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SEWER REQUISITION FOR OASIS DEVELOPMENT

Cumbria

Archaeological Evaluation Report

Commissioned by:

North West Water Ltd

Sewer Requisition for Oasis Development, Nr Brougham Cumbria

Archaeological Evaluation Report

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The Borehole watching brief was undertaken by David Hodgkinson, the landscape survey was supervised by Chris Wild and assisted by Graham Mottershead. The trial excavations were undertaken by Graham Mottershead and Stuart Elder under the direction of James Wright. The project was managed by Jamie Quartermaine. The report was written by James Wright with contributions by Chris Wild and David Hodgkinson, and was edited by Jamie Quartermaine and Rachel Newman.

EXECUTIVE SUMMARY

At the request of North West Water Ltd the Lancaster University Archaeological Unit undertook an archaeological evaluation of the proposed route of a sewerage pipeline to the east of Brougham in Cumbria (between NY 54652935 and NY 56502757). This involved a watching brief of boreholes, a landscape survey, and trial trenching of the sub-surface remains along the proposed pipeline. The watching brief was undertaken between 19th and 20th March 1996 and the landscape survey and trial trenching were undertaken between 24th April and 3rd May 1996.

The watching brief involved the examination of the sub-surface stratigraphy of boreholes excavated by Bechtel Water Technology Ltd and did not generate any definitive evidence of human activity. The landscape survey involved the systematic field walking of the route and the mapping of any features or artefacts identified. The survey revealed a limited survival of agricultural earthworks at the northern end, but for the most part the surface evidence has been lost as a result of intensive ploughing.

The trial trenching involved the excavation of 57 15m x 4m trenches, which were located at *c*50m intervals along the route of the pipeline. The topsoil was removed mechanically to a maximum depth of 0.5m and each trench was then manually cleaned and inspected for archaeological remains. Where any features were observed they were sampled and recorded.

Two areas of archaeological potential were discovered, one at the northern end of the route and the other at the southern end. The site identified at the northern end comprised two ditches, one of which was aligned north/south, and the second north-west/south-east. Two segments of the north/south ditch were excavated, which varied between *c*2.0-3.0m in width and 0.70m - 0.37m in depth; sherds of Roman pottery were recovered from these. The second ditch was 1.60m wide and 0.32m deep and produced no finds. During hand cleaning of the trench (1) containing part of the north/south ditch a lead cast plug was retrieved, and a small lead plug was recorded from Trench 2, 50m to the south. Nine sherds of Roman pottery were also recovered from Trench 5, which was 190m to the south of the ditches; however, no archaeological features could be observed in the limited area of this trench.

A line of postholes was exposed at the southern end of the pipeline (Trench 41) and the trench was expanded to 26m by 9m to test the existence of further postholes. This revealed the remains of a rectangular post-built structure, 7.5m long and 3.4m wide. Two pieces of possibly burnt flint, and a piece of flint-like stone, were recovered from the postholes, but no other finds were associated. The grouping of the postholes suggested that some of the posts had been replaced during the use of the building. To their east was a second cluster of postholes which continued beyond the edge of the trench, and these probably represent another structure. Trenches (1.5m wide) were excavated for *c*20m to the north, south, and east, from the original trench; no evidence of an enclosure ditch was identified but a pit was half exposed in the trench to the east.

The limited lithic finds retrieved from the postholes may suggest a prehistoric date, but it must be emphasised that only three pieces of flint were recovered, and that flint is a durable material with the capacity of being redeposited in later features. The dimensions of the

building are similar to those of Building 5 at Fremington (Oliver *et al* 1996) which is only 1.5km to the west of Trench 41; the Fremington structure was dated by its association with post-Roman buildings, an extremely rare occurrence in the North West.

It is therefore recommended that a further programme of excavation is undertaken to investigate the two areas of archaeological potential and to mitigate their damage by the proposed sewer requisition by means of full excavation and recording.

1. INTRODUCTION

1.1 Background

The Lancaster University Archaeological Unit (LUAU) was commissioned by North West Water Ltd to undertake an archaeological evaluation along the proposed route of a sewerage pipeline for the Oasis holiday development at Whinfell, near Penrith, Cumbria. The proposed sewer requisition is to the east of Brougham in Cumbria (between NY 54652935 and NY 56502757, shown on Fig. 1). The evaluation involved a watching brief of boreholes, a landscape survey, and trial trenching of the sub-surface remains within the easement corridor of the proposed pipeline. The landscape and trial trenching elements of the evaluation were undertaken in accordance with a project design submitted by LUAU (Appendix 1), which was produced on the basis of a verbal brief by the Cumbria County Archaeologist. The watching brief of the boreholes was undertaken at the request of North West Water Ltd (15/3/1996) and took place between 19th and 20th March 1996. The watching brief element of the evaluation was undertaken prior to the landscape survey and trial trenching which were undertaken between 24th April and 3rd May 1996. The results of all three elements of the evaluation have been incorporated within the present report.

The area of the development is of great archaeological significance; the present A66 follows approximately the same line as a prehistoric route across the Pennines, the significance of which is reflected by King Arthur's Round Table, Mayburgh, and Little Round Table, the three henge or henge-related monuments to the south of Penrith (Harding and Lee 1987). The A66 follows more closely the route of the Roman road (Margary 1957, 118), whilst near to the proposed pipeline was a Roman fort and the remains of a cemetery which is 150m to the west of the pipeline route (Ministry of Public Buildings and Works 1967, 12; 1968, 17). Previous excavations undertaken at Fremington, *c*220m to the south of the pipeline (Oliver *et al* 1996) demonstrated the existence of an early medieval settlement and there is a medieval castle at Brougham, *c*1km to the west. In view of the activity from the Neolithic through to the medieval period, and the local and national importance of some of these remains, an evaluation was required by the County Archaeologist, Mr M Daniells. This was to incorporate a landscape survey and trial trenching, but there was no requirement for a desk-top study as it was considered that this would not adequately inform the archaeological potential of the study area.

In response to a verbal specification by the County Archaeologist, LUAU prepared a project design (LUAU 1996) for an archaeological evaluation to be undertaken along the line of the proposed sewer. The evaluation involved the mechanical excavation of trenches every 50m, positioned to sample the width of the easement corridor. Because difficulties of feature recognition were anticipated due to the geological gravels of the area the trenches were excavated to twice the normal width and were therefore 4.0m wide and 15.0m long, the extra width increasing the possibility of detecting subtle features. There was no requirement for evaluation within Whinfell Forest because of the reduced archaeological survival as a result of forest planting.

1.2 The site

The proposed sewer requisition is *c*2.5km long (Figs 2 and 3), running roughly south-east from the sewage works on the south bank of the River Eamont to Whinfell Forest. It crosses gently undulating land that gradually rises to the south, whilst the southernmost *c*1km of the site closely follows a stream which flows north to the River Eamont. The valley of this stream has a fairly steep shoulder to the east, but dry valleys open to the west. The solid geology is New Red Sandstone of Triassic Age, overlain by fluvial gravel, sand, silt, and clay and the soils are mapped as the Newport 1 Series which are typical brown sands. All the land at the time of the work was in agricultural use, mostly as grassland, but three fields had been ploughed and it was evident that most fields had been cultivated in the past. The height varies between *c*117m OD at the northern end of the pipeline and *c*145m OD at the southern.

2. METHODOLOGY

2.1 Borehole Watching Brief

Each borehole was a manually excavated pit, measuring 1m by 1m, and was generally between 0.80m and 1.10m in depth. The boreholes were inspected and recorded by LUAU during their excavation, allowing immediate finds retrieval and recording if necessary. Where possible a brief surface inspection of the surrounding area was made, in order to retrieve artefacts which would have been compromised by the surface activity of borehole excavation.

2.2 Landscape survey

A rapid field inspection was undertaken within the sewer requisition corridor. The area comprised predominantly pasture land, but there were also three ploughed fields. However, much of the area has been intensively cultivated in the past and there was consequently relatively little surviving evidence of surface features. The three ploughed fields were examined by intensive artefact survey to identify any material brought to the surface by the plough; however, the only material identified was of nineteenth or twentieth century date and attributable to night soiling practices.

Sites identified by the rapid inspection were subject to an LUAU level II survey (Appendix 2), which recorded the location, character, extent of surface archaeological features and involved the production of complete hachured interpretative drawings of the earthworks. This was accompanied by a detailed written and photographic record (the descriptions are included in Section *8.2)*.

The survey control was established by means of a closed traverse, and the survey was undertaken using a Carl Zeiss ELTA 4 total station. The digital survey data was transferred to an industry standard Computer Aided Drafting (CAD) system for the production of the survey drawings.

2.3 Field Evaluation

A programme of greenfield trench excavation was used as a subterranean survey technique to examine archaeological deposits not evident from the surface, and targeted in areas with no previously known archaeological features. Its aim was to establish the presence or absence of any previously unsuspected archaeological deposits, and, if established, to define their character, date, and state of survival. The programme was also required to explore the extent of a variable width corridor (average 25m width) in areas of archaeological potential as identified within the assessment.

The local soils, combined with the ephemeral nature of the archaeological evidence, meant that archaeological features were extremely difficult to discern by trenching techniques, particularly in section. Although clearer in plan, it was necessary to have sufficient area open to enable an effective identification; it was therefore decided to excavate wide trenches (3.6m width) to provide an adequate plan view of the exposed deposits.

The 'greenfield' trenching was undertaken using an alternate trench configuration, whereby trenches were located parallel to the corridor line, on alternate sides of the corridor with a trench laid periodically across the corridor line to ensure identification of linear features. In order to examine 5% of the working corridor, as required by the County Archaeologist, it was in theory necessary to excavate *c* 60 double width trenches, which necessitated an average of 50m separation between trenches. In the event 57 trenches were excavated, which comprises Trenches 1-53 and four additional trenches excavated as part of Trench 41. The shortfall from the stated maximum was due to the presence of unfavourable topography or the existence of services (water, electricity or telecommunications).

2.3.1 Excavation methodology

The trenches were excavated under supervision every 50m, using a wheeled excavator, fitted with a 1.8m wide toothless ditching bucket, to remove topsoil, and where necessary subsoil. The trenches were manually cleaned and inspected for archaeological features, and the spoil-heaps were also inspected for artefacts. In trenches with no archaeological remains *pro forma* LUAU Trench Sheets were completed recording the orientation, dimensions, topsoil, and geology of the trench. Trenches were numbered from 1 upwards in their order of excavation. Where archaeological features were uncovered they were manually excavated, and recorded photographically, on *pro forma* LUAU context sheets, and on drafting film. Finds were bagged by context. When necessary trenches were either enlarged, or further adjacent trenches were excavated, to resolve uncertainties.

Accurate scale drawings were made where appropriate, and black and white/colour photographs were taken as necessary. Environmental samples were taken as appropriate, but no analysis was undertaken as part of the present evaluation. All finds were handled and stored according to standard practice (following current Institute of Field Archaeologists guidelines) in order to minimise deterioration.

2.4 Health and safety

Both Lancaster University and LUAU maintain Safety Policies, the latter based on the SCAUM (Standing Conference of Unit Managers) Health and Safety Manual (1991). In keeping with current Health and Safety at Work Regulations, prior to commencing on-site work, a risk assessment for each activity was completed. The position of all trenches was also scanned for underground cables using a U-scan cable detection device.

3. BOREHOLE WATCHING BRIEF RESULTS

The borehole watching brief was required to investigate the sub-surface deposits and identify archaeological activity at selected points along the route. The detail results of the investigations are included within the borehole gazetteer (Section *8.1*). The inspection of the boreholes along the length of the proposed sewer trench did not reveal any archaeological remains; however, the archaeologically random positioning of the boreholes did provide an opportunity to inspect areas away from the sites of major archaeological activity. This had the potential to investigate the archaeological sensitivity of the overall easement corridor and thereby inform the planning process.

The changing topography and subsoil make-up recorded in the borehole sections made it possible to make a projection of the potential of archaeological presence along the corridor. The watching brief demonstrated that the natural deposits in the study area varied from 0.3m to 0.8m and that the shallower deposits were at the southern end of the corridor. It was found that the northern end of the study area comprised gently rolling pasture land with a relatively deep coverage of topsoil and subsoil. Recent archaeological work at Fremington has shown that this type of terrain was favoured for settlement. The occurrence of these types of conditions, for roughly half the length of the proposed sewer alignment, may indicate that there is an improved likelihood of identifying archaeological features within the northern half of the pipeline. However, this does not preclude the possibility of also identifying an archaeological resource at the southern end of the pipe route (see Section *5.2*).

