'TIME-HONOURED LANCASTER'

(Cross Fleury 1891)

The Lancaster Urban Archaeological Strategy Project

Project Design for an Urban Archaeological Database

Issue Number: 2002-3/067
OA Job Number: L7791

National Grid Reference: SD 476 615

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Document File Location	Jamie/Projects/7791UAD/2002reha	

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1. INTRODUCTION

1.1 BACKGROUND AND NATIONAL CONTEXT

1.1.1 ***National Policy:*** Department of the Environment (DoE) planning guidance (*PPG16,* 1990) identifies the presence of archaeological deposits as a material consideration in the determination of a planning application and it expects planning authorities to adopt a curatorial role. PPG 15 (1994) recognises the archaeological potential of standing buildings and allows local authorities to give consideration to this aspect.

1.1.2 National policy on urban archaeological resources was set out *in Managing the urban archaeological resource* (English Heritage 1992), which proposed that management be achieved under an Urban Archaeological Strategy, to be developed in three broad stages:

- *Stage 1 (UAI9)* ***Urban Archaeological Database***
  Creation of a database of archaeological information to support informed planning advice;
- *Stage 2 (UAA)* ***Urban Archaeological Assessment***
  Preparation of a written assessment which synthesises current archaeological knowledge and understanding of, in this case, Lancaster in terms of local, regional and national archaeological importance.
- *Stage 3 (UAS)* ***Urban Archaeological Strategy***
  Preparation of a strategy for managing the archaeological resource and updating of the database.

1.1.3 ***The Need for an Urban Archaeological Strategy, Lancaster:*** whilst the working relationship between Lancaster City Council and the County Sites and Monuments Record (SMR) has always been excellent, it is clear that Lancaster City Council has a need to procure detailed archaeological data for their own planning. A detailed Urban Archaeological Database has therefore been proposed for the historic heart of the city which will support the provision of forward planning and development control advice by the Lancashire County Archaeological Service (LCAS) to Lancaster City Council and effect will be an extension of the SMR. It will become an important tool for early consultation between planners, developers and archaeologists.

1.1.4 The present proposal is submitted by Oxford Archaeology North (OA North) (formerly Lancaster University Archaeological Unit) in conjunction with Lancaster City Council, to outline the structure, preparation and management of an Urban Archaeological Database (UAD) designed to collate a selection of available data relating to the City of Lancaster relevant to the management of its archaeological resource. The UAD will facilitate the production of the Urban Archaeological Assessment (UAA) and ultimately the Urban Archaeological Strategy (UAS), for Lancaster, which will provide for the management of the archaeological resource within the bounds of the city, and will maximise the value of conservation and preservation in the urban context. This will provide a simple set of maps indicating archaeological potential and hazard areas, for use by planning officers. The Urban Archaeological Strategy will be produced by Lancaster City Council in conjunction with Lancashire County Council (*Section 3.2*).

1.1.5 The UAD will involve the detailed analysis of, and research into, the development of Lancaster from its inception to the present day. It will thereby provide the basis for strategic planning and allow for the conservation, presentation and future development of Lancaster's historic resource.

1.1.6 Lancaster's Roman and medieval history places it in the hierarchy of historic northern towns, after York and Chester, and Carlisle, but alongside Manchester, Durham and Newcastle. English Heritage has acknowledged the great archaeological importance of Lancaster as one of the most dominant settlements in the north of England, in its willingness to consider funding the creation of a UAD for the City.

1.1.7 ***Urban Archaeological Database:*** the present project design for the establishment of a UAD for Lancaster is the product of a pilot study, undertaken by OA North. This pilot study assessed the proposed methodology and the extent of documentary and archaeological records pertinent to the city. The documentary material was found to be fairly extensive and the great majority of the sources examined contained unique material of pertinence to the overall study. The pilot study highlighted the significance of the city at particular stages of its history, particularly the Roman period, during the medieval period, and also during the late eighteenth and early nineteenth centuries when it served as an important regional port and had prominent links with the New World. A more detailed assessment of the results of the pilot study is presented in *Section 4*.

1.1.8 The pilot study provided a detailed breakdown of all pertinent sources and also involved a GIS trial on a selected area to test for any complications that may arise during the main study, in addition it allowed for an accurate assessment of the resource implications for the completion of GIS design and the assimilation of the UAD (*Sections 6 and 8*).

1.1.9 The presentation of this enhanced project design incorporates discussions between English Heritage, Lancaster City Council, and Lancashire County Council, in line with English Heritage's policy statement *Managing the Urban Archaeological Resource* (1992). The project design is prepared in accordance with English Heritage's guidelines for the *Management of Archaeological Projects* (MAP 2) (English Heritage 1991) and with a brief issued in September 1993*, 'Urban Archaeological Databases: Extended Brief for Project Designs*' (English Heritage 1993).

2. LANCASTER URBAN ARCHAEOLOGICAL DATABASE BACKGROUND

'*Lancaster is one of the major historic centres of northern England*'

(Jones and Shotter 1988)

2.1 THE HISTORY OF LANCASTER

2.1.1 ***Introduction:*** '*Lancaster is a Market Town, Borough, and Parish, in the Hundreds of Amounderness and Lonsdale (south of the sands) in the Deanery of Amounderness, and in the Archdeaconry of Richmond; 11 miles north of Garstang; 15 miles SW of Kirkby Lonsdale; 22 miles NNW of Preston; and 239 miles NNW of London*' (Baines 1825, 1).

2.1.2 The City of Lancaster, situated in the extreme north of the County of Lancashire, is well known principally as the county town and at various stages in its history has been of considerable regional importance. Its location close to a long-disputed and often ambivalent national border, has, in the past, afforded it a strategic and historic significance far greater than its present size and distinctly rural nature would suggest. Indeed, its value was such that it can be listed alongside York, Chester, Newcastle, and Carlisle as one of the dominant centres of the North in both the Roman and certainly the medieval periods. It became a city in 1936/7.

2.1.3 The castle and parish church (formerly a priory) stand above the modern city, overlooking the upper tidal reaches of the river Lune. The modern town extends to the east, along Church Street, to the south, down King Street and Penny street, and to the west, where nineteenth century reclamation enabled settlement to spread onto the former marsh.

2.1.4 ***Prehistory:*** there has been no deliberate excavation of known prehistoric sites within the city, all excavated material having been encountered by chance during the course of other projects. There is probably no way of predicting the occurrence of prehistoric material in the city although a detailed study of Castle Hill may produce some evidence for this period.

2.1.5 Excavations in Church Street (Penney 1981b) produced Neolithic pottery and a series of stake holes, perhaps suggesting a settlement site close by, presumably on or near the banks of the river Lune. Most other finds are of a chance nature which might be expected anywhere, particularly flints and isolated items of metalwork, and only a few of them are well provenanced. Of particular interest, however, is the group of Bronze Age vessels found at various times on Lancaster Moor and within the limits of the urban area, which appear to represent the presence of at least one, probably two, flat inhumation cemeteries. Little concrete evidence for Iron Age activity emerges anywhere in northern Lancashire, except for hillforts such as that at Warton Crag, to the north of Lancaster. A number of authors have suggested that the anomalous earthworks on Castle Hill, now assumed to be medieval, but following the line of the Flavian fort on the site, might, in fact represent the re-use of existing Iron Age earthworks by the Romans. There is a cluster of burials centred around upper Penny Street, which are probably native British activity, but could also potentially be of pre-Roman origin. The putative Iron Age artefacts from the city, La Tene-type ironwork

from the site of Westfield Memorial Village, are now thought to derive from Romano-British burials.

2.1.6 ***The Roman Period:*** numerous small excavations have been undertaken since the 1920s in an attempt to elucidate the Roman presence in Lancaster. The majority of them have concentrated on Castle Hill and Church Street. Almost all of the excavations have been undertaken in rescue contexts and thus their location has been dictated by circumstance rather than the aims of research. This means that many of the questions which arise from the archaeology of Roman Lancaster remain unanswered, and in the welcome lack of development on Castle Hill are likely to remain so (much of the area is Scheduled and the rest is a conservation area). Much, but not all, of this work is poorly or inaccessibly published. Work in recent years has concentrated around the lines of Church Street and Damside Street (Williams and Newman 1989; LUAU 1991), allowing some understanding of the extramural settlement and the putative waterfront which probably lies somewhere at the base of the slope, near the northern end of Damside street.

2.1.7 Several excavations have been undertaken on the area of the forts since 1927. All were small, or in the face of unsympathetic development, or both. This has had the result of presenting a series of keyhole vignettes which illustrate the richness of the archaeological sequence in this area and the radical change undergone in the fourth century, but probably raise more questions than they answer. Ten excavations have been undertaken over a period of almost fifty years, the results of almost all of which have now been published in some form (Jones and Shotter 1988). The lack of necessity for rescue excavation in this part of the City since 1975 almost certainly reflects a successful conservation policy for the area.

2.1.8 The fort was founded on Castle Hill at the strategic lowest crossing point of the Lune, and also at the articulation point between sea and land advances (it is notable that early Roman activity has been identified at similar sites at all the mouths of major rivers in the North West). Traditional opinion has it that the first substantial fort was built here during Agricola's northern advance in the late AD 70s. Shotter (Shotter and White 1990, 19) has suggested that the first military activity might predate this slightly but allows that, in the circumstances, differentiation archaeologically between the activity of Agricola and his two Flavian predecessors would be very difficult given the level of recovered evidence to date. The earliest fort appears to have followed the natural lie of the hill, with its north/south axis lying along the highest ridge. The many small excavations on or around Castle Hill (best summarised by Jones and Shotter 1988; Shotter and White 1990) have suggested that the earliest Flavian fort was of conventional size and shape with turf ramparts and timber buildings. It appears that this fort, despite modification, was short-lived and that it was briefly abandoned and then reoccupied towards the end of the first century. At this point it appears to have been extensively re-modelled, the northern rampart was moved northwards, possibly suggesting an enlargement and reorientation towards communication with the fort at Watercrook, near Kendal.

2.1.9 The fort was substantially reconstructed in the early second century. RIB 604, dated to AD 102, mentions rebuilding and it was probably as part of these works that the rampart was faced with stone, new defensive ditches were dug and extra wooden palisades were erected. The north-eastern corner of this fort was located during excavations in Mitre Yard in 1975. It is probable that this fort was abandoned in the course of the short-lived Antonine advance into Scotland but it appears that it was reoccupied during the AD 160s, but reduced to a normal-sized garrison - perhaps

suggesting that some of the fort was allowed to fall into dereliction. Certainly, by the mid-third century it was occupied by a cavalry regiment (*Ala Gallorum Sebosiana*) who appear to have been forced to undertake a considerable programme of building restoration (RIB 605, dated to AD 260, records the reconstruction of a bath-house and basilica). Excavations in Vicarage Fields have suggested the presence at this date of a courtyard building of some size; interpreted originally as *praesidium*, it is perhaps more likely to have been an official residence for a regional officer of high status.

2.1.10 The political confusion of the fourth century AD, when it seemed that the Roman Empire was tearing itself apart, left Britain especially vulnerable to attack from the sea. The fort at Lancaster was clearly important in the defence of the west coast and to this end, about AD 330, the entire fort was reoriented and rebuilt on the northern and eastern sectors of Castle Hill. The substantial nature of the new fort can be demonstrated by the surviving fragment of its circuit wall (Wery Wall) which is thought to incorporate an external bastion, indicating the shift in military thinking towards static defence. The exact shape and size of the fort, however, remains problematic and only this one wall can be identified with certainty. It is, however, postulated to have been an irregular polygon (perhaps only three-sided) of about 5.5 acres, closely associated with the protection of harbourage along the banks of the Lune. The fort was probably effectively abandoned at the beginning of the fifth century.

2.1.11 Antiquarian commentators have frequently noted the numerous Roman finds from Lancaster (for instance West 1779). It is apparent from their distribution that a substantial extramural settlement lay beyond the east gate of the fort, and there is little doubt that Church Street, running down along a low sandy ridge from Castle Hill to Stonewell, preserves the line of the Roman road, and was the principal road of the extramural settlement.

2.1.12 Roman finds have been collected and reported from Church Street for three centuries or more. In recent years development in the City has centred around this area, at first piecemeal and more recently with major re-development projected for the Mitchell's Brewery Site (now largely excavated), Damside Bus Station, and Pye's Warehouse (on Damside Street). It is unfortunate that there was no archaeological observation during the major redevelopment of St Nicholas Street in the 1960s, an area which largely preserved its medieval character, apparently at the edge of the Roman settlement.

2.1.13 Keyhole excavations along the length of Church Street have demonstrated a range of timber strip houses lying at right-angles to the road. Large-scale excavations in 1988 and 1992, on the site of Mitchell's Brewery in Church Street, demonstrated a succession of buildings and a range of artefacts from the first to fourth centuries AD. Richmond (1959) has suggested ribbon development along the road from the north gate of the fort towards the river crossing and Roman material has come from the St Georges Quay / Union Square / Fleet Square area. Recent trial excavations alongside Damside Street (LUAU 1991) have also indicated Roman material along the old line of the Lune, perhaps indicating an extended river frontage to the west.

2.1.14 Circumstance has allowed a more coherent picture of the extramural settlement to be built up from the numerous small excavations than has been possible for the fort, and the recent (1988 and 1992) excavations on the site of Mitchell's Brewery have added significantly to that picture. It seems that development of the extramural settlement lagged slightly behind the fort, it probably not flourishing until the beginning of the second century. It had been thought, from lack of evidence, that it had largely failed in

this eastern area by the end of the second / early third centuries, but the range of fourth century finds from the uncellared Mitchell's Brewery site (Howard-Davis pers comm) has demonstrated that this apparent failure is simply a stratigraphical artefact, created by extensive cellaring in the city centre, which had effectively obliterated the later Roman and early medieval levels from the street frontage.

2.1.15 The extent of the extramural settlement has yet to be determined, although cremations from the southern end of Penny Street seem to give clear indication that this area lay outside the settlement. Until recently it was assumed that the tombstone of Apollinaris (RIB 606), found on Cheapside in 1772, indicated a cemetery but investigation (Ellis 1987) has suggested that the stone had been re-used, and there is no other evidence to suggest a cemetery there. More recent investigation on the site of Lancaster Market has, however, confirmed the presence of Roman activity in that area, although the archaeological deposits are badly disturbed (Drury forthcoming). It now seems clear, that the edge of Roman settlement lay between Common Garden Street and Spring Garden Street to the south, as cremations have recently been excavated at the junction of Penny Street with Spring Garden Street and George Street (LUAU 1995) and also a funerary urn recovered from the former Brambles site in 1987 (LSNR 10114, Lcity Mus 876).

2.1.16 Persistent antiquarian reports of Roman material from the Stonewell / Moor Lane area of the city might indicate the continuance of settlement along the line of the road to the east or perhaps an outlying settlement. To the west of Castle Hill little is known, although Roman material was encountered during the construction of Castle Station, and in 1934-5 burials were excavated on the site of Westfield Memorial Village. It is highly unlikely that settlement extended far on the western side as most of the residential area, known today as the Marsh, was not drained until the nineteenth century. The spread of evidence does, however, suggest that Roman Lancaster was, in fact, appreciably larger than its medieval successor.

2.1.17 ***Early Medieval Lancaster:*** there has been as yet no targeted excavation of an early medieval site within the limits of the City and very few finds have been encountered anywhere other than Castle Hill. It is possible that relatively little early medieval archaeology survives in the city centre, in part because extensive cellaring has removed the relevant levels. It will, however, be possible to predict areas which have not been subject to cellaring and therefore will have a higher potential for survival of early medieval deposits (*Section 5.4.25*).

2.1.18 Little is known of the latest Roman activity in the town, though most likely it would have related to a slow transition from Roman town to early medieval township. It seems unlikely that there was a complete break in settlement of any length, since the modern street layout barely deviates from that of the earlier Roman town, suggesting that the roads, at least, remained in existence and the coincidence of individual property boundaries along Church Street is marked. It is quite likely that the early medieval monastery discussed below utilised extant Roman walling, and certainly the Wery Wall formed a boundary, when Roger of Poitou gave the church on Castle Hill to the monastery of St Martin of Sees in 1094. It continued to serve this function well into the eighteenth century when Stukeley noted it.

2.1.19 There is little doubt that, like Cumbria, northern Lancashire was extensively settled during the early medieval period. The chapel of St Patrick on Heysham Head is a Christian foundation of early date (Potter and Andrews 1994) and the line of the Lune is marked by a series of pre-Conquest crosses, presumably indicating the early origins

of the churchyards in which they lie, many of which, interestingly, are juxtaposed with motte-and-bailey fortifications. Such systematic defence must suggest that the Lune formed a significant boundary at an early date and Higham (1986) has suggested that upper Lonsdale, as far downstream as Kirkby Lonsdale, may have marked the southern extremity of the Kingdom of Rheged; Lancaster is clearly associated with that putative boundary. At least fifteen early cross fragments have been recovered from the vicinity, or built into the fabric, of the Priory of St Mary on Castle Hill. Such a number, several of which are memorial in nature (*Pray for Cynebath Cuthbertson; Pray for the soul of Hard...*), and date from AD 750-900, must strongly suggest the existence of a significant religious establishment on the site (Newman 1996). The existence, at Domesday, of a clearly defined dual focus for the settlement, with *Loncastre* specifically differentiated from *Chercaloncastr*e, tends to suggest an ecclesiastical establishment surrounded by secular activity, in the manner of that at Whithorn, Dumfries and Galloway (Hill 1997). The dominance of the religious settlement may explain the puzzling shift of secular lordship to the neighbouring manor of Halton, recorded in Domesday.

2.1.20 It is likely that cellared street frontages have substantially removed evidence for early medieval Lancaster in most of the built-up areas, but there must remain the strong likelihood that the ecclesiastical establishment lies beneath the church and Vicarage Fields and there may also be islands of intact deposits between the cellars within the rest of the city. Artefact evidence is largely restricted to coin finds, but these are sufficient in number to reinforce the presence of a substantial settlement on, or around, Castle Hill. It has been suggested, from numismatic evidence, that Lancaster may have functioned as a mint during the reigns of Aethelred II (AD 840-848), Cnut (AD 1016-1035), and Harold I (AD 1035-40) when three moneyers are recorded, although this is now questioned (A White, pers comm).

2.1.21 ***Medieval Lancaster:*** the County and Honour of Lancaster is a Norman creation; prior to the Conquest the two settlements of Lancaster were vills of the Honour whose *caput baroniae* lay at Halton, and as such they owed allegiance to the Earl of Northumbria. The Domesday Survey contains only scant record of northern Lancashire, as part of Richmondshire, and until recently it has been assumed that this reflects the severity of William's treatment of the North in the early years of his reign.

2.1.22 The Domesday entry lists two settlements at Lancaster (*Loncastre*, perhaps centred on the Church Street area, and *Chercaloncastre*, around the Priory, on Castle Hill), as well as several other settlements which now fall within the city confines, *Scozeforde* (Scotforth), *Sline* (Slyne), *Aldeclif* (Aldcliffe) *Schertune* (Skerton) and *Neutun* (Bulk).

2.1.23 It was, it seems, Roger of Poitou who effectively created the County of Lancashire and the Honour of Lonsdale in the north to formalise and regularise his holdings, by depriving the manor of Halton of its former status. In 1094 Roger moved to found, or re-establish, a monastic house in Lancaster and to this end he gave the already extant church of St Mary, several local manors, churches, and tithes to the Benedictine house of St Martin at Sees, in return for the establishment of the Priory of St Mary. From the late eleventh century its importance to the security of the emergent Norman kingdom was clear, although it was briefly in the hands of David, King of Scotland (as was so much of the North during the reign of Stephen). The date at which the Castle was built is not known precisely, but it was certainly in existence by 1102 when the Honour of Lancaster was forfeited to Henry I. By 1351 the Duke of Lancaster was granted Palatine jurisdiction for life and by 1396, in the hands of John of Gaunt, the Duchy was declared a Palatinate in perpetuity. Once his son assumed the crown as Henry IV,

Lancaster has always remained a royal duchy. Lancaster's political significance was thus assured, although the later medieval development of the town can best be described as one of gentle economic stagnation; as in much of the North West, the impact of the Scottish Wars was severe. It must be suggested that the numerous disputes over the Honour of Lancaster had a significant effect on the prosperity and development of the town; with the exception of the castle and the Priory church, however, little of the medieval town remains above ground.

2.1.24 Documentary evidence for the street layout of Lancaster dates from as early as the twelfth century and certainly Penny Street was recorded as having been burnt by the Scots in 1322 (Penney 1981a), one of several occasions on which the town suffered severe damage by raiding. Many of the street names remain, unchanged, to this day. A single elevation sketch of the city (PRO MR 15. D.L.31/112) is known, dated to the second half of the sixteenth century, but its main concern is Castle Hill; for the rest of the city it provides only an outline townscape lacking in detail and distorted in layout and scale. No true map of the city exists prior to that drawn up by Speed in 1610. The central road plan shown by him differs little from the present and it would seem that the basic layout of Lancaster's road system was firmly established at an early date and has only been modified by recent development.

