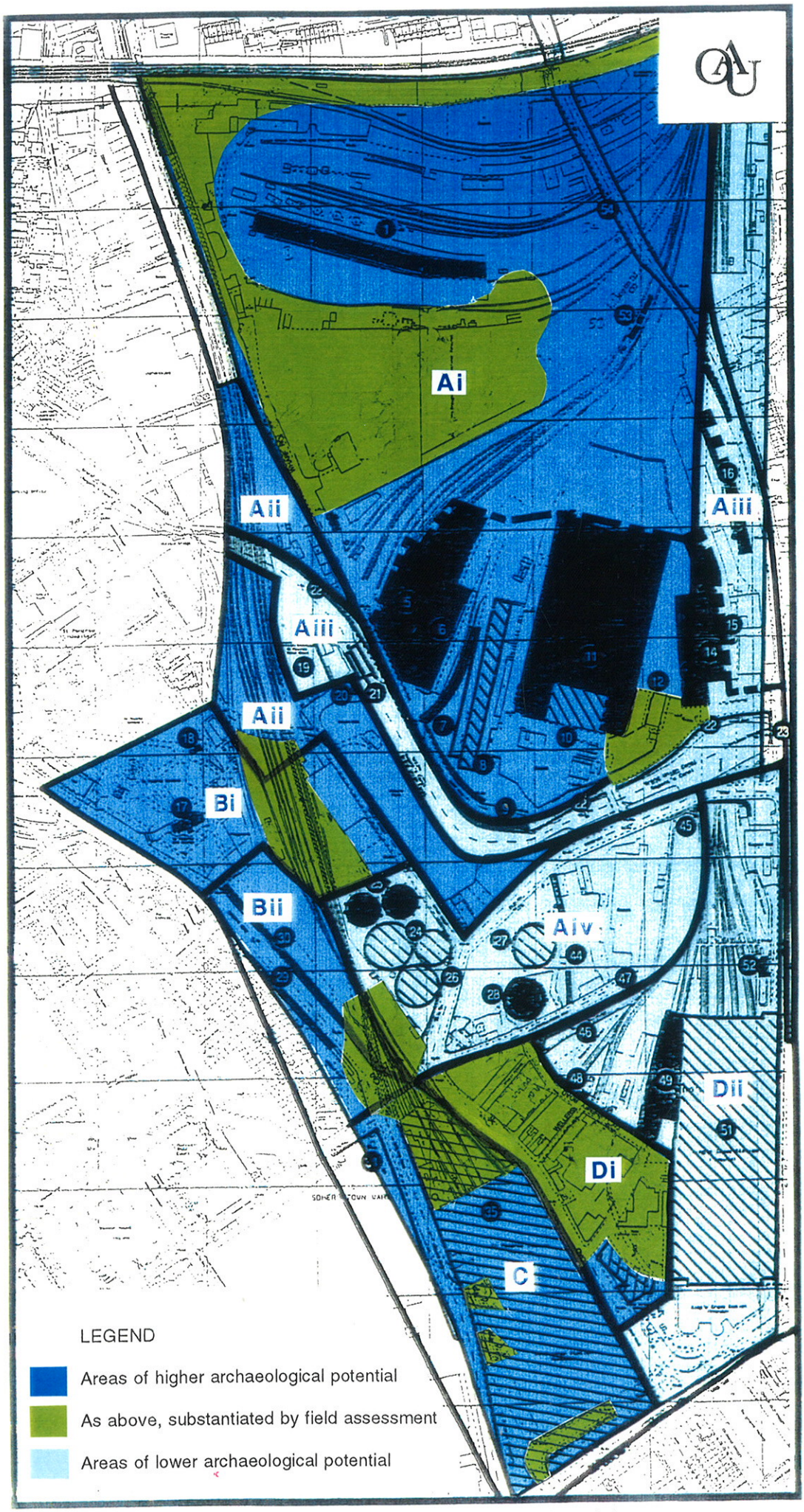
HORIZONTAL SCALE 0 50 100 150 200 250 METRES

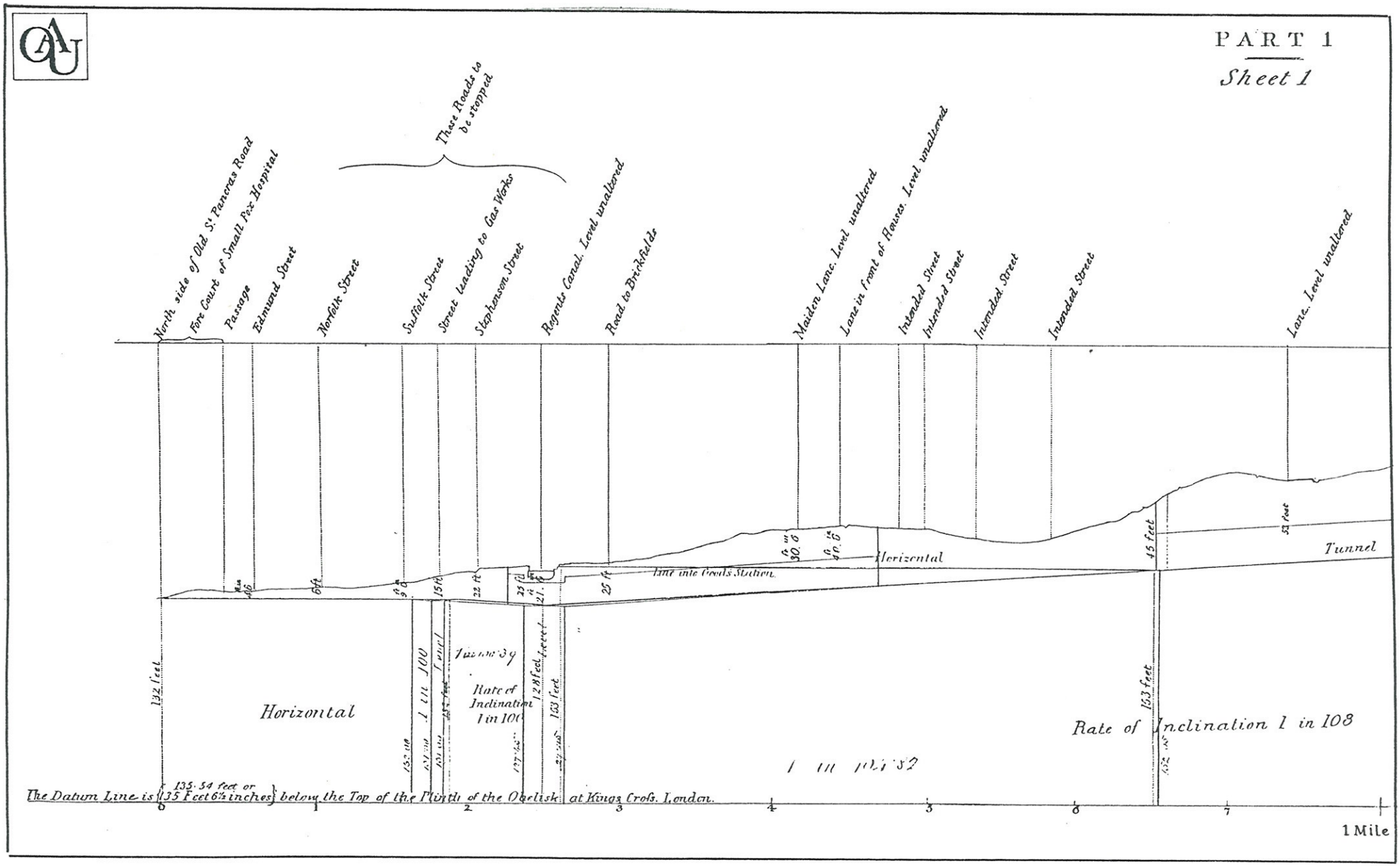
ST PANCRAS TERMINUS
REFERENCE DESIGN
LAYOUT OF CONSTRUCTION WORKS

| Drawn by CLC | Scale | Size | Drawing No. | Revision |
|---|---|---|---|---|
| Date FEB 04 | 1:2500 | A0 | 00EL / 265-7404 / 0006 | 0E |
| Work Package ENGINEERING | | | | |




St.Pancras: 1995-6 Reassessment of Zones of Archaeological Potential.
The figure should be read in conjunction with the zones of ground disturbance identified on figure 6.