4. LANDSCAPE SURVEY RESULTS

The primary walk-over survey of the route identified a limited number of earthworks which could then be subject to more detailed recording by a Level 2 survey (Appendix 3). This level of survey provided a basic interpretative record for evaluation purposes, which was sufficiently detailed to act as mitigation for monuments of reduced archaeological significance.

The landscape survey identified two sites at the northern end of the proposed route, to the north of the A66 (Fig. 4). The first site (1) was a small mound of stones, presumed to be a modern clearance cairn; it was, however, investigated by the excavation of Trench 2 (see Section *8.3*) and was found to be a natural feature. The second site comprised two shallow banks running along the same axis as the present field boundaries. These two features were probably originally linked to form one boundary element of an earlier field system. A similar feature was noted outside the easement area, on the bank on the opposite side of the field towards Lightwater, and probably dates from the same period.

Other topographic evidence for earlier farming practices can however be seen outside the proposed route of the sewer, for instance at Whinfell Park on the steeper slopes towards the marsh to the west, where ridge and furrow is clearly visible.

The general paucity of surface features along the length of the proposed sewer requisition reflects the past intensity of agricultural activity in the area. Although much of the area is presently in pastoral use, historically it has been subject to ploughing over a considerable period and this has clearly degraded the surface evidence of archaeological features.

5. EVALUATION RESULTS

Fifty-seven trial trenches were excavated as part of this evaluation, which included the four trenches excavated as part of Trench 41. The majority of the trenches produced no evidence of archaeological activity, but a small number produced significant evidence of archaeological remains and are summarised below. The detailed findings from the excavation of all trenches, including those that did not produce evidence of archaeological activity, are presented within the Gazetteer Trench Descriptions (Section *8.3*).

5.1 Trenches 1, 52, and 53 (Northern Section)

In the northern part of the pipeline two ditches were discovered (Trenches 1, 52 and 53, see Fig 2). These were probably field boundaries although one or both could have formed part of an enclosure. However, they were at an angle of *c*45° to each other, which perhaps suggests that they were of differing dates. The shallower ditch, seen in Trench 52 as context 142, was not recorded in Trench 1 and it is probable that the intersection of the ditches occurs just to the north of Trench 1. It was thought at the time of excavation that a lead cast-plug from this trench was from a ditch-like feature but this could not be confirmed in the course of the evaluation. No secure dating evidence was obtained from either ditch, with only one sherd of pottery, dating between AD 200 and 240, being recovered from depth in the fill of the ditch in Trench 53. It is probably not coincident that this was the most substantial sherd recovered; the other sherds from the three trenches in this area were retrieved from at or just below the level of machining, in areas adjacent to the ditches; it is probable that these are not in situ as a result of plough disturbance. Three pieces of lead were recovered, in addition to the cast plug from Trench 1; there was another cast-plug from Trench 2 (50m to the south) and two, probably modern, artefacts from topsoil adjacent to Trench 1. The cast plugs are of a type often encountered on Roman sites. The two probably modern lead artefacts recovered from the topsoil are likely to have been bullets, probably related to the adjacent rifle butts (NY 5472,2929) which are shown on the 2nd edition OS map of 1900. A sandstone slab recovered from the ditch must have been manually transported as no bedrock was observed in any of the trenches to the north of the A66, and may have been used as building material. The presence of Roman artefacts within the ditches may indicate that the ditches are of Roman date.

5.2 Trench 41

The excavation of Trench 41 identified a line of postholes which was potentially part of a larger structure and so the trench was extended to make it rectangular, measuring 16.5m by 8.5m (Fig 6). This larger trench revealed the extent of the structure (see Section *5.2.1* below), but it was decided to excavate three 1.7m wide slots radiating to the north-west for 21.0m, the north-east for 16.5m and to the south-west for 17.0m to test for further structures and other associated activity. The first extension investigated the extent of the posthole complex and the second investigated the possibility of a boundary ditch around the structure.

5.2.1 The posthole structure

A total of 15 postholes and five possible stakeholes was exposed, of which four postholes and four stakeholes were sectioned. Their arrangement suggested that they formed at least three corners of a sub-rectangular structure and some intermediary postholes suggested that an internal division may have existed. The form of the structure is shown in Figure 7, which uses

dashed lines to show the position of the probable building. The largest postholes formed the apparent corners and the smaller features corresponded with the putative internal division. The posts were for the most part in pairs, suggesting that there had been some refurbishment of the structure. A pit (141) was also uncovered about 5m to the east of the structure; it was found to be at least 0.75m long, 0.50m wide, and 0.51m deep and had steeply sloping sides with a rounded base, its only identified fill (139) being a very dark grey brown fine sandy loam which contained some flecks of charcoal. By virtue of the absence of dating evidence and lack of overall stratigraphic sequence means that its relationship with other features remains uncertain.

Further postholes were identified near the edge of the trench, and it must be assumed that these form part of a second structure; however, there is no evident pattern to the configuration of this limited number of postholes and it is clear that the form of any building will not be evidenced without the benefit of further excavation. Two ceramic field drains (126 and 134) and a large modern pit (108) were also identified.

5.3 Trenches 5, 17, and 18

Artefacts were identified from three trenches scattered along the pipeline route, but no definite features were associated. Trench 5 lay 147m north of the A66, and Trenches 17 and 18 were 47m and 59m respectively to the south of the A66 (Fig. 2).

Ten sherds of abraded Roman pottery were recovered from Trench 5, and it is probable that the pottery was deposited as a result of night-soiling practices. Similarly, single sherds of Roman pottery were recovered from each of Trenches 17 and 18, and the same mode of deposition can be assumed. Excepting Trenches 1, 52, and 53 discussed above, no Roman material was recovered from the rest of the route of the pipeline which seems to imply that Roman activity, possibly including farming, was confined to a corridor on either side of the A66.

5.4 Trench 14

This trench was in a broad shallow, dry valley which stretched to the north towards the River Eamont. Geological deposits of fine sand were overlain in most of the trench by a peat layer of 0.13m depth, which followed the contours of the natural sand. The discovery of a layer of peat was unexpected. The peat was probably the result of a minor flood-plain mire caused by impeded drainage, and although a pollen column was taken no further analysis was considered at this stage. The trench was located in a gently sloping dry valley which drained towards the north, but there was a field drain with running water which had cut the peat.

5.5 Trenches 28 and 32

These two trenches were situated in the shallow valley of the stream that flowed north to join the River Eamont. The single flint tool recovered from Trench 28 may be regarded as a stray loss or possibly a discard, particularly as the blade was already broken when found and given the lack of associated archaeological features. It does, however, indicate a prehistoric presence, albeit transitory. A small piece of volcanic tuff was found which was probably been

an axe sharpening flake; although there is also the slight possibility that the single flake was a naturally occurring conchoidally fractured fragment of a glacial erratic.

5.6 Trenches 48 and 49

A shallow ditch or possible lynchet in Trenches 48 and 49 could not be dated, although it is potentially a relict element of a field system pre-dating the present system.

5.7 Finds

A limited Romano-British ceramic assemblage (35 fragments in total) was recovered during the project. The material comprises small and abraded pieces, suggesting considerable and sustained disturbance and movement within the soil matrix. Most of the material comprises heavily rolled fragments of ceramic vessels, probably of late second to third century date, although five fragments of calcite gritted ware (significantly, less abraded) from Trench 1, within the fill of the north/south ditch (context 146) are likely to derive from vessels whose date range extends into the fourth century AD. The group is probably best placed within the third century.

Four fragments of lead were recovered, two being small cast plugs of a kind frequently encountered on sites of Roman date; the other two lenticular objects remain unidentified but are potentially bullets.

Of the stone objects one is a small fragment of a slab of red sandstone of local origin, four are rough fragments of a creamy-white chert-like stone which do not appear to have been worked, one is an oddly shaped but undoubtedly retouched flint blade, and the final fragment is a very small flake of green tuff, which was possibly struck, but could also have originated from glacial drift.

A single tiny fragment of heavily calcined bone was also recovered from the subsoil of trench 1.

The assemblage establishes without doubt that there was Romano-British activity, probably of third century date, within the vicinity of the A66. The degree of damage to the material suggests, however, a significant level of disturbance and that the ceramics especially could be residual within later cut features.

6. DISCUSSION

The evaluation has identified important evidence of archaeological remains, particularly from the northern and southern ends of the pipeline route (Trenches 1, 52, 53 and 41) but there is also a sporadic scatter of artefacts from either side of the A66 and a ditch was found within Trenches 48 and 49, although this contained no finds. The presence of this latter feature, and the small assemblage of finds from the area of the road, demonstrate that there was archaeological activity within the locality, apart from at the north and south extremes of the route. However, these areas were extensively evaluated during this phase of the programme and do not warrant further investigation.

At the southern end of the pipeline a rectangular post-built structure, measuring at least 7.5m by 3.2 - 3.4m, was uncovered. From the few postholes sampled there was no reliable dating evidence, only two possible pieces of burnt flint, and it is therefore not possible to suggest a reliable date for this structure. The presence of a further posthole group suggests that this may be a part of a larger complex but there was no obvious enclosure ditch within *c*20m to the north, east, or south of the postholes. Although rectangular buildings have been excavated in the north, dating from the Neolithic period onwards, they are more commonly historic in date. A similar post-built structure of an early medieval date was excavated at Fremington *c*1km to the west (Oliver *et al* 1996). These structures are superficially consistent with the tradition of rectangular vernacular buildings which often displays similarity of size, simple ratios (typically 2:1) between the dimensions, a lack of internal structural supports, and partitions at one end. This type of building apparently spanned the Roman to medieval periods (James *et al* 1984, 186-7, 203) and it may be that a similar date is applicable to the Whinfell structure. Further work is clearly needed to establish the extent and character of the settlement and to establish a chronology.

At the northern end of the pipeline route is a series of intersecting ditches (Trenches 1, 52 and 53) which contain Romano-British ceramics and are possibly elements of a Romano-British field system; however, the exact relationships have not been established and they may represent multi-period activity. The existence of such a field system may also be suggested by cartographic analysis which demonstrates that elements of the modern field system to the east of Brougham may have had early antecedents. Analytical principles applied by Williamson (1987) to demonstrate the existence of pre-Roman field systems in East Anglia, involving the examination of field boundary configurations on either side of a Roman road, can be used to examine the modern maps around Brougham. Similar analysis shows that there is a north-west/south-east orientated co-axial field system, centred on Whinfell Park, to the south of the Roman Road. To the north of the road is another block of co-axial system on the same alignment and with the same approximate separation between the boundaries as that to the south. There are two extant field boundaries, which 'cross' the road linking the two blocks of co-axial field system and there are at least two others to the east of Whinfell House which cross the road relating to other blocks of co-axial field system. This may suggest that some limited alignments of a field system, cut by the Roman road, survive to the present day. Significantly the ditches identified in Trenches 1, 52 and 53 have two different orientations, one at 45° to the line of the A66 and the other perpendicular to the A66, and this would potentially correspond to the pre-road and post-road field alignments suggested by the cartographic analysis. However, at present the analysis has only examined a very small proportion of the landscape and has not examined tithe or 1st edition mapping; it is therefore

not possible to confirm the early origin of the field system, but there is a case for undertaking further analytical work.

It is important to note that although the study area has been examined by both aerial photographic and surface reconnaissance, these did not reveal any evidence of archaeological activity at either of the two sites (Trenches (1,52 and 53) and (41)), a similar situation to that at Fremington. This highlights value of sub-surface evaluations particularly in this sort of lowland terrain.

The archaeological significance of the Brougham area has long been highlighted by the presence of Neolithic henge monuments, the Roman fort, a Roman cemetery, a Roman road and the early medieval settlement at Fremington. The present evaluation would appear to confirm the archaeological significance of the area and demonstrates the potential for the discovery of settlement remains that could compete in importance with those of the nearby Fremington site.

7. RECOMMENDATIONS

LUAU conducts evaluations in accordance with the Institute of Field Archaeologists' Code of Conduct and best practices, and also in the light of *The management of archaeological projects* (English Heritage 2nd edition 1991). Our concern must be to protect and preserve archaeological sites wherever possible, and only where this is not feasible are destructive techniques advocated. Our aim is to recommend the appropriate action which will achieve recording objectively, without any waste of resources.