2.1.25 Despite the existence of standing buildings, and firm locations for several now completely destroyed, such as the Dominican Friary which lies beneath Dalton Square, very little archaeological evidence has been recorded for the medieval period. This is, as for earlier periods, largely the result of extensive cellaring and sweeping development in the 1960s, undertaken in effect without archaeological observation. Some small-scale excavation has been undertaken on the site of the Dominican Friary, but there has been little other archaeological investigation. Some architectural survey has been undertaken within the city, revealing remnant elements of later medieval vernacular architecture, but on the whole Lancaster has not been the subject of the intensive studies afforded such towns as Norwich in the late 1960s and 1970s.

2.1.26 ***Post-medieval and Modern Lancaster:*** the economic base of the town was founded in its role as a market centre, serving a solid, but not particularly wealthy rural hinterland, and it was not until the shipping trade with the Americas became established in the late seventeenth century that Lancaster accrued real wealth, generating industrial development. This period of dramatic expansion and building on the one hand gave the city many of its finest buildings, but on the other obliterated much of the medieval townscape.

2.1.27 The Carpenter's Arms in Bridge Lane and the Judges Lodgings are thought to be the oldest surviving vernacular houses in the town, both dating from the seventeenth century. It is thought that the Cross Keys Public House, built in 1613 and demolished in the late 1960s in the course of the construction of BHS, on Market Street, may have incorporated a medieval undercroft in its cellarage, but this cannot be stated with complete confidence.

2.1.28 There is little to illustrate the town except for the Elizabethan sketch (*Section 2.1.24*), which implies largely timber-framed, thatched buildings and the ground plans of later buildings, especially in Church Street, which often preserve the typical L-shape plan of medieval town houses. The appearance of re-used timber was noted during structural alterations to the Judges Lodgings, undertaken in 1979 and reused, possibly medieval, timbers were noted during the demolition of the Mitchell's Brewery buildings between Market Street and Church Street, in 1988.

2.1.29 It seems evident that, during the sixteenth and seventeenth centuries, Lancaster endured a period of significant economic stagnation, probably the result of various political upheavals. In 1586 Lancaster joined in support of the Pilgrimage of Grace and remained staunchly Catholic long afterwards, many of the townspeople being imprisoned for their faith. Although some new building was undertaken by men of substance, it is clear that the town was falling into general disrepair at this time. Several contemporary documents refer to buildings in varying states of decay and ruin. Camden, visiting *c*1586, describes Lancaster: "*The town at this day is not very well peopled, nor much frequented*". James I, on Royal Progress in 1617, avoided the town, staying at Ashton Hall and Hornby instead, probably due to the lack of suitable accommodation. At the outbreak of the Civil War the castle was in Royal hands, but not garrisoned and in consequence it was taken with ease by Parliamentarian forces. In 1642-3 Lancaster was besieged by the Earl of Derby who recaptured the town but not the castle and on 19th March 1643, as he left to face attack from Preston, he ordered that the town be burnt (Penney 1981a). In the subsequent conflagration all of Penny Street (90 houses) was destroyed.

2.1.30 The Sugar House, built in 1684, presaged an upturn in Lancaster's fortunes based on trade with the West Indies; with this development, the port, which held responsibility for the whole coast from Liverpool to the Scottish Borders, began to thrive, leading to an expansion of the city to the north of Castle Hill. Prosperity was, however, slow to come and in 1698 Celia Fiennes wrote that "*the town is old and much decay'd*" (Hillaby 1983, 218), when she visited the city after a major fire of that year.

2.1.31 In both 1715 and 1745 Lancaster was yet again invaded by the Scots and Jacobite troops were billeted here. The earlier incursion was of a civilised nature and "*it is acknowledged that the invaders paid for what they took and that none of the townspeople were injured*" (Farrer and Brownbill 1911, 19). The town clearly remained in decline during the early part of the eighteenth century and Defoe, visiting in 1730, describes the town as having "*little to recommend it but a decayed castle and a more decayed port, not capable of receiving ships of any considerable burden*" with "*little or no trade and few people*" (Defoe 1738, iii, 183). In 1745, there seems to have been again little trouble when the Scottish army marched through the city, either in advance or retreat. The house where Prince Charles Edward Stewart was reputed to have stayed in Church Street has been a notable attraction for the last two hundred years.

2.1.32 By 1749 the river was subject to improvement and the quayside upgraded - such improvements seem to have given a considerable boost to trade with the West Indies and Lancaster entered a period of unparalleled prosperity during which many fine buildings were erected, including St George's Quay, the Custom House, the Old Town Hall and Skerton Bridge. The economy of Lancaster has always been substantially based on its role as an agricultural market town, but one interesting offshoot of its trade with the Americas was the growth of an high class furniture manufactory (especially Gillows), using hardwoods imported by returning merchant ships.

2.1.33 The construction of the canal in 1797 served in part to improve trade with the growing industrial hinterland of South Lancashire, leading to a growth in small-scale, sometimes faltering, textile enterprises near the canal: White Cross cotton mill, Bulk silk mill etc. The construction of the railway in 1840 marked a major change in the character and development of the city. It in part extended along the line of the former quay, and effectively marked the end of Lancaster's maritime tradition. It also provided the important impetus to the industrial development of Lancaster, and during

the second half of the nineteenth century there was a dramatic increase in the extent of the city, and it brought about a period of considerable prosperity. In 1845 linoleum was first produced in the city and soon became a dominant industry; this coupled with the expanding furniture industry resulted in considerable prosperity which not only doubled the population, but also attracted significant service industries, such as sanitaria, which added considerably to the architectural heritage of the area. Like many a county town, Lancaster fell into industrial decline with the economic slump in the late 1970s.

2.2 BACKGROUND TO THE PLANNING AND MANAGEMENT OF THE ARCHAEOLOGICAL RESOURCE WITHIN LANCASTER

2.2.1 From the creation of the Lancashire County Sites and Monuments Record (SMR) in 1976, the city has been relatively well served in terms of archaeological resource management. The SMR was then based at the University, and from at least 1984 the SMR Officer was providing development control advice to Lancaster City Council and was able to take a relatively active role in discussions concerning the creation of a core conservation area, amongst other things. The response to individual planning questions and the practical observation of development etc at that time generally lay with the archaeological staff of the Council's City Museums Service, who continue to maintain a simple archaeological database and have much localised knowledge. However, larger scale excavations in advance of development have, since the mid-1980s, been undertaken by the then Lancaster University Archaeological Unit (now Oxford Archaeology North). More recently, responsibility for the maintenance of the SMR has passed to Lancashire County Council, with the appointment of a County archaeological curator, and the development of a County Archaeological Service based in Preston. Lancaster City Council supports this service, which provides its planning advice in terms of archaeological impact. The database held in Lancaster City Museums Service is cross-referenced with the County SMR and the two are largely duplicates of each other. Most archaeological work in the area, apart from some watching briefs still undertaken by the City Museums Service and the LCAS, is carried out by OA North, although much is now subject to competitive tender.

2.2.2 It is intended that the proposed Urban Archaeological Database incorporates all the data on Lancaster held by the City Museums Service and the Lancashire County Council and will supersede the databases held by both organisations for the extent of the historic centre of Lancaster City.

3. AIMS AND OBJECTIVES OF THE URBAN ARCHAEOLOGICAL STRATEGY

3.1 GENERAL PRINCIPLE

3.1.1 The detailed management of the urban archaeological resource requires a staged approach (English Heritage 1992; 1993):

- Pilot study: to allow precise details of timetable and cost to be established (now completed)
- Creation of Urban Archaeological Database (data collection and manipulation using GIS)
- Creation of Urban Archaeological Assessment (resulting in publication)
- Production of Urban Archaeological Strategy (planning tool)
- Enhancement/maintenance of Urban Archaeological Database; use as planning tool/amenity/educational tool.

3.1.2 The Urban Archaeological Database will be a sophisticated and sensitive planning tool and will be a new element of the SMR held by Lancashire County Council. It will optimise the management of the archaeological resource within the bounds of the city through the creation of an Urban Archaeological Strategy. To this end, it will be GIS-based, a principle which has already been established in other similar projects, for instance the Newcastle Urban Database. It is vital that, from its inception, the project be resourced accordingly.

3.1.3 The present project design defines the second stage of the Urban Archaeological Strategy: the creation of the Urban Archaeological Database, although it has been compiled with the subsequent stages in mind. The staged approach is regarded as vital to ensure a well-targeted and cost-effective product.

3.2 THE AIMS OF THE OVERALL PROJECT

3.2.1 The primary aim of the overall project is, and must remain, the development of an Urban Archaeological Strategy, a valid and reasoned document for the future management of the archaeological resource, including in effect an improved 'early-warning system' in terms of development control. This will be a significant contribution to the planning process, highlighting the most archaeologically important parts of the city. The creation of such an Urban Archaeological Strategy would follow on from the compilation of an Urban Archaeological Database from which an Urban Archaeological Assessment can be made. The future maintenance of such a city-wide database is vital to the continued review and updating of the Urban Archaeological Strategy.

3.2.2 The overall Urban Archaeological Strategy will be based upon a fundamental underlying research agenda, designed and implemented from the outset of the project. The agenda will be designed to investigate the evolution of this major English county town. It will make it possible to review the settlement as a single archaeological and historical entity, not only as the sum of its parts, and to demonstrate how interaction between the separate elements has influenced the development of the modern city, and

also, by interface with the county-wide SMR, it will highlight the context of the city within wider environs.

3.2.3 The Urban Archaeological Assessment should strive towards presenting the evolution of Lancaster's historic core, and to a degree, its interaction with its social and economic hinterland through communication links, industrial supplies and markets, agriculture, and so on, using multiple lines of evidence brought together through the presentation and synthesis of data to produce 'time slice' views of the present city at critical moments in its development.

3.2.4 It is important that such a project should not simply service the needs of town planners and archaeologists, although these are fundamental to its rationale, but that the results should be accessible and comprehensible to the inhabitants of Lancaster today, who are, indeed, part of the history of tomorrow. The feasibility of on-line presentation of some datasets should be considered as part of the archaeological assessment, as the UAD would be an important potential amenity asset (*Section 5.4.38*). It may involve the establishment of a hypertext document serviced by the database etc (constant update) available at terminals in the City Library, the Museums and the Council offices, and could be made more widely available by providing an interactive graphic and textual summary of the UAD on CDs which could be made available to schools. Such presentations should be designed with a view both to teaching and interactive data-gathering and should be of great benefit as a source of material for local history and education, involving the inhabitants of the city and region in an unobtrusive but valuable fashion, for instance drawing on the life experience of industrial workers, and the responsible reporting of new finds etc within the designated area (*Section 3.4.1 below*). This would serve as a valuable contribution towards scotching a common public grumble that archaeological developments are not adequately reported to the general populace.

3.3 OBJECTIVES OF THE OVERALL PROJECT

3.3.1 To achieve the aims defined above, there is a need to create and verify a definitive Urban Archaeological Database of known archaeological material within the study area, in the form of event and monument records, as defined by other Urban Archaeological Databases (Darvill and Gerard 1994). These records will reference their underlying sources.

3.3.2 The creation of this Urban Archaeological Database will require the rapid appraisal and assessment of the survival of known archaeological deposits and upstanding remains to provide information on the thickness, volume, character, date and public interpretation, if applicable, as well as information as to the recording of that information to date.

3.3.3 From this, an archaeological and historical framework for the city should be developed, utilising the predictive modelling capabilities of the system, in the form of an Urban Archaeological Assessment.

3.3.4 Finally, policies for the future management of the archaeological resource should be formulated, to produce a proactive response to the needs of the resource, including policies on conservation, preservation, protection, presentation and display, future research, and also contingency options, to build on those already in place. This will take the form of an Urban Archaeological Strategy and will be undertaken by Lancaster City Council, with advice from the County Archaeological Service.

3.4 URBAN ARCHAEOLOGICAL DATABASE

3.4.1 The Urban Archaeological Database will be a functioning GIS providing the opportunity to interact between textual and graphic 'event' and 'monument' records. One of the principal aims of the UAD is to establish not only known archaeological deposits but also to identify the potential for survival of such deposits, which can be achieved by establishing negative evidence as well as positive, in order to highlight areas of potential. This would be achieved by the following stages:

- cellar survey: buildings with documented or observed cellars will be highlighted within the GIS;
- early and nineteenth century maps (Docton's of 1684, Mackreth's of 1778 and Binn's of 1821) will be graphically superimposed upon modern mapping within the GIS system to enable a direct comparison of the development of Lancaster. Areas that have been subject to little post-medieval or modern development will be highlighted on a separate layer within the GIS system.;
- a basic deposit model will be established, on the basis of documented archaeological interventions and boreholes. It is however, accepted that the amount of borehole and excavation data is insufficient to provide a detailed deposit model. It is therefore proposed to establish a basic model of the natural/ made ground interface, within the study area, which would be presented in conjunction with areas of known truncation demonstrated by the cellar survey. Areas with demonstrably deep deposits will be highlighted on a separate layer within the GIS system;
- a model of the extent and character of Roman and medieval activity can be generated on the basis of documented interventions and cartographic sources. Such a model will be enhanced and adapted in the light of further archaeological work.

3.4.2 A comparison of all these attributes will provide an indication of archaeological sensitivity, an approach which was successfully used to establish the potential of the Mitchell's Brewery site on Church Street. The difference is that with the GIS based UAD the process can be undertaken mechanically to compute a comparison of all the defined attributes, and thereby provide a graphical depiction of levels of archaeological sensitivity for the whole of the study area.

3.4.3 Perhaps the most significant aspect of Lancaster is the survival of parts of the Roman forts as upstanding earthworks in an area not subsequently developed in the medieval, post-medieval or modern periods. Although limited localised examination of these earthworks has been undertaken, no extensive survey has been undertaken to record these important features and their interpretation and chronology are uncertain (A White pers comm). By virtue of their importance, it is suggested that they be surveyed at this early stage of the programme (rather than during the assessment stage) in order to provide a record of the extent, and character of these features for incorporation within the database; this would therefore enable the better management of this valuable resource. Although parts of the Vicarage Fields area have been subject to excavation, particularly by Richmond, these excavation results cannot be presented within the context of the fort remains as there is no adequate mapped record of the earthwork features. The presentation of the survey would provide the all important context with which to understand the excavation events, but also potentially would

allow the presentation of relationships between excavation areas. The survey would also enhance our understanding of the earthwork remains themselves. Experience has shown that any interpretation of earthworks is extremely difficult unless they are adequately surveyed and depicted within an appropriate context; it is therefore hoped that the presentation on the GIS of the earthwork survey in conjunction with the excavated structural features in this area will allow for an improved interpretation of the function and chronology of the earthworks.

3.4.4 ***Assessment and Urban Strategy:*** it is anticipated that, following the compilation of the Urban Archaeological Database, a synthetic review of the archaeological resource of the city will be undertaken (the Urban Archaeological Assessment), which will, amongst other things, highlight gaps and inadequacies in the range of information available to the database. Following this, an Urban Archaeological Strategy will be designed and enacted by Lancaster City Council, with advice from Lancashire County Council, to aid in the management of the archaeological resource within the historic core of the city. It is anticipated that the implementation of these three procedures will highlight the requirement for further archaeological initiatives in line with the primary research agenda. This may, for example, involve a programme of geophysical survey within the Vicarage Fields area and even possibly research excavation designed to address significant interpretative problems highlighted by the completion of the database compilation and the Urban Archaeological Assessment.

4. STATEMENT OF POTENTIAL

4.1 PILOT STUDY - INTRODUCTION

4.1.1 The ultimate aim of the pilot programme was to identify the resource requirements for compiling the Urban Archaeological Database and to enable the revision of this project design with accurate costings and timetable attached for submission to English Heritage. The pilot study addressed four main issues:

- to assess the quantity and quality of the sources to be drawn on for the compilation of the Urban Archaeological Database, with a view also of assessing their accessibility and indeed relevance/value to the Urban Archaeological Database;
- to design a workable GIS-based database for the capture, manipulation and presentation of the data. The pilot study provided a manageable amount of data, that could be used to test the system and thereby identify any potential problems at an early stage;
- to collect and enter onto the computer database data for a sample study area. The pilot study area, described in *Section 4.3.1* below, was defined in order to provide an assessment of a sample of the data available for the city.;
- to use the experience gained during the pilot study to refine methods for the compilation of the main Urban Archaeological Database.

4.2 PILOT STUDY - DESK-TOP SEARCH

4.2.1 A desk-top search was undertaken in numerous libraries and archives for material relating to the past development and current archaeological status of Lancaster, including archaeological reports and archives, articles in the archaeological and national press, primary and secondary sources, aerial photographs, paintings and drawings, photographs, maps and plans. The archives consulted, their contents and relative importance for the main study, are summarised in *Appendix 1* below.

4.2.2 Particular importance was attached to historic maps and plans, because they can provide archaeological information in a format compatible with a GIS database. The history of individual structures or plots, of changing street plans and industrial concerns, can be traced through maps, and this evidence tested by archaeological means when the opportunity arises.

4.2.3 Fieldwork consisted, at this stage, of a brief appraisal of visible archaeology in the pilot study area and in the wider city. Sadly it must be agreed that a previous writer was accurate when he stated that: '*After the visitor has seen the Castle and St Mary's Church he will look in vain for a building of earlier date than the seventeenth century*' (Roper 1898, 7). This is particularly true in the pilot study area, which has been subjected to aggressive and largely unsupervised development. Visible archaeology mainly takes the form of street patterns and architecture. The Castle Hill area, being undeveloped and now protected by Scheduling and Conservation Area status, is the only open area in the city where buried remains are visible as earthworks.

4.3 OVERALL STUDY AREA - GENERAL RESOURCE

4.3.1 The desk-top study for the overall area identified a diverse but important archaeological resource, which is defined within *Appendix 1* and is summarised below.

4.3.2 ***Database Records (SMRs and Listed Buildings):*** the number of Listed Buildings in historic Lancaster is estimated at around 300, but the present cut-off date for this study of 1800 means that many will be excluded. The number of Listings directly related to the period under study is estimated at no more than 150. Likewise, the precise number of SMR entries which describe features belonging to our study period is not known. However, Mr Peter Iles has kindly supplied copies of all SMR entries for the city, and there are 120 for the city. In addition there is a card indexed and computerised database, maintained by the Lancaster City Museums, which, although not comprehensive, contains some important records of interventions in the 1970's and '80's which are not replicated elsewhere.

4.3.3 ***Photographs and paintings:*** the Lancaster City and Maritime Museums each hold large collections of photographs, which are mainly of late nineteenth or twentieth century date, but some show structures, features or archaeological deposits which predate 1800 and are therefore of relevance to the proposed study. Although a detailed examination of all these photographs was not within the remit of the pilot study, an estimate of the number of useful photographs is likely to be around 100. There is also a limited number of paintings, notably the painting by Gideon Yates of 1805, which shows the junction of St Nicholas Street and Stonewell. Photographic copies of most paintings are held by the City Museum.

4.3.4 ***Documents:*** an explanation of the value of individual sources has been presented in *Section 4.6* and *Appendix 1*. Naturally, documents with potential to elucidate the archaeology have been regarded as the most valuable in the present study. Early sources are extremely scarce, and of limited value where they exist. Medieval references, such as they are, invariably mention only a street name with little corroborative detail, but these are of use in defining the broad, if not localised, character of the city. The papers of Stukeley and Towneley may be useful in describing antiquities and archaeological features of the city.

4.3.5 Perhaps the most valuable documents in terms of illustrating change and its physical expression in Lancaster are maps, particularly the Docton synthesis of a 1684 map and the Mackreth map of 1778. The OS 1st edition 6" map (1845) (and also the 6" map of 1849) provides a very detailed and accurate record of the city at the end of the study period. In conjunction with these, statistical records such as Window Tax returns and the Valuation of Inhabitants (CL, MS 3706) can be most useful in interpreting social and economic developments. The wills of Lancaster's citizens, most of which are held at the County Record Office, offer information about material culture in the city at the time of its early expansion in trade. They can be associated with particular streets or addresses, thereby creating a picture of commercial and residential patterns from the late sixteenth century onwards. A large number of wills survive, and the number which are relevant to historic Lancaster may be above 100.

4.3.6 The documents held at the City Library include a wide variety of leases, agreements and property-related items which are particularly helpful in understanding the processes of development in Lancaster. They cannot be precisely enumerated, nor would this be particularly helpful as some documents are very short and others very long, or worthy of longer study. However, at least 100 documents are thought to be directly useful for the present study.

4.3.7 ***Boreholes:*** there are potentially up to 30 boreholes within the study area (J Keen pers comm); these are for the most part concentrated in areas where there has been recent development. A series of boreholes created in advance of the recent sewerage scheme in the bus station area by North West Water Ltd would potentially provide useful information into an area where there is the potential for considerable stratigraphic and organic preservation.

4.3.8 ***Cellar Survey:*** the cellar survey started by the City Museum was found to be very incomplete; indeed it only incorporated three properties, all of which are in Church Street. This is nevertheless a crucial part of the compilation of the Urban Archaeological Database, in that it provides a guide to potential archaeological survival in islands of uncellared land and at least an outline survey will need to be undertaken.