figure 8




Proposed vertical alignment of Great Northern Line, deposited 1852. (Public Record Office Office: Rail 236/945)

figure 9

## Appendix 1 Geoarchaeological Assessment

REPORT ON THE GEOARCHAEOLOGICAL POTENTIAL OF THE

# ST. PANCRAS CTRL TERMINUS SITE,

URL TASK INSTRUCTION 10412/10506

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September 1996

GEOARCHAEOLOGICAL SERVICE FACILITY
GSF SITE ASSESSMENT REPORT 96/05

**Appendix 1**

## GEOARCHAEOLOGICAL POTENTIAL OF THE ST.PANCRAS CTRL TERMINUS SITE

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*List of figures*



*List of tables*

# GEOARCHAEOLOGICAL POTENTIAL OF THE ST.PANCRAS CTRL TERMINUS SITE

*SUMMARY*

*This report documents geoarchaeological field observations by the GSF on the St Pancras CTRL Terminus site, and integrates these observations with geotechnical stratigraphic data provided by Union Railways Ltd. (Section 4.0). The report describes the significance of these data (Sections 4.3 and 5.0) and reviews potential for future work (Section 6.0).*

*The GSF work has suggested that two areas of the site complex may require further investigation. The area in the vicinity of Pancras Road contains the likely relict drainage of the Fleet river and would repay further investigation. A second area of potential interest occurs in the north west of the site where sediments described as 'Head deposits' are located. Local pockets of deeply stratified, well preserved, material may exist elsewhere within the area but their location cannot be predicted with assurance on present information;,, they could be discovered through watching briefs during construction of the terminus.*

## 1.0 INTRODUCTION

i. This report was commissioned by the Oxford Archaeological Unit (OAU) and forms part of the OAU response to Union Railways Ltd. (URL). Task Instruction TIS192/084 - 10412 (Archaeological Evaluation and Watching Brief at St. Pancras). The project fieldwork was undertaken jointly by staff of the Oxford Archaeological Unit and the Geoarchaeological Service Facility (GSF) of University College London Institute of Archaeology.

ii. Field project work commenced in October 1995 and was completed in December 1995. This report documents the GSF field observations and integrates these observations with geotechnical stratigraphic data provided by Union Railways Ltd. (Section 4.0). The report describes the significance of these data (Sections 4.3 and 5.0) and indicates potential for future work (Section 6.0).

iii. The conclusions drawn in this report (Section 6.0) are based on observations and information drawn from field and desk based evaluation where all reasonable and practical steps have been taken by the GSF to ensure the accuracy and adequacy of the data. The conclusions drawn are those of the authors and they retain the right to modify these views in the light of future work in the area.

## 2.0 AIMS AND OBJECTIVES OF THE STUDY, AND TASKS

i. The aims and objectives of the project were as set out above for the main report (Section 2).

ii. In order to achieve these aims and objectives, GSF examined URL geotechnical data for the St. Pancras area (the St Pancras Terminus geosegment) including both the pre-1995 (historical) data and those collected as part of the 1995 geotechnical investigations; examined available engineering proposals for the St. Pancras terminus; interpreted the geotechnical data (including facies modelling and assessment of archaeological potential). From this a specifically geoarchaeological objective was identified as follows:

- *To understand the nature of the sub-surface area from a geoarchaeological perspective.*

iii. Additional questions were raised during the project that reflected the specific nature of the sequences observed, the recognition of buried soils and landsurfaces and the datums of these surfaces. Where possible these have also been addressed in this report.

## 3.0 BEDROCK GEOLOGY AND GEOMORPHOLOGY OF THE STUDY AREA

i. The area of investigation lies to the north of Euston Road/Pentonville Road (Figure A1). Today the area is dominated by the railway works and other industrial buildings and little or no evidence of the pre-construction landscape is visible. Ground levels within the area of investigation presently lie between *circa* 25 m and 40 m OD.

ii. Bedrock geology consists of London Clay (British Geological Survey, 1993) (Figure A1, Inset); Pleistocene sands and gravels are not recorded within the area of investigation but have been recorded to the south (Lynch Hill Gravel) and the east (Boyn Hill Gravel, Figure A1, Inset). Variations in the precise location of the boundaries of these superficial deposits and the distribution and classification of these sediments are noted when the accounts of the British Geological Survey and Gibbard are compared (e.g. compare Gibbard 1994 with the British Geological Survey North London Sheet).

iii. No areas of apparent Holocene sedimentation are noted in the BGS mapping. However, an important north bank tributary of the Thames, the Fleet, is recorded in the vicinity of St. Pancras Road between St. Pancraş and Kings Cross Stations. This river is thought to have been navigable upstream of St Pancras as far as Kentish Town (Barton, 1962) and sediments deposited by this river may lie within the study area.

iv. Mapping scales and the dense urban nature of the study area may have precluded detailed mapping of small outcrops of sediments. In particular it is noted that sediments associated with the Holocene development of the river Fleet may not have been recorded, and the absence of such sediments shown on the British Geological Survey map need not be significant. Additionally small outcrops of Thames gravels may also occur within the area but may be omitted from the survey mapping.

v. On the basis of the known geology it is unlikely that extensive tracts of Quaternary/Holocene sediments occur in the area. Thus typical sequences are expected to show weathered bedrock London Clay lying directly below made ground. The London Clay contact surface may, where intact, represent an important unconformity. This unconformity, represented by a major weathering/soil horizon would indicate the location of a major landsurface. The landsurface may have concatenated archaeological material resting on or within the soil zone and features may be cut into the London Clay surface. However, it is noted that it is often difficult to separate heavily weathered from reworked London Clay and in areas where human activity has been common this factor is likely to cause considerable difficulties when one attempts to interpret the sequences buried sub-surface.

## 4.0 GSF FIELD PROCEDURES AND OBSERVATIONS

### 4.1 GSF field methodology and recording practices used during this study

i. The GSF contribution to the project involved a presence on site during the excavation and recording of test pits and trial trenches dug for archaeological purposes or under archaeological supervision. Where possible GSF personnel recorded the sequence stratigraphy using standard geological terminology routinely used by the GSF. Criteria normally includes colour (Munsell standardised), grain size, grain shape, angularity/roundness, composition, structure, presence/absence of contained biological material and strength properties.

ii. Stratigraphic logging was undertaken in conjunction with OAU section context recording where possible in order to integrate data sets. Continuous recording of profiles was not always possible due to safety constraints and access to profiles. These considerations therefore limited, in some cases, the information that could be extracted from the trenches and observation pits. A full listing of all sections observed by the GSF is given in Table A1.

| GSF MONITORED LOCATIONS | | OAU MONITORED LOCATIONS | |
|---|---|---|---|
| OT | 3745A | OP | 3803 |
| OT | 3745B | TP | 3738 |
| TP | 3857 | TP | 3896 |
| TP | 5010 | TP | 3804 |
| OP | 3862 | TP | 3822 |
| TP | 5005 | TP | 5000 |
| TP | 3842 | TP | 3810 |
| OP | 3859 | TP | 3844 |
| TP | 3882 | | |
| TP | 3881 | | |
| TP | 3883 | | |
| OP | 3734 | | |
| OP | 3732 | | |

*Table A1. Geoarchaeologically monitored pits/trenches within the St. Pancras terminus area. A further fifty-eight pit/trenches were monitored archaeologically*

iii. In addition to the test pits monitored by the GSF/OAU, geotechnical borehole logs were examined as part of the desk based evaluation.

iv. Note was taken of the grades of London Clay (Grades I to V) recorded in the geotechnical logs, in case this had an useful correlation with the extent to which the historic ground surface (including softer, more weathered grades) had been cut away in recent time. It was found that as a measure of truncation of archaeological deposits the data could not reliably be used to discriminate between minor and major downcutting, and therefore had little value for archaeological prediction.

### 4.2 Observations made by the GSF during the field programme

(i) The observations made by the GSF have been integrated with geotechnical data that have enabled four transects to be constructed. These have been designated Transects A, B, C, D (Fig. 5; Figs A2-3). Geotechnical data locations for each transect are presented in Tables A2 to A5 and shown on Figures 2 and A1. Archaeological and geoarchaeological data from all field observations are collated in Table 6 (Archaeological Report Section 5.5).