Both the site of putative Roman ditches (Trenches 1, 52 and 53) and that of the timber posthole structure (Trench 41) have considerable archaeological potential and it is our recommendation that they are subjected to mitigation recording in advance of their destruction by the proposed sewer requisition. In the circumstances the most appropriate strategy would be to machine strip, within the easement corridor, the topsoil in the area around the two sites and then undertake manual open area excavation of the features revealed. On the basis of the evaluation trenching, it is anticipated that an 30m x 25m section of the easement corridor will need to be stripped by machine at each site (see Figs 4 and 5).

The northern site would also benefit from the machine stripping of a 15m x 4m trench to establish the line of the ditch to the south of Trench 53.

It is understood that the topsoil strip for construction purposes of the pipeline corridor will be undertaken by bulldozer, which restricts examination of the exposed soils, because of the movement of the tracked vehicles over the ground following stripping. Unless the topsoil will be stripped by backactor machine there would be little value in undertaking a watching brief during such a stripping programme and is consequently not recommended.

8. GAZETTEER

8.1 Borehole Descriptions

Borehole 1
Topography Low lying, flat ground, to the immediate north of the A66
Dimensions 1m by 1m; 0.90m deep.
Description Water worn gravels were identified at 0.35m below the ground surface. The gravels comprised 60% rounded pebbles within a coarse brown sand matrix. These were overlain by a topsoil deposit of orange brown alluvium with high sand content. No artefacts were recovered

Borehole 2
Topography Gently undulating pasture land, although unseeded.
Dimensions 1m by 1m; 1.05m deep.
Description Natural sand deposits were identified at 0.50m below the ground surface. The sand was a distinct orange colour and contained 5% rounded stones, with an average diameter of 50mm. The topsoil deposit was 0.42m of slightly clayey brown sand. The boundary between natural subsoils and topsoil was obscured due to extensive leeching of minerals. No artefacts were recovered.

Borehole 3
Topography Rolling rounded hillocks used as pasture land
Dimensions 1m by 1m; 1.10m in depth.
Description Coarse orange sand deposits were identified at a depth of 0.24m and contained *c*15% sub-angular cobbles, the average size being 0.06m in diameter. Topsoil within this borehole was a mid brown slightly clayey, loose, sand containing 1% rounded stones. No artefacts were recovered.

Borehole 4
Topography Situated on undulating pasture land.
Dimensions 1m by 1m; 1.20m deep.
Description Orange sand was present at a depth of 0.21m and was relatively free of stone inclusions due to its situation at the top of a slope. The topsoil was a deposit of very stoney (*c*15%) slightly clayey sand. The boundary between topsoil and subsoil was obscured through leeching. No artefacts were recovered.

Borehole 5
Topography Undulating fields, on a slight slope; seeded crop.
Dimensions 1m by 1m; 1.20m deep.
Description Natural subsoils of coarse orange sand were identified at an approximate depth of 0.50m. Topsoil deposits of slightly loamy sand overlay the natural subsoil and had leeched through making definite identification of the soil boundary difficult. The trench was excavated to a maximum depth of 0.60m whereupon inundation occurred almost immediately. No artefacts were recovered.

Borehole 6
Topography Situated in low-lying pasture at the foot of a large natural bank; very waterlogged.
Dimensions 1m by 1m; 0.60m deep.
Description On excavation this borehole was almost immediately inundated with water. At a depth of 0.41m very pale orange, coarse, wet sand was revealed. This was overlain by 0.40m of brown slightly silty coarse sand, which was very loose. No finds were recovered.

Borehole 7
Topography Low-lying pasture at the foot of the natural bank and adjacent to a small beck.
Dimensions 1m by 1m; 0.70m deep.
Description Natural sand was recorded at a depth of 0.60m below the ground surface. It was orange in colour and coarse with a high cobble content (10% rounded cobbles 0.07m in diameter). This was overlain by a leeched possibly podzolic horizon of dark grey loamy sand approximately 0.15m in depth. Immediately above this was an orange brown coarse silty sand topsoil. No finds were recovered.

Borehole 8
Topography Low-lying pasture at the foot of a natural bank, adjacent to a small beck.
Dimensions 1m by 1m; 0.85m deep.
Description Broken sandstone bedrock was identified at 0.67m below the ground surface. It largely comprised clay sand and large broken fragments. It was directly overlain by *c*0.30m of rounded river-worn boulders and cobbles (average size 0.06m; maximum 0.20m in diameter) within a sand matrix. The cobble layer was overlain by 0.30m of orange brown slightly silty sand. No artefacts were identified.

Borehole 9
Topography Low-lying pasture
Dimensions 1m by 1m; 1.20m deep
Description Fragmented bedrock was established at a depth of 0.80m, consisting of shattered sandstone fragments *c* 0.07m in diameter within a coarse orange sand matrix. It was overlain by a deposit of pale greyish orange sand which was 0.27m thick. Topsoil was a relatively deep deposit of dark brown sand, with no stone inclusions. No artefacts were recovered.

Borehole 10
Topography Heavily wooded coniferous plantation, situated on a hillside.
Dimensions 1m by 1m; 1.20m deep.
Description Broken bedrock was established at a depth of 0.48m, which comprised sandstone boulders and broken fragments. This was overlain by a slightly mottled deposit of pinkish grey, coarse, loose, sand. Topsoil was 0.21m of loose black sand and leaf litter. No artefacts were recovered.

8.2 Landscape Survey Gazetteer

Site 1
NGR: NY 54652928
Site Type A possible clearance cairn
Dimensions 5.5m diam, 0.3m height
Description The site comprised a small mound of sub-rounded stones, which was relatively well-defined and appeared to be a possible clearance cairn. However, it was further investigated by the excavation of Trench 2 and was found to have a natural origin (see Section 8.3).

Site 2
NGR: NY 54662922 to NY 54762928
Site Type Field boundaries
Dimensions Three banks; 48m, 39m and 31m west to east respectively
Description A field boundary with three sections, running parallel to the present boundaries (Fig. 11). The western most example comprised two east / west banks, which survived to a maximum height of 0.2m and were on either side of a narrow (0.4m width) ditch or track. Two other features comprised only one bank, surviving to a maximum height of 0.2m. These features most probably represent part of an earlier, possibly medieval, field system.

8.3 Trench Descriptions

Trench 1
This trench, which was aligned east / west, was 17.0m long and 4.1m wide, and had a maximum depth of 0.38m. Natural geology was a mixture of gravel and dark silty loam which made the identification of features difficult. A sondage was excavated towards the northern edge of the trench to investigate a possible ditch but this was found to be inconclusive. Two segments were excavated of a north / south ditch (104) at the northern and southern ends of the trench. This revealed that the ditch was 3.4m wide immediately below topsoil, 0.90m deep, with gently sloping sides, and a rounded base. The only fill, 103, was a dark greyish brown clay loam containing occasional large stones. Ten sherds of Roman pottery were recovered from fill 103, and a small piece of lead was recovered during hand clearance of the trench. Two small fragments of lead were found on the surface of the ploughsoil in the immediate vicinity of this trench. The ditch was also exposed in Trench 53.

Trench 2
This was aligned north / south and was positioned to section a possible cairn recorded during the walk-over survey. This possible cairn was revealed to be of a natural origin, as it became wider with depth and merged with natural. The trench was 0.52m deep. No archaeological features were observed.

Trench 3
Trench 3 (15.0m long, 4.1m wide) was aligned north / south. The topsoil was a dark brown silty loam of 0.20m depth, and the natural was the same texture but became a paler colour with depth. No archaeological features were observed.

Trench 4
This trench was aligned east / west. The topsoil was 0.28m deep, and a further 0.10m of overburden was removed revealing that geological deposits were predominantly of fine gravel in a silty clay matrix. There were no archaeological features.

Trench 5
This trench was aligned north / south, and was machined to a depth of 0.46m. The geological deposits were of silty clay loam with occasional small stones. A roughly linear spread of large stones crossed the trench 3.7m from the southern end of the trench and a sondage measuring 2.0m long by 0.3m wide by 0.5m deep was excavated across this potential feature. Although no sign of a cut was observed several fragments of Roman pottery were recovered from the sondage.

Trench 6
This trench measured 15.0m long by 4.1m wide, and was excavated to a depth of 0.4m. It was aligned north / south, and the natural subsoil was a fine friable sand. No archaeological features were observed.

Trench 7
The trench was 15.0m long, 4.1m wide, and 0.4m deep. Natural deposits were of silty clay, which had been cut by a field drain backfilled with stones. No archaeological features were observed.

Trench 8
This trench was machined to a depth of 0.49m to uncover geological deposits of silty clay with abundant very small stones. No archaeological features were observed.

Trench 9
This trench was aligned east / west, and was machined to a depth of 0.4m. A pale silty clay natural was exposed, which contained patches of brown and dark brown soil. The latter were removed to reveal rounded cobbles of c80mm diameter. These were shown to slump to the west where they were covered by a very pale silty clay of natural origin.

Trench 10
A trench of 15.0m by 4.1m was excavated to a depth of 0.25m revealing a stiff reddish brown, sandy clay containing abundant small to very large stones. A local informant suggested that this was redeposited material from a dump used during widening of the A66. A sondage was mechanically excavated to a depth of 0.88m without any change in materials, and it was the opinion of the excavator that these were *in situ* geological deposits. No archaeological features were observed.

Trench 11
This trench was 15.0m long, 4.1m wide, and was machined to a depth of 0.41m. Geological deposits of brown gravel extended over the whole trench, and no archaeological features were observed.

Trench 12
This trench was 15.0m long, 4.1m wide, and was aligned north / south. It was first excavated to a depth of 0.42m below the level of topsoil, but it was not possible to determine with any confidence if there were archaeological features present so a further 0.25m depth was mechanically removed, and this revealed that there were no features.

Trench 13
The trench measured 15.1m by 4.1m, and was aligned east / west. At a depth of 0.45m pale brown sand geological deposits were revealed, into which a stone-lined field drain had been inserted. There were no archaeological features.

Trench 14
This trench was in a broad shallow dry valley which stretched to the north towards the River Eamont. It was 15.4m long, 4.1m wide, and 0.3m deep, and was aligned east / west parallel to the A66. Geological deposits of fine sand were overlain in most of the trench by a peat layer of 0.13m depth. The peat layer followed the contours of the natural sand which undulated slightly but there were no artefacts to date the organic material. Two bulk samples, one from the top and the other from the base, were taken of this material, and pollen samples were taken at vertical intervals of 0.05m, starting 0.10m below the base of the peat. The peat had been cut by a 1.1m wide, 1.0m deep steep-sided ditch backfilled with large stones which functioned as a drain.

Trench 15
This trench was 15.0m long, 4.1m wide and 0.34m deep. Geological deposits were a mixture of reddish brown sand, very pale grey sand, and pale grey sandy clay loam, and to check that these were all of a natural origin a slot of 2.3m length and 0.35m width was excavated through the sandy clay to a depth of 0.25m. This showed that all the layers exposed were slumping to the north, suggesting that they were all of natural origin, and so no further action was taken.

Trench 16
This trench was 15.0m long, 4.0m wide and 0.45m deep. Natural deposits were reddish brown fine sands containing gravel. A possible feature was excavated, and demonstrated to be an animal burrow.

Trench 17
This was 15.0m long and 4.1m wide, and was excavated to a depth of 0.4m. Geological deposits were reddish brown fine sands. A sherd of Roman pottery was retrieved during hand clearance, but no archaeological features could be identified.

Trench 18
This trench was 15.0m long, 4.0m wide, and 0.47m deep. The natural was a reddish brown silty clay containing small and medium stones and some very large stones. A sherd of Roman pottery was recovered adjacent to a patch of pale olive mottled sand, but no features could be seen.

Trench 19
This trench was excavated for a length of 10.2m. Abundant very large stones made further machining impracticable, and the trench was abandoned.

Trench 20
This trench measured 15.0m by 4.0m, and was 0.44m deep. The natural deposits were pale grey fine sands. A dark band of soil was excavated in the southern end of the trench, and was shown to cover a ceramic field drain. There were no archaeological features.

Trench 21
This trench was 15.0m long, 4.0m wide, and was machined to a depth of 0.4m to expose reddish brown and pale grey fine sands. A segment was excavated through a 1.68m wide depression filled with dark sand, revealing it to be 0.15m deep. No finds were recovered from this possible feature.

Trench 22
This trench was 15.0m long, 4.0m wide, and was machined to a depth of 0.45m. Pale brown, fine sands comprised the geological deposits in most of the trench but a band of mixed red and pale brown sand containing gravel ran across the trench; a sondage was excavated through this deposit to reveal that it was a small outcrop of geological origin, possibly a slightly earlier deposit of post-glacial material. Two ceramic field drains were observed in the trench but no other archaeological features were identified.