4.3.9 ***Aerial Photographs:*** the value of aerial photographs will be principally in informing the investigation of the earthwork remains on Vicarage Fields. Aerial Photographs have been examined at Palatine Hall and were found to be taken from too great an altitude to be of value to the study. However, there are some pertinent low level oblique photographs held by the SMR and a search has been initiated with RCHM(E) which has highlighted a number of photographs which similarly have the potential to inform the Vicarage fields area; these, however, have not been examined.

4.3.10 ***Archaeological Archives:*** many of the interventions, however small, have been reported within *Contrebis*, the bulletin of the Lancaster Archaeological and Historical Society. As many as 45 articles on finds, watching briefs, excavations and chance discoveries from within Lancaster have been published within this journal since its formation in 1973. Some of the larger excavations have been published more comprehensively in other journals, but for many of the smaller interventions or discoveries *Contrebis* provides the sole published record. More recently the majority of the interventions have been undertaken by OA North, and the results tend to be presented as a client report and either accessioned as an archive with Lancaster City Museum or are still held by OA North. To date 18 archaeological projects have been undertaken within the extent of the study area by OA North.

4.3.11 ***Museum Collections:*** the Lancaster City Museum contains a large collection of artefacts which have resulted either from isolated discoveries or have been recovered in the course of interventions. The Maritime Museum also contains a pertinent artefactual assemblage, although the artefacts here are for the most part from the end of the study period. The value of these artefacts is dependent upon the accuracy of their provenance; where they can be located with a degree of precision, they provide a valuable indicator of historical activity.

4.3.12 ***Oral Sources:*** examination of *Contrebis* reveals that the majority of the investigations in Lancaster during the 1970s and 1980s were undertaken by or were under the guidance of a limited number of professional or amateur archaeologists. These individuals have a considerable knowledge of the archaeological investigations that have taken place over the years and it is understood that they have data that is not published or within the public domain. The principal sources for this information would be Andrew White (curator of Lancaster City Museum), David Shotter (Senior Lecturer at Lancaster University), Robert Bellis and Geoffrey Leather.

4.3.13 ***Resource Summary:*** presented below in tabular form is an estimate of the numbers of event and monument records that will be generated by each source. The figures are inevitably imprecise because it was only possible to examine a sample of the

documents from each source and because it is not known to what extent sources repeat each other.

Source	Monument Record Nos.	Event Record Nos.
Ashmolean Museum, Oxford	7	20
Bodleian Libraries, Oxford	4	12
Manchester Central Library	4	15
Lancs County Record Office	30	100
LCAS (SMR)	50	120
LCAS (Listed Buildings)	150	150
LCAS (Aerial Photographs)	5	30
Lancaster City Council Planning Department	-	90
Lancaster City Library	20	85
Lancaster City Museum	50	180
Lancaster University Library	4	12
OA North Archives	20	70
Literary and Philosophical Society, Newcastle	3	8
PRO Kew	6	25
Total	353	917

4.3.14 It is also possible to make a very basic estimate of the numbers of monuments, categorised according to period, although this is inevitably biased towards the later periods.

Period	Monument Record Nos.
Prehistoric	3
Roman	30
Early Medieval	4
Medieval	40
Post-Medieval	276
Total	353

4.4 PILOT STUDY AREA: LOCATION AND PRESENT STATUS

4.4.1 The pilot study area lay in a truncated triangle of land centred roughly on SD 4776 6178, and defined for most of its history by three roads: St Nicholas Street, Cheapside (Pudding Lane until at least the late nineteenth century) and Church Street (St

Marygate until the nineteenth century), with the truncated eastern end of the triangle made by Stonewell, a street named for the medieval well of St Mary.

4.4.2 At first sight, the area chosen for the pilot study may seem atypical as an archaeological resource. Little is known of its archaeology, and its history is poorly documented until at least the seventeenth century. The site is now almost entirely occupied by the St Nicholas Arcade shopping centre. This complex was constructed initially in the 1960s and 1970s with no archaeological supervision or input whatsoever, and a great opportunity to study stratified deposits in a central area of the city was thereby lost. It is believed that most archaeological deposits were during the excavation of car parks for the shopping mall.

4.4.3 However, a scarcity of archaeological and documentary evidence is by no means untypical of Lancaster and has indeed been a motivating force behind the commissioning of the present study. Until the 1980s only Castle Hill had been subject to any major systematic archaeological investigation, and it was generally the only part of the city described in detail by antiquarian visitors or historians.

4.4.4 With the exception of the castle and priory precincts, the pilot study area was as well represented in documentary sources as most other parts of the city. Likewise, its history of investigation by archaeological or historical means, whilst scant, was not unrepresentative. Information yielded by available sources has demonstrated that these sources used together can provide a meaningful context in which to interpret future archaeological data.

4.4.5 There were no Scheduled Monuments and no Listed Buildings within the study area. The study area, however, fell within Lancaster City Council's conservation area and the Council is committed to protecting the archaeological resource within the historic town (J Keen, pers comm).

4.5 PILOT STUDY AREA TOPOGRAPHY

4.5.1 The study area presently lies on ground which slopes only slightly up to the south and west. However, the underlying land has been described thus: '*Beneath the present buildings* [on St Nicholas Street] *the natural lie of the land falls steeply away to the east. This is the point at which the sandy terrace above the original course of the Lune runs out, and probably in ancient times the river was joined by a tributary stream from the south, marked now by the line of Stonewell and Rosemary Lane,*' (CM).

4.5.2 The neighbouring streets - Great John Street, Moor Lane, Gage Street, St Leonard's Gate - are all thought to be creations of the medieval period (Penney 1981b). It is likely that the eastern and northern limits of the study area correspond roughly to those of the Roman extramural settlement.

4.6 PILOT STUDY AREA - THE HISTORICAL AND ARCHAEOLOGICAL DEVELOPMENT

4.6.1 ***Roman:*** almost all archaeological finds recovered from the Pudding Lane or Cheapside area have been Roman, and on the strength of accumulated archaeological evidence, Church Street is believed to have been one of the major streets in the Roman

settlement, leading through the extramural activity to the east gate of the fort. There is reason to believe that Cheapside too may have Roman antecedents.

4.6.2 In 1772 a Roman tombstone, with pottery and bones, was found on the west side of Pudding Lane at or around SD 4772 6175 (CM, Antiquity no.834). Details of the inscription have been variously interpreted, but it is agreed that it commemorated Lucius Julius Appolinaris, a citizen of Treves, 30 years of age, and a horseman of the *Ala Augusta* regiment. The present whereabouts of the stone are not known. In 1812, drain-cutting in the middle of the same road brought up a number of bones with many fragments of Roman pottery, thought to be cinerary urns, and two quern stones (Lancaster Gazette 12/9/1812: Simpson 1852, 119). In 1933, construction work at No.7 Cheapside exposed finds described in Ordnance Survey record cards as 'Roman. amphora neck etc.' which are now held at Lancaster City Museum under the accession number LM 50 (CM).

4.6.3 For many years these discoveries were thought to represent a cemetery, and therefore to indicate the eastern limits of the extramural settlement. However, limited excavations during 1983, close to the find spot of the tombstone in Cheapside, whilst somewhat inconclusive, did not suggest either a cemetery or the limit of the settlement (Ellis 1987). The burial ground is now thought to have been situated at the south end of Penny Street, and the study area seems to represent an occupational area on the eastern fringes of the extramural settlement. This conclusion may be reinforced by the alignment of remnant boundaries, mentioned in *Section 4.6.30*. The Appolinaris stone is now generally interpreted as a reused funerary stone, though the several discoveries, mentioned above, of bones thought to be human have not been satisfactorily explained.

4.6.4 A brief report on the Cheapside excavation by W Graham Watson is held at the City Museum. In it he states that because of cellaring, archaeological deposits were expected only in undisturbed pockets between former buildings on the site. Deep deposits of topsoil made some of the presumed archaeological deposits inaccessible, whilst others could not be excavated for safety reasons. In a section which was excavated, modern pits were seen to overlie '*a thick layer of brown sticky soil that produced no finds at all...*[and] *looked as if it might be garden soil.*' Although this description does not allow detailed analysis, it is worth noting that recent excavations at Mitchell's Brewery to the west encountered substantial post-Roman deposits of a broadly similar nature (C Howard-Davis, pers comm), and it is tentatively suggested that it may prove to be characteristic of post-Roman levels in the city.

4.6.5 Below this 'garden soil', layers included finds of late first to early second century pottery and bone. A bone pin and an *as* (a small coin of Domitian, AD 86-87) were unstratified finds (Watson 1984).

4.6.6 Discoveries in St Nicholas Street have been of a similar nature to those in Cheapside. In 1854, sewer construction in St Nicholas' Street revealed 'two skeletons and Roman pottery' and a Samian fragment was found in May 1968, on the north side of the multi-storey car park site there. A cast of this fragment is held by the City Museum.

4.6.7 ***Medieval:*** no written evidence is available for the study area prior to the Middle Ages, when the streets defining it are first mentioned by name. Church Street (formerly Saint Marygate) is first mentioned in the thirteenth century, and St Nicholas' Street and Pudding Lane (later Cheapside) in a rental of Cockersand Abbey of 1284 (CRO CC 111/111).

4.6.8 Like all parts of the city, the study area is poorly documented in the medieval period. Most documentary evidence until the sixteenth century is of a general nature, and does not apply to the study area in particular. The town was documented as having been sacked by the Scots in 1322, and since only the Castle is said to have survived, the study area could be assumed to have fallen with the rest (Baines 1868). However, no evidence has been found of burning in the medieval layers of the Mitchells excavations (R Newman pers comm). Sparse sources for the sixteenth century suggest that the city had been formerly more prosperous, but was now in a state of great decay: a statute of 1544 stated that the previously 'beautiful houses' were 'falling into ruin', and a petition of 1553 described the city as 'very ruinous and in great decay' (Docton 1954). However, the division in 1570 of a '*capital messuage called Great* [Bamfant?] *Hall in St Mary Gate Street.....into 3 several dwellings houses*' with small herb gardens may be an early indication of increasing pressure on accommodation in the city (CS 102, 93.)

4.6.9 Camden, however, visiting in 1586, and Speed in 1610, are in agreement that the city was sparsely populated (Docton 1954). On negative evidence it could be suggested that the state of the buildings, if not admirable, was no longer so bad as to provoke adverse comment from either man; yet Lancaster was still simply a market town and was far from large or prosperous. Richard Blome, visiting in 1670, commented that the city was essentially rural (Docton 1954), and Celia Fiennes, visiting after a large fire in 1586, that the city was '*old and much decayed*', though adding that '*the streets are some of them well pitched and of a good size*' (Hillaby 1983, 218).

4.6.10 Speed's map of Lancaster, printed in 1610, shows the study area as a simple triangle of land with the street frontages entirely built up. This is a schematic map, which does not accurately reflect features or scale, and fails to show gaps in the street-frontage buildings which are seen in the measured Docton map of 1684. However, it does indicate that the area behind the street frontage was free of structures.

4.6.11 The Docton map of 1684 shows the study area as largely open. The narrow enclosures between streets apparently largely preserve medieval burgage plot boundaries. A property in the middle of Pudding Lane extends into the long plot behind, giving it an L-shape. This is probably the property described in Leonard Potter's will of 1686 (see Section *4.6.12* below). The corner properties on Pudding Lane are also L-shaped; part of the northern one later became the Red Lion Inn. Other buildings are mostly simple rectangles. Several stables are shown, and two of the smaller buildings are described as 'Shop'.

4.6.12 The will of Leonard Potter, a householder in the study area, was proved in 1686, two years after the Docton map was surveyed (CRO: WRW/A). The house it describes is thought to be the large L-shaped structure shown on that map. The will describes '*my messuage or dwelling house...*[in] *Pudding Lane....with the stables garden and appurtenances thereto*'. Some chambers are identified: the '*far chamber, near chamber, chamber over house, grooms chamber, chamber over cellar, passage room, chamber below, garretts, cellar, stables, court yard, kitchen, house and 'parlour'*. From this description may be surmised a two-storey building with attic (garrett) space, a cellar, and open space including a garden at the rear. Reading William Stout's description of old properties on Pudding Lane fifty years later (*Section 4.6.16*) it is clear that this would have been a timber house with a thatched roof.

4.6.13 Items recorded in this building are mostly beds, chairs and soft furnishings such as bed hangings and also a looking glass. These are furnishings which imply a comfortable, if

not luxurious, standard of living. Outside were oats and hay, barrels and buckets. The most valuable item was a store of leather and shoes worth £13. Mr Potter was probably a cobbler and cordwainer, using part of his Pudding Lane premises as a warehouse for storage, and the street frontage block as a workshop and shop.

4.6.14 A will of 1689 (CRO, WRW/A) itemises the property of one John Lawson, possibly the man named on the Docton map as a householder at the south end of Pudding Lane. His property included fabric to the very high value of over £140. This implies a successful trader in possession of spacious storage facilities which may not, however, have lain within the study area. No address is given in the will.

4.6.15 The study area clearly contained small-scale industrial premises by the end of the seventeenth century. Without earlier evidence it is impossible to say whether there was a long tradition of similar use, such as artisan's workshops, on the same site; archaeological evidence would be the best means of testing this hypothesis.

4.6.16 The eighteenth century saw a continuation of small-scale manufacture and retail in the study area. The draper, merchant and autobiographer William Stout had his premises on Pudding Lane. He described the surrounding housing in 1733 as being constructed almost exclusively of timber: '*most of the houses...from the upper end of* [his neighbour's] *house being of wood and thatched to the corner of the Butcher's Shambles and not one stone partition wall in that length, save one and a public oven, in a bad low thatched building...*' (Marshall 1967).

4.6.17 Considering the timber housing to be a fire hazard, he pulled down his own property to rebuild in stone and encouraged his neighbours to build in stone or brick, which at least two did. This movement away from timber building and towards rebuilding in more lasting material seems characteristic of the city's regeneration, which began at about this time. From the mid 1740s onwards, travellers' accounts of the city often refer to the proliferation of new stone buildings: in 1769 Defoe's revised *Tour* describes a '*good port and a handsome new Quey (sic.). Of late there is a fine row of neat Buildings near the Castle*'. This is in notable contrast to his first edition (*Section 2.1.29*), which is extremely derogatory and would imply considerable development of the town between 1738 and 1769.

4.6.18 Window-tax returns (CRO DDCa/15/3) and poll books seem to confirm that larger and more complex houses were built in the mid to late eighteenth century on street frontages in the study area (LL, MS 3706). The standard form would have seen a shop at ground level and accommodation for the owner's household above.

4.6.19 The long plots behind these buildings had formerly included little more than a stable or barn, as the Docton map illustrates, and might be described as essentially rural smallholdings in an urban setting. Now, however, these spaces were gradually filled with structures and took on a more varied nature. Apartments, warehouses and stores to supply the street-front shops were built and several, like William Stout's, were built or rebuilt in stone. A conveyance of 29 March 1748 (LL, MS 3404) transfers ownership of a '*barn yard and gardens*' in St Nicholas Street, and mention is made of '*a certain barn recently purchased by William Dilworth*'. This is thought to be the site later listed as Dilworths, a manufacturer of sail-cloth (Anon 1815). A similar document of 1749 (LL, MS 5271), concerning the plot next to the Red Lion, transfers it from a farmer to Richard Bell, a tailor: Bell's will of 1785 leaves the holding as '*three messuages ....with shops, brewhouse and other buildings*' (LL, MS 5273). These documents are evidence for a movement away from husbandry or domestic use, and towards industrial or commercial use, in the study area.

4.6.20 The Mackreth map of 1778 shows the city's changing nature reflected in the study area. Much less open ground is visible by this date than could be seen on the Docton map of almost 100 years earlier. Two open areas containing trees may be imagined as orchards and/or private gardens, but other spaces are long and narrow, serving only to give access to outbuildings which fill the plots behind street frontages. It is not generally possible to tell which buildings are entirely new and which are extensions of the earlier buildings, but a jettied extension mentioned in *Section 4.6.26* below is shown on the map, and was probably, connected to a mid-eighteenth century stone building. Most new buildings respected former boundaries. Many were cellared to maximise storage space, truncating archaeological levels, and Leonard Potter's will of 1686 suggests that this had long been the case.

4.6.21 Beyond the structural details supplied by William Stout, few of these buildings can be described individually. Sir Nicholas Sherburne of Stonyhurst built a grand house called Mulberry House on the south side of St Nicholas Street, before his death in 1717, but its form is not known (CM). Next to it stood a chapel, which was rebuilt in 1786 (*ibid*).

4.6.22 The increased building rate was a result of Lancaster's trading success. West, writing a year after publication of the Mackreth map, speaks of '*streets well paved and thronged with the inhabitants busied in prosperous trade to the West Indies and other places*' (West 1779). In the study area, West Indian imports of mahogany, sugar, coffee, cotton, rum and fabric found outlets in shops such as that of Gilbert Batty, grocer and tallow chandler, on Pudding Lane (Anon 1815). The rising numbers of sailors, merchants, shipbuilders and service trades made demands on accommodation and facilities. Amongst these services were new public houses including the Green Dragon, Red Lion and Bull's Head (Cross Fleury 1891, 494): until 1684 there had been only two inns in Lancaster (Docton 1957)

4.6.23 The major expansion of population and wealth came in the 1770s and 1780s. Population estimates are as follows:

Year	**Population**	**Source**
1776	5,550	Docton 1957(window tax returns)
1784	8,584	Clark 1807 (parish clerk's survey)
1801	9,028	Clark 1807 (window tax returns)

4.6.24 In 1784, at the height of the population boom, Church Street was home to 901 people, Market Street to 785, Pudding Lane to 198, and St Nicholas Street to 307 (Clark 1807). The distribution of these figures may reflect not only the relative length of the streets - Pudding Lane being a short lane and Church Street a long thoroughfare - but perhaps also represents an increasing division between residential areas like Church Street, and commercial/industrial quarters like those in the study area.

4.6.25 By 1800 the study area was well established as a retail quarter. Gilbert Batty's business as tallow chandler represented one of the declining industries of Lancaster, but sail-cloth, an important factor in the city's economy, was manufactured at Dilworth's on Cheapside (Anon 1815). The shopkeepers of the city generally were described as '*numerous and opulent*', and the retail trade '*greater than could be expected from the*

number of inhabitants', perhaps owing to large numbers of visiting sailors and ship owners patronising the shops (Anon 1815). Shops and manufacturer listed in the study area in the early nineteenth century were in many cases established during the eighteenth. They included booksellers, a shoemaker, a silversmith, glass and china dealers, a brazier and tinman, a hatmaker, a hosier, ironmongers and textile manufacturers, a saddler and the sail cloth manufactory. The majority of these were on Cheapside. St Nicholas Street, for which the present shopping centre was named, was apparently not then at the hub of retail trade.

4.6.26 Many houses in the study area retained their thatched roofs until the nineteenth century (Cross Fleury 1891, 449). A painting by Gideon Yates of 1805 shows the junction of St Nicholas Street and Stonewell, with many thatched houses. An undated drawing in the Maritime Museum, probably of the late nineteenth century, shows a two-storey building at 'North Corner, Pudding Lane, Lancaster' with a timber-jettied extension, adjacent to the Red Lion Inn and Todd's Ironmongers. By this date the building and its neighbours had tiled roofs.

4.6.27 ***Conclusions:*** from evidence recovered during this and earlier studies (Shotter and White 1990, 32-5 and 50), it seems likely that Cheapside, formerly Pudding Lane, preserves the line of a Roman road and fell within the extent of the extramural settlement. The east/west roman road following the broad line of Church Street, would have extended through the middle of the study area plot, in order to link up with Moor Lane.

4.6.28 Boundaries in the study area, some of which were identifiable as late as 1957 (OS 1:2500, 1957), may also have had relatively early origins. Longer plots on the Docton map of 1684 run perpendicular to Pudding Lane, and not to Church Street or St Nicholas Street; plots running off these latter streets are truncated and irregular in shape, as if respecting pre-existing boundaries. However, the plots off the western part of Church are indeed perpendicular to the line of Church Street. Church Street is generally accepted as the main thoroughfare of the Roman town (Penney, 1981; A White, pers comm; R Newman, pers comm), but the section of Church street past the study area, has been diverted to the north, away from the line of the Roman road. It is perhaps significant that it is in the area of this altered section of Church Street, that the plots preferentially accord with the line of Pudding Lane. This would suggest that the plots off Pudding Lane/Penny Street predated those from the altered line of Church Street, either because Pudding/Penny Street was earlier or because the burgage plots off Pudding Lane/Penny Street were established at a time when there were no burgage plots extending out from this diverted eastern end of Church Street. This does not necessarily indicate that these plots were contemporary with the establishment of the roads, but does demonstrate that the Penny/Pudding Street plots are relatively early by comparison with those others shown on the Docton map.