(ii) The four transects have been constructed to indicate and characterise the main stratigraphic sub-surface units. The location and content of the transects were agreed by the GSF and OAU in order to standardise and integrate the project objectives. Specific comments on individual locations within the transects are made below (4.2.1. to 4.2.4.). In addition to these locations all other geotechnical areas of investigation were examined and found to fit into the patterns observed and described by these transects.

| Observation type | Observation number | Source |
|---|---|---|
| BH SA | 3719 | URL |
| OP | 3741A | URL |
| BH SA | 3721 | URL |
| OP | 3743 | OAU |
| BH | 97 | (Historic, Soil Mechanics 24 07 93) |
| BH SA | 3855 | URL |
| BH SW | 3723 | URL |
| BH SW | 3723A | URL |
| OT | 3745A | (GSF/OAU observed and sampled observation trenches) |
| OT | 3745B | (GSF/OAU observed and sampled observation trenches) |

*Table A 2. Data set used in construction of Transect A.*

| Observation type | Observation number | Source |
|---|---|---|
| OT | 3745A | URL (Common to Transects A and B) |
| OT | 3745B | URL (Common to Transects A and B) |
| TP | 3854 | URL |
| TP | 3853 | URL |
| TP | 3846 | URL |
| TP | 3840 | URL |
| TP | 3843 | URL |
| BH | 82 | (Historic, Soil Mechanics 22 07 93) |
| OP | 3820 | URL |
| OP | 3818 | URL |

*Table A 3. Data set used in construction of Transect B.*

| Observation type | Observation number | Source |
|---|---|---|
| OP | 3781 | URL |
| BH SA | 3877 | URL |
| TP | 3895 | URL |
| BH SA | 3878 | URL |
| TP | 5000 | URL |
| BH SR | 3728 | URL |
| BH PR | 3755 | URL |
| TP | 3892 | URL |
| BH SA | 3705 | URL |
| TP | 3884 | URL |

*Table A 4. Data set used in construction of Transect C.*

| Observation type | Observation number | Source |
|---|---|---|
| TP | 3898 | URL |
| TP | 3899 | URL |
| TP | 3891 | URL |
| TP | 3890 | URL |
| TP | 3886 | URL |
| TP | 3882 | URL |

*Table 5. Data set used in construction of Transect D.*

**4.2.1 Transect A** (Figs 2, 5; Fig A1)

**Borehole SA3719** (Ground Level +17.40 m OD) This borehole shows made ground to a depth of +14.30 m OD. A sub-unit logged as a firm brown, grey and red-brown slightly sandy-clay with a little gravel occurs towards the base of the made ground unit and may correspond with the unit recorded in OT3745A and 3745B (interpreted at these two locations as alluvial silts overlain by a weathered 'soil horizon'). The contact with the London Clay (grade 111b) is recorded at +14.30 m OD.

**OP3741A** (Ground Level +17.49 m OD) Made ground was present almost to the base of the observation pit, where a brick cellar wall overlay London Clay at +14.75 m OD.

**Borehole SA3721** (Ground Level +23.07 m OD) Made ground extends to +14.37 m OD and overlies a unit of 'Alluvium' lying between +14.37 m OD and +12.27 m OD The borehole log records a gravel at a depth of 6.70m (+16.37 m OD). This gravel unit, within the made ground, is at a similar height to the gravel band recorded in OT3745A and OT3745B. However, the presence of brick and wood fragments within sediments below the gravel (in SA 3721) suggests that a correlation with the gravels in OT3745 may be misleading. The sequence recorded in borehole SA 3721 between approximately +16.30 m OD and +12.27 m OD (top contact of London Clay, grade III) has the characteristics of deposits formed under a variable low to medium energy fluvial regime that have been disturbed/modified towards the top. At this location the top of the London Clay is recorded at the lowest datum along the transect. (+12.27 m OD).

**Borehole BH 97** (Historic) (Ground Level +16.34 m OD) Made ground to a depth of +12.64 m OD with a direct contact onto London Clay.

**Borehole SA3855** (Ground Level +17.04 m OD) Made ground is recorded to +16.64 m OD and overlies a unit between +16.64 m OD and +15.54 m OD described as 'firm brown slightly sandy clay with some sub-angular to sub-rounded fine to coarse flint gravel'. The geotechnical log suggests the gravel may be 'Head' gravel. However, the proximity to OT3745A and OT3745B where gravels are recorded at similar datums (+15.97 m OD to +15.47 m OD) and where these

gravels are identified as fluvial sediments suggests a fluvial origin should be considered for the stratified sediments preserved in this trench.

**Borehole SW3723** (Ground Level +16.98 m OD). Records indicate made ground to a depth of +15.98 m OD A unit of dense brown mottled grey and orange brown very clayey sandy sub-rounded and rounded fine to coarse flint gravel is recorded between +15.98 m OD and the contact with the London Clay (grade I) at +14.88 m OD.The borehole log suggests that the gravel deposit is alluvium. The description and the altitude of this gravel unit suggests that it may correlate with the fluvial gravel unit in OT3745A and OT3745B.

**Borehole SW3723A** (Ground Level +16.97 m OD)·A similar stratigraphy exists at this location to that recorded in SW 3723.

**OT3745A** (Ground Level +17.07 m OD) Made ground is present to a depth of +16.77 m OD and overlies a unit interpreted as a possible weathered soil horizon at a depth of +16.62 m OD. The 'soil' horizon overlies a red brown mottled clay-silt between +16.62 m and +16.30 m OD This unit (with the appearance of sediments often referred to as brickearths) is interpreted as low energy fluvial sediments. It contains rare rounded flints and root traces. At +16.30 m OD a sharp contact onto a rounded/sub-rounded (predominantly) flint gravel unit with a clayey silt coarse sand matrix is noted. The gravel unit is interpreted as being fluvially lain. The gravel unit overlies a weathered (blocky structure) London Clay. Transition from the gravel to underlying London Clay is sharp and occurs at +15.47 m OD.

**OT3745B** The stratigraphy recorded in OT3745B was similar to that in OT3745A.

The evidence from this transect suggests that fluvial sediments occur immediately above London Clay bedrock at a number of locations. A possible channel exists in the vicinity of BH SA3721 that has been infilled by fine grained organic rich sediments. Coarse gravel units occur at datums 2.5 m to 3.0 m higher to the east and fine upwards to clay-silts probably representing deposition on a river floodplain (OT3745). These may be older sediments deposited initially by a higher energy river related to the Fleet channel or may reflect remnants of other, pre-existing, drainage patterns. The evidence from this transect suggests that these deposits may be extensive. In places they may contain organic material and therefore potential palaeoenvironmental indicators. Archaeological material may be stratified in these sediments but may have been subject to reworking and (post-depositional) taphonomic processes.

4.2.2 **Transect B** (Fig. 2; Figs A1, A2)
**OT3745A** See above under Transect A. 4.2.1.

**OT3745B** The stratigraphy recorded in OT3745B was similar to that in OT3745A (see Transect A).

**TP3854** (Ground Level +15.43 m OD) Made ground recorded to a depth of 0.55 m where a contact onto London Clay (grade III) occurs at +14.88 m OD. The contact onto London Clay at +14.88 m OD in this test pit reflects similar contact datums in TP's 3853, 3846 and 3840 at +14.97 m, +15.18 m and +15.22 m OD respectively.

**TP3853** (Ground Level +15.52 m OD) Contact to London Clay +14.97 m OD.

**TP3846** (Ground Level +16.23 m OD) Contact to London Clay +15.18 m OD.

**TP3840** (Ground Level +16.27 m OD) Contact to London Clay +15.22 m OD.

**TP3843** (Ground Level +16.49 m OD) Contact to London Clay +15.19 m OD.

**Borehole BH 82** (Ground Level +24.02 m OD) Made ground contacts 'Alluvium' at +22.52 m OD. The Alluvial deposit is described as 'firm dark grey and black slightly sandy very silty-clay with occasional angular medium to coarse flint gravel'. Although termed alluvial, the possibility that this unit may be colluvially derived should be considered. The 'Alluvial' deposits contact London Clay at +21.67 m OD.

**OP3820** (Ground Level +24.29 m OD) Between +24.29 m OD and +19.79 m OD made ground with significant disturbance is recorded. The London Clay contact is recorded at +19.79 m OD directly beneath the made ground.

**OP3818** (Ground Level +24.91 m OD) Made ground is recorded to a depth of +21.91 m OD.

This transect shows two distinct levels of bedrock London Clay/Made Ground-Alluvium contact. The southern part of the transect has rockhead contacts at c.+14.0 m to +15.0 m OD. At the southern end of the transect London Clay is overlain by fluvial sediments. To the north of the canal the London Clay contacts occur at c. +22.0 m OD. Only one borehole, BH 82, contains any evidence for stratified sediments on this higher level surface. It is unclear from this data whether this profile represents a natural topographic profile or whether truncation of sequences has taken place.