Trench 23

This trench was 15.0m long and 4.0m wide and was excavated to a depth of 0.3m where fine sands of pale grey and reddish brown with patches of very dark grey sands were exposed. Cut into these natural deposits were trenches for two ceramic field drains, and two modern postholes. There were no other archaeological features identified.

Trench 24
This trench was excavated for a length of 15.1m, a width of 4.0m and a depth of 0.31m. The geological deposits uncovered at this depth were pale reddish brown fine sands with some dark patches. There were no archaeological features identified.

Trench 25
This trench was 15.0m long and 4.0m wide. It was 0.38m deep and the natural deposits were fine sands mostly of a pale brown colour but with some iron panning. There were no archaeological features identified.

Trench 26
A 15.0m by 4.0m trench was excavated to a depth of 0.34m to reveal fine sands of geological origin. Although animal burrows were present, no archaeological features were identified.

Trench 27
This trench measured 15.2m by 4.0m, and was excavated to a depth of 0.32m. Geological sands were revealed, which contained animal burrows but no archaeological features.

Trench 28
Measuring 15.0m by 4.0m this trench was excavated to 0.4m depth. The geological deposits were fine sands with, in the north-western end of the trench, some medium-sized stones. A piece of worked flint was recovered from near these stones but excavation around them revealed no cut, and it was assumed that the stones were of a geological origin. No archaeological features were observed.

Trench 29
This trench was 15.0m long, 4.0m wide, and 0.47m deep. The geological deposits were fine sands varying in colour between pale brown and reddish brown. The south-western end of the trench was a 0.25m wide field drain filled with coarse red sand. There were no archaeological features.

Trench 30
This trench was 15.2m long, 4.0m wide, and had an average depth of 0.9m. Natural reddish brown fine sands were exposed, and a slot was excavated in the northern end of the trench to confirm that these were *in situ* geological deposits. No archaeological features were observed.

Trench 31
This trench measured 15.0m by 4.0m, and 0.4m of overburden was removed to expose a reddish brown fine sand of geological origin. Two field drains were exposed but there were no archaeological features.

Trench 32
This trench was at the bottom of a steep slope in the valley of a stream, and was 15.0m long by 4.0m wide. There was a build-up of hillwash necessitating the removal of 0.7m of overburden, which was a dark greyish brown fine sandy loam of 0.5m depth above a brown sandy silt loam. The geological deposits were fine sands. At *c*9m from the western end of the trench there were some large stones in a curvilinear distribution which were manually cleaned, planned, and then a 0.5m wide slot was excavated across them. This showed that the stones had not been placed in a cut feature and that there was a change, with depth, in the geology from fine sand to the west of the line of stones to coarse sand to their east. It was determined that the stones were naturally, not humanly, positioned, and the graphic record is not included within the present report. However, during the cleaning a small conchoidally fractured flake of volcanic tuff was recovered, which could have originated from a Neolithic axe, although it could potentially also have been a product of natural conchoidal fracturing from a glacial erratic stone.

Trench 33
This trench measured 15.0m by 4.0m and was 6.0m away from a north-flowing stream. Natural deposits of fine sand or silty clay were reached at a depth of 0.35m. There were frequent medium stones in the sand, and the

holes left where these had been machined away filled with water. Heavy manganese concretions were seen, but there were no archaeological features.

Trench 34
This trench measured 15.0m by 4.0m, and was 0.55m deep. Fine sand deposits containing some stones were exposed, but there were no archaeological features.

Trench 35
This trench was 15.0m long and 4.0m wide. It was machined to a depth of 0.5m to reveal a fine silty clay which contained frequent boulders. No archaeological features were observed.

Trench 36
The same natural deposit of silt with many boulders that was observed in Trench 35 was encountered here, although the boulders were smaller. The trench measured 15.0m by 4.0m, and was 0.4m deep. No archaeology was uncovered.

Trench 37
This trench was 15.0m long, 4.0m wide, and was machined to a depth of 0.5m to reveal fine sands which varied in colour from very pale grey through reddish brown to very dark grey, and which were of a natural origin. There were no archaeological features identified.

Trench 38
This trench was 15.2m long and 3.6m wide and was machined to a depth of 0.5m, revealing a reddish brown silty clay containing occasional boulders and a small patch of gravel. There were animal burrows but no archaeological features.

Trench 39
This trench sloped fairly steeply to the west, and measured 15.0m long, 4.0m wide, and was machined to a depth of 0.5m. Natural deposits were of reddish brown sandy silt or sandy clay containing a small number of medium stones. In the western end of the trench was a greyish brown, fine sandy loam of 0.15m depth which contained frequent stones, and which was probably disturbed by the plough. There were no archaeological features.

Trench 40
This trench was the most southerly excavated, and was close to a marshy area of land near to a stream. The trench measured 15.0m by 4.0m, and was machined to an average depth of 0.3m. Natural deposits of fine sand were observed, and there were four land drains, two ceramic, one stone-lined, and one ditch backfilled with stones. There were no archaeologically significant features.

Trench 41 (Figs 5 and 6)
The excavation of Trench 41 identified a line of postholes, which were potentially part of a larger structure and so the trench was extended to make it in to a rectangle measuring 16.5m by 8.5m (Fig. 6). This larger trench revealed the full extent of the structure (see below), but it was decided to excavate three 1.7m wide slots radiating to the north-west for 21.0m, the north-east for 16.5m and to the south-west for 17.0m. The first extension was to ensure that the limit of the postholes was reached and to check whether there was a parallel line of postholes. The second expansion was to test whether there was a boundary ditch around the structure that had been revealed. The overburden overlying the archaeological deposits was 0.4m in depth.

A total of 15 postholes and five possible stakeholes was exposed (Figs 5 and 6); four postholes and four stakeholes were sectioned. Posthole 114 had a diameter of 0.50m and a depth of 0.23m. It had a sharp break of slope at the top and a rounded profile. Its fill (113) was a dark brown fine sandy silt loam, which produced two fragments of burnt flint. Posthole 116 was 0.70m to the north-west. It had a diameter of 0.60m, a depth of 0.16m, and a rounded profile. Its fill, 115, was also a dark brown fine sandy silt loam which produced a small piece of flint. Posthole 118 was sub-rectangular in shape, 0.52m long, 0.27m wide, and 0.13m deep. Fill 117 was a dark brown fine sandy silt loam. Posthole 120 had a diameter of 0.65m, a depth of 0.19m, and a bowl-shaped profile. It had three fills possibly representing a postpipe (128), postpacking (127), and soil that accumulated after the decay of the posthole (119). Fill 127 was 0.11m deep and 0.24m wide, and was a pale brown sand, probably a redeposited natural. Fill 128 was a very dark brown sand, and was 0.22m wide and

0.14m deep, whilst fill 119, which sealed the two other fills, was a dark brown fine sandy silt loam and was 0.08m deep.

The possible stakeholes were about twice as long as they were wide, and were 0.11m or less deep. Stakehole 110 was 0.44m long, 0.18m wide and 0.11m deep, and its fill (109), was a dark brown fine sandy silt loam. Stakehole 112 was 0.38m long, 0.19m wide, and 0.06m deep. Its fill (111) was a dark brown fine sandy silt loam. Possible stakehole 122 was 0.42m long, 0.18m wide and 0.06m deep. Fill 121 was a dark brown fine sandy silt loam. Possible post pit 124 was 0.37m long, 0.22m wide and 0.11m deep. Fill 123 was a dark brown fine sandy silt loam. A pit (141) was uncovered and was sectioned. It was shown to be at least 0.75m long, at least 0.50m wide, and 0.51m deep. It had steeply sloping sides and a rounded base, and its only identified fill, 139, was a very dark grey brown fine sandy loam which contained some flecks of charcoal.

These features and the unexcavated postholes and stakeholes are shown on Figures 5 and 6. A rectangle defines the probable building of which they formed a part. Further postholes near the edge of the trench probably form a second structure. Two ceramic field drains (126 and 134) and a large modern pit (108) are also shown.

Trench 42
This trench was 15.0m long, 4.0m wide, 0.4m deep, and natural deposits were reddish brown fine sands. There was a field drain but there were no other archaeological features identified.

Trench 43
This trench, which measured 15.4m long by 4.0m wide, was on a gentle west-facing slope towards the stream. It was machined to a depth of 0.4m to reveal mixed yellowish brown and reddish brown fine sands of a natural origin. There were no archaeological features identified.

Trench 44
This trench was *c*8m from the field edge, and beyond the field boundary was a *c*0.5m drop into the adjacent field; the height difference may have been caused by erosion from hillwash. The trench was 15.0m long, 4.0m wide, and 0.3m deep. The natural deposits were fine sandy silt loams containing patches of sandy clay and occasional small stones. There were no archaeological features identified.

Trench 45
This measured 15.0m by 4.0m, and was machined to a depth of 0.3m to reveal fine sand of yellow brown and red brown colour. There was a fairly steep slope to the west. No archaeological features were observed.

Trench 46
This trench was 15.0m long, 4.0m wide, and 0.4m deep. Geological deposits of fine sands varying in colour from very pale grey through reddish brown to black were exposed. Animal burrows were exposed but there were no archaeological features.

Trench 47
This trench measured 15.0m by 4.0m, and was 0.4m deep. Geological deposits of red sandstone were exposed for *c*3m from the northern end of the trench, and this was overlain by fine sand. A possible feature was sectioned but shown to be an animal burrow, and there were no archaeological features identified.

Trench 48
This trench was originally 15.0m by 4.0m but the western end was expanded to create a T-shaped trench in which the cross-piece was 9.0m long and 0.42m deep. Parallel to the cross piece was a 2.85m wide and 0.15m deep feature, 156. The sides sloped gently to a base that was parallel to the east-facing slope of the valley side. The fill, 157, was a brown fine sandy loam containing many stones, especially to east. No finds were recovered from this feature, which continued beyond both edges of the trench.

Trench 49
This 6.0m long trench was excavated 7.0m to the north-north-west of Trench 48 to confirm that the feature observed in that trench continued. This was shown to be so, and no further action was taken.

Trench 50

This measured 15.0m by 4.0m, and machining to a depth of 0.4m revealed geological deposits of fine sand with abundant small gravel. There were no archaeological features.

Trench 51
This measured 15.0m by 4.0m, and was 0.4m deep. Geological deposits were of fine sand with a small number of medium stones. There was heavy mineral staining in the north-eastern corner of the trench but there were no archaeological features.

Trench 52 (Fig. 8)
This trench measured 15.0m by 1.7m, and was located to investigate the area to the south of Trench 1, where the existence of a ditch was suspected. An overburden of 0.5m depth was removed to reveal gravels and silty clays, both of a natural origin. However, running in a north-west / south-east direction across the trench was ditch 142. This was 1.61m wide and 0.31m deep with gently sloping sides and a rounded base. Fill 143 was a greyish brown silty clay loam containing some medium sized stones, and was in the south-eastern side of the ditch. Fill 144 was a brown silty clay loam, and it filled the rest of the ditch. No finds were recovered.

Trench 53 (Fig. 9)
This trench was 15.5m long and 1.6m wide, and was 0.4m deep. Natural deposits of silty clay loam containing much gravel were encountered at this depth. A north / south ditch, 154, was encountered, and a 0.5m wide segment of this was excavated. The ditch was 2.13m wide, 0.37m deep, and had gently sloping sides and a rounded base. The only fill, 155, was a silty clay loam, from which a sherd of Roman pottery was retrieved. The two ditches converge, but the anticipated point of inter-section was just to the north of trench 1.

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APPENDIX 1
Project Design

Lancaster
University
Archaeological
Unit

March 1996

SEWER REQUISITION FOR OASIS DEVELOPMENT, PENRITH

CUMBRIA

ARCHAEOLOGICAL EVALUATION

Proposals

The following project design is offered in response to a letter from North West Water Limited requesting an archaeological evaluation in advance of sewer laying at Whinfell, near Penrith, Cumbria.

1. INTRODUCTION

The proposed *c* 4.1km long sewer requisition at Whinfell, near Penrith extends through an area which contains archaeological remains of some considerable significance. It has been suggested (Higham and Jones 1975) that the area is one of the densest for Romano-British settlements in Cumbria forming 'a dispersed vicus' around the fort at Brougham. The A66 was originally the line of a Roman road, following a major trans-pennine link and there is a known Roman cemetery to the north-west of the Countess Pillar. Probably the most important site is the late roman/early-medieval site at Fremington (NY 54752880), which was excavated by LUAU in advance of the Shell North West Ethylene Pipeline (NWEP: summary extract enclosed); it is arguably one of the most important early medieval sites in the North of England. Because of the constraints of the development, this was only part excavated and the full extent of the site remains unknown; at its closest point the proposed sewer will be only 220m away from the identified part.