4.6.29 In view of Roman finds made in the study area and on Penny Street, a Roman date for Cheapside is not surprising and has already been suggested (Shotter and White 1990, 32-5 and 50). That the Cheapside/Penny Street alignment could predate the altered eastern section of Church Street by a sufficient length of time to allow the establishment of property boundaries, would be considerably more difficult to verify, and archaeological investigation would be necessary to establish the sequence.

4.6.30 There is evidently the potential that the boundaries seen on the 1684 and 1778 maps are survivals of medieval or even potentially Roman boundaries, and may suggest a considerable degree of continuity and survival. Discoveries at the Mitchell's Brewery

site (OA North forthcoming) suggest that long-lived boundaries are discernible there (C Howard-Davis, pers comm), and they may yet prove to be the norm in parts of the city which formerly lay within the Roman extramural settlement.

4.7 PILOT STUDY AREA - DEPOSIT MODELLING

4.7.1 The removal of archaeological deposits in the construction of the St Nicholas Arcade is understood to be almost total; however, it is possible to present a brief analysis of the likely deposits before and after this development. The Appolinaris stone was found in 1772 at a depth of around 5ft, and Roman pottery discovered on St Nicholas Street in 1854 was at a depth of approximately 6ft (Baines 1868). Discoveries made in Church Street in the 1770s and 1780s, though not within the study area, encountered Roman remains at '6 feet from the surface' (Baines 1868).

4.7.2 Deposits seen at this depth in the eighteenth and nineteenth centuries would have been encountered, and partially removed, during the construction of cellars in the study area from the seventeenth century onwards. Areas which were not cellared, including stables and some outbuildings as well as rare pockets of virgin ground, are likely to have allowed the preservation of archaeological deposits.

4.7.3 If a depth of around 6ft or 1.8m is representative of undisturbed Roman remains in the study area, then all post-Roman and the majority of Roman deposits are likely to have been removed during the construction of the shopping centre and its car parks. Although remains at a greater depth might survive, this is unlikely to include anything but the earliest Roman levels or the lower parts of deeply cut features (such as wells); a Roman well has been identified at the Mitchells site beneath a very deep cellar (R Newman pers comm).

4.7.4 Deep archaeological stratigraphy has been seen elsewhere in the city (notably at Damside Street, where Roman deposits were up to 4m below the present ground surface: R Newman, pers comm), but this unusual depth has been the result of cumulative silting. Deposits at this depth are not expected in the study area.

4.8 PILOT STUDY AREA - WALK-OVER SURVEY

4.8.1 Fieldwork was limited to an inspection of the study area by foot. The removal of deposits suggested by documentary evidence is confirmed by an examination of the site. Structures in the study area are almost entirely of the late twentieth century, and remaining fragments of earlier buildings are attributed to the nineteenth century, beyond the cut-off date for the present study.

4.8.2 The construction of the shopping centre entailed the creation of a large car park beneath the shopping and storage levels, which is likely to have removed all archaeological deposits.

4.9 PILOT STUDY AREA - TESTING OF UAD RECORDING TECHNIQUES

4.9.1 Research in the study area produced 30 documentary records detailing such sources as maps, articles of agreement, wills, auction posters and leases; three finds records, including the Appolinaris tombstone; and 22 monument records, usually concerning domestic buildings mentioned briefly in the documents. The extent of information

available from these records can be judged by the above analysis of the area's development, which was produced by consulting these sources.

4.9.2 The partial nature of evidence in the sources for the study area allows, for the most part, only a general location for particular buildings or monuments. For instance, the autobiography of William Stout, a rich source of information on the style and use of buildings on Pudding Lane, does not allow any particular property (even his own) to be pinpointed with certainty. It has generally been possible to locate features only to within one street or to one side of that street, and it is believed that the study area is typical of the greater town in this respect.

4.9.3 Occasionally, however, the use of two or more sources together allows further detail to be recovered, and a feature to be more closely located. For example, the nineteenth century drawing, mentioned in *Section 4.6.26*, appears to show a jettied extension which was also shown on the Docton map of 1684.

4.9.4 In general, the results within the study area have proved very encouraging. It was never expected that detailed historical profiles of individual properties would be forthcoming, but in terms of recovering information about a particular area which will inform future archaeological interventions, the pilot study has been successful. Particularly significant was the demonstration, within the pilot study area, that even a relatively small pool of sources can together provide a great deal of information if properly integrated.

4.9.5 The records generated in the pilot study area clearly do not allow direct extrapolation to all other parts of the city. It is not possible to say that any area of roughly similar size would generate a similar number or type of records. The quayside area, for instance, may be able to draw on commercial or travellers' accounts which will supply particular types of information, whilst the Castle Hill area will be unrepresentative in having numerous archaeological interventions.

4.9.7 However, the pilot study area gives a good indication of the level of information that can be expected in one limited quarter of the city. Since most of the sources used here, for example the Docton map and the 1794 valuation of inhabitants, will apply equally to other parts of the historic town, it is realistic to conclude that the study area represents the lower end of the scale for record generation, and that the Castle Hill area may represent the higher end.

4.9.8 Unsurprisingly, the pilot study showed that larger or more detailed documents can be time-consuming to input, because they must be analysed as the data is extracted from them, to ensure that all possible entries in all possible fields have been generated. For example, a simple auction poster usually refers to only one area, and can be entered only once, but documents such as window tax returns contain details of many properties in many areas, and of property holders who may provide links to other areas of the city and to new sources. As a general rule, those sources which require the most time for data entry are the most rewarding in terms of information yielded. For example, Kenneth Docton's 1954 analysis of the Window Tax returns requires one documentary record for the source itself - and several entries for monuments or properties referred to on Church Street, Penny Street etc. These entries in turn require a linked graphic element to highlight their location.

4.9.9 It is the process of extracting all possible details from a document which has taken the most time for the pilot study, and this will be mirrored in the completion of the full database. However, this is essential to the database's success. As the amount of data

already recorded increases, the process of adding and cross-referencing new material will become faster, since the database itself will highlight relevant cross-references.

4.9.10 No substantial omissions or difficulties were encountered in the use of the various record forms.

4.10 PILOT STUDY TESTING OF GIS TECHNIQUES

4.10.1 The present project design draws on the original results of the Lancaster UAD pilot study, but also on the results of the Oxford UAD undertaken by Oxford Archaeology, which was undertaken using ArcView 3.2 linked to Access 2000.

4.10.2 ***Pilot Study:*** during the pilot study, a sample Access 97 database was linked to ArcView 3.0. The live link was achieved using ODBC database-linking technology, which is supported by both ArcView and Access. This was supplemented by Dynamic Data Exchange (DDE), which was coded in ArcView using Avenue scripts, and in Access using Visual Basic for Applications (VBA). DDE created client-server relationships, allowing controlling instructions and data to be passed between the two software packages. This form of dynamic linkage provided a powerful tool for database query and spatial visualisation.

4.10.3 The pilot study also demonstrated the flexibility of interface customisation offered by the two software packages. ArcView, in association with the freely available ESRI Dialogue Designer extension, allowed complete control over the creation of menus, buttons, tools and forms. The proprietary Avenue programming language facilitates the coding of additional routines that augment the existing functionality of ArcView. These features allowed the GIS to be exactly tailored to the needs of an Urban Archaeological Database. An operational interface was constructed for the pilot project that demonstrates the majority of the design principles. The front end Geographic User Interface (GUI) presents the user with the option of accessing either borehole information, building information, document information, deposit information, finds information or monument information.

4.10.4 VBA scripts were successfully prepared to communicate with ArcView. The form takes four variables: the UAD number; northing; easting; and the ID, and passes them to ArcView to be used in the Avenue scripts. The feature or features selected are then highlighted in the GUI. The principles of this interactive approach can be directly applied to the rest of the database, once it has been populated.

4.10.5 ***Oxford UAD*:** since the pilot study was undertaken for Lancaster there have been considerable improvements in the ArcView and Access software. In particular, these enable the linking of the two packages without the intermediary ODBC and DDE technologies, and in the Oxford UAD it was possible to provide an adequate link direct between the two packages. It is therefore proposed to use this combination with the Lancaster UAD (*Section 5.2*).

5. METHOD STATEMENT

5.1 SCOPE OF WORK

5.1.1 ***The participants:*** it is envisaged that the Urban Archaeology Database (UAD) will be designed and compiled by OA North, Lancaster City Council Planning Service, and Lancashire County Archaeological Service (LCAS), in co-operation with the City Museums Service, and with funding from English Heritage and Lancaster City Council. The design and development of the GIS system, which will present the data graphically, will be undertaken by Oxford Archaeology GIS specialists. Oxford Archaeology will not be developing a final end user system, however. The long-term maintenance of the UAD will be undertaken by LCAS, on behalf of Lancaster City Council; the UAD will form a sub-element of the County SMR. Development planning advice for Lancaster City Council will be provided by LCAS using the UAD.

5.1.2 ***The area under investigation:*** the expansion of Lancaster beyond its historic core is a relatively recent event. The earliest maps (Speed 1610 and Docton's copy of a map of 1684) in effect show the extent of the medieval town and, indeed, as far as has been ascertained to date, it broadly also shows the extent of the Roman settlement. To provide an effective database it is proposed therefore that the study area should be broadly based upon the historic town as depicted on Binn's map (1821), which would encompass a substantial area beyond that defined on Docton's map. Townships such as Skerton, within the modern city, but independent of the historic core, should, for present purposes be excluded from the study area. Although, in terms of planning within the modern-day city, it would be important to add them to the database; this should be a matter for discussion (the precedent for this has been set in other cases, for instance at Cirencester).

5.1.3 ***The period under consideration:*** it is also proposed that there should be a chronological cut-off for the study. The general cut-off date advocated by English Heritage is 1750. The industrial archaeology of the city is, however, extremely important to any detailed understanding of the processes of growth within the post-medieval township. Particularly key developments such as; the port to the west of the medieval bridge, the construction of the canal and its associated mills, and the early development of the railway. Indeed, significant developments in the growth of Lancaster continue until the period immediately after the Second World War. For the pilot project it was proposed that the study should be limited to the date at which the canal was constructed; therefore the relatively arbitrary date of 1800 was agreed. However, it must be emphasised that the present cultural and historical identity of Lancaster rests to a great extent on the boom in commercial and civic enterprise which took place from the mid-eighteenth century onwards, with a brief hiatus between the 1820's and the 1850's. Indeed the opening of the Lancaster Canal can be seen as the keystone in its industrial foundation and it should be noted that this expansion has an impact on the archaeological deposits of earlier occupation. Although the architectural and topographical character of the city were largely defined by 1820, the industrial growth and change of focus from sea to rail are truly apparent only from the 1850's onwards.

5.1.4 As the primary evidence for the extent, form and character of the city is from map sources it is important that the cut-off date for the study correspond to the publication of one of the city maps, in order that a definitive snapshot of city be provided for that

date. The Mackreth map (1778) was compiled prior to many of the more significant developments of Lancaster. Clark's map (1807) is a cartographic proposal rather than a representation of Lancaster as it was at that date and is therefore not a true snapshot of the close of the period. Binns' map (1821) is a very detailed representation for the period, and depicts dramatic changes by comparison with that of Mackreth, including some early industrial development associated with the canal. Atkinson's map (1824) by contrast is apparently based on the Binns' map, but is more schematic; consequently it would not provide an adequate cut-off marker for the study. Finally, there is the OS first edition map 60" (1845) which provides an extremely accurate and detailed record of Lancaster, but is some time after the 1800 cut-off date. The date of this map broadly coincides with the construction of the railway (1842), and effectively defines the end of Lancaster as a port, and also marks a significant change in the character of the city, as major industries, such as those manufacturing linoleum and furniture, created considerable prosperity and effectively doubled the population and extent of the city. The railway effectively defined the cusp point marking the start of a major episode of development and expansion. However, prior to this development there was a long period of hiatus which extended back to the early 1820s, during which there was no obvious growth and little change to the character of the city. Consequently the Binns' map (1821) effectively defines the end of one phase of expansion and the OS 1st edition map (1845) marks the start of the next. In terms of the development of Lancaster, the most appropriate date for a cut-off would be at the end of the episode of development and therefore would correspond with use of the 1821 Binns' map. However, it is understood that this would provide an unacceptable precedent with respect to the other UAD's that have been or are being established and the preferred cut-off date of English Heritage is 1800.

5.1.5 ***Research Agenda:*** a useful tool for assessing the categories of data will be a simple draft research agenda, which will identify major issues and questions about the archaeology of Lancaster. The primary areas of concern identified to date are as follows:

- what was the extent and character of any prehistoric activity?
- what was the extent of the Roman extramural settlement?
- how did the forts articulate with the extramural settlement, particularly in terms of their respective origins, development and decay?
- how did the Roman military installation on Castle Hill develop into a post-Roman settlement?
- can the extent of the two pre-Conquest settlements at Lancaster recorded in Domesday Book (*Loncastre* and *Chercaloncastre)*, be defined ?
- what was the character and extent of the early development of the medieval town?
- how did the burgage plots develop?
- how did the religious house(s) in medieval Lancaster develop;?
- what was the impact of the development of overseas trade on the architecture and archaeology of Lancaster during the mid to late eighteenth century?

5.2 GIS STRUCTURE

5.2.1 ***GIS Approach:*** although in the first instance expensive to compile, schemes elsewhere have clearly vindicated the use of a fully GIS-based approach, thus integrating a map-based interpretation system with the detailed database. Both Lancaster City Council and Lancashire County Council have expertise in using GIS systems and the structure and software is designed for ease of use and maintenance by both organisations. Similarly, OA has considerable GIS expertise and it is anticipated that the training costs for the present project will be relatively low.

5.2.2 The intention of the UAD is to complement the present SMR, and to present the character and diversity of the archaeological resource of Lancaster in a geographical fashion. Because of the versatility of the GIS medium it is possible to interrogate and analyse the total available dataset for the city, in a way that would otherwise be too laborious and impractical. Such an interrogation can, for example, present the distribution of finds for selected periods. It is also possible, by combining searches of archaeological finds against areas of known disturbance and archaeological loss (Lancaster suffered badly from the uncontained redevelopment of the 1960s when significant areas of the city centre were swept away with little record), to present the areas of period activity without the bias of selective recovery. The ability to present the archaeological resource in a meaningful and valid manner will enhance the management of that resource and thereby allow for its preservation.

5.2.3 ***GIS Structure:*** Lancaster City Council runs a Cartology GIS system. Lancashire County Council is currently using ArcView 3.2a, which provides considerable flexibility of display, especially in terms of the potential educational value of the database. Given the agreement in principle between Lancashire County Council and Lancaster City Council for the future maintenance of the Urban Archaeological Database by Lancashire County Council (*Appendix 5*), it is proposed that the database be developed in Access 2000, and combined with the GIS package ArcView 3.2. This can interchange raw data with the Cartology GIS, used by Lancashire City Council. The design structure of the GIS and database will combine what has been learned from the construction of the Oxford Urban Archaeological Database with that produced for the pilot study (*Section 4.10*). There will be minor developments of the design as a result of further liaison with other UADs and also as a more extensive dataset is incorporated.

5.2.4 ***Graphic Data:*** the base for the GIS will be, as for the pilot study, the OS 1:1250 Landline coverage provided under licence by Lancaster City Council. Other data will be held in a series of layers that will be draped over the base data. Earlier maps are an important resource that can be compared to reveal temporal change. At present maps from 1778, 1957 and 1997 are included but, in the final project, six will be rubber-sheeted and geo-rectified. Data will be generated from ArcView Shapefiles and digitised in a combination of Autocad and ArcView, and will consist of a point or polygon for each entity with an attached identifier. This will enable the layer to be linked to the database via this common identifier. The principal Shapefiles to be created are detailed in the table below.

Shapefile Name	Identifier	Type
Monuments	Monument number	Polygon
Monument Centroids	Monument number	Point

Recognition Event Area	Recognition Event number	Polygon
Recognition Event Point	Recognition Event number	Point
Pictorial hyperlink	Hotlink ID number	Point

5.2.5 ***Graphic Monument Data:*** the monuments will be defined as outlines representing their maximum extent. Interior details will be omitted except where they are defined as a separate monument in their own right. Using attributes assigned in the database it will be possible to query out the inter-relationship between monuments, for example by period, type or sub/super monument.

5.2.6 Two Monument Shapefiles will be created by digitising. A polygon shapefile will represent the known extent of each monument as a polygon. Where the extent is unknown a distinct hexagon-shaped polygon will be used, of standard dimensions, to represent the polygon. A point shapefile will be generated from the polygon shapefile, once completed, as a centroid of each polygon. This will be used to generate an OS grid reference for each monument within the database. Graphical point information can also be generated from this OS grid reference within the database

5.2.7 ***Graphic Recognition Event Data:*** the Recognition Events will be initially defined as a geo-reference point. These will be used to generate an OS grid reference for each recognition event within the database.

5.2.8 In addition, an area outline will be defined for all excavation Recognition Events where sufficient information exists to locate it and where the event is of a sufficient size to warrant it. This will consist of the limit of excavation for that excavation, but not features within the excavation.

5.2.9 This will result in two shapefiles being created, consisting of Recognition Event area polygons and Recognition event points generated from the OS grid references within the database.

5.2.10 ***Pictorial/photograph hyperlink:*** for each pictorial representation or photograph to be hotlinked, a point will be digitised in an appropriate location. This will take the form of a point Shapefile with an identifier to enable linking to the relevant image.

5.3 DATABASE STRUCTURE

5.3.1 ***General Structure and Principles****:* as a general principle the data structure needs to be as simple as possible, whilst still able to carry out detailed analysis of the information. It is proposed to utilise the database structure employed by Oxford Archaeology for the Oxford Urban Archaeological Database, which has been rigorously tested, extensively refined, and is currently in use for the Oxford UAD. It is a structure which appears best to balance depth, simplicity, and ease of use. The database structure is aimed to be as close as possible in structure to other databases serving general planning and research applications so as to allow exchange of data. In practice, this does not involve a slavish copying of field names, but it is vital to avoid the lumping together, into single fields, of data which might for other purposes need to be split between fields. This sometimes forces an extra complexity onto the data structure. In order of priority, other databases would include:

- County SMR structure

- English Heritage National Archaeological Record structure.
- Other UADs.

5.3.2 The key datasets consist of Tables of: *Recognition Events, Monuments, and Deposits* (to record geological and archaeological horizons from which deposit models can be generated). Subsidiary tables include *Bibliographical Sources* (as a means of avoiding unnecessary repetition of details) and *Indices of digital files, drawings, and images*. The data structure is fully normalised, ie double entry of information in more than one field is avoided. The basic unit of recording will be the 'Recognition Event' for field data and 'Monument' for interpretative information.

5.3.3 The choice of fields within this framework has been influenced by examples of data structures provided by compilers working elsewhere in England. A review of several existing studies revealed a wide variation of approach in the grouping of the obligatory and optional fields of the *Data Standard* (RCHME 1993). This is not necessarily surprising in view of the priority given to local resource-type and local planning requirements in the *Extended Brief* (English Heritage 1993, para 4). There is, however, wide agreement on the soundness of the core concepts and the core field-lists in those two documents. In practice, since their publication, differences between UAD structures seem to have been in matters of emphasis and detail, reflecting local circumstances.

5.3.4 ***Recognition Event Data:*** the Recognition Event table will record archaeological observations of all kinds, ie *observed data*. The core of *'Recognition Event'* information will be derived from the sources, which include maps, drawings, photographs and documentary sources, and reports or notes of field observations and investigations, summarising the key details of their results. Significant amounts of detailed field records or finds catalogues etc will *not* be included. Such material will remain in archive, the existence of which will be recorded.

5.3.5 In the course of the pilot study and the work undertaken to date on the Oxford UAD, it is clear that the separation of data between Recognition Event and Monument databases is not necessarily a clear-cut choice. In the light of the work undertaken it is proposed to use the Recognition Event database as the prime repository for much of individual detail of sites. Much of this detail, such as the presence of pits, walls, activity of different periods etc will be entered into the Archaeological Elements section of the Recognition Event form, with further details and discussion being added to the Site Description (free-text) field. More time than envisaged prior to the Pilot Study will therefore be spent on the creation of Archaeological Element records. Considerably less time will therefore be spent on inputting detailed elements into the Monuments Database. Bibliographic details of all Published Sources and unpublished Client reports will be entered in a separate Bibliographic Data table within the UAD database. Basic cross-references to the Bibliographic Data table, such as Bibliographic Number and page numbers, will be entered in the *Recognition Event* table. It is envisaged that the Bibliographic Data table will in itself develop into a core resource for future research into the archaeology of Lancaster. *Appendix 3* shows all the proposed fields for the Recognition Events database and is based on the list of 'Data Fields for UAD Site Record' in *Urban Archaeology Databases - Data Standard and Compiler's Manual* (RCHME 1993).

5.3.6 ***Monument Data:*** the Monuments table will primarily record archaeological interpretations of Recognition Event data, ie synthetic data, although some locational data, such as grid references, National Monuments Record Reference numbers and

English Heritage References numbers will be included within both Recognition Event and Monument Databases (see *Appendix 4* for list of fields). While the 'recognition event' data provides the basis of the UAD, the ultimate functions of the database outlined above are essentially interpretative; they relate to archaeological and historical understanding and extrapolation from existing data and interpretations to inform conservation and planning decisions or to support new research and education.