4.2.3 **Transect C** (Figs 2, 5; Fig. A1)
**OP3781** (Ground Level +27.63 m OD) This pit records an embankment structure on the north bank of the Regents Canal adjacent to the canal tow path. Recorded sediments to a depth of 4.51 m are banked against a retaining wall and eight strata were recorded. The angled profile and disturbed stratigraphy has resulted in indistinct boundaries between strata in the lower recorded levels. The top of stratum VIII at +24.1 m OD records top of London Clay. All overlying units are disturbed made ground.

**Borehole SA3877** (Ground Level +26.10 m OD) Made ground to London Clay contact at +23.70 m OD.

**TP3895** (Ground Level +25.62 m OD) Made ground to London Clay contact at +24.02 m OD.

**Borehole SA3878** (Ground Level +26.52 m OD) Made ground overlies 'Soft to firm, green grey, speckled black clay with a little sub-angular to sub-rounded fine flint gravel' at +24.72 m OD. This has been interpreted as 'Head deposits' in the geotechnical logs. However, a fluvial origin from these deposits is also possible. The top of the London Clay lies at +24.12 m OD.

**TP5000** (Ground Level +26.03 m OD) Made ground contacts a unit described as 'Head' deposit at +24.23 m OD. An alternative interpretation indicating a fluvial origin for these sediments is possible. The 'Head deposit' contacts London Clay at approximately +23.63 m OD. The lowest 'made ground' unit lying between +24.83 m OD and +24.23 m OD is described as soft, grey speckled black clay with some sub-angular to rounded fine to coarse flint gravel similar to that in SA3878.

**Borehole SR3728** (Ground Level +26.06 m OD) Made ground to London Clay contact at +24.46 m OD.

**Borehole PR3755** (Ground Level +26.13 m OD) Made ground to London Clay contact at +24.03 m OD.

**TP3890** (Ground Level +24.88 m OD) Made ground to London Clay contact at +23.83 m OD.

**Borehole SA3705** (Ground Level +24.22 m OD) Made ground to London Clay contact at +22.82 m OD.

**TP3884** (Ground Level +23.59 m OD) Made ground to London Clay contact at +22.19 m OD.

The evidence from this transect suggests that London Clay contact datums vary between c. +22.5 m and +24.5 m OD. Only two locations along this transect produced evidence for stratified sediments between the London Clay and made ground. The origin of these sediments is equivocal and both a periglacial solifluction (head) and fluvial origin may be argued for; however on balance a fluvial origin is considered more likely (below 4.2.4, Transect D discussion; Archaeological Report 5.5).

**4.2.4. Transect D** (Fig. 2; Figs A1, A3)

**TP3898** (Ground Level +25.17 m OD) Made ground to +22.87 O.D. Between +22.87 and +21.97 m OD a 'stiff brown mottled dark grey and blue grey clay with sub-rounded fine and medium flint and quartz gravel', is recorded. This deposit is

interpreted on the geotechnical logs as a 'Head deposit'. At +22.67 m OD organic and peat traces are recorded that are typically incompatible with a 'Head' origin and may indicate a fluvial origin for these sediments. These deposits correlate with the altitudinal range of stratified sediments recorded in Transect C. Transition to London Clay is not recorded in TP3898.

**TP3899** (Ground Level +25.16 m OD) Made ground to +23.96 m OD. Between +23.96 m and +22.96 m OD (limit of excavation depth) a unit described as a 'Firm brown and grey-brown mottled friable clay with a little sub-rounded fine quartz and flint gravel and locally with some fine and medium gravel sized pockets of soft black organic clay' is present. The unit has been interpreted as 'Head' type deposits in the geotechnical logs. This unit occurs at similar datums to the deposits recorded within Transect C. Contact to London Clay not recorded in TP3899.

**TP3891** (Ground Level +25.11 m OD) Made ground contact to London Clay at +24.31 m OD.

**TP3890** (Ground Level +24.88 m OD) Made ground contact to London Clay at +23.83 m OD.

**TP3886** (Ground Level +25.66 m OD) Made ground contact to London Clay at +25.26 m OD.

**TP3882** (Ground Level +29.37 m OD) Made ground contact to London Clay at +27.07 m OD.

This transect contains London Clay contacts between +23.0 m and +25.0 m OD. At the southern end of the profile stratified sands have been noted. Geotechnical ascription as 'head' appears incompatible with the unit descriptions containing peat/organic lenses; an alternative hypothesis suggests these units have a fluvial origin.

## 4.3 Discussion

The results of this study have been restricted by the need to examine stratigraphy across a wide area using data generated, and interpreted, by drillers and site engineers prior to inspection by geoarchaeologists. In some cases alternative explanations/interpretations for processes of origin can be suggested for some units (e.g. see TP3898/3899 in Section 4.2.4. above). These limitations have been off-set by the ability of the GSF to monitor works across the site (Table A1). The information derived from this study indicate that:

1. Made ground overlies bedrock London Clay over much of the site area.

2. In many locations it is likely that the London Clay surface may have been truncated by human activity coincident with former construction activity at the site.

The identification of weathered London Clay surfaces is difficult due to the properties of the clay. Considerable difficulties are encountered when attempting to distinguish *in situ* and partially reworked London Clay in open sections. In borehole logged data it is often impossible to determine this status.

3. The topography of the area dips generally to the south (see Transect B). Differences in the datums of London Clay contact surfaces have been noted in some sections where:

i) London Clay contacts occur at or below +13.0 m OD (e.g. Transect A, SA 3721, BH 97).

ii) London Clay contacts occur between +15.0 m and +17.0 m OD (e.g. Transect A, SA3855 to OP3745 and Transect B, TP3845 to 3843).

iii) London Clay contacts occur above +20.0 m OD (see Transect B, BH 82 to OP3818).

This may reflect differences in the original landsurface datums across the area.

4. An area of the study area in the vicinity of St. Pancras Station and the western part of Kings Cross Station (described under Transect A) appears to indicate that sediments are locally present within this area that appear to have a fluvial or colluvial origin. Two sets of sediments outcrop at differing elevations within this area, below and above +14.5 m OD (see point 3, i) and ii) above). These sediments may be related to the Fleet drainage and indicate that a sequence of sediments within and immediately adjacent to the Fleet may exist. These deposits are not recorded on the British Geological Survey map.

5. An area overlain by gravel exists to the north of the canal at higher elevations (>+20.0 m OD). These sediments have been interpreted as Head deposits indicating a possible periglacial origin for the sediments. These may however be of fluvial origin and either relate to the Fleet drainage pattern or be outliers of Boyn Hill Gravel or Langley Silt recorded to the east of the study area by the British Geological Survey.

## 5.0 RESOLVING KEY ARCHAEOLOGICAL AND GEOARCHAEOLOGICAL QUESTIONS (Fig. A4)

The objectives of the geoarchaeological study were set out in Sections 2.0 of the Main Report and of this Appendix. The degree to which these questions can be answered depended on access to the test pits and geotechnical data which was largely achieved. The objectives can now be addressed, beginning with the specifically geoarchaeological objective identified under 2.0 (ii) above.

5.1 *To understand the nature of the sub-surface area from a geoarchaeological perspective.*

The sub-surface stratigraphy of the area is complex due to the extensive impact caused by railway construction activity since the mid-nineteenth century. Former ground surfaces are difficult to identify due to the problematic nature of the weathered nature of London Clay however it is possible that a former river channel complex existed in the western part of Transect A (Area 1) (Fig. A4) with older river gravel deposits on the higher ground to the east (Area 2). An altitudinally higher zone of fluvial gravels deposition appears to have existed in the north east area of the site (Area 3). Areas of intact former landsurfaces may exist in association with these sequences.

5.2 *To establish the presence/absence, extent, condition, character, quality and date of any archaeological remains within the area.*

The geotechnical data has highlighted the areas of potential interest adjacent to St. Pancras Station and in the area north of Regents Canal (Fig. A4, Areas 1 - 3). Within these areas stratigraphy exists and may contain stratified archaeological material that may be locally well preserved. However, stratified material is likely to be restricted to localised pockets making correlation and comparison between areas difficult. All archaeological material within the area post-dates the creation of the Thames channel in the Anglian. A possible chronological division, based only on the relative altitudinal criteria, may suggest the oldest sequences are present in Area 3 and the youngest in Area 1.