At Brougham a medieval castle partly overlies the Roman fort. The Roman road continued to be used in subsequent periods and there is evidence of settlements and field systems of different periods associated with it. A Romano-British field system has been identified at NY 548289 and there is also aerial photographic evidence of a possible field system at NY 555289, an area which will be directly affected by the proposed sewer (Lambert 1996, 130).

Because the pipe line will be running alongside a Roman road, which has been used as a major communication route in subsequent periods, there is the potential for finding settlement remains, further relict field systems and even cemeteries in relation to it. The landscape of the area has considerable archaeological sensitivity and any below ground works in the area have a potential of revealing archaeological remains.

The county archaeologist (26th February) has recommended that an archaeological evaluation be undertaken in advance of the sewer construction to assess the precise archaeological implications of the development and the methodology, defined below, is based on discussions with him.

The Lancaster University Archaeological Unit has considerable experience of the evaluation and excavation of sites of all periods, having undertaken a great number of small and large scale projects during the past 15 years. Evaluations have taken place within the planning process, to fulfil the requirements of clients and planning authorities, to very rigorous timetables. The archaeological work associated with a number of road schemes throughout the north of England has been undertaken recently, both for Cumbria County Council Highways and Engineering and for the government's Highways Department. LUAU is presently undertaking two major landscape surveys (Forest of Bowland and Haweswater estates) for North West Water Limited and is also about to undertake archaeological recording in advance of a water main near Kirkby Stephen.

LUAU has undertaken considerable archaeological investigations in an area immediately adjacent to the line of the proposed sewer in advance of the Shell North-West Ethylene Pipeline and at present holds the archive for this work. LUAU is very familiar with the archaeology of the area and the local soils and are in a unique position to be able to authoritatively undertake this proposed evaluation.

LUAU has the professional expertise and resource to undertake the project detailed below to a high level of quality and efficiency. LUAU and all its members of staff operate subject to the Institute of Field Archaeologists (IFA) Code of Conduct.

2. OBJECTIVES

The following programme has been designed, in consultation with the County Archaeologist, to provide an accurate archaeological evaluation of the designated area, within its broader context. The required stages to achieve these ends are as follows:

2.1 Field Survey

It has been recommended by the County Archaeologist that a walk-over survey is combined with a more detailed topographic survey, to prevent the resultant delays if the two were undertaken separately. An initial walkover survey would identify if any earthworks existed and help position targeted trial trenches. Following this a programme of field survey of visible earthwork features would be undertaken along the sewer route, to produce a detailed plan of those features to be affected by the works. A photographic record would be utilised to complement this work.

2.2 Field Evaluation

A limited programme of trial excavations, as recommended by the County Archaeologist, will be undertaken to establish the nature, extent, chronology, and preservation of any archaeological deposits encountered. It is believed that the most archaeologically sensitive area of the proposed sewer is at the north-western end of the route, in the vicinity of the Roman road and it is recommended by the County Archaeologist that trenching be concentrated in this area. Subject to the results of the field survey, any identified earthworks will be investigated by targeted trenching Suitable samples recovered will be assessed for their palaeoenvironmental potential.

2.3 Evaluation Report

A written evaluation report will assess the significance of the data generated by this programme within a local and regional context. It will advise on the mitigation measures necessary to protect and/or record (to appropriate levels) identified archaeological features and deposits, including any appropriate further evaluation, excavation, and recording strategies.

3. METHOD STATEMENT

The following work programme is submitted in line with the stages and objectives of the archaeological work summarised above.

3.1 Field Survey

3.1.1 Project preparation
The initial stage of the programme will involve accessing the archaeological archive of the Shell NWEP project and the Cumbria Sites and Monuments Record. Any aerial photographic material lodged in either the County Sites and Monuments Record or the County Record Office will be studied. Published secondary sources will also be examined and assessed.

3.1.2 Survey programme
The time constraints of the programme necessitate combining the walkover and topographic surveys for the line of the route. The survey will therefore examine the length of the sewer route and provide a detailed LUAU level 2 topographic survey (see appendix 2 for LUAU levels) of any earthworks or archaeological features identified. Unless the archaeological features are of particular significance this level of survey will provide a mitigation record of the surface evidence.

The survey will create a record of those parts directly affected by the works, and also elements that extend for some short distance beyond the limits of any proposed groundworks. This will provide a complete record of individual features and will provide an overall context for those elements identified within the corridor.

Because the present costs are being submitted prior to a preliminary walk-over survey; it is not possible to anticipate the amount of survey work that will be required. The costs therefore assume that a low intensity of archaeological features will be identified during the survey, but a contingency cost for further survey work is incorporated if the walk-over survey reveals a significant amount of earthworks. The contingency would be brought into play in agreement with the county archaeologist and the client.

3.1.3 Walk-over survey

A rapid surface inspection of the 25m wide corridor along the route will record the location, extent, and nature of any visible surviving archaeological remains within the designated area (where accessible). Any areas of ancillary activity, such as the pumping station as far as these have been identified at this stage, will also be examined.

All archaeological information collected in the course of field inspection will be recorded in standardised form, and will provide the basis for the topographic survey. This will form the basis of a gazetteer, to be submitted as part of the report.

3.1.4 Topographic Survey

The detailed topographic survey would be undertaken using total station equipment, to produce hachured plans of earthwork features. The survey would be undertaken with respect to a survey control established by North West Water Ltd (NWWL).

The digital survey data would be stored within a portable logger for subsequent transference into a survey processing package (Intsurveyor). The output field plots would be annotated with hachures, plus any other topographic detail in the field. These field edits would then be superimposed onto digital data within an industry standard CAD system (FastCAD). Subject to the requirements of North-West Water limited, the archaeological detail can be either digitally or graphically superimposed with a topographic ground model provided by NWWL for the working area.

3.1.5 Photographic recording

In parallel with the topographic survey work, a photographic survey would be undertaken to record, in both monochrome and colour slide formats, significant topographic features affected by the proposed sewer requisition.

3.2 Field Evaluation

3.2.1 Access

It is understood that NWWL will negotiate access for the archaeological works, although LUAU will as a matter of courtesy contact the tenants and landowners prior to initiating the survey and trial trenching. The precise location of any services within the study area will be provided by the client.

3.2.2 Greenfield Trenching

The proposed sewer requisition will require top-soil stripping along a 25m wide working corridor and it will be necessary to evaluate this area by means of a 'greenfield' trial trenching programme. It is anticipated that the forested south-eastern section of the sewer route would not warrant evaluation as any archaeological deposits are likely to have been disturbed during the forest planting, The trial trenching programme will establish the presence or absence of any previously unsuspected archaeological deposits and, if established, will then briefly test their date, nature, and quality of preservation. Excavation will normally be limited to the upper surface of significant archaeological deposits, unless further work is regarded by ourselves and the county archaeologist as essential in order to complete the full evaluation. This element of the trial trenching is invaluable in order to assess the area within the extent of the works corridor, where there is a potential for archaeological deposits to survive which are not visible on the surface. This also reduces the possibility of the discovery of any important archaeological features within those designated plots during groundworks, so as to minimise the possibility of any disruption at that late stage.

The LUAU excavations at nearby Fremington have demonstrated that the local soils, combined with the ephemeral nature of the archaeological evidence, have meant that the archaeological features could not be identified from aerial photographic or geophysical techniques and can also be extremely difficult to discern by trenching techniques, particularly in section. They are clearer in plan, but need sufficient area open to enable an effective identification; it is therefore proposed to excavate wide trenches (3.6m wide) that are twice the width of the conventional greenfield trench, particularly in the area near to the Roman road and adjacent to the

Fremington site. In some instances it may also be necessary to clean the underlying material by hoe, to improve the chances of identifying archaeological features. The south-easternmost section of the proposed sewer route has a lower archaeological potential and, subject to an assessment of the soils following the removal of top-soil, it may be appropriate to excavate 30m x 1.8m trenches in this area, which can examine a greater proportion of the length of the corridor.

The 'greenfield' trenching would be undertaken using an alternate trench configuration, whereby trenches are located parallel to the corridor line, on alternate sides of the corridor with a trench laid across the corridor line after every two parallel trenches (see attached plan).

The trenches would be either 15m x 3.6m or 30m x 1.8m in size, but would have a similar area. Because the forested south-eastern section will probably not require trenching, the overall area that will be stripped and which will require evaluation is *c* 8.0 hectares. It has been recommended by the county archaeologist, that a maximum of *c* 60 trenches will be necessary to evaluate this area. If the double width trenches were uniformly distributed along the length of the sewer requisition, this would necessitate a 50m separation between trenches, but as the area of greatest archaeological significance is believed to be at the north-west end of the route, near to the line of the Roman road, it is proposed to employ a flexible approach to the distribution of the trenches. The trench separation near to the Roman road will be reduced to as low as 30m, while those to the south-east will be separated by as much as 70m.

The precise locations of the trenches would however be determined during the pre-evaluation survey work, and would be confirmed with the tenant/landowner, client, and county archaeologist, prior to trial trenching.

3.2.3 Targeted trenching

Any suspected monuments identified as a result of the field survey phase, will be investigated by targeted trenches, to explore the character, nature and date of the features. The precise location and extent of any targeted trenches would be determined during the survey work, and would be agreed with all relevant parties prior to trial trenching. The costings anticipate four targeted trenches, which would be in addition to the proposed green-field trench configuration. In addition a contingency cost for an additional five targeted trenches is defined below.

3.2.4 Methodology

To maximise the speed and efficiency of the operation the removal of overburden will be undertaken by machine (with a standard 1.8m toothless ditching bucket), although in areas where ephemeral remains are encountered elements may be hand dug. All trenches will be excavated in a stratigraphical manner, whether by machine or by hand. Trenches will be accurately located with respect to the NWWL survey control by use of a Total Station.

In the northern section only top-soil will be removed initially to enable the identification of the very shallow and delicate archaeological features at this interface.

Full regard will, of course, be given to all constraints (services etc) during the excavation of the trenches, as well as to all Health and Safety considerations. LUAU provides a Health and Safety Statement for all projects and maintains a Unit Safety policy. All site procedures are in accordance with the guidance set out in the Health and Safety Manual compiled by the Standing Conference of Archaeological Unit Managers (1991) and risk assessments are implemented for all projects. As a matter of course the Unit uses a U-Scan device prior to any excavation to test for services.

Land disturbed as a result of this work will be reinstated, where ground conditions allow, to the Client's satisfaction, although LUAU as a matter of course replaces material in a stratigraphic manner and can relays the surface, if required. It is presumed that the Client will have responsibility for site security. LUAU would take responsibility for temporary fencing arrangements to exclude livestock or any other farming activities. In addition, any deep sections of open trench would be fenced off to prevent any accidents occurring to LUAU/client staff.

3.2.5 Timetable

All excavation will be undertaken within constraints agreed with the client.

3.2.6 Recording

All information identified in the course of the site works will be recorded stratigraphically, with sufficient pictorial record (plans, sections and both black and white and colour photographs) to identify and illustrate individual features. Primary records will be available for inspection at all times.

Results of the field investigation will be recorded using a system, adapted from that used by Central Archaeology Service of English Heritage. The archive will include both a photographic record and accurate large scale plans and sections at an appropriate scale (1:50, 1:20, and 1:10). All artefacts and ecofacts will be recorded using the same system, and will be handled and stored according to standard practice (following current Institute of Field Archaeologists guidelines) in order to minimise deterioration. Samples will be collected for technological, pedological, palaeoenvironmental and chronological analysis as appropriate, but it is only intended to process such material for assessment at this stage. If necessary, access to conservation advice and facilities can be made available. LUAU maintains close relationships with Ancient Monuments Laboratory staff at the Universities of Durham and York and, in addition, employs artefact and palaeoecology specialists with considerable expertise in the investigation, excavation and finds management of sites of all periods and types, who are readily available for consultation.