5.3.7 The database needs to be able to cover a hierarchy of different levels of archaeological entity: for example, the *Monuments* Table needs to cover both monument groups (eg Lancaster Castle) and individual monuments (eg Witches Tower). The detailed hierarchy needs to be open-ended and flexible, while being as simplified as proves practicable. As discussed above (*Section 5.3.4*), the choice of where to separate data between Recognition Event and Monument databases is in practice debatable, and can have serious cost implications. The proposal for the Lancaster UAD is therefore to put as much individual site detail as possible into the Recognition Events database, and to concentrate the Monuments database work on the identification of larger, individually coherent Monument Groups.

5.4 TASK BREAKDOWN

5.4.1 ***Introduction:*** the tasks necessary to compile the Urban Archaeological database are defined below. They are numbered within square brackets and are cross-referenced with the project resources (*Section 6.4, Section 8*) and the Gantt chart (*Appendix 4*).

5.4.2 ***Project Liaison [1]:*** a steering group will be established at the outset of the project to oversee the compilation of the UAD. This will comprise representatives of English Heritage, Lancaster City Council, Lancashire County Council, and Lancaster City Museums. Its aim will be to facilitate, monitor and guide the overall programme. It will meet at the outset and at three monthly intervals during the course of the project.

5.4.3 ***UAD Liaison [2]:*** this will take place with compilers of other UADs in the UK, including the Oxford and the Newcastle-on Tyne UAD's. Both databases use ArcView and Access, and so there should be a beneficial sharing of knowledge regarding the technical issues involved in the creation and maintenance of the database. LCAS, as the end users, would also be closely involved at this liaison stage to refine the structure of the database and ensure compatibility with the existing GIS systems.

5.4.4 ***Design of GIS and Database [3]:*** the pilot study demonstrated the flexibility of interface customisation offered by the GIS and database packages (ArcView and Access). ArcView allows complete control over the creation of menus, buttons, tools and forms. These features will be developed to allow the GIS to be tailored to assess the needs of an Urban Archaeological Database. The GIS will be developed primarily on from that used by Oxford Archaeology for the Oxford UAD. This will facilitate end users of the system (Lancaster City Council and Lancashire County Council) to define exact user needs and enable them to develop the end product to their requirements.

5.4.5 ***GIS Training [4]***: following on from the design of the GIS and database OA North staff will be trained by key personnel of Oxford Archaeology, involved in the production Oxford UAD, in the use of the ArcView GIS system.

5.4.6 ***Data Gathering [5]:*** the first stage of the process is to obtain all relevant information for assimilation within the UAD. This follows on from the pilot study which examined all the pertinent sources and identified what material was contained in each; the

detailed results of this study are presented in *Appendix 1*. Two sources, the John Rylands Library, Manchester, and the University of Durham Library, only contain material that is duplicated elsewhere and therefore will not be revisited during the main study.

5.4.7 The data captured will be of a form and character defined within *Section 5.4.10-5.4.19* (Database Input). The sources that will be investigated are as follows:

Ashmolean Museum Library, Oxford

Bodleian Libraries, Oxford

Manchester Central Library

Lancashire County Record Office, Preston

Lancashire Sites and Monuments Record, Preston

Lancaster City Council Planning Dept, Palatine Hall, Lancaster

Lancaster City Library

Lancaster City Museums

OA North Library/Archives

Lancaster University Library

Literary and Philosophical Society, Newcastle upon Tyne

Public Record Office, Kew

Royal Commission on the Historical Monuments (England) - NMR

5.4.8 The number of event and monument records that will be generated has been estimated and is presented in tabular form in *Section 4.3.13*. The number is inevitably imprecise, because only a sample of the documentation was examined and because it does not account for the amount of repetition of events and monuments between the respective sources.

5.4.9 ***Data collation [6]:*** the data generated by the data-capturing process will need to be assembled, rationalised and organised to enable its input within the formalised structure of the database.

5.4.10 ***Scanning of Historic Maps [7 and 8]:*** high quality scans will be made of the Mackreth (1778), Speed (1610) and Docton (1684) maps. This will be achieved using a high resolution A0 scanner. The maps will be scanned as both Line Art and Greyscale at an appropriate resolution to show up detail. The base maps will then be digitised on screen to produce final vector representations of the key maps, which will then be rubber sheeted into the GIS.

5.4.11 ***OA North / LCAS Liaison:*** in order to maximise the utility of the final GIS, a close liaison will be needed between the organisations and staff that will use it (principally LCAS). This will allow refinement of the interface style, desired functionality and visualisation techniques. This liaison should take place at key stages throughout the development of the GIS. As part of the delivery of the final GIS, LCAS staff will also need to be trained in its operation.

5.4.11 ***Rubber-sheeting of Historic Maps [9]:*** the scans of the Mackreth (1778), Speed (1610) and Docton (1684) maps will be rubber-sheeted and geo-referenced using

Autocad Overlay. They will be rubber-sheeted by identifying reference points extant today and linking them on the map to their modern day equivalents on the relevant Ordnance Survey 1:1250 map. Corners of buildings and boundary junctions have proved the most reliable reference points. Autocad Overlay allows experimentation with first and second order polynomial transformations to achieve an optimal fit with minimal distortion. It may be necessary to geo-reference the historic maps in smaller blocks to achieve an acceptable fit, as has been done with the Oxford Urban Archaeological Database.

5.4.12 ***Scanning and Rubber-Sheeting of Ordnance Survey (OS) First Edition Map [9]***: early editions of OS maps can also be incorporated into the GIS by scanning. Part of this process has already been undertaken in the course of the pilot project, when a portion of the 1957 OS 1:2500 map was scanned at high resolution. As the original paper map is already referenced to the National Grid, the geo-referencing of the digital image is straightforward and will be achieved using Autocad Overlay using a simple affine transformation. A similar process will be followed to incorporate the First Edition OS maps (1845 and 1849) into the GIS. However, as these are drawn in latitude/longitude projection, there is a fundamental lack of fit between these and the modern OS grid, therefore rubber-sheeting is also necessary to obtain a fit. The control co-ordinates necessary for this can be purchased from the OS.

5.4.13 ***Database Input [10-19]:*** the collated data [6] will be entered into the Access database in a format compatible with the interactive database. It is proposed to input two levels of textual data into the database; there will be a summary of the source information, which will be held within a separate field of the event table; then, if sufficient information is available, there will be a full transcription of the pertinent information from the source. The textual data will be scanned in from photocopies of the original source, and will be edited and inserted into the source description field. Although it is considered important that a full transcription of the relevant sources be inserted, it is inevitable in some instances that this be selective text blocks. There are ten classes [10-19] of data which will have been input from the varied sources defined in *Section 5.4.6*. These are defined below.

5.4.14 ***SMR and Listed Building data [10 and 11]:*** the Lancashire Sites and Monuments Record contains *c*120 records for the city and has accordingly contributed significantly to planning decisions in the historic core of the city (with cross-referencing to the National Archaeological Record and the National Monuments Record, both curated by the Royal Commission on Historical Monuments (England) (RCHM(E)), and the Ordnance Survey Record Cards). The SMR has digital records of the great majority of the *c*300 Listed Building Records [11] which can therefore be transferred directly into the UAD Access database. This would involve the generation of an appropriate routine within Access to enable the transfer between the respective fields of the source and those of the UAD. At this stage the coordinates for the entries will have to be refined by correlating with the GIS copy of the OS data.

5.4.15 ***Lancaster City Museums Database and Records [12]*:** Lancaster City Museums has a basic archaeological database, which is held on cards and on a Dbase format. It is arranged by subject and street name, and is cross-referenced to journals and other relevant publications. However, 70% of it is a copy of the SMR. The remaining 30% is from its own sources and largely relates to findspots. The number of records that are expected to be generated is *c* 50 monuments and *c*180 events. The database will be checked and cross-referenced with other sources before being input into the UAD. The City Museums also contains a large collection of artefacts which have been either

isolated discoveries or have been recovered in the course of interventions. The artefacts will be recorded within the Finds tables and those finds from excavations will be cross-referenced with the relevant Deposit table; bulk finds will be recorded accordingly.

5.4.16 ***Deposit / Intervention Records [13]:*** the principal sources for recent intervention data include the archives and reports of OA North, who has undertaken the vast majority of archaeological field interventions in the last fifteen years, although there are also limited and occasional interventions undertaken by other archaeological units. Journals, such as *Contrebis*, *Transactions of the Lancashire and Cheshire Historical Society*, and the *Transactions of the Lancashire and Cheshire Antiquarian Society,* will also be examined. The records of Richmond's excavations, which are held at the Ashmolean Museum Library, Oxford, will also checked with other sources and input into the UAD.

5.4.17 ***Oral Sources [14]:*** investigation of oral sources will also be undertaken, and this will concentrate on local historians and archaeologists (including Professor David Shotter of Lancaster University, Mr Robert Bellis, formerly of Aldcliffe, Dr Andrew White of the City Museums, Mr Geoffrey Leather who have knowledge and records of excavations and research undertaken within the city. In addition, the Lancaster Archaeological and Historical Society and the Lancaster Civic Society will be contacted.

5.4.18 ***Documentary Data [15]:*** the documentary study will concentrate on any source of historical data that will relate specifically to identifiable site locations; to an extent this will exclude much of the historical documentation for the city as much of the data relate to individuals and events rather than locales. Where the documentary data provide locational information they invariably relate to whole streets rather than a specific property on that street, and consequently there is considerable imprecision as to the precise location of any documented monument. A separate GIS overlay will be established for the documentary information, upon which will be defined a broad polygon extending around whole streets or similar areas, and these will be referenced to all the event records pertaining to such broad extents. The textual description will incorporate a summary of the pertinent location-specific information provided by each document and will incorporate the full quotation where appropriate. The estimated numbers of event and monument records that will be generated from each principal source is presented in *Section 4.3.13*.

5.4.19 ***Cartographic Data [16]:*** the most useful sources will be early maps, particularly the 1610 Speed map, the map of 1684 (copied by Docton), Mackreth's map of 1778, Clark's map of 1807, Binns' map of 1821, Atkinson's map of 1824, and the first edition 6" (1845) and 60" (1849) Ordnance Survey maps. However, Clark's map will be of least use as it shows areas of planned development rather than actual changes and some of these proposed developments were never constructed. The original map, from which Docton generated his widely distributed copy, is held at the Lancashire County Record Office; an additional copy will be made for incorporation into the UAD.

5.4.20 ***Boreholes and Planning Constraints [17]:*** Lancaster City Council will provide what information they hold on all known geological field interventions, including borehole data, which will be surveyed by the City Council during the compilation of the Urban Archaeological Database. The digital data provided by this survey will be translated into the UAD. Liaison will take place as to planning information, such as planning

constraints' maps, conservation areas, tree preservation orders, and, where relevant, public footpaths and bridleways, gas and oil pipelines, electricity lines, major hazard installations, mineral consultation areas etc. Where digitally available this data will be transferred from the Cartology database into the UAD; otherwise the data will be digitised for incorporation into the UAD. Each of the datasets will be incorporated onto discrete layers within the GIS.

5.4.21 ***Aerial Photographic Data [18]:*** the open areas within the historic city, such as Vicarage Fields, with their upstanding earthworks, make the investigation of aerial photographs of particular relevance for Lancaster. The Royal Commission on Historical Monuments (England) (RCHM(E)) have been consulted as to the extent and relevance of aerial photographic material, as have Lancashire County Council. The Lancashire County Council photographs are of too small a scale to be of value, but the SMR has some useful low-level oblique photographs of sufficient scale to highlight the earthworks. Similarly, the RCHM(E) record has a limited set of photographs of this area.

5.4.22 ***Pictorial Data [19]:*** pictorial and photographic records will be accessed as these will provide information about features, structures and buildings within the city. The main sources are the City and Maritime Museums, which have considerable photographic collections. Although these post-date the proposed cut-off date for the study, they provide recognition events for monuments that pre-date the cut-off date. The earlier the date of the recognition event the greater will be its value in defining the original form of the monuments. There are also some eighteenth century paintings which will be of considerable value in establishing the character and form of specific areas of Lancaster. An event record will be compiled for each photograph or drawing, which will then contribute details to the assimilation of the monument records.

5.4.24 ***GIS Processing [20]:*** once all the database information has been imported the data will be incorporated with the digital map base in the GIS. These will be digitised on-screen as ArcView Shapefiles as detailed in *Section 5.2*. Unique identifiers will be used to link the spatial features to the attribute information contained in the Access database.

5.4.25 ***Topographic Survey of Vicarage Fields [21]:*** the earthwork remains on Vicarage Fields are an invaluable survival of parts of the Roman fort and potentially post-Roman structures on the same site. However, no accurate and detailed survey has yet been undertaken of the earthworks, thereby severely limiting our understanding of the significance, function and potentially the chronology of these features. It is also not possible to present the excavation events in the Vicarage Fields area within an appropriate context, despite the survival of fort earthworks, because of the lack of a usable map record. It is therefore proposed to undertake a rapid survey of the remains for incorporation within the UAD, which will provide the basis for an assessment of their significance, and the all-important context for the excavation remains, as well as allowing for the management of the extant remains.

5.4.26 It is proposed to undertake an OA North level 3 survey (LUAU 1993) of Vicarage Fields and potentially also the churchyard, subject to access. This level of survey is equivalent to an RCHM(E) level 3. It will involve the survey of the earthworks and the recording of appropriate topographic detail around the extent of the site to put the archaeological detail in context. This will be an inexpensive exercise but will have the potential to increase significantly our knowledge of this, the most visually important locations in the UAD study area.

5.4.27 Survey control will be established by closed traverse and internally will be accurate to +- 15mm; the control network will be located onto the Ordnance Survey National Grid by traverse from an Ordnance Survey Triangulation Point on top of the Priory Church (GPS). The surface features will be surveyed by EDM tacheometry using a total station linked to a data logger; the accuracy of detail generation will be appropriate for a 1:200 output. The digital data will be transferred onto a portable computer for manipulation and transfer to other digital or hard media. The archaeological detail will be drawn up in the field as a dimensioned drawing on the plots with respect to survey markers. Most topographic detail will also be surveyed, particularly if it is archaeologically significant or is in the vicinity of archaeological features. The survey drawings will be generated within a CAD system and will then be incorporated digitally into the GIS system via a DXF or DWG file format. The survey will be accompanied by a gazetteer description of individual archaeological features, which will relate directly to the survey mapping and will be incorporated within a UAD text field. The survey data will be presented within an event table and also the monument table; it is anticipated that at least seven monuments will be generated as a result of the survey.

5.4.28 ***Cellar and Verification Survey [23 - 25]:*** a combined verification and cellar survey will be undertaken. This would involve the examination of the below ground extent of the buildings within the study area (cellar survey). This would at the same time check the accuracy of the database entry for each building and determine the current survival of individual monuments (as defined by the *Urban Archaeological Databases: extended brief for Project Designs,* English Heritage 1993) (verification survey).

5.4.29 The cellar survey will be undertaken in order to identify areas where archaeological deposits are unlikely to survive and this will be a primary source for the formation of the deposit model (*Section 5.4.34*). The survey will follow on from an incomplete cellar survey instigated by Lancaster City Museums some twenty years ago, which has been found to include only three addresses on Church Street. The resource implications of this survey are presented within *Section 8*.

5.4.30 The survey will be as rapid and cost effective as possible, and will be undertaken without internal examination of all properties, although if access is readily available, investigation of the cellar interior will be undertaken. It will involve a rapid visual inspection for cellar lights from the street frontage and where access is available the rear of the buildings will also be examined. If internal access has been obtained the depth of the cellar will also be recorded. All buildings within the study area will be investigated by this technique. The results will be presented within the database format for incorporation into the GIS system and will incorporate an NGR, the extent of the property, the observed age of the property and the evidence for the cellar.

5.4.31 The field verification will establish the present condition of above ground monuments that have been identified by the desk-top search and will also assess the topographic context and land-usage of documentary sites, which no longer survive as above ground features. The definition of the present land-usage will provide additional information to that already defined on the modern OS 1:2500 mapping and will show, for example, if plots are derelict ground, occupied by modern buildings, open thoroughfare or if the usage has changed since the production of the OS mapping. The land-use information will be presented on a separate layer within the GIS system.

5.4.32 ***Input of Graphic Images [26]:*** old photographs and drawings will provide a useful visual resource in the final database. Such items are related to distinct spatial locations

within the study area. As a result, scanned images of these items will be hot linked to relevant points on the base map, allowing the retrieval of a photograph or drawing through a simple mouse click on the map. Each image will be incorporated into an individual event record, and the information will serve to inform a monument record.

5.4.33 ***OA North GIS processing [27]:*** a further stage of GIS processing will be undertaken to assimilate the scanned pictorial data and the topographic, cellar and verification surveys into the UAD. Project staff trained by in-house OA GIS specialists will undertake this.

5.4.34 ***Deposit Model [29 and 30]:*** it is proposed that a deposit model is constructed using erratically distributed borehole and excavation data held within the deposit and borehole tables. It will also be a requirement to compare the borehole data with the present day land surface. At present there is a limited amount of survey data for the city area, which would result in only a crude digital terrain model (DTM) for the present surface; it is proposed, therefore, to obtain additional data from height information for man-hole covers held by North West Water Ltd.

5.4.35 The most critical part of the deposit model creation process is correlating the different sources of stratigraphy which have been recorded over the last one hundred years. It has not been possible to examine any of the borehole data, as they are at present in the process of being completed by Lancaster City Council, but it is understood that only a basic level of borehole data will be available for the assimilation of the UAD. While it will not be possible to reconstruct individual stratigraphic episodes throughout the study area with the limited data available, it may be possible to construct a very basic modelled surface for the interface between made ground and natural subsoil, and for the depth of the present surface, which together would provide an indication of the gross thickness of stratification.

5.4.36 The assimilation of the borehole and excavation data will generate three-dimensional co-ordinates for the main interface of made ground/natural subsoil, and the present surface. These datasets will be mathematically converted into a digital terrain model (DTM) using either Surfer or ArcView 3D Analyst Extensions and can be output as a digital mesh over the study area or as a contour plot. If 3D Analyst is used, the DTM can be transferred back into ArcView for assimilation with the GIS data. Areas that have a particular *lacuna* of borehole or excavation events will be omitted from the model, in order to prevent any excessive distortion or over-generalisation of the modelled surface. In addition, profiles will be generated across areas with particularly good coverage of boreholes. This may be more useful than attempting a full deposit model with limited data.

5.4.37 Whilst it is recognised that deposit modelling with limited datasets is not always successful it is felt by us that time should be allocated to this to make the attempt. At the very least the borehole data can be included in the database and the process will give a better understanding of the nature of the deposits.

5.4.38 ***Urban Archaeological Assessment Project Design [30]:*** the establishment of the Urban Archaeological Database will culminate in a summary report as to the information gathered and a project design for the Urban Archaeological Assessment (UAA). The summary report will include a statement about the sources that were identified as of potential value to the UAD, but which could not be adequately exploited. The summary report will also incorporate detailed system documentation, and also a user guide for the use and application of the UAD. This will provide sufficient guidance for non-specialist users to interact and operate the system.

5.4.39 The UAA project design will define the specification and resource requirements for the generation of the Lancaster Urban Archaeological Assessment and will provide detailed costings for its generation, as well as any subsequent data capture processes highlighted by the generation of the UAD.

5.4.40 The updated project design will examine the potential for utilising the UAD as an educational tool, and will present options for on-line access, be it through the use of CDs or through terminals established in key locations, such as the Lancaster City and Maritime Museums.

5.4.41 ***Transfer of UAD:*** on completion of the UAD, the system will be transferred over to the Lancashire County Archaeological Service and to Lancaster City Council. This will involve liaison with the respective organisations and will also require training in the use of the system.

6. RESOURCES AND TIMETABLE

6.1 COMPUTER EQUIPMENT

6.1.1 The GIS database will be developed by in-house GIS specialists on the basis of the Pilot Study initial design by Regional Research Laboratory (RRL) of Lancaster University and on that developed for the Oxford UAD by Oxford Archaeology. The design will be undertaken using equipment already in place. Once the system is established, and all historic maps have been rubber-sheeted into place, the data will be input by OA North project staff at the Lancaster office. Following completion of the GIS database, the UAD will be maintained by Lancashire County Council. Neither OA North nor Lancaster City Council have machines of an adequate specification for this purpose, or with capacity to take on the dataset; consequently there will be a requirement for the purchase of at least one new machine (*Appendix 2*), which will be passed to Lancaster City Council when the UAD is completed. The intention is that there will also be a working copy of the UAD with Lancaster City Council, and this will similarly require an appropriate platform.

6.1.2 OA North already possesses both A0 and A1 digitisers, and also an A4 scanner, and an A0 scanner is available at the Oxford office. A0 plotters are available at the Oxford office and A2 printers are available in the Lancaster office; thus by judicious use of this resource, there will not be a requirement to enhance this facility for the proposed programme.