5.3 *To determine whether any deposits of palaeoenvironmental interest associated with the River Fleet and other water courses are present and to assess their potential for analysis.*

Sediments possibly relating to the course of the river Fleet have been tentatively identified in the St. Pancras -Kings Cross Station areas (Areas 1 and 2). Although no sediment samples suitable for palaeoenvironmental investigation were recovered within the geoarchaeological investigation, the geotechnical data suggest that sediments here may contain biological material; investigation (and sampling strategy) should be designed to address any uncertainty about the taphonomic history of the samples in order to minimise any interpretative problems arising.

5.4 *To determine the potential of any archaeological features and deposits for the study of past environment and economy.*

Aside from the above, no archaeological features were recorded by the GSF that proved suitable for determining potential of archaeological material.
Archaeological features may be cut into the surface of the London Clay in places but borehole and geotechnical data are inherently unlikely to provide such evidence.

5.5 *To assess the archaeological importance of such remains, and the potential for further fieldwork to fulfil research objectives.*

The importance of the sequences recorded by the GSF is difficult to determine in a solely geoarchaeological perspective. It is unlikely that they are of major

significance, although since the difficulty of determination arises in part from small exposures and the absence of local reference examples, their importance cannot be discounted.

## 6.0 POTENTIAL FOR FURTHER WORK IN THE STUDY AREA (Fig. A4)

The results of the study conducted by the GSF suggest that further work will be hampered due to the unknown extent of recent human activity in the study area and the difficulty to be encountered in attempting to locate buried *foci* of human activity.

The GSF work has suggested that two areas of the site complex would repay further investigation. The area in the vicinity of Pancras Road, within the area thought to contain the relict drainage of the Fleet river (Areas 1 and 2) would be subject to considerable sub-surface disruption under the proposed scheme (see Fig. A4), and a watching brief during construction may show stratified sequences of Roman and medieval date which could contain palaeo-environmental data.

A second area of potential interest occurs in the north west of the site where sediments described in geotechnical logs as 'Head deposits' are located (Area 3). Sub-surface construction is proposed in this area, and a watching brief should be considered where appropriate.

Outside the above locations it is not considered likely that important geoarchaeological sequences will be preserved, partly owing to the substantial destruction and disruption to this area in the recent past. Within the two designated areas sequence preservation may be patchy, subject to intrusive impact from recent human activity, and modified by potential changes in groundwater conditions resulting from human activity.

In comparison to certain other areas of the CTRL route corridor the St. Pancras terminus is considered of lower geoarchaeological potential. Any further geoarchaeological and palaeoenvironmental investigation of the area should be justified on the basis of well defined and articulated archaeological questions arising from this evaluation. Paragraphs 5.1-5.3 of this Appendix note significant issues which have not been resolved by evaluation.

## 7.0 CONCLUSIONS

This study has examined geotechnical data and open trench information from a number of locations within the vicinity of the proposed St. Pancras terminus of the Union Railway. The evidence resulting from this survey suggest that sequences within the area are generally poorly preserved and subject to intense recent post-depositional disturbance.

Two areas of potential interest have been located, within which recording watching briefs targeted on well defined and articulated geoarchaeological issues may be justified. The southerly area, to the east of St. Pancras Station centres of the likely course of the Fleet River. Archaeological excavation (within a recording watching brief) of sequences pertaining to this river would be of interest and should be investigated further.

The wider area of the terminus cannot be considered of the same geoarchaeological potential, and survey work may not enhance the present view of the surrounding area. Local pockets of deeply stratified, well preserved material may exist, but their locations cannot be predicted on available data.

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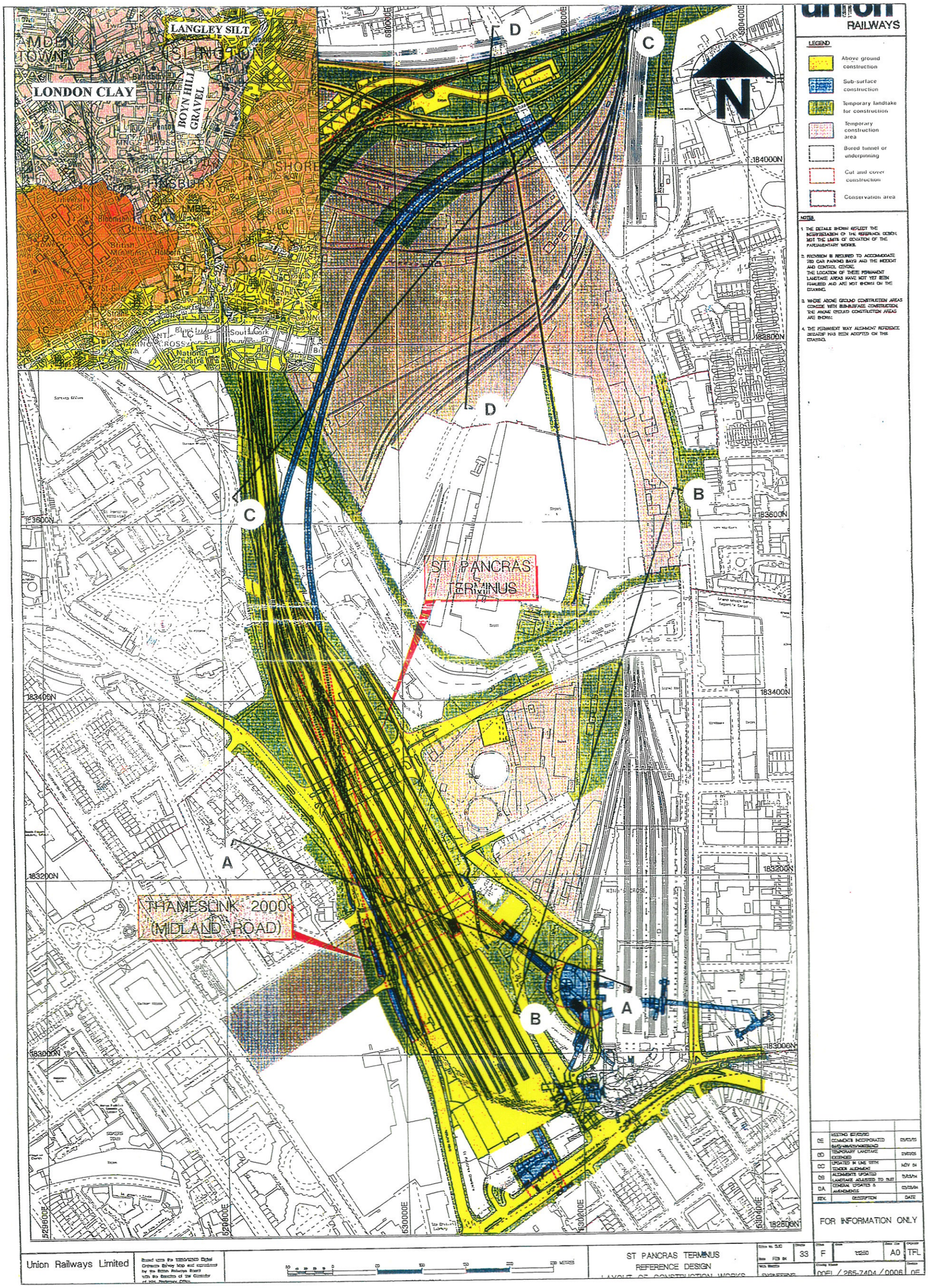


Figure A1: Site location plan showing transect locations and route corridor.
INSET: BGS mapped geology of the St.Pancras area.