3.3 Evaluation Report

3.3.1 Archive

The results of the fieldwork will form the basis of a full archive to professional standards, in accordance with current English Heritage guidelines (*The Management of Archaeological Projects, 2nd edition, 1991*). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. It will include summary processing and analysis of all features, finds, or palaeoenvironmental data recovered during fieldwork. The deposition of a properly ordered and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the IFA in that organisation's code of conduct. LUAU conforms to best practice in the preparation of project archives for long-term storage. The expense of preparing such an archive is part of the project cost, but only represents a very small proportion of the total. This archive can be provided in the English Heritage Central Archaeology Service format, both as a printed document and on computer disks as ASCII files, and a synthesis (in the form of the index to the archive and the report) will be included in the Cumbria Sites and Monuments Record. A copy of the archive can also be made available for deposition with the National Archaeological Record in Southampton. LUAU practice is to deposit the original record archive of projects (paper, magnetic and plastic media) with the appropriate County Record Office (Carlisle), and a full copy of the record archive (microform or microfiche) together with the material archive (artefacts, ecofacts, and samples) with an appropriate museum. The actual details of the arrangements for the deposition/loan and long term storage of this material will be agreed with the landowner and the receiving institution. Wherever possible, LUAU recommends the deposition of such material in a local museum approved by the Museums and Galleries Commission, and would make appropriate arrangements with the designated museum at the outset of the project for the proper labelling, packaging, and accessioning of all material recovered. The archive costs include a single payment of £11/m3 to the receiving museum as a one-off contribution towards the cost of long term storage and curation.

3.3.2 Evaluation report

One bound and one unbound copy of a written synthetic report will be submitted to the Client, and a further copy submitted to the Cumbria County Archaeologist. The report will include a copy of this project design, and indications of any agreed departure from that design. It will present, summarise, and interpret the results of the programme detailed above and will include a full index of archaeological features identified in the course of the project, with an assessment of the overall stratigraphy, together with appropriate illustrations, including detailed plans and sections indicating the locations of archaeological features. Any finds recovered from the excavations will be assessed with reference to other local material and any particular or unusual features of the assemblage will be highlighted and the potential of the site for palaeoenvironmental analysis will be considered. The report will also include a complete bibliography of sources from which data has been derived, and a list of further sources identified during the programme of work, but not examined in detail.

This report will identify areas of defined archaeology, the location of trenches, and whether the results of the sampling were positive or negative. An assessment and statement of the actual and potential archaeological significance of the site within the broader context of regional and national archaeological priorities will be made. Illustrative material will include a location map, section drawings, and plans if appropriate; it can be tailored to

the specific requests of the client (eg particular scales etc), subject to discussion. The report will be in the same basic format as this project design; a copy of the report can be provided on 3.5" disk (IBM compatible format).

3.3.3 Proposals
The report will make a clear statement of the likely archaeological implications of the intended sewer development. It will highlight whether, as a first option, the preservation *in situ* of significant archaeological features should take place and possible strategies for the mitigation of the impact of the development, including design modification, will be considered. When preservation is neither possible, nor practical, a further stage of archaeological work may be required. In this case, recommendations for such mitigation measures will be submitted. In addition, it is quite likely that a recommendation for a full-time watching brief will be proposed, during all groundworks. It should also be made clear that the results of this evaluation should only be considered as representative of the below ground archaeological potential of those areas presently accessible for trial trenching.

3.3.4 Confidentiality
The evaluation report is designed as a document for the specific use of the Client, for the particular purpose as defined in the project design, and should be treated as such; it is not suitable for publication as an academic report, or otherwise, without amendment or revision. Any requirement to revise or reorder the material for submission or presentation to third parties beyond the project brief and project design, or for any other explicit purpose can be fulfilled, but will require separate discussion and funding.

3.4 Project Monitoring

3.4.1 Cumbria County Council
Whilst the work is undertaken North West Water Limited, the Cumbria County Archaeologist will be kept fully informed of the work and its results. Any proposed changes to the project design will be agreed with him in co-ordination with the Client. LUAU will arrange a preliminary meeting, if requested, and the Cumbria County Archaeologist will be informed in writing at the commencement of the project.

3.4.2 North West Water Limited
LUAU will consult with North West Water Limited regarding access to land within the study area. This consultation will include, if required, the attendance of a representative of that company at any meetings convened with the Cumbria County Archaeologist, or his representative to discuss progress or the report.

4. WORK TIMETABLE

The phases of work would comprise:

4.1 Field Survey
To be undertaken during a three day period

4.2 Field Evaluation
To be undertaken during a two week period.

4.3 Evaluation Report
The work would be undertaken during a three week period following completion of the field work.

The evaluation programme should ideally be undertaken at the earliest opportunity, in case it produces significant archaeological deposits that may require further evaluation. Such an eventuality could have an adverse impact upon the sewer requisition timetable unless adequate contingency time is allowed for.

LUAU can execute projects at very short notice once an agreement has been signed with the client. The project (fieldwork, report and archive) is scheduled for completion within eight weeks from its commencement.

5. OUTLINE RESOURCES

The following resource base will be necessary to achieve the proposals detailed above. The breakdown of the total cost of the project is provided on the accompanying covering letter.

5.1 Field Survey
2 man-days Project Supervisor
2 man-days Project Assistant

5.2 Field Evaluation
9 man-days Project Officer
15 man-days Project Assistants

5.3 Evaluation Report
4 man-days Project Officer (Evaluation)
1 man-days Project Officer (Surveyor)
3 man-days Supervisor (CAD)
1 man-days Supervisor (draughting)

The project will be under the project management of **James Quartermaine BA Surv Dip MIFA** to whom all correspondence should be addressed.

All Unit staff are experienced, each with several years appropriate professional expertise. Project Officers in Unit terminology are senior supervisors, capable of organising and running complex area excavations as well as short-term evaluations to rigorous timetables.

APPENDIX 2
Finds Catalogue

Ceramic

Trench 1
Fill 103 produced five small fragments of greyware or Black Burnished ware (BB1), and five small fragments of a calcite-gritted ware of the late second/third century or later.

Trench 5
The following finds were recovered: two very small, very abraded sherds of Samian, three small fragments of greyware, one small fragment of calcite gritted pottery of late second or third century onwards, two sherds of Black Burnished ware (BB1), one a flaring rim of the late second or third century, one a plain upright rim possibly of the third century or later, and one fragment of brick.

Trench 7
One fragment of Romano-British greyware pottery, with a very sandy fabric.

Trench 17
One small fragment of possible Black Burnished ware (BB1).

Trench 18
One fragment of a greyware jar with an impressed decoration, which may date to the third century.

Trench 53
A small sherd of a bowl (BB1), possibly form G226 (Gillam 1976) and dated between AD200 and AD240, was retrieved from fill 146 of ditch 145.

Lead

Trench 1
Subsoil 102 produced a small cast plug filling, with an oval ridged void. Two small lenticular discs, one of which possibly had two raised, concentric rings, were recovered from the ploughsoil adjacent to the trench.

Trench 2
A small plug filling small round hole was found during hand clearance.

Stone

Trench 28
One dark retouched blade fragment of brown flint was recovered during hand clearance.

Trench 32
A very small flake, possibly of Group VI fine grained volcanic tuff, was recovered during hand clearance.

Trench 41
Fill 113 produced two small fragments of possibly burnt flint, whilst fill 115 produced a small fragment of white, flint-like stone which was not worked, and an unworked fragment of white flint-like stone was retrieved during hand clearance of the trench.

Trench 53
A fragment of a red sandstone slab was retrieved from fill 146 of ditch 145.

Bone

Trench 1
Subsoil 102 produced a very small fragment of heavily calcined bone.

level is used to assess the archaeological significance of the site and serves as the basis, along with other evaluation techniques, for the submission of recommendations to the District or County Planning Officer.

Level 3 Survey (Mitigation)

Level 3 survey is a comprehensive record of the archaeological features in relation to the surface topography. It incorporates an interpretative hachure survey alongside a full computer generated model of the ground surface enacted when a full survey is needed in conjunction with excavations or in cases where detailed survey of fragile upstanding earthworks is the only appropriate mitigative measure.

The Level 3 mitigation survey is designed to record the archaeological site as fully as current technology will allow in advance of its destruction. It is applied selectively to sites of particular importance and which have a good survival of surface features.

It is generated by the provision of additional survey data to the Level 2 survey and is of an equivalent level of accuracy (+- 0.05m). In many cases only a relatively limited amount of additional data is required to upgrade the Level 2 survey to the full surface modelled Level 3 and therefore this can be an economic recording option.

It is generated on CAD which maintains the original accuracy of the survey data and allows flexibility of drawing output at any scale. The drawing file will record the contour detail at different height separations and the final survey drawings can therefore be tailored to meet any requirements of the client.

ILLUSTRATIONS

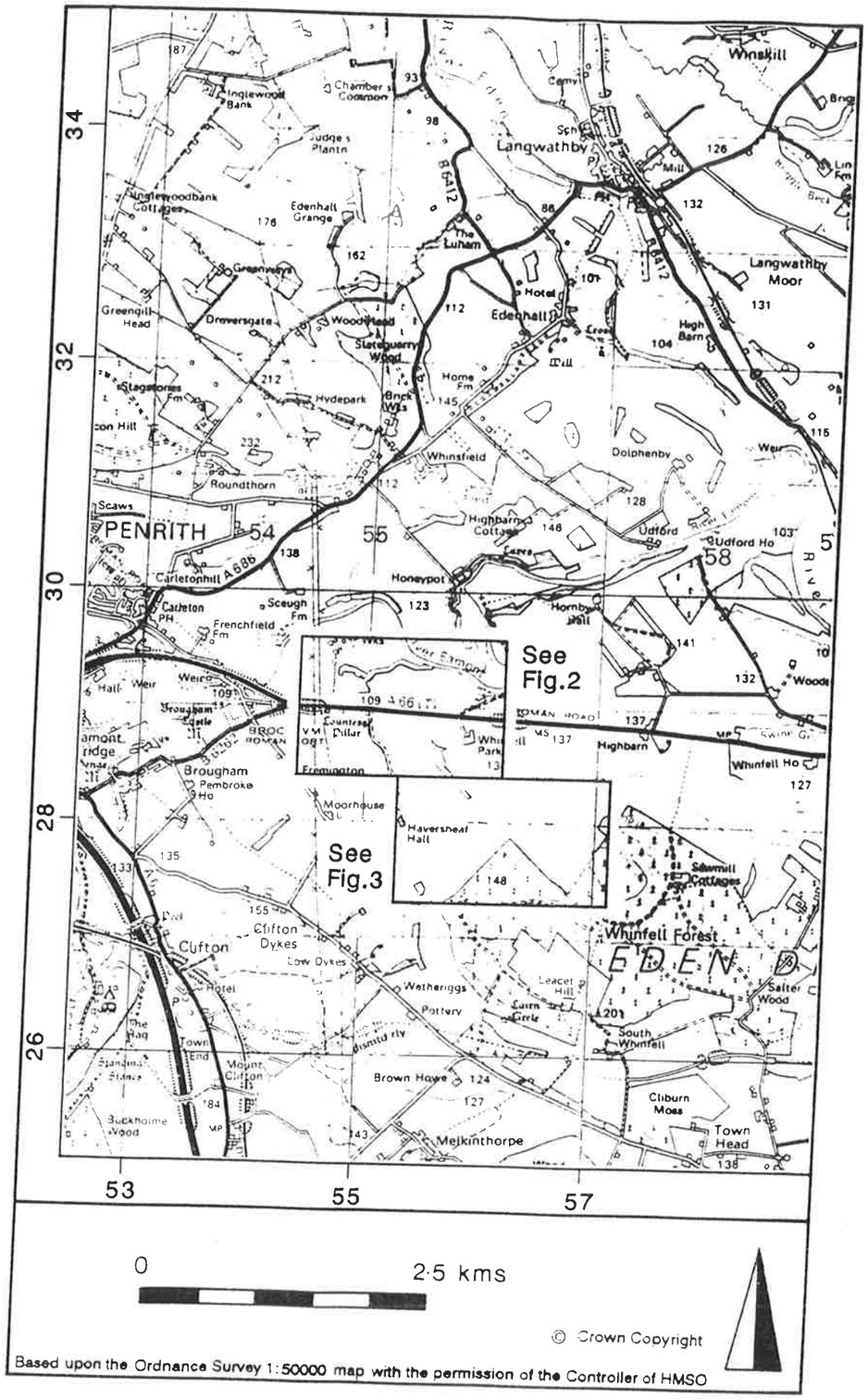
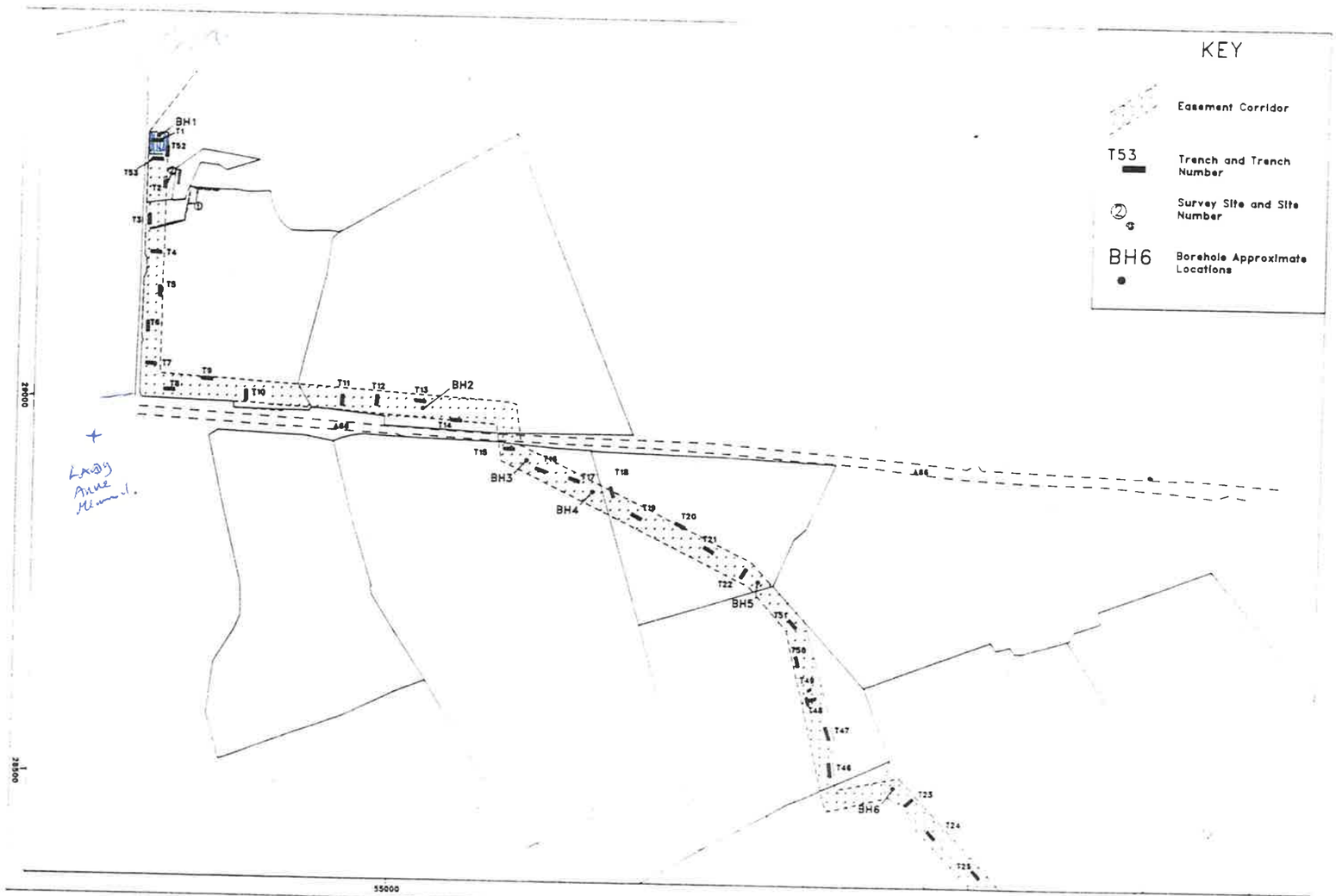