6.2 DATABASE SOFTWARE LICENCES

6.2.1 The software for the assimilation of the UAD will be ArcView 3.2, coupled with Access 2000. OA North possesses licences for Access 2000, but will need to purchase a licence of ArcView 3.2 for the Lancaster office; the costs are £1012.50. Lancashire County Council are already using ArcView 3.2 software, and are operating Access 2000.

6.2.2 Lancaster City Council has provided Ordnance Survey base data in digital form as its contribution to the project and this has now been assimilated into the GIS. This has an enormously favourable impact on the resources sought from English Heritage.

6.3 PERSONNEL

Data Capture and Processing	Project Supervisor Jo Cooke
Project Coordination	Project Manager Ianto Wain
GIS Design and support	Matt Bradley (OA)
Digitising	Project Assistant
Project Management	Project Manager Jamie Quartermaine

Academic Overview	Line Manager Rachel Newman

6.3.2 ***Liaison:*** the success of the project depends on close liaison between the various bodies concerned. It is therefore proposed that there should be regular meetings of a team, comprising representatives of OA North (project manager and members of the project team as required), Lancaster City Council Planning Services, Lancashire County Council, and English Heritage, to assess progress against agreed project indicators, monitor quality, and plan the next stages of work. Meetings will be held at three month intervals and will be coordinated by Lancaster City Council. In addition, there will be more frequent *ad hoc* internal project management meetings to discuss the progress of the project.

6.4 TIMETABLE AND RESOURCES

6.4.1 The staff resources for the project are defined in *Section 8* and the corresponding timetable is presented as a Gantt chart within *Appendix 4*. The principal task numbers are shown within square brackets ([ ]) against each task and correspond accordingly to tasks defined on the Gantt chart and within the project costings.

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8. PROJECT COSTINGS

Project costings are detailed overleaf, broken down by task.

APPENDIX 1
APPRAISAL OF SOURCE ARCHIVES

Archives are listed in alphabetical order.

THE ASHMOLEAN MUSEUM LIBRARY, OXFORD

The Ashmolean Library has a very strong collection of archaeological literature, most of which is housed in its Richmond Room. Lancaster is well represented, but most of the relevant literature is available in Lancaster's own libraries, and the Ashmolean collection was visited mainly for the papers of early twentieth-century antiquarian Francis Haverfield and the archaeologist Ian Richmond, who excavated several times in the Castle Hill area during the 1950s and 1960s.

The Haverfield archive consists of papers, notes and cuttings collected by Haverfield in the early twentieth century; this archive is arranged by county, and subdivided by site. The general envelope on Lancashire had no entries for Lancaster. The envelope for Lancaster included cuttings from the *Lancaster Guardian*. One, from 7/11/1914, mentions discoveries in St Mary's Vicarage garden - 'an old Roman fireplace.....[and] part of an old wall, four feet thick, and of considerable depth, about which a good deal of curiosity exists, especially as at the foot of the wall a handful of Saxon coins in an excellent state of preservation were discovered.' Haverfield's jotted references are to articles already seen elsewhere and which, in any case, give only cursory information - for example, an article in *Archaeologia* (**IV**, 130) which makes mention of 'a diminutive bronze spoon found near Lancaster' or a reference to the mention of '... a Roman altar lately found at Lancaster' near the castle in 1797 (*Archaeologia* **13***,* 401).

The Richmond archive is housed in a dedicated portion of the library, and is consulted via its custodian Graham Piddock. It includes Richmond's notebooks, some plans and photographs, cuttings of articles about his excavations, and off prints of his and other articles (eg the Newstead and Droop articles relating to their excavations on Castle Hill in the 1920s). The collection has a card index which is not entirely reliable; for example it refers twice to a '1708 map' of Lancaster which is in fact the Mackreth map of 1778. Entries for Lancaster gave references to three notebooks, which contained brief notes and measured sketches of trench locations at Castle Hill from 1958 onwards: a general plan, thought to show the trench locations of an excavation on Castle Hill in 1951; approximately 25 photographs taken during excavations, of which all but three are unlabelled; photographs of the Mackreth map; cuttings, mainly from the Lancaster Guardian, concerning excavations at Castle Hill in the 1950s and 60s; and correspondence, mainly to do with arranging labour and access to the site.

The Ashmolean's general card index and computer index were also consulted, but showed no further entries other than articles already consulted.

The Ashmolean is not one of the more productive sources for the project generally, and contained no data relevant to the pilot study.

THE BODLEIAN LIBRARIES, OXFORD

The Bodley was visited to inspect the papers of F W Farrer (editor of the *Victoria County History for Lancashire*) and the eighteenth-century antiquary William Stukeley, both of which are held in the Duke Humfrey library in the Old Bodleian Library. The cataloguing system is hard to interrogate by subject matter alone, but a geographical index facilitates access to 'Lancashire' records, for example. A large collection of archaeological journals and papers is held but, like those at the Ashmolean, most are available in Lancaster.

The Farrer papers are a small collection consisting mainly of personal letters from Farrer to other people, and accordingly filed with the papers of the other correspondent. No indication of subject is given in the catalogue, and these files were not exhaustively searched. A typical sample file (41837) consisted of a large bundle of letters to E W B Nicholson, librarian at the Bodley 1869-97, all of which were concerned with Nicholson's establishment of a new magazine in the 1850s. There are a further three bundles of letters (41697 is letters to Farrer; also 41827 and 43522), and these too are thought to be personal correspondence. It is unlikely that they will contain further information on Lancaster, but they will be checked during the main study.

The Stukeley papers, like the Farrer papers, are not divided by detailed subject classification. They include some of Stukeley's book collection, a number of his own treatises on general antiquities, astronomy and science, original drawings for the *Itinerarium* and other items which are not relevant to the study. There are around 150 entries in the catalogue, each containing several items, but most can be instantly excluded from the present search. There are, however, notebooks and diaries, some of which may contain information on Stukeley's visits to Lancaster. The extreme length of time taken to produce documents should be borne in mind when using the library.

The Bodleian holds several manuscripts of the antiquary Christopher Towneley, which have not been catalogued because they are 'utterly illegible' (S Tomlinson, pers comm). The archivist at Chetham's Library in Manchester (qv) has also encountered this problem, but a majority of the documents are available as transcripts in the Manchester Central Library, and it is recommended that they be consulted there.

The librarian of the Duke Humfrey Library, Mr Steve Tomlinson, was unable to suggest further relevant archives. Catalogues, including the computer catalogue covering 77 libraries in Oxford, did not suggest any new sources.

The map room is in the New Bodleian Library. A card index, arranged geographically, gives several references to Lancaster, but most of these are available in Lancaster (eg those of Mackreth and Clark).

There were two exceptions: one of these, a map of the 'Lancaster canal' ((E)C17 (451) [44]) shows the proposed canal route of 1794 as it passes near the boundary of Pennington township. The other, a small-scale (2" to the mile) plan of 1832, was commissioned to establish parliamentary boundaries (C17 a.20/1 (no. 94)). Its representation of the town is extremely small but shows the street-plan, with the Castle and canal clearly visible. Built-up areas are shaded. The pilot study area is visible as on the 1778 map, and the town is essentially the same as that on the 1821 Binn's map or the 1845 Ordnance Survey 1st edition map.

In general the Bodleian Libraries are not an important source for the database.

CHETHAM'S LIBRARY, MANCHESTER

Chetham's Library holds several manuscripts associated with Christopher Towneley (1604-1674) of Towneley Hall, Burnley and his fellow antiquary Richard Kuerden (1623-*c*1690), who transcribed many public and private documents including deeds, pedigrees, charters and abstracts of wills. However, these are best consulted in transcript form elsewhere for various reasons. Like the Bodleian (qv), Chetham's library has been unable to catalogue or handlist these documents because they are 'almost entirely illegible'. The reader therefore needs a reference for a specific document from another source (for example, the *Victoria County History* occasionally refers to them). Without precise references the librarian is reluctant to allow access.

It must be emphasised that the Manchester Central Library contains transcripts of many Towneley manuscripts, and is a good alternative source of essentially similar information.

JOHN RYLANDS LIBRARY, MANCHESTER

The John Rylands Library holds a large and varied collection including archaeological journals and books, which proved to be largely irrelevant for the present study. Those articles referred to in the card index are available in Lancaster. The archivist was unable to suggest any other sources in the library.

LANCASHIRE SITES AND MONUMENTS RECORD (SMR), LANCASHIRE COUNTY COUNCIL, PRESTON

The SMR contains a brief description of each monument or event (such as an excavation or findspot) in the historic town, with brief references to sources of information for each entry.

All SMR entries are held on a Superfile database, and there is now also a GIS database on ArcView 2.0a and Access 2.0. Aerial photographs are to be added to this database in a format showing the real area of coverage against 1:10 000 map coverage. The SMR is also held on card files which generally duplicate the information held on computer, although occasionally newspaper cuttings or other brief details may be added to card files without updating computer records. The card files, like those held at the City Museum, generally include or duplicate information from the old Ordnance Survey cards. A digital listed building record is held for the majority of the Lancaster listed buildings within an Access 2.0 format.

There are archaeological journals, off-prints and reports held at the SMR, but most of these are available in the OA North archive or have been incorporated in SMR files. Likewise, maps held at the SMR generally duplicate those held at the City Museum.

LANCASHIRE COUNTY RECORD OFFICE, PRESTON

Along with the Lancaster Museum and Library, the County Record Office is one of the most valuable sources of material for the UAD. In addition to local journals and antiquarian publications, the Record Office holds primary documentation including medieval sources, such as wills proved at Richmond and property deeds. Church registers and nonconformist registers are available.

A wide variety of papers deposited by local companies and families is stored here. A brief scan of handlists suggested that few of these will be relevant for the UAD, with its cut-off date of 1821.

An extensive card index, arranged by place, subject and family name, allows speedy cross-referencing to maximise the information from primary documents. Handlists include a number of family archives which may be useful in the main study.

LANCASTER CITY COUNCIL PLANNING DEPARTMENT, PALATINE HALL

The council has little information on the historic town, and will be consulted mainly for details of recent or current developments.

There is an extensive collection of recent colour aerial photographs of the town (both obliques and near-verticals) but these are thought to be at a very small scale. There are no general maps to show where service trenches are located. However, some information may be available for individual sites from the council's engineering department in Morecambe.

Data on Listed Buildings and Scheduled Monuments is held. There is also a map showing the location of all Listed Buildings (around 300 in present-day Lancaster). A map is available showing areas of planning constraint such as conservation areas, and current planning applications are available, with brief details of proposed changes.

There is some data relating to a series of boreholes excavated around the extent of the Lancaster study area. These have, for the most part, been produced in conjunction with local developments.

LANCASTER CITY LIBRARY

The library has a good and well-catalogued collection of published and unpublished sources relating to Lancaster, including local history journals, theses, pamphlets, trade directories from the early nineteenth century and local papers going back to 1802.

Most important for the database is its collection of primary documents, including deeds and inquisitions post mortem, property auctions, correspondence and plans. These are catalogued in a 'Local Studies Guide' by classes such as Topography, Estates, Streets, Buildings, Bridges and Town Improvements. The *Lancashire Bibliographies* provide references for specific registers and wills, Acts of Parliament, and business histories. The Record Society volumes and Lancashire and Cheshire Antiquarian Society volumes are found here, as are other useful collections regarding wills, marriages and prominent citizens.

Maps held in the collection include those by Speed (1610), Docton (from 1684), Mackreth (1778), Clark (1807), Binns (1821), Atkinson (1824) and the Tithe map of 1830 (PL1/9). Ordnance Survey maps include the 6" 1st edition of 1845, and quarter sheets (1" to 1 mile) of 1852, 1967 and 1907.

The library is particularly strong in documents of the later eighteenth century. Property documents of that period often describe properties on particular streets in sufficient detail to inform future archaeological interventions. The documents have provided useful information for the pilot study area and should allow further data gathering in the main study. For instance, document MS 3404 summarises property documents of 1748-1811 concerning a messuage on St Nicholas Street.

Auction posters of the late eighteenth or early nineteenth centuries advertising sales of virgin land are able to provide a *terminus post quem* for building developments, and those advertising property indicate former features such as the 'six dwelling-houses, with a stable and shoeing house, yard and other conveniences.....near the Stone-Well....also a Smithy or building and outcast there' advertised in 1789 (Pamphlets S10). A poster of 1829 mentions 'a

large substantial freehold dwelling house...' in Church Street, with a yard and garden behind, demonstrating that even at that date the land behind some central street frontages was potentially undisturbed. Similarly, early nineteenth century posters advertising new warehouse and business premises by the canal testify to the development of commerce and associated structures. Many of these documents give the name of the householder or landowner, which will allow checks to be made for wills and private or commercial papers relating to particular properties.

Window-tax returns of 1766 are available (Docton 1957), as is the poll-book or 'Valuation.....of the inhabitants of the town of Lancaster ' of 1796 (CL, MS 3706). The poll-book includes only property-qualified men with surnames A-G but since their tenants are mentioned regardless of name, gender or status, the information supplied is not so fragmentary as might be feared. Poll-book entries are brief but demonstrate that in the 1790s many town houses had an orchard and/or garden, and therefore that central Lancaster still had substantial pockets of undisturbed ground.

Records of the early nineteenth century cast light on the latter end of the study period. For within a trade directory of 1815 shows that Gilbert Batty still occupied the house, shop and warehouse in Pudding Lane which were registered to him in 1796 (Anon 1815). Sketches, plans and drawings of the early nineteenth century will be able to inform archaeological investigation of the eighteenth century.

Much of the information held in these documents is not of an explicitly archaeological nature. Nonetheless it should inform future archaeological work in the city, and will contribute significantly to the interpretation of evidence encountered during excavation or recording.

LANCASTER CITY MUSEUM

The Curator, Dr Andrew White, is very knowledgeable about the history of Lancaster and has himself undertaken a great deal of archaeological and historical research in the town. A large collection of up to 300 photographs of Lancaster are held by the museum; many of them are either of twentieth century date or are late nineteenth century but may have some value for the end of the study period.

The museum has copies of all the plans of Lancaster, and maps including Docton and Mackreth, the 6" first Edition OS map of 1892 and the unusual 60" first edition of 1845 for the whole town. A large collection of photographs and pictures (some of which are held at the Maritime Museum, qv) is available, containing several hundred entries for Lancaster. Photographs can be accessed by street name, and paintings (many of which are held at the Maritime Museum) are also indexed. It will be necessary to consult these for details of any pre-1800 structures recorded.

A card index, including data collated from Ordnance Survey record cards and the SMR, is arranged by subject and street name. Cross-references to journals and other publications of relevance are included, and in many cases, full extracts obviate the need to consult the journals. A further collection of files, arranged by street name, contains correspondence, photographs and cuttings. Trade directories are available, including some of the late eighteenth century.

A cellar survey begun in the 1970s was inspected. This was specifically mentioned in the project brief and was expected to be a promising tool in pinpointing undisturbed land. However, the survey included only three addresses, all of which were on Church Street.

Details of excavations in the town, including reports and cuttings, are kept in four box files, one of which is devoted to Vicarage Fields and includes Richmond's report of 1950. A useful list of sources and quotations for medieval Lancaster is included in one of these boxes.

The museum holds a considerable artefactual collection, which incorporates much of the material from the various interventions that have been undertaken within the extent of the study area. The artefact assemblages from the major excavations are covered in the relevant publications and reports, but there are also many artefacts which were either isolated finds or were a result of small-scale interventions and for which these, and the associated label, provide the only record of the provenance and / or intervention.

LANCASTER UNIVERSITY ARCHAEOLOGICAL UNIT

OA North has undertaken the majority of the major explorations within Lancaster since 1987 and has copies of all the reports and copies of much of the archive material; the original archival material for completed projects is deposited within the Lancashire Record Office. The more recent projects have utilised digital graphic recording (CAD) and all survey plans have been accurately surveyed into the OS national grid, consequently the CAD plans can be dropped straight into the GIS with only the minimum of additional input. OA North also has some records of interventions undertaken within the city, by other organisations and individuals. Its library has copies of much of the more recent published material for Lancaster.

LANCASTER UNIVERSITY LIBRARY

Perhaps surprisingly, the University Library did not provide any hitherto unseen sources for the UAD, with the exception of Docton's 1957 *Lancaster, 1684*, a pamphlet accompanying his synthesised map. This pamphlet has been hard to locate elsewhere, and is useful for its brief commentary on the map.

The local studies section of the library was well supplied with pamphlets and books on Lancaster, but these were mostly concerned with the history of Lancaster after 1800, or were mainly photographic collections with little information about Lancaster before 1800. Archaeological literature and journals are available at OA North and in Lancaster Library or Museum.

LITERARY AND PHILOSOPHICAL SOCIETY, NEWCASTLE UPON TYNE

This library includes a number of secondary sources and is particularly valuable for original editions of earlier antiquarian works such as those of Camden and Leland. The *Victoria County History* and the *Reports of the Deputy Keeper of the Public Records Office* are also held. Although it is not of primary importance, it is valuable for the earlier sources which can be difficult to get hold of in other locations.

MANCHESTER CENTRAL LIBRARY

Fifteen volumes of the famously illegible Towneley manuscripts (see Chetham's Library and Bodleian Libraries, above) were bought by William Farrer, who made transcripts of them. The manuscripts and transcripts are now held in the Manchester Central Library as a part of the Farrer collection, with Farrer's transcripts of Towneley material (L1/51/1/1-44).

These documents have the potential to supply archaeological detail concerning the town prior to the seventeenth century, a period for which any additional information will be valuable. No

material is known to relate directly to the pilot study area, but some time should be allowed in the main study to examine these documents.

MARITIME MUSEUM, LANCASTER

The museum's main resource for the UAD lies in its pictorial archive, which includes a number of paintings, photographs and pictures likely to be of use to the main study. Many of these are understandably of a maritime nature, concentrating on the river, quay and bridge, but there were also pictures of the town in the late nineteenth century including that of the North Corner, Pudding Lane. Some artefacts and primary documentation such as ship's records are kept here also, and will be of use in studying the quayside area and its expansion.

UNIVERSITY OF DURHAM LIBRARY

A fairly complete set of Chetham Society volumes is held at the library, as are several nineteenth-century local histories and volumes of the Record Society's transcriptions of Lancashire and Cheshire documents. Whilst these are useful, they are available elsewhere.

PUBLIC RECORD OFFICE, KEW

The main value of the Public Record Office to the construction of the UAD lies in its collection of original documents belonging to the Duchy of Lancaster. The archive is divided into approximately 60 sub-categories, such as enclosures or deeds. Indices generally list place names, so that documents relating specifically to Lancaster can be located quite quickly.

A very full study was made of all Duchy handlists, and archivists were consulted to see if any further records could be located. However, the result was disappointing. No documents at all were located which offer any archaeological information for the pilot study, and very few deal with Lancaster at all. Although several rentals were found which name streets in Lancaster, none of these predated known references from elsewhere. It is thought that all of the relevant Latin rentals have been transcribed, for instance by Farrer in his '*Lancashire Pipe Rolls and Early Lancashire Charters*' (1902) or his '*Early Yorkshire Charters, III*' (1916), and by the Chetham Society in volumes available in Lancaster Library.

Several categories were thought unlikely to yield useful information, but in all cases the class list was inspected item by item to establish the likely importance of the class. In particular, DL42/106-27, a group of surveys, dating from 1425-1686 and 1770-1835, were examined. None of these, however, relates to Lancaster.

Other classes likely to be of use for the UAD include DL29, accounts of lands held by the Duchy. The archive includes a bundle of rentals and papers of the five religious houses that came to the Duchy at the Dissolution. This class is notoriously obscure in indexing, with documents referenced in a number of volumes. Rentals of lands in Lancaster held by Cockersand Abbey at the Dissolution were seen (DL 29/143/2273 and DL 29/ 217/3342), but little could be gained from them. DL 38 is a small class (13 documents) containing the certificates of colleges, chantries and other foundations, and contains information on location, goods and chattels, and tenants of these institutions. However, relevant extracts are transcribed in the Chetham Society (1862; LIX and LX), and can be consulted in Lancaster.

Maps and plans are held separately from their parent documents, but detailed cataloguing and a computer catalogue allow the two to be quickly combined when necessary.

MFC 207 is an Elizabethan picture-map of *c*1590. It shows the Castle and a number of houses around it, but it is thought that the houses are largely whimsical representations. MPD 179 is a plan showing the mill as it was in 1755, with an east elevation showing the wheel, and a plan of the river around it including locations and owners of adjacent properties, eg 'Butterfield's Dye House'.

No further maps or plans at all of Lancaster prior to 1821 were located, and the photographic index showed no references to Lancaster.

ROYAL COMMISSION ON THE HISTORICAL MONUMENTS OF ENGLAND, SWINDON

The records for Lancaster held by the National Monuments Record were for the most part duplicated by the SMR. The only data not duplicated were a set of aerial photographs of the city, which included some very useful oblique photographs of the Vicarage Fields area and the castle.

