Waterlogged Archaeological Deposits
Nantwich, Cheshire

Desktop study of archaeological and borehole investigations
Cheshire County Council and English Heritage 2663/522

406.0889.003

July 2007

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1.0 INTRODUCTION

1.1 Background to the project

Within the historic core of Nantwich excavations and investigations during the past thirty years have demonstrated the extensive existence of extremely well-preserved archaeological remains within a deep sequence of organic-rich deposits (Plates 1 - 6). This sequence has survived due to waterlogged conditions and includes a wealth of palaeoenvironmental data as well as organic artefacts and structural timbers that date back to Roman times, and perhaps to even earlier periods. The deposits are not confined to the valley floor (c.33m AOD) but are found to occur also on the slopes and hill top either side of the river Weaver (which rise to c.44m and 41m AOD to the west and east bank respectively). As such Nantwich is unique amongst Cheshire's historic towns, and the significance of the remains is comparable with those from nationally important locations such as York, Carlisle, and Lincoln. These cities have enjoyed more intensive programmes of commercially-funded excavation and research than Nantwich, and thus have allowed informed decisions to be made at an early stage in the planning process. Because of the lack of sufficiently integrated strategic data on below-ground deposits within the historic town, in contrast the situation in Nantwich has often had to rely upon unexpected discoveries made during construction projects being hastily morphed into major excavations, often at short notice and post-planning permission The proposed survey is the first step in changing the ad hoc arrangements of recent years into a formal strategic framework for long-term management and investigation of this rare resource.

In April 2007 Cheshire County Council, with funding from English Heritage, commissioned SLR Consulting to undertake a programme of works including desktop study, a campaign of field coring, and preparation of a management strategy. The SLR team has included archaeologists, geologists, hydrogeologists, and GIS specialists, and the present Desktop study report represents the completion of the first stage of works.

1.2 Aims and objectives

1.2.1 Aims

- to provide a predictive model for assessing the location of waterlogged deposits in and around Nantwich. This will aid in understanding the parameters of formation and preservation of the deposits and also their vulnerability.
- development of a strategy to promote the preservation of water logged deposits similar to other schemes that have been carried out in areas such as York.

- to disseminate and promote the strategy developed during the project both regionally and nationally. It is hoped the best practice developed will aid the preservation of other such deposits in locations where the issue is yet to be addressed.

1.2.2 Objectives

- locate the extent of waterlogged deposits;
- characterise the nature and formation of the deposits;
- provide scientific dating evidence on the date of the deposits and on significant events developments within the sequence;

- assess the state of preservation of the deposits;
- assess threats to the deposits;

- improve the understanding of the waterlogged deposits commonly associated with the salt industry and their preservation requirements;

- ensure the survival of waterlogged organic deposits within the urban environment

1.3 Methodology

A desktop study has been conducted to gather and compile data from various sources in order to see the extent and nature of waterlogged deposits, in relation to their topographical, geological, hydro-geological, archaeological and historical context. The data has been layered within a GIS so that analysis has been helped through easy comparative mapping and interrogation. This has also allowed 3-D modelling of the sub-surface landforms to be attempted as a tool to help with understanding the physical constraints to the waterlogged deposits.

Sources consulted have included archaeological data stored at Cheshire's Historic Environment Record, variously recorded as monument data (information prior to structured fieldwork and introduction of PPG16) and event data (for archaeological investigations during the past 17 years). A series of unpublished and published archaeological reports were also searched for specific information, and the results recorded in tabulated form. The principal aim of this work was to establish those records which showed the presence of waterlogged or organic remains, and those that showed the absence of these deposits. Depth, date and brief details about the nature of these deposits were also logged.

Historic mapping has been used to help understand the development of the town during the 19th and 20th centuries, mostly from the Ordnance Survey series, but also including the 1851 Nantwich Town plan produced as a consequence of the Public Health Act 1850. Although earlier maps such as the poor rate 1794 survey and the 1846 Tithe map exist, they are not available digitally and therefore have not been used in the GIS.

Geological borehole data has been compiled from records kept by the British Geological Survey, and from other sources such as Cheshire County Council's Geotechnical Section. The Environment Agency were consulted, but had no available borehole information. Crewe and Nantwich Borough Council were consulted but they no longer retain borehole records.