Fig.1 Location map



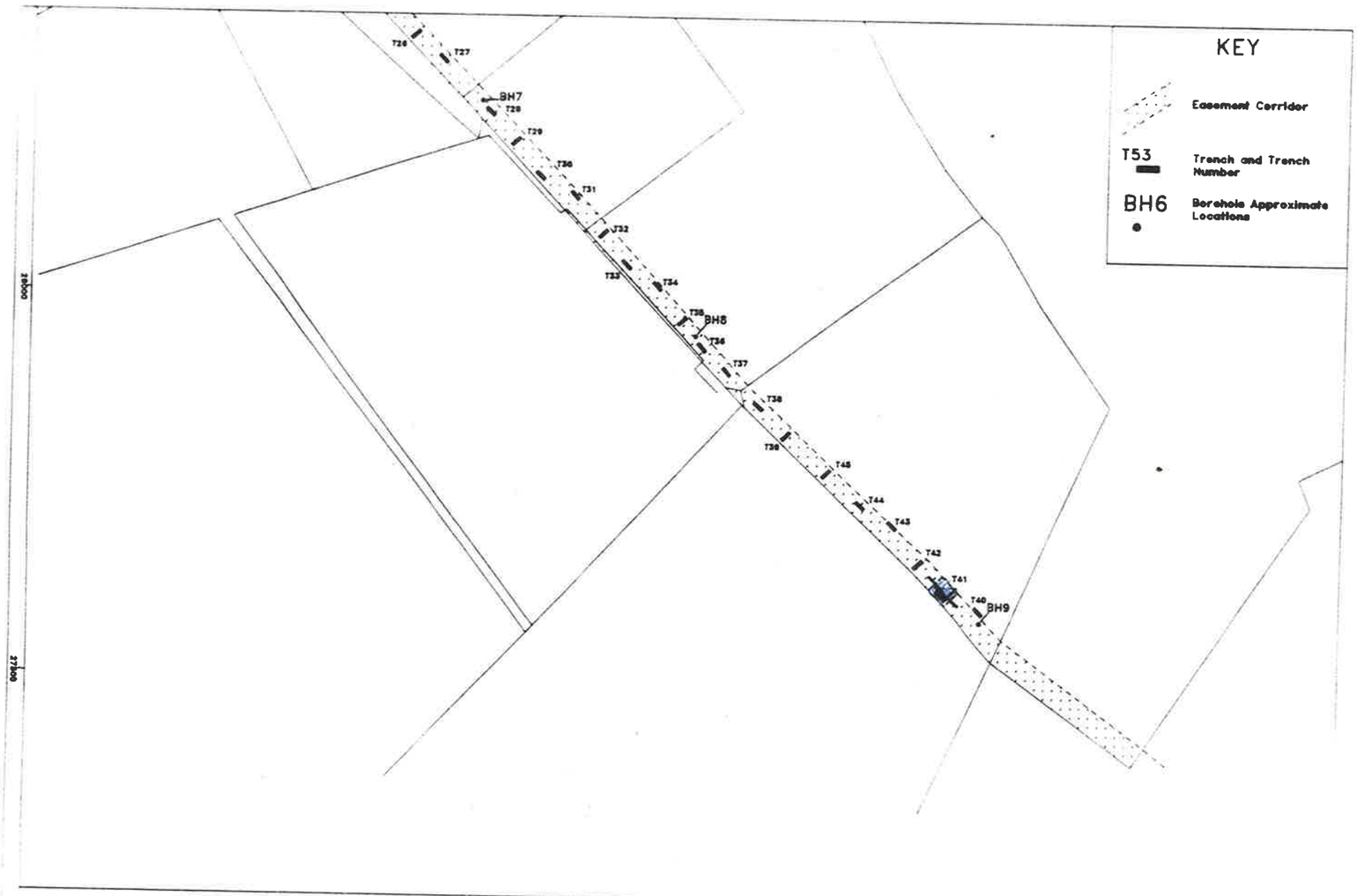
OASIS SEWER REQUISITION
Archaeological Evaluation

PLAN NAME
NORTH PLAN

100m

DRAWN BY CW
DATE 05 – 1996
SCALE 1:5000
FIGURE NO. 2

LANCASTER UNIVERSITY ARCHAEOLOGICAL UNIT



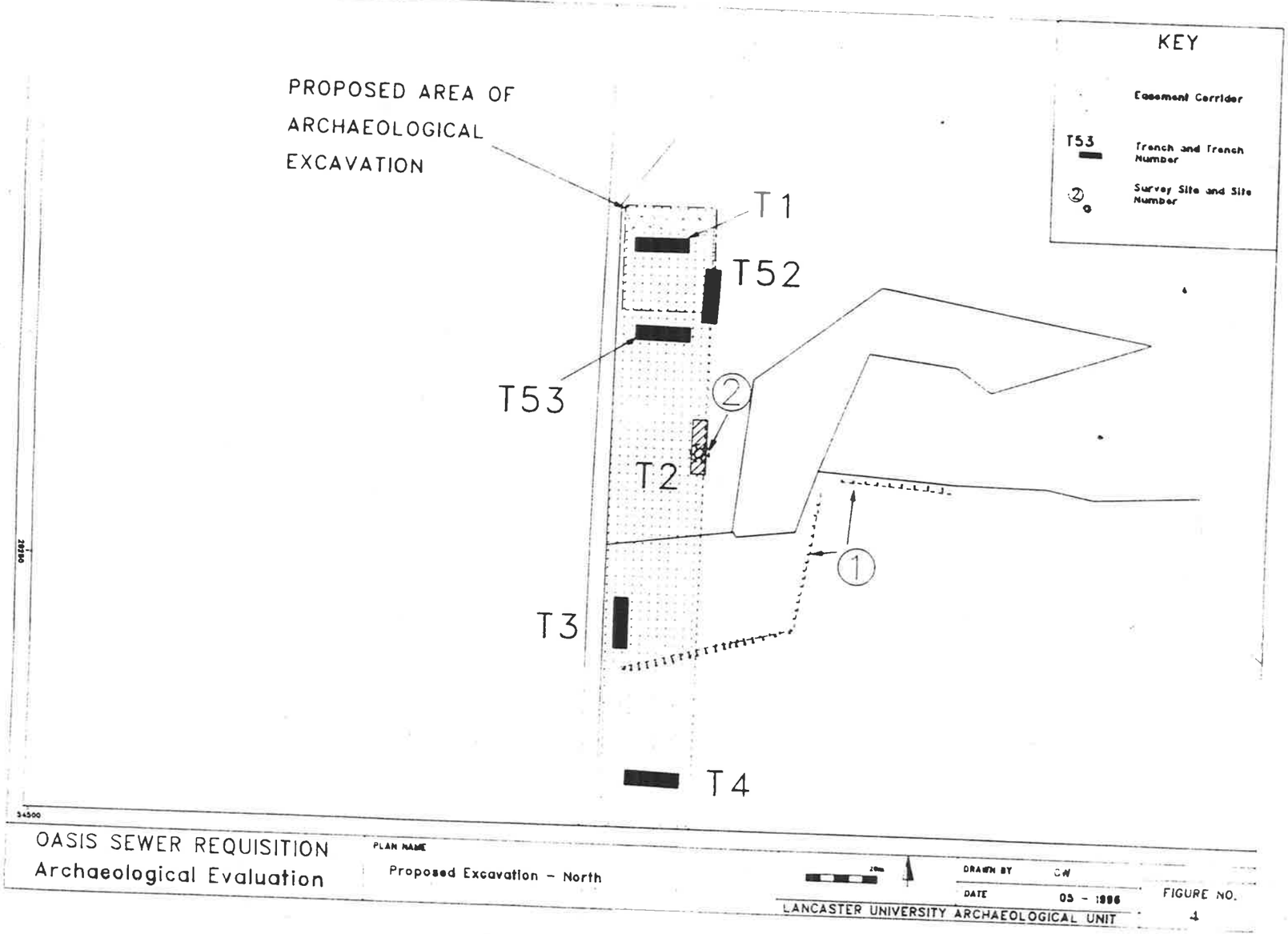
OASIS SEWER REQUISITION
Archaeological Evaluation