APPENDIX 2
HARDWARE REQUIREMENTS FOR GIS SYSTEM

The GIS database will be developed by OA at its Oxford Office, who will be using equipment already in place (defined below). Once the system is established and all historic maps have been rubber-sheeted into place the data will be input by OA North staff at their Lancaster office. As none of the existing OA North computer equipment in Lancaster is of an adequate specification for this purpose, there will be a requirement for the purchase of a new machine.

Existing OA (Oxford) Computer Specification:

Pentium 4 1.6 Ghz processor

40 Gb hard disk

256 Mb RAM

128 Mb graphics card

21" Monitor

DATA Tape Backup

Windows 2000 operating System

ArcView 3.2

Microsoft Access 2000

OA North Computer Specification:

Pentium 4 2 Ghz processor

40 Gb hard disk

256 Mb RAM

19" Monitor

Windows 2000 operating System

ArcView 3.2

Microsoft Access 2000

APPENDIX 3
RECOGNITION EVENT DATABASE STRUCTURE

Fields in the *Compiler's Manual* list (RCHM(E) and English Heritage 1993) which are omitted from the Lancaster database are shown in italic and indicated in the final column. Fields added to the *Compiler's Manual* list are also indicated in the final column

Field names in *Compiler's Manual* list (if different) are indicated by square brackets

(M/R/O = Mandatory / Recommended / Optional fields in *Compiler's Manual*)

FIELD NAME	M/R/O	ADDED/OMITTED
RECOGNITON EVENT RECORD		
Recognition Event NUMBER]	M	
ADMINISTRATIVE LOCATION		
County Code	M	*Omitted (all Lancs)*
Administrative local authority code	M	*Omitted (all Lancaster)*
Civil parish full name	R	
OTHER LOCATION		
Non-parish area	R	
Historic Parish	O	
Site Name	R	
RECOGNITION TYPE		
Recognition Event TYPE	M	
Event Start Date	R	
Event End date	R	
Event Date precision	O	
Fieldworker name	R	
Fieldworker role	O	
Associated Organization	R	
MAP AND GRID REFERENCE		
NGS [National grid reference 100km square]	R	
Easting (National grid reference)	R	
Northing (National grid reference)	R	
National grid reference qualifier	R	
National grid reference precision	O	

Grid reference number	R	*omitted*
Shape	O	*omitted*
GEOGRAPHICAL INFORMATION		
Site area	O	*omitted*
Land Use	O	*omitted*
Soil	O	*omitted*
Topography	O	*omitted*
Aspect	O	*omitted*
RCHME REFERENCE NUMBERS		
National Monuments Record reference no	O	
OS 1:10000 quarter sheet	O	
National Archaeological Record reference no	R	
National Buildings Record building no	O	
National Buildings Record phase no	O	
National Buildings Record site no	R	
ENGLISH HERITAGE REFERENCE NUMBERS		
English Heritage county no	R	*Omitted (all Lancs)*
English Heritage county suffix	R	*Omitted (all Lancs)*
English Heritage part letter	O	
Scheduled monument national no	R	
Scheduled monument constraint area suffix	O	
Scheduled monument archaeological item number	O	
Listed Building Number	R	(cross-referenced to separate Listed Building table)
SMR REFERENCE NUMBERS		
SMR reference number	R	*Omitted (in Recognition Event table)*
LISTED BUILDING ADDRESS		
Listed building road/street	O	(in separate listed Building table)
Listed building side of street	O	(in separate listed Bldg. table)
Listed building street number	O	(in separate listed Building table)
Listed building number qualifier	O	(in separate listed Building table)
POSTAL ADDRESS		

Postal address	O	*omitted*
Post code	O	*omitted*
SITE DESCRIPTION		
Site Description	O	
Archaeol Element: Number	R	(in separate Archaeol Elements table)
Archaeol Element: Keyword [Term]	R	(in separate Archaeol Elements table)
Archaeol Element: Quantity	R	(in separate Archaeol Elements table)
Archaeol Element: period	R	(in separate Archaeol Elements table)
Archaeol Element: monument record number	R	*Omitted (cross-referenced to Monument via Recognition Event number)*
Artefact: Number	R	Omitted (following Latest UAD Data Standard)
Artefact: Keyword [Term]	R	Omitted (following Latest UAD Data Standard)
Artefact: Quantity	R	Omitted (following Latest UAD Data Standard)
Artefact: period	R	Omitted (following Latest UAD Data Standard)
Artefact: monument record number	R	Omitted (following Latest UAD Data Standard)*)*
Ecofact: Number	R	Omitted (following Latest UAD Data Standard))
Ecofact: Keyword [Term]	R	Omitted (following Latest UAD Data Standard)
Ecofact: Quantity	R	Omitted (following Latest UAD Data Standard)
Ecofact: period	R	Omitted (following Latest UAD Data Standard)
Ecofact: monument record number	R	*Omitted (following Latest UAD Data Standard)*
DEPOSIT CHARACTER		
Deposit Horizon Keyword	-	**Added** (in separate Deposit Horizons table)
NGS [Location National Grid Reference]	O	(in separate Deposit Horizons table)
Easting [Location National Grid Reference]	O	(in separate Deposit Horizons table)
Northing [Location National Grid Reference]	O	(in separate Deposit Horizons table)
Z co-ordinate	-	**Added** (in separate Deposit Horizons table)

X/Y precision	-	**Added** (in separate Deposit Horizons table)
Z Precision	-	**Added** (in separate Deposit Horizons table)
Deposit Character	-	**Added** (in separate Deposit Horizons table)
Comment	-	**Added** (in separate Deposit Horizons table)
Surface height OD	O	*Omitted (recorded as Deposit Horizon Keyword)*
Intervention to OD	O	*Omitted (recorded as Deposit Horizon Keyword)*
Subsoil Geology OD	O	*Omitted (recorded as Deposit Horizon Keyword)*
Depth of made ground	O	*Omitted (recorded as Deposit Horizon Keyword)*
Depth of intervention	O	*Omitted (recorded as Deposit Horizon Keyword)*
Geology	O	*Omitted (recorded as Deposit Horizon Keyword)*
Water level OD	O	*Omitted (recorded as Deposit Horizon Keyword)*
Moisture	O	*Omitted (recorded in Deposit Character)*
Anaerobic	O	*Omitted (recorded in Deposit Character)*
Principal Deposits: description	O	*Omitted (recorded in Deposit Character)*
Principal deposits: top: height OD	O	*Omitted (recorded as Deposit Horizon Keyword)*
Principal deposits: base: height OD	O	*Omitted (recorded as Deposit Horizon Keyword)*
Principal deposits: Periods	O	
Unstratified Finds: Periods	O	
SITE DISCRIMINATION		
Site Discrimination	O	
STATUS		
Area Status	O	
Status Qualifier	O	
Status Identifier	O	
ARCHIVE		
Archive: Deposited	O	
Archive: Ref Number(s)	O	
Archive: Type(s)	O	

FINDS		
Finds: Deposited	O	
Finds: Ref Number(s)	O	
SOURCES		
Bibliographic type	M	(in separate Sources table)
Bibliographic document title	O	(in separate Sources table)
Page nos [Bibliographic inclusive page number]	R	(in separate Sources table)
Editor(s)	-	**Added** (in separate Sources table)
Author(s) [Bibliographic document originator(s)]	R	(in separate Sources table)
Author(s)' role [Bibliographic document originator(s)' role]	R	(in separate Sources table)
Year [Bibliographic document date of publication or issue]	R	(in separate Sources table)
Bibliographic document publisher or issuer	O	(in separate Sources table)
Bibliographic document place of publication	O	(in separate Sources table)
Bibliographic document edition	O	(in separate Sources table)
In: Editor(s)	-	**Added** (in separate Sources table)
In: Author(s)	-	**Added** (in separate Sources table)
In: Year	-	**Added** (in separate Sources table)
In: UAD BIB number [source number]	-	**Added** (in separate Sources table)
Bibliographic document ISBN	O	(in separate Sources table)
Description/comment [Bibliographic document description]	O	(in separate Sources table)
Bibliographic series or monograph: Title	O	(in separate Sources table)
Bibliographic series originator(s)	O	*Omitted*
Bibliographic series originator(s)' role	O	*Omitted*
Bibliographic document ISSN	O	(in separate Sources table)
Bibliographic series description	O	*Omitted*
Place of deposition	O	(in separate Sources table)
UAD BIB number [source number]	R	(**cross-referenced** to separate Sources table)
Archival source location	O	(in separate Sources table)
Archival source accession number	O	(in separate Sources table)
OWNERSHIP	O	
VISITS	O	

RECORD COMPILATION		
Data Entered by: [Compiler]	O	
Date of Initial Data Entry [Compilation Date]	O	
Data updates (initials, dates)	-	

APPENDIX 4
MONUMENT DATABASE STRUCTURE

Fields in the *Compiler's Manual* list (RCHM(E) and English Heritage 1993) which are omitted from the database are shown in italic and indicated in the final column. Fields added to the *Compiler's Manual* list are also indicated in the final column

Field names in *Compiler's Manual* list (if different) are indicated by square brackets

(M/R/O = Mandatory / Recommended / Optional fields in *Compiler's Manual*)

Field	M/R/O	Added/Omitted
MONUMENT RECORD		
Monument Number	M	
MONUMENT DESCRIPTION		
Monument Type Keyword	M	
Monument: Certainty	0	
Quantity	M	
Description	R	
Hist Building: Past Functions	-	*Omitted*
Hist Building: Current use	-	*Omitted*
Recognition Event Number	M	separate lookup table
AGE		
Date Minimum	O	
Date Minimum: Precision	-	**Added**
Date Maximum	O	
Date Maximum: Precision	-	**Added**
Display Date	O	*Omitted*
Period	M	
Period: Precision	O	
Scientific date	O	
ADMINISTRATIVE LOCATION		
County Code	M	*Omitted (all Lancs)*
Administrative local authority code	M	*Omitted (all Lancaster)*
Civil parish full name	R	

OTHER LOCATION		
Non-parish area	R	*omitted*
Locality	O	*omitted*
Monument name	R	
Salter Survey reference	-	**added**
MAP AND GRID REFERENCE		
NGS (National grid reference 100km square)	R	
Easting (National grid reference)	R	
Northing (National grid reference)	R	
National grid reference qualifier	R	
National grid reference precision	O	
Grid reference number	R	*omitted*
Shape	O	*omitted*
GEOGRAPHICAL INFORMATION		
Monument area	O	*omitted*
Land Use	O	*omitted*
Geology	O	*omitted*
Soil	O	*omitted*
Topography	O	*omitted*
Aspect	O	*omitted*
RCHME REFERENCE NUMBERS		
National Monuments Record reference no	O	*Omitted (in Recognition Event table)*
OS 1:10000 quarter sheet	O	*Omitted (in Recognition Event table)*
National Archaeological Record reference no	R	*Omitted (in Recognition Event table)*
National Buildings Record building no	O	*Omitted (in Recognition Event table)*
National Buildings Record phase no	O	*Omitted (in Recognition Event table)*
National Buildings Record site no	R	*Omitted (in Recognition Event table)*
ENGLISH HERITAGE REFERENCE NUMBERS		
English Heritage county no	R	*Omitted (in Recognition Event table)*
English Heritage county suffix	R	*Omitted (in Recognition Event table)*

English Heritage part letter	O	*Omitted (in Recognition Event table)*
Scheduled monument national no	R	*Omitted (in Recognition Event table)*
Scheduled monument constraint area suffix	O	*Omitted (in Recognition Event table)*
Scheduled monument archaeological item number	O	*Omitted (in Recognition Event table)*
Listed Building Number	R	(cross-referenced to separate Listed Building table)
SMR REFERENCE NUMBERS		
SMR reference number	R	*Omitted (in Recognition Event table)*
LISTED BUILDING ADDRESS		
Listed building road/street	O	(in separate listed Building table)
Listed building side of street	O	(in separate listed Building table)
Listed building street number	O	(in separate listed Building table)
Listed building number qualifier	O	(in separate listed Building table)
POSTAL ADDRESS		
Postal address	O	*omitted*
Post code	O	*omitted*
MONUMENT CHARACTERIZATION		
Monument Characterization	O	Field present but not filled in until Assessment Stage
MONUMENT DISCRIMINATION		
Monument Discrimination	O	Field present but not filled in until Assessment Stage
MANAGEMENT APPRAISAL		
Management Appraisal	O	Field present but not filled in until Assessment Stage
STATUS		
Area Status	O	*Omitted (in Recognition Event table)*
Status Qualifier	O	*Omitted (in Recognition Event table)*

Status Identifier	O	*Omitted (in Recognition Event table)*
SOURCES		
Bibliographic type	M	(in separate Sources table)
Bibliographic document title	O	(in separate Sources table)
Page nos [Bibliographic inclusive page number]	R	(in separate Sources table)
Editor(s)	-	**Added** (in separate Sources table)
Author(s) [Bibliographic document originator(s)]	R	(in separate Sources table)
Author(s)' role [Bibliographic document originator(s)' role]	R	(in separate Sources table)
Year [Bibliographic document date of publication or issue]	R	(in separate Sources table)
Bibliographic document publisher or issuer	O	(in separate Sources table)
Bibliographic document place of publication	O	(in separate Sources table)
Bibliographic document edition	O	(in separate Sources table)
In: Editor(s)	-	**Added** (in separate Sources table)
In: Author(s)	-	**Added** (in separate Sources table)
In: Year	-	**Added** (in separate Sources table)
In: UAD BIB number [source number]	-	**Added** (in separate Sources table)
Bibliographic document ISBN	O	(in separate Sources table)
Description/comment [Bibliographic document description]	O	(in separate Sources table)
Bibliographic series or monograph: Title	O	(in separate Sources table)
Bibliographic series originator(s)	O	*omitted*
Bibliographic series originator(s)' role	O	*omitted*
Bibliographic document ISSN	O	(in separate Sources table)
Bibliographic series description	O	*omitted*
Place of deposition	O	(in separate Sources table)
UAD BIB number [source number]	R	(cross-referenced to separate Sources table)
Archival source location	O	(in separate Sources table)
Archival source accession number	O	(in separate Sources table)
OWNERSHIP	O	
VISITS	O	
RECORD COMPILATION		

Data Entered by: [Compiler]	O	Automatically entered
Date of Initial Data Entry [Compilation date]	O	Automatically entered
Data updates (initials, dates)	-	**added**

APPENDIX 5
RCHME/EH SUMMARY UAD DATABASE STRUCTURE

APPENDIX 6

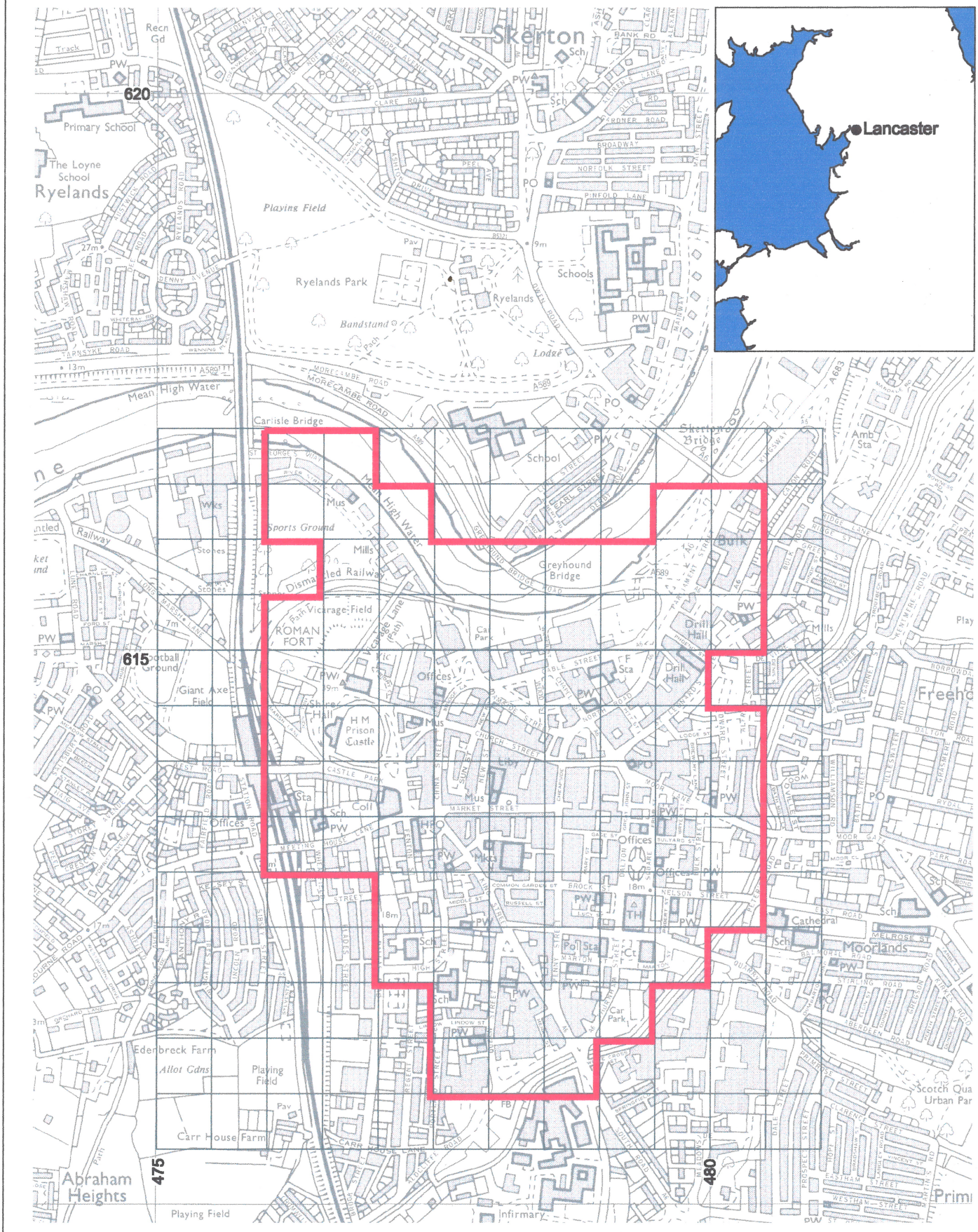
GANTT CHART

Detailed overleaf is a gantt chart showing the proposed project schedule.

APPENDIX 7
UAD AGREEMENT BETWEEN LANCASTER CITY COUNCIL AND LANCASHIRE COUNTY COUNCIL

The text of an agreement between the Lancaster City Council and the Lancashire County Council for the on-going maintenance and support of the Urban Archaeological Database.