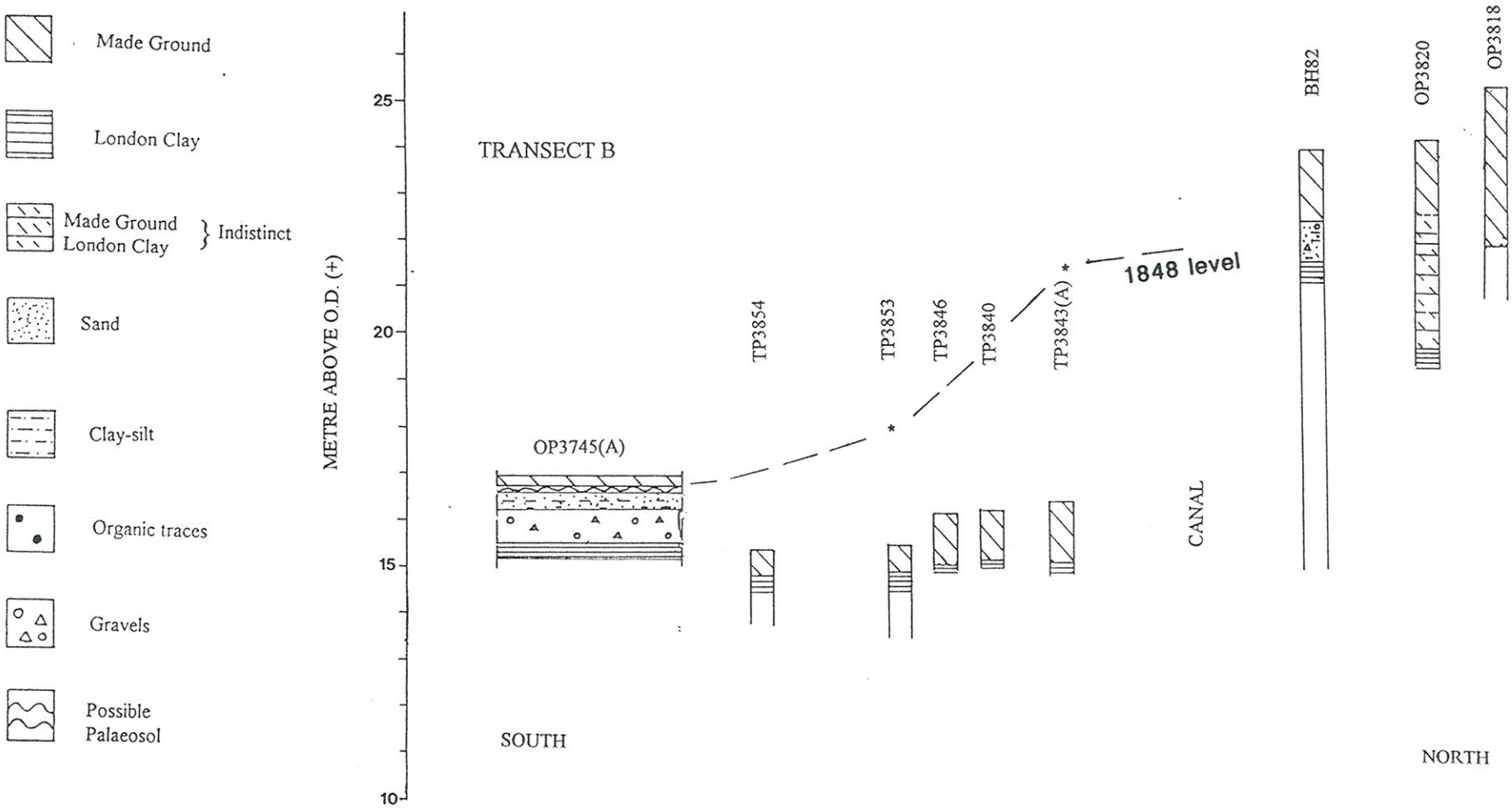


Figure A2: Transect B (for Transect A see Archaeological Report Fig.5).

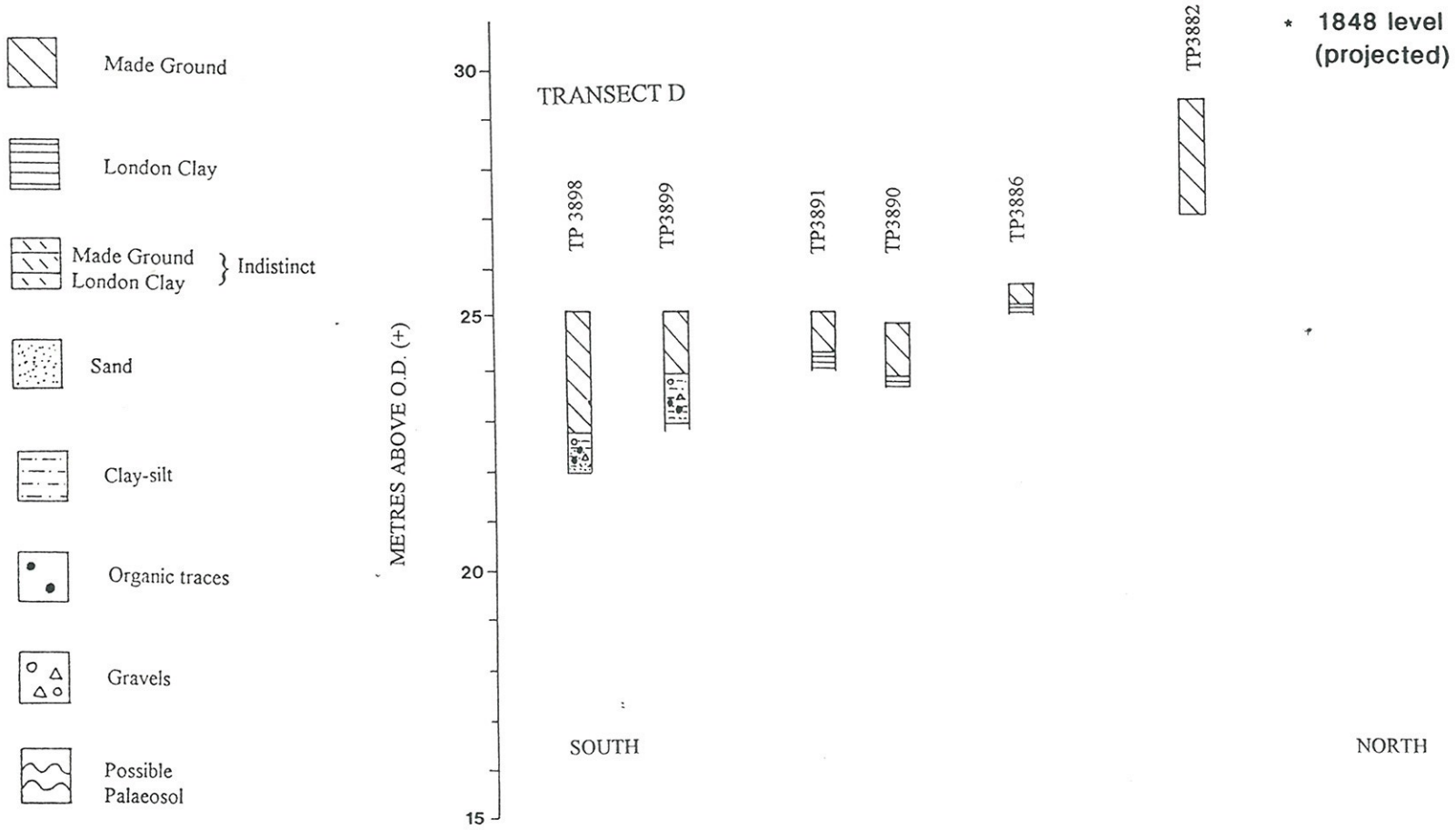


Figure A3: Transect D (for Transect C see Archaeological Report Fig. 5).