PLAN NAME
South Plan

100m

DRAWN BY CW
DATE 05 - 1996
SCALE 1:5000
FIGURE NO. 3

LANCASTER UNIVERSITY ARCHAEOLOGICAL UNIT



OASIS SEWER REQUISITION
Archaeological Evaluation

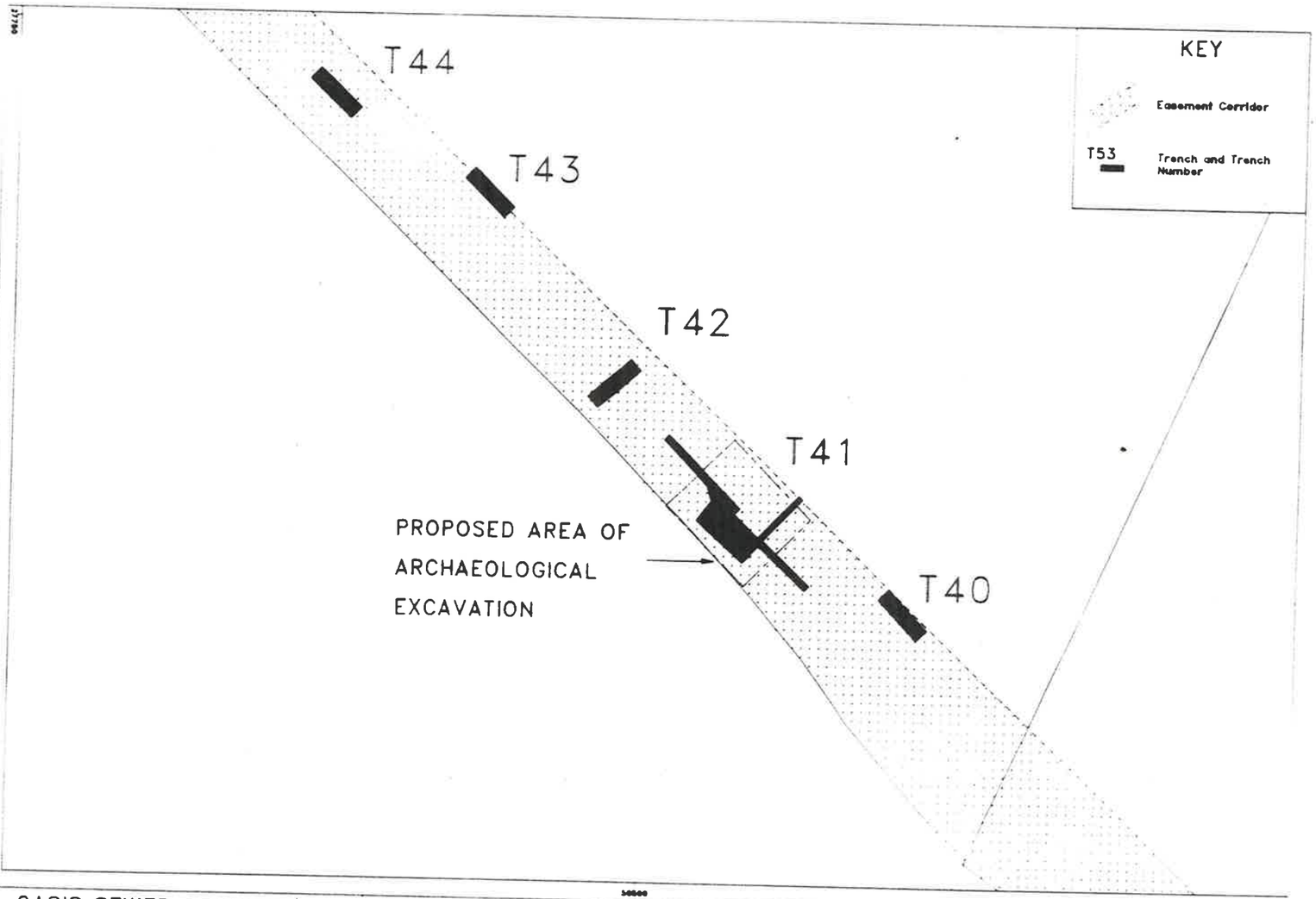
PLAN NAME
Proposed Excavation – North

20m

DRAWN BY CW
DATE 05 – 1996

LANCASTER UNIVERSITY ARCHAEOLOGICAL UNIT

FIGURE NO.
4

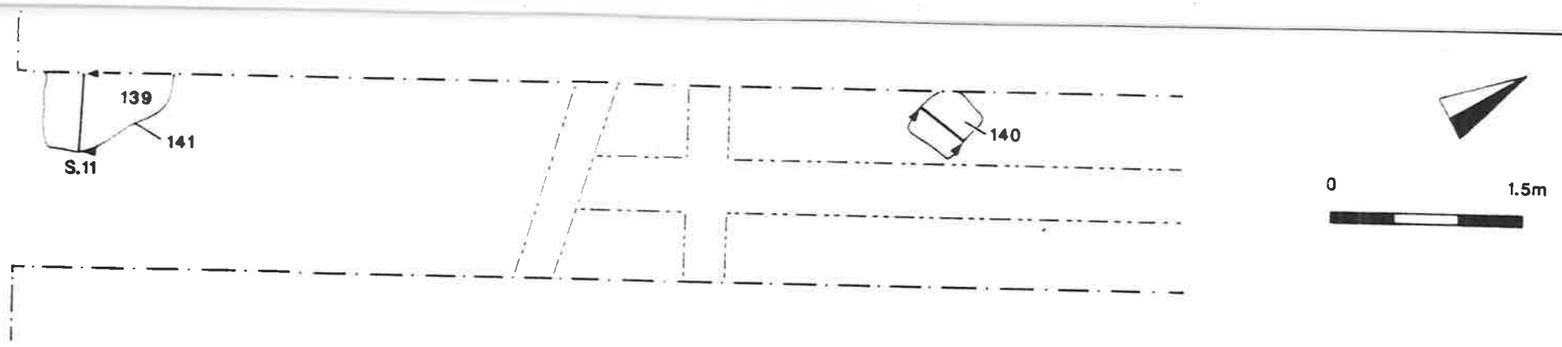


OASIS SEWER REQUISITION
Archaeological Evaluation

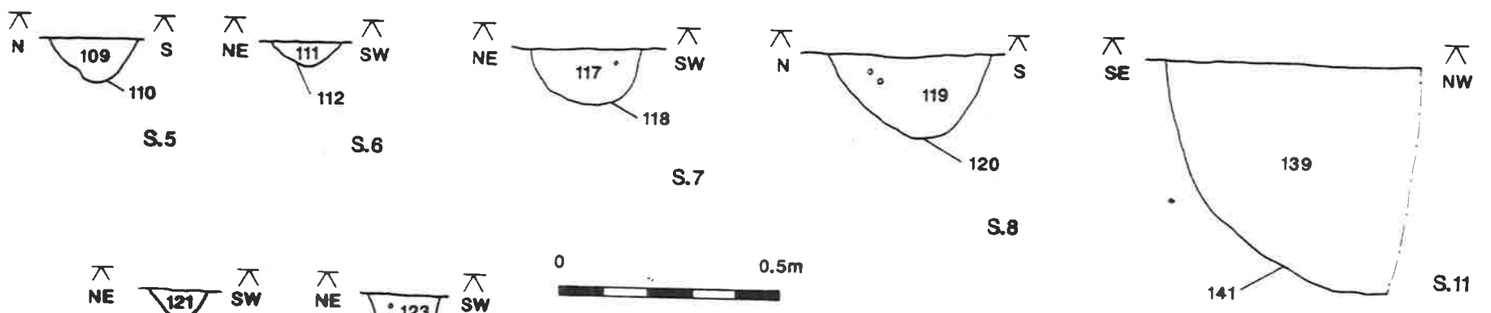
PLAN NAME
Proposed Excavation – South

DRAWN BY CW
DATE 05 – 1996
SCALE 1:1000
FIGURE NO. 5

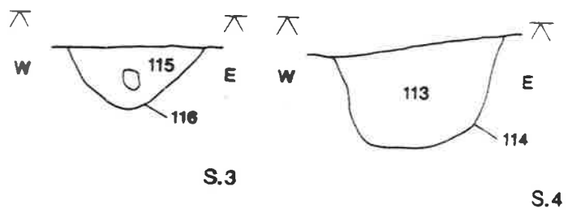
LANCASTER UNIVERSITY ARCHAEOLOGICAL UNIT



Trench 41B



Post Hole Sections



Trench 41 – Figure location diagram

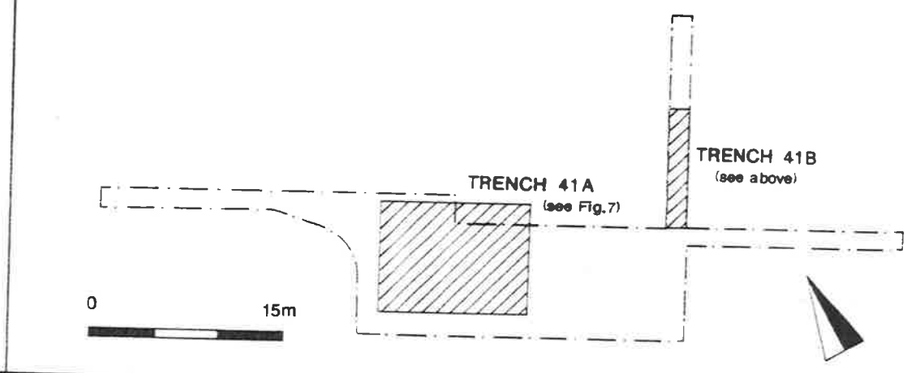


Fig.6 Trench 41 – Location Diagram and Post Hole Sections

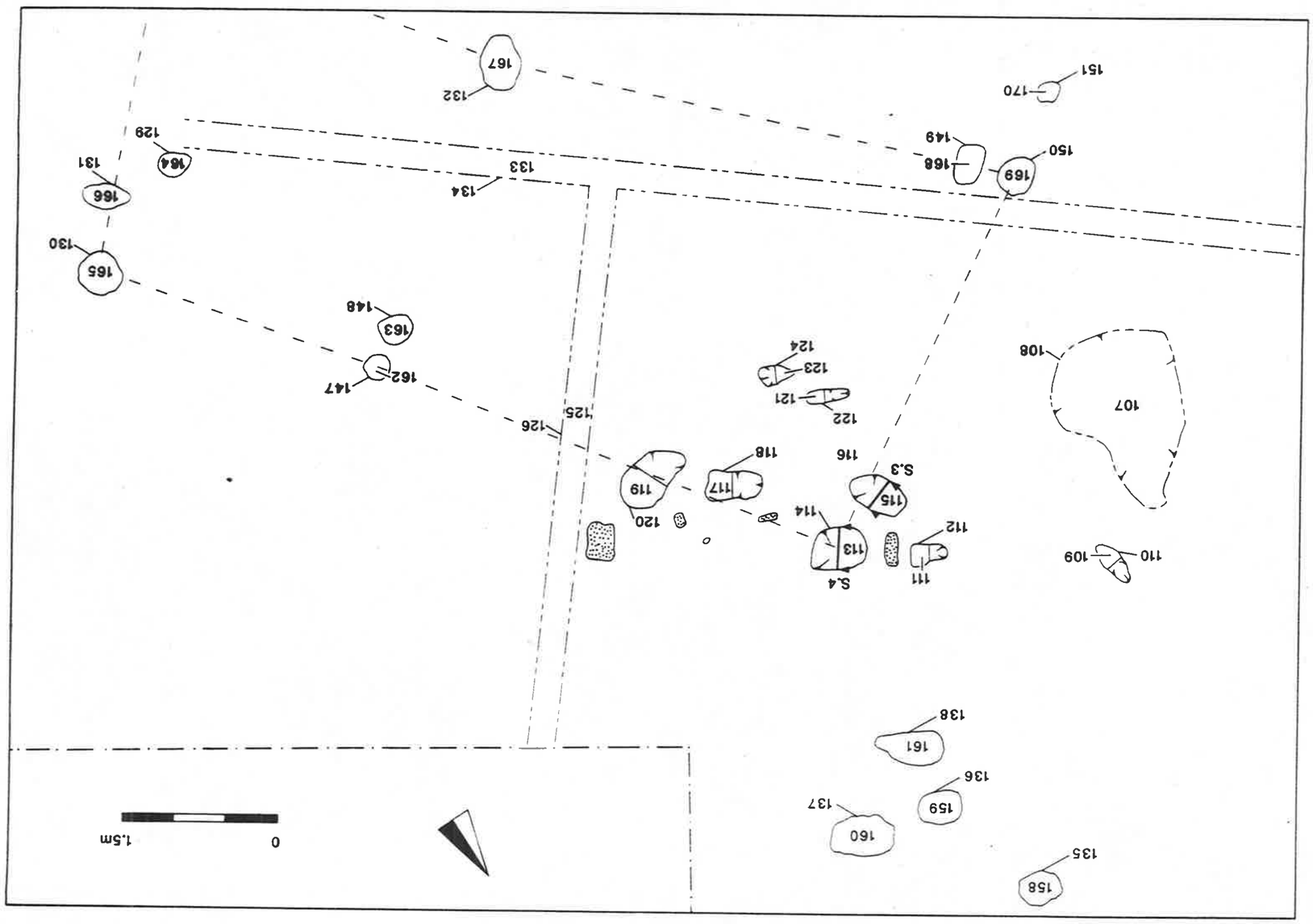


Fig.7 Trench 41A - Plan of Timber Post Hole Structure