ILLUSTRATIONS



based upon the Ordnance Survey 1:10000
with the permission of the controller of HMSO
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oa north

0 500
metres

Figure 1: Lancaster Urban Archaeological Database Study Area

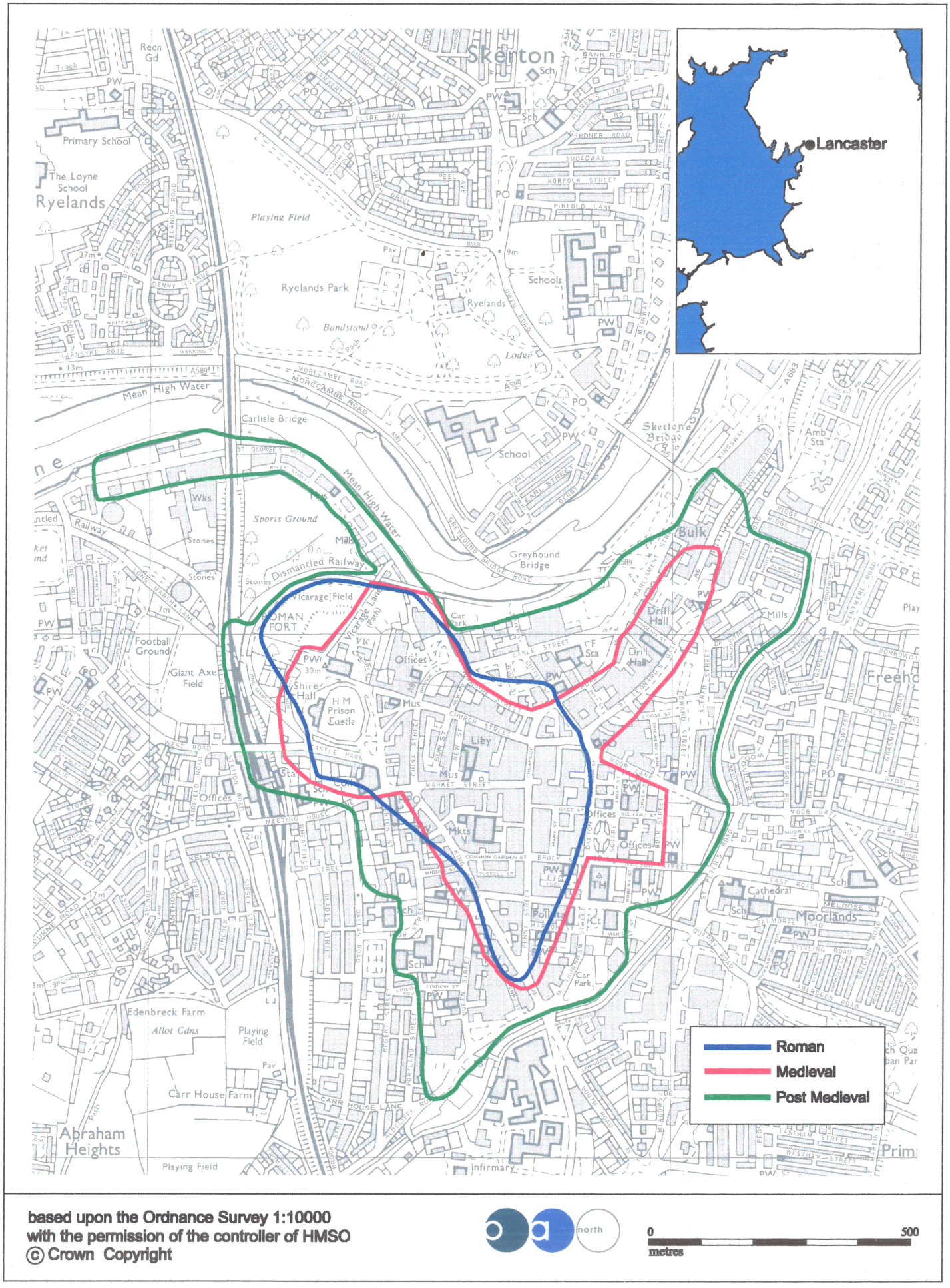

Figure 2: Extent of Roman, Medieval and Post-Medieval (1845) Lancaster

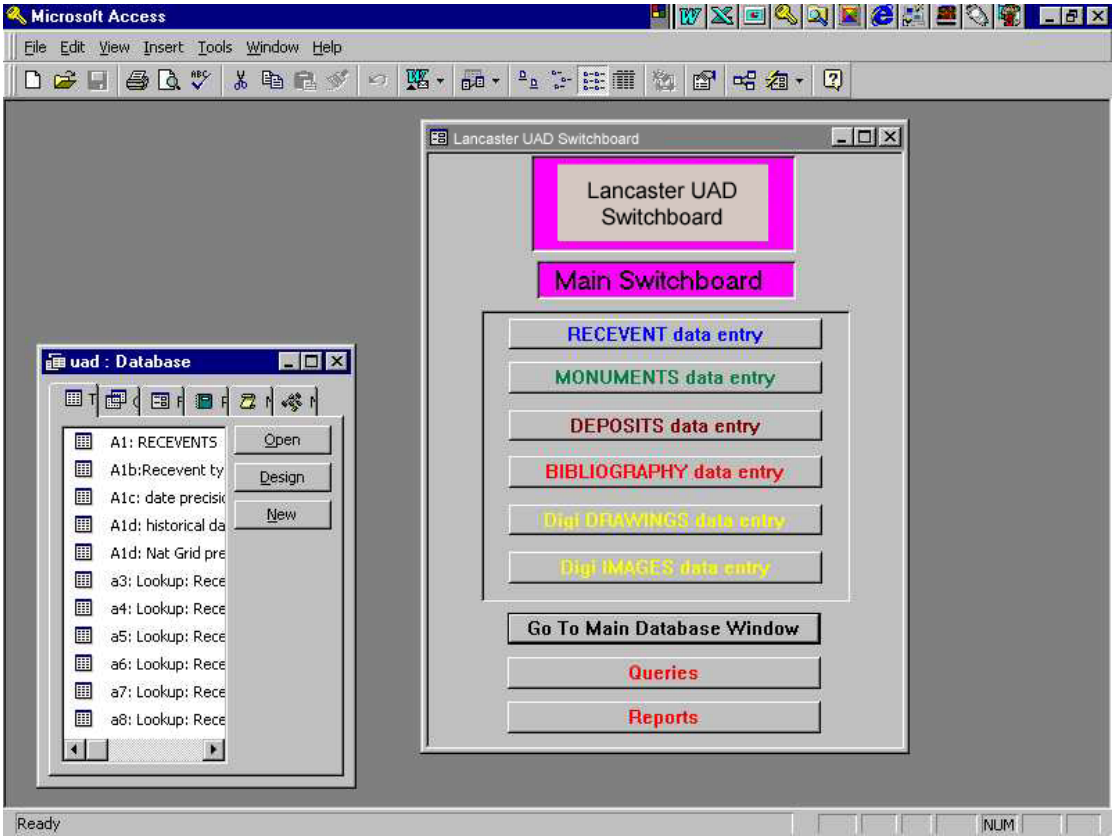

Fig 3 Access Database Front Page

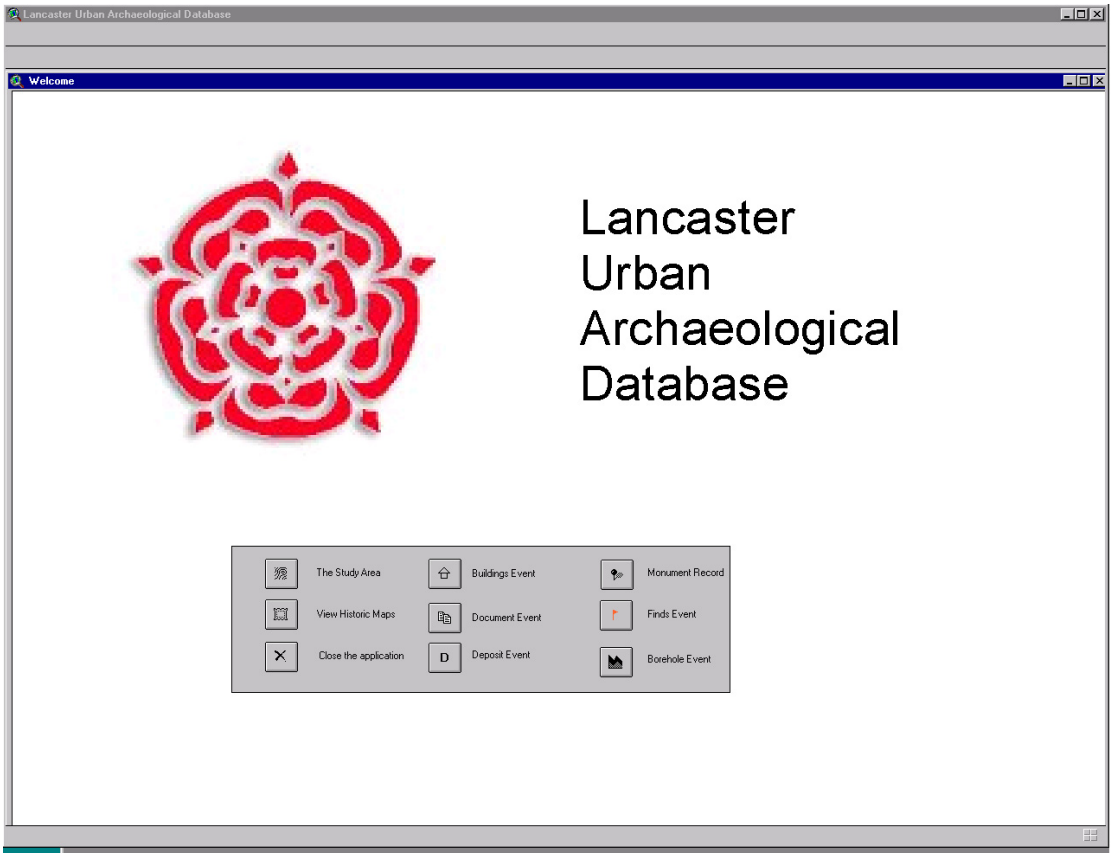

Fig 4 ArcView GIS Front Page

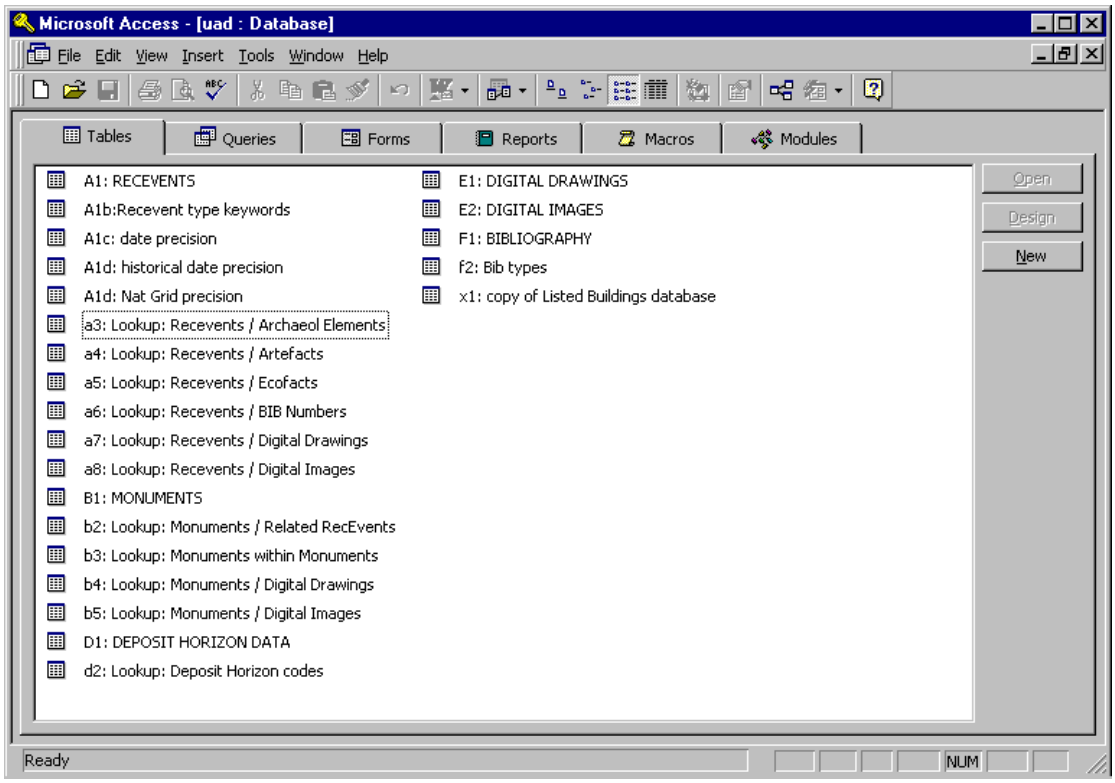

Fig 5 Primary Database Tables

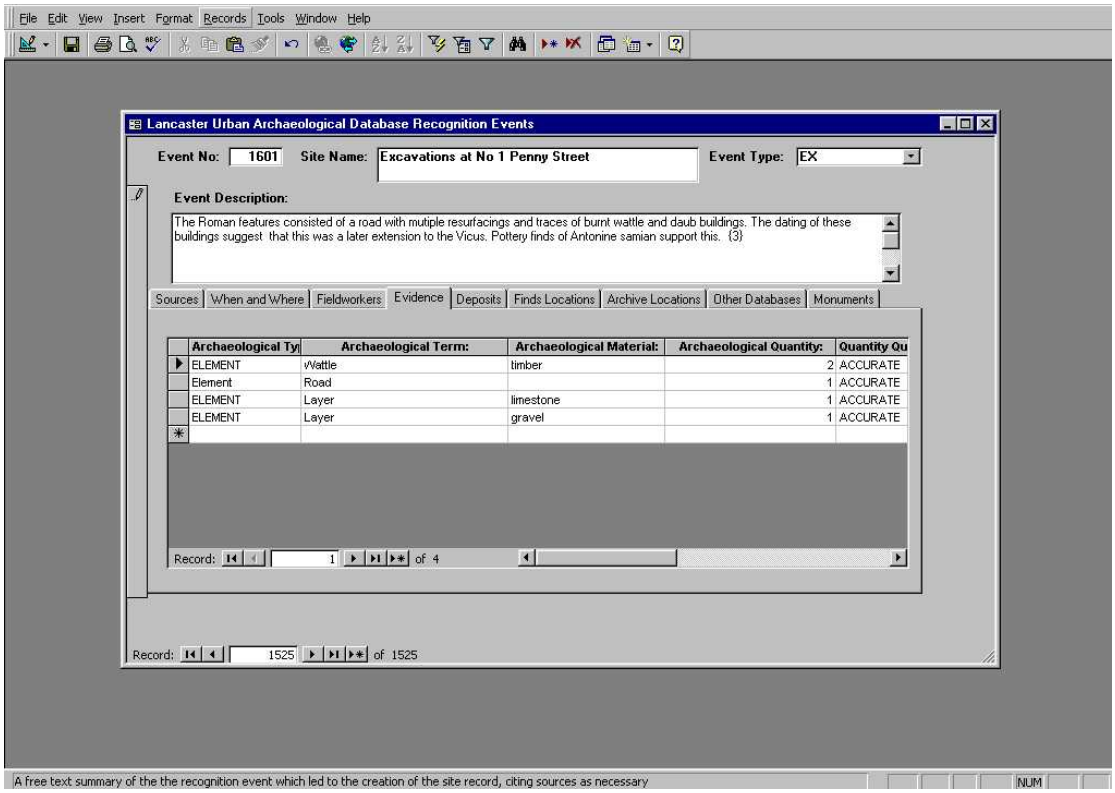

Fig 6 Example of Access Data Entry Form (Recognition Events)

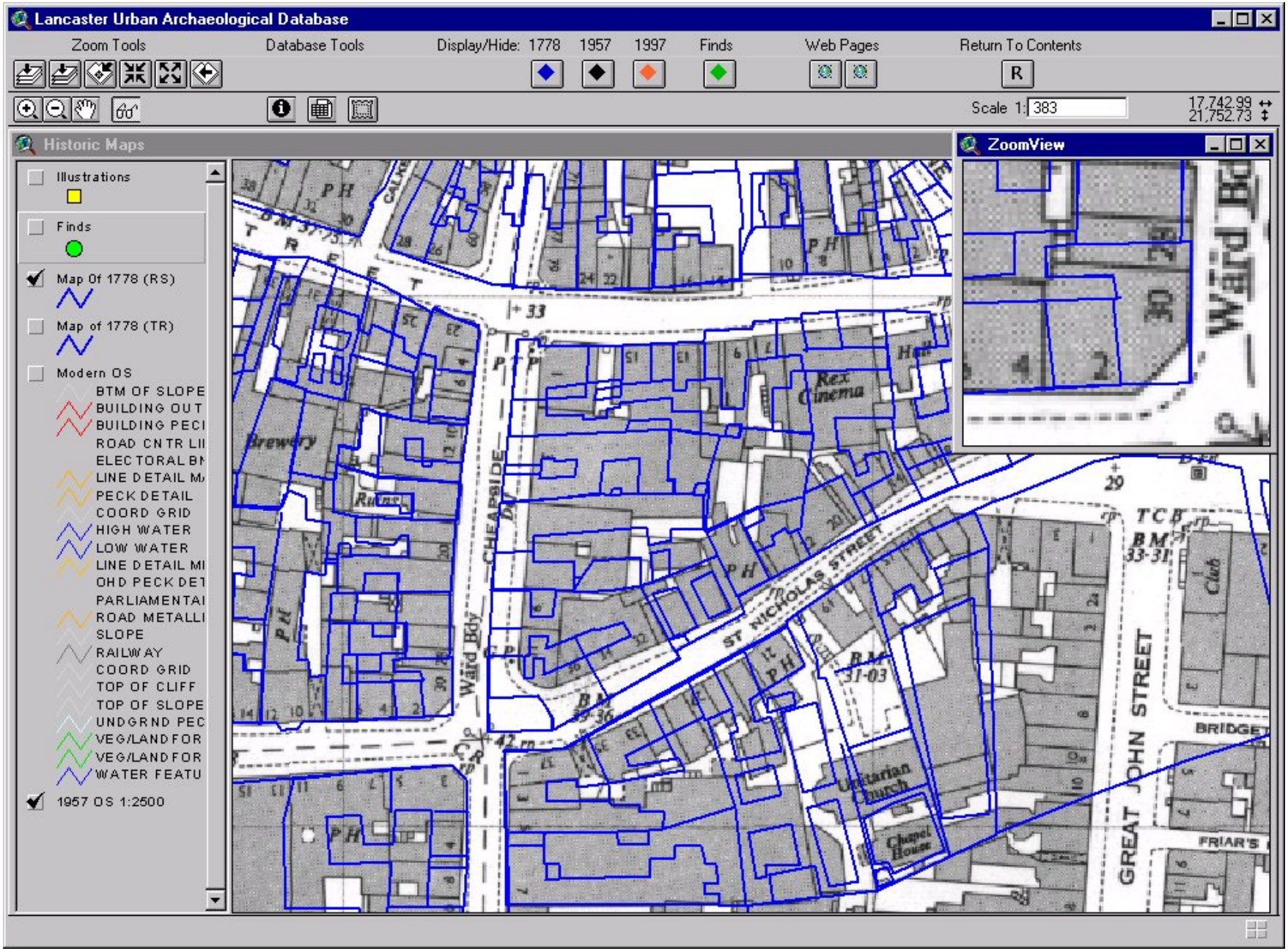

Fig 7 ArcView showing pilot study area with rubber sheeted Mackreth map

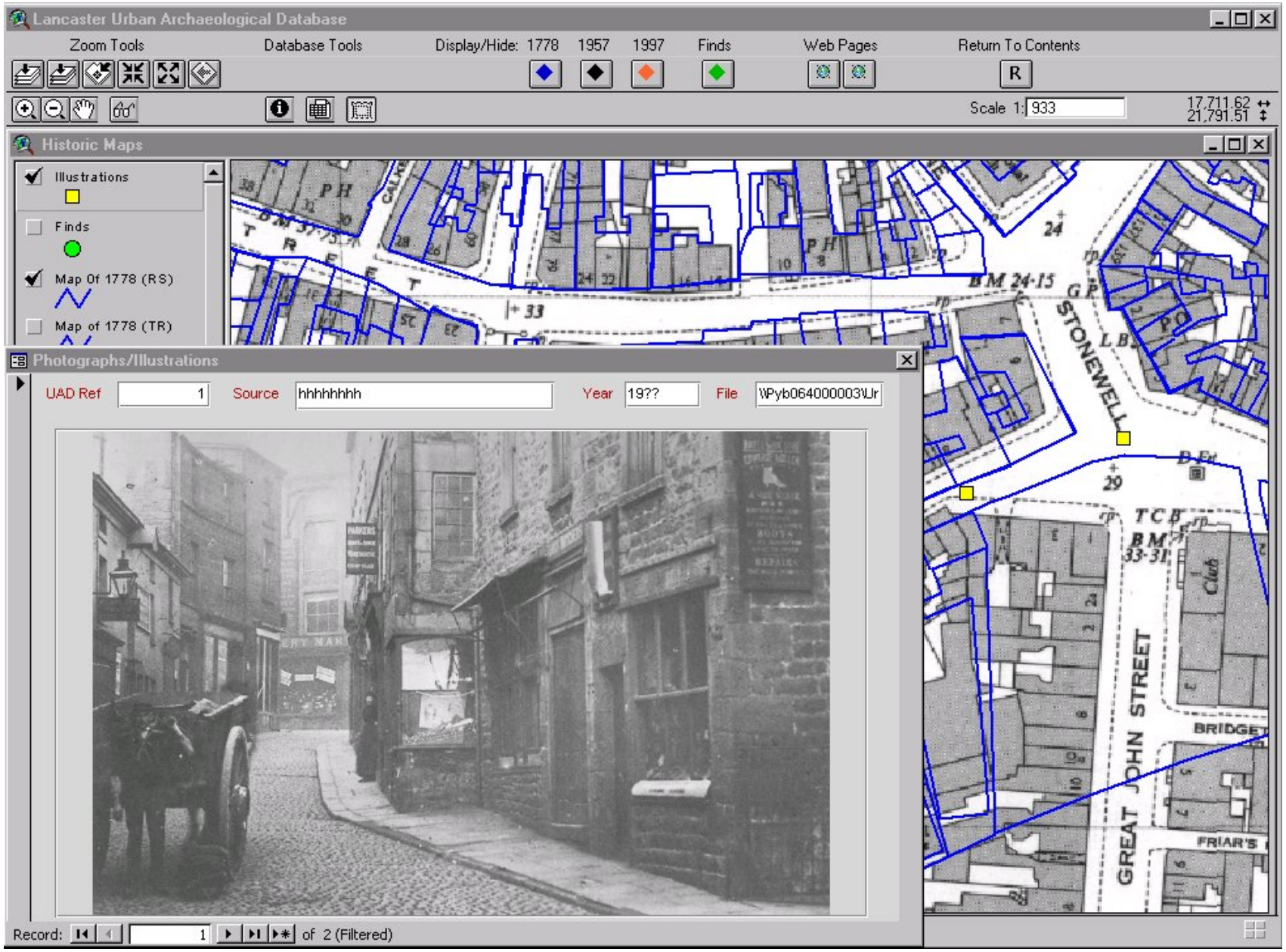

Fig 8 ArcView with superimposed photographic image