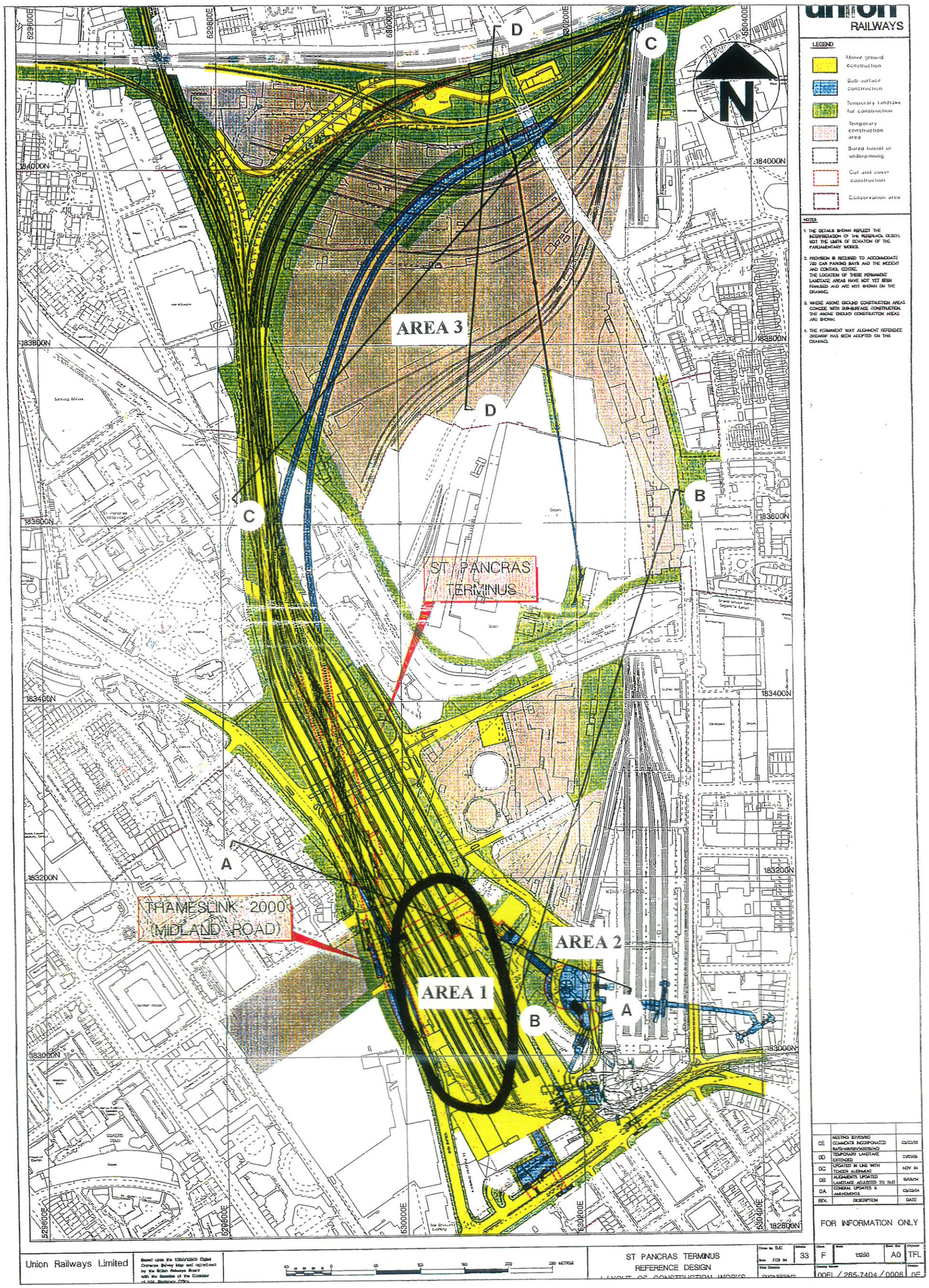


Figure A4: Site location plan showing areas of geoloarchaeological interest.

## APPENDIX 2: ST PANCRAS: THE PRE-RAILWAY TOPOGRAPHY AND LEVELS OF TRUNCATION (Figs 5, 6, 9; Figs A2, A3)

i. The historic landscape of St Pancras is considered in the ES, where the assessment is based on standard sources. When it became apparent that the historic landscape had been so seriously affected by canal and railway works that it was unlikely that even the natural drainage pattern could be reconstructed, a more intensive analysis of the pre-railway topographic and cartographic sources was carried out. The primary aim of this survey was to use these sources to furnish data on the pre-Railway topography of the St Pancras area to assist the archaeological interpretation of the geo-technical investigations conducted in the St Pancras area in 1995. Two principal sources were identified: the 1848-51 Commissioners of Sewers maps, held by the Bodleian Library, Oxford, and the deposited plans of the Great Northern Railway and the Midland Railway held by the Public Record Office, Kew.

ii. It has been possible in several places to make general comparisons between the pre-Railway levels (ie those obtained from the 1848 OS 1:1056 `Skeleton plan' and the 1852 Deposited plans for the Kings Cross Main line) and the post Railway levels (ie those obtained from the 1874 OS 1:1056 and various modern 1:1250 plans) for the Northern Railway lands. This is complicated by the nature of the 1848 maps which show detail only for existing streets and therefore only give levels values for already developed areas. Within the area of the Railway lands it was therefore possible to obtain meaningful comparisons for only two areas: Agar Town (Fig 6), a Victorian slum on the north-eastern bank of Regents Canal and the line of York Way (Fig 6) and the houses to the east. For the area between the Regents Canal and York Way it is therefore blank. The principal source for the pre-Railway topography is therefore the survey used for the 1852 map which, while giving a profile of the land adjacent to York Way, does not give a sufficient spread of information of the area of the railway lands to the west. The area of Agar Town is very well served for 1848 levels.

iii. Examination of the historical and map sources reveals some obvious areas of ground disturbance, some of which are still represented by extant features and some of which have now vanished. The Northern Railway lands, here taken to mean everything between Regents Canal and the North London Line, contain two areas of now infilled canal basin, in addition to the Regents Canal itself and the small canal basin, also now gone, which extended from the Canal to the south. Four canal arms originally ran underneath the Granary from the basin to the south. Some pre-railway disturbance is also indicated by the survey for the deposited engineering plan which identifies the south-western part of the railway lands as lying within a field identified as `Brick Fields' (later coal drops, see Fig 6). The Great Northern (now the East Coast) Main Line runs in triple tunnel from just north of Kings Cross station underneath the Regents Canal, through the eastern edge of the railway lands and crossing under the line of York Way to emerge to its east.

iv. Levels quoted below are adjusted from Liverpool to Newlyn datum heights using a conversion factor supplied by the Ordnance Survey, the corrected value quoted as Ordnance Datum (OD). Despite the deficiencies of the data for the main area of Railway yard some general conclusions can be drawn. Examination of the 1848 levels for York Way show that the road sloped fairly gently upwards from the north side of the Regents Canal, rising from a height of OD 23.40 m (1848), at a point c.30m to the north of the bridge over the Regents Canal (other levels closer to the bridge are higher and would appear to represent the bridge ramp) to a height of OD 29.01 (1848) at the point where Randall's Road (Fig. 6)joins York Way, just to the north of the point where the Gasworks Tunnel (Fig. 6) passes beneath York Way. This rise is generally matched by the 1874 levels which show a rise from OD 23.65 m to 29.83 at roughly equivalent locations. This topography is reflected by Rocque's map of London and Ten Miles around (1746), the best general source for pre-development topography where hachures show the land rising to the north and east of York Way.

v. This general model of the topography would seem to be supported by the curved line of Regents Canal, the line of which appears to cut across field boundaries and land ownership (as marked on pre-canal maps of the area such as Rocque (1746) or Thompson (1801)) and therefore could be argued to have been cut on this line to follow the flatter ground around the bottom of the contour, only cutting into the slope at the point where the lock is formed.

vi. It would therefore seem reasonable to suggest that the pre-Railway topography of the land generally follows the profile of York Way, possibly falling slightly to the west. This south-north rise is confirmed by the slightly oblique profile through the site afforded us by the Great Northern engineering plan. This shows the slightly undulating land rising from OD 22.40 m on the northern bank of Regents Canal to approx OD 29.87 just before the point where the alignments pass beneath York Way. A similar rise is likely for the areas to the west of the Railway lands: the 1848 levels for Cambridge Street (now Camley Street, Fig. 6) show a steady inclination from OD 19.95 in the south, just to the east of St Pancras Churchyard to OD 25.88 at the northern point of Agar Town.

vii. Taking this as a general model and allowing for the element of doubt inherent in drawing detailed comparisons between neighbouring datum levels it would appear that the ground level of this part of the railway lands has been roughly levelled, through a combination of ground raising in the south and quite severe truncation in the north, and now possesses only a very slight south-north incline. The 1874 map shows a line of level values running along the far eastern edge of the Railway lands roughly parallel to York Way. The southernmost level of this group, which lies approx 60 m north of the Regents Canal between the Potato Dock (Fig. 6) and York Way, shows a value of OD 24.32, approx 0.8 m higher than the nearest 1848 level taken on York Way, which lies approx 3 m to its south-east. The northernmost level, which is situated in the railway lands immediately to the south-west of the York Way/Rentals Road junction is given as OD 24.81, a rise of less than 1 m but a drop of over 4 m from the 1848 level taken at this junction. The

point at which the apparent ground-levelling process passes from ground raising in the south to truncation in the north is not entirely clear but would appear to occur at, or close to, the point at which Copenhagen Street runs into York Way (Fig. 6). At this point the 1848 level of York Way is at OD 24.68, while the railway lands to immediately to the west are given a level of OD 24.78. The 1852 profile gives an approximate height of 24 m for the tunnel centreline just to the west of this point. To the north the 1848 (and 1874) York Way levels and the 1874 Railway land levels begin to diverge. As the 1848 York Way levels rise towards the Rentals Road level of OD 29.01 (through levels of OD 27.38 and 28.32) the Railway land levels flatten to run through levels of OD 24.78 and 25.14, dipping again for the northern level of 24.81.

ix. Further evidence of the landraising at the southern end of the Railway lands comes from a value located at the south of the site, between the Potato Market and the northern bank of Regents Canal, close to the centreline of the Gasworks Tunnel. On the 1852 section the ground level at this point is shown at OD 22.40 m, by 1874 this ground level is given as OD 24.07, indicating a general rise of approx 1.5 m; this assuming 1852 deposit drawing reflects the pre-railway level, then this rise is perhaps related to the creation of Wharf Road (Fig. 6).

x. The general topography of the 19th-century Railway lands, as indicated by the 1874 levels, would appear to show a roughly level area in the south, while the northern section of the site can demonstrate an east-west incline: in rough section the levels rise from OD 24.81 m in the east to a level of OD 26.36, taken at the far western side of the Great Northern Goods depot. This is not a steady rise: the levels hardly rise within the north-eastern half of the site (a level taken at roughly the centre of the projected line across the site shows a value of OD 24.90) but in the north-eastern sector the levels rise steadily to OD 26.36. Beyond this point, into the Midlands Goods Yard the levels rise again reaching levels of over 28 m. This general picture (within the Northern Goods Yard) is of course affected by changes in level in different areas, required presumably by specific requirements of the various storage, maintenance and trading functions of the area which tend to confuse this picture. Such a change can be observed in the area between the Coal Shed and Coal Shoots, just to the north of Regents Canal, where the level drops by about 2.5 m from an average level of OD 24 m to between 21 and 21.5 m: this is presumably a localised drop to facilitate transfer of coal from railway to carts. The northern and southern areas of the site are at different levels, the level changes from roughly OD 24 m to between OD 24.9 and 25.7 (as the ground slopes from east to west), the change marked by a step: the change, noticeable on the 1874 map as a change between two sets of railway lines is marked, on the modern maps as the change between railway lines (in the south) and the Freightliner Terminal/Gallifords Yard (Fig. 6) in the north).

xi. In the absence of a comprehensive set of 1848 levels, or any clear picture of pre-railway levels from other sources, it is difficult to state categorically what implications this topography has for ground surface survival. If our suggested model of a slight drop from east to west, and a more dramatic fall from north-

south holds true then it would appear that the Railway lands as a whole have suffered a general truncation in the north-eastern section and may have been artificially raised in the south-western, south-eastern and north-western areas.

xii. The other, more fruitful area for comparison of the 1848 and 1874 levels lies within the Goods Depot of the Midland Railway, which occupies part of the site of Agar Town. Comparison of the 1848 (Agar Town) levels and the 1874 (Great Northern/Midland Railway Land) levels show some general patterns: north of the curve of Regents Canal and the St Pancras Basin, ie within the area of the Midlands Good Shed, the land shows evidence of land raising between 1848 and 1874: the one or two 1874 levels obtained indicate a far greater rise in land surface: typical (neighbouring) levels within the area of the Midlands Goods Shed include a rise from OD 26.62 to 28.43.

xiii. South of the canal this rise is hardly evident at all and rises such as the shift from OD 23.35 to 23.7 outside the workhouse, now St Pancras Hospital (Fig. 6) are probably of little consequence: there are some instances where the levels actually fall on a similar scale. In general the area to the south of the canal appears to have undergone little change in level between 1848 and 1874, aside from the embankment of the Midland Main Line, and to the east the cuttings relating to Kings Cross and the Milk Dock.

## APPENDIX 3: FLOATED AND SIEVED SAMPLES FROM THE URL EVALUATION AT ST PANCRAS

by Mark Robinson

### 1 Introduction

Two soil samples (40 l and 1.5 l) from possible medieval contexts encountered during evaluation trenching at St Pancras were floated onto a mesh of 0.25 mm, primarily for the recovery of charred plant remains. Eleven samples, each of 100 g, from sediments encountered in the trial pits were sieved down to 0.2 mm, primarily to recover remains that might aid in the identification of a buried ground surface. The flots and sieved samples were sorted under a binocular microscope to extract identifiable macroscopic biological remains.

### 2 Results

The results from the flots are given in Table 3.1. In addition to charred plant remains, the flots contained uncharred remains and coal debris. These too have been recorded. Details of the sieved samples are given in Table 3.2. Although macroscopic biological remains were absent from all but one of these samples, the general characteristics of the samples were still of use for interpretation, so have been recorded. The only biological remains recovered from the sieved samples were 4 seeds of *Ranunculus* S. *Batrachium* sp. (water crowfoot) and 8 seeds of *Glyceria* sp. (reed grass) from TP3896/4.

### 3 Interpretation - Flots

i. Both flots contained large quantities of coal fragments, coke and coal ash, showing that the deposits had experienced substantial modern contamination. The non-charred fruit pips in OP3745/A/6 <3>, including *Vitis vinifera* (grape) and *Ficus carica* (fig), suggested a sewage component to the deposit. While it is possible that the context was indeed a medieval waterlogged deposit which contained sewage, it is much more likely that the deposit was not waterlogged and that the pips represented recent contamination. The uncharred remains from OP3861/4 likewise implied either a waterlogged medieval deposit or recent contamination. The two beetles from this flot, *Megasternum obscurum* and *Onthophilus striatus* tend to occur in foul organic material.

ii. Both the samples contained *Quercus* sp. (oak) charcoal but the only crop remain was a single charred grain of *Avena* sp. (oats), from OP3745/A/6 <3>. Given the degree of contamination of these samples, the date of these remains is uncertain.

### 4 Sieved Samples

i. The sieved samples could broadly be divided into two groups. There were those samples of gleyed or organic, slightly gritty, silty clay which were from the upper part of the sequences (see Table 2). Most of these samples also contained small fragments of fired clay, possibly brick. The other samples, which were from the lower part of sequences, or at least did not overlie the gleyed deposits, were brown clay. The only sample to yield macroscopic biological remains was TP3896/4, from

the most organic of the deposits. It contained seeds of *Glyceria* sp. (reed grass), a tall reedswamp species and *Ranunculus* S. *Batrachium* sp. (water crowfoot), a submerged to floating-leaved aquatic plant.

ii. Some of the brown clay sediments perhaps represented weathered London Clay. However, the occurrence of small rounded flint pebbles in TP3844/6 would suggest a fluvio-glacial component. This deposit, and possibly some of the other brown clay samples, could have been boulder clay-type material.

iii. The nature of the gleyed to organic sediments would be consistent with a buried old ground surface or Holocene alluvial sediments. They certainly were not the underlying brown clay redeposited unless much additional material including organic material (necessary for the microbial activity which causes gleying) had been added. The seeds from TP3896/4 suggest an alluvial origin to the sediment. The fine particle size of the sediment was characteristic of a low energy depositional environment, but whether the sediments of this sample accumulated in a pond, a ditch, a reedswamp or on a floodplain remains unknown. The occurrence of fired clay in most of the gleyed or organic sediments suggested them to have been recent or contaminated.

## 5 Conclusions

The floated samples were so heavily contaminated that they were of little use. The sieved samples helped serve to characterize the sediments of the evaluation trenches. Tertiary or Pleistocene clays could be distinguished from recent sediments. However, it was not possible to establish whether the recent sediments represented an old ground surface, alluvium or dumped imported material, although fired clay in most of these deposits would suggest a recent date.

Table 3.1: **Floated Samples**

| Flot contents | | Presence or number of items | |
|---|---|---|---|
| | | OP3745/A/6 <3> | OP3861/4 |
| Coal, Coke, Coal Ash | | + | + |
| Charred Plant Remains | | | |
| *Quercus* sp. | oak - charcoal | + | + |
| *Avena* sp. | oats - grain | 1 | - |
| Non-charred seeds | | | |
| *Chenopodium album* L. | fat hen | 1 | - |
| *Atriplex* sp. | orache | - | 1 |
| *Vitis vinifera* L. | grape | 1 | - |
| *Rubus* cf. *fruticosus* agg. | blackberry | 3 | - |
| *Ficus carica* L. | fig | 1 | - |
| *Sambucus nigra* L. | elder | 5 | - |
| *Carduus* sp. | thistle | - | 1 |
| Non-charred Coleoptera | | | |
| *Megasternum obscurum* (Marsh.) | | - | 1 |
| *Onthophilus striatus* (Forst.) | | - | 1 |


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