1.4 The nature of the evidence

This desktop study is not designed to provide a synthesis of our current historical and archaeological knowledge for Nantwich, a recent account of which can be accessed through Cheshire County Council's and English Heritage's Historic Town Survey of 2003, but instead the study focuses on an assessment of the evidence for waterlogged organic remains within the historic core of the town. The available data includes recent archaeological investigations and older ones dating back a generation or more, as well as boreholes which indicate the extent of "made ground" and underlying "natural" superficial geological deposits. The spatial, vertical and temporal extent of these deposits has been collated so that the data can be mapped and modelled using a GIS. The original site data was not recorded in a consistent manner, and there is very little detailed information on heights above mean sea level for the various stratigraphic sequences that have been recorded in any detail. There is also a diversity of terms used to describe the types of deposit that are the focus of this study, variously describing the build up of wet archaeological and palaeoenvironmental remains as waterlogged deposits, organic remains, timbers, black soil, fibrous vegetal material, and with many individual items identified such as leather shoes, wooden artefacts, timber salt-working equipment, as well as wooden conduits and sewers. Negative evidence has also been of use in defining the limits for the main area of waterlogged deposits, where investigations on the periphery have recorded a shallow stratigraphic sequence and no waterlogged deposits.

2.0 RESULTS

2.1 Topographical background, soils and historic landscape characterisation

Historic Nantwich lies at a crossing point of the River Weaver which has cut a shallow valley through Glacial Till (Figs. 1, 2, & 3). The river meanders through this valley, the floor of which is some 200m wide and c.34m - 33m AOD south and north of the town respectively. From this level the west bank rises to a plateau of approximately 44m AOD c.500m from the river, from the junction of Edmund Wright Way and Millfields northwestwards along Welshmen's Lane, before the land rises again west of the Shropshire- Union Canal to 59m AOD at Dorfold Hall and Acton. Midway between the plateau and the river the land at Kingsley Fields and at the east end of Millfields is 38m AOD. On the east side of the river the land rises to around 38/39m AOD along a north-south line from the junction of Wellington Road and Parkfield Drive to Barony Park, a line that is coincident with the top of the river terrace deposits and c.400m from the river. The land continues to rise east of this line to 41/42m AOD approximately 500m from the river, where it forms a plateau 300-400m wide before rising to over 48m 500m further east (Fig. 2).

The lowest areas of the historic town are at the Weir (34.42m AOD), at Waterlode Street (33.75m AOD), and at Snow Hill (34.59m AOD) on the eastern side of the river, and just north of the Wood Streets (34.86m AOD) on the west side. The east bank rises more steeply than the west, whilst the relief north – south remains largely constant: no particular undulations are visible which might suggest minor watercourses draining into the river. Contours and spot heights indicate that Hospital Street follows a slight ridge running westwards (Fig. 2).

The local soil classification refers to two zones within the town, distributed on the north and south sides of a boundary approximately following the line of the Hospital Street ridge and Welsh Row. The southern zone is described as "U712f Unsurveyed – Slowly permeable seasonally waterlogged reddish clayey and fine loam over clayey soils, often stoneless" and the northern zone is similar "U812b Unsurveyed – Deep permeable sandy and coarse loamy soils. Groundwater controlled by ditches."

The modern built up townscape will have altered the original underlying subtleties of the topography, but historic mapping and documentary sources allow some insight into earlier landuse, and thus an indication of topography. Barony Heath and the east end of the town (Fig. 5) appears to have been heath land in the middle of the 19th century, with grazing rights affirmed for the townsfolk (Garton 1972; p7), on the heath and at the Crofts, town fields and common south of Beam Street. To the southwest the land was wet and marshy. It is possible that Kingsley Fields were wooded, as the *–ley* suffix was often given to a woodland clearing, and the name 1st and 2nd Wood Street could refer to this earlier landscape; in addition the irregular pattern of field boundaries, and fields criss-crossed by paths, suggest gradual encroachment on to an area of woodland. The river level was recorded as 100' 4" on the 1851 Public Health Act Map, c.30.5m AOD.

2.2 Geological background

2.2.1 Summary and sources

The following information sources have been examined in order to assess the geology in and around Nantwich:

- British Geological Survey (BGS), 1:50,000 England and Wales Sheet 122, Nantwich (solid with drift);

- Poole, E.G. and Whiteman, A.J., Memoirs of the Geological Survey of Great Britain, England and Wales, Geology of the country around Nantwich and Whitchurch (explanation of Sheet 122), HMSO (1966);

- British Geological Survey, The physical properties of minor aquifers in England and Wales;

- Cheshire County Council Geotechnical Services borehole and trial pit logs for Kingsley Fields, Nantwich;

- Records of boreholes held on the BGS database

At surface, Nantwich is underlain by superficial (drift) deposits consisting of Alluvium, River Terrace Deposits, Glacial Till and undifferentiated Glaciofluvial Deposits (Fig. 3). The superficial deposits are underlain by solid geological strata of the Wilkesley Halite Formation.

2.2.2 Solid Geology

The geology beneath Nantwich as taken from the published geological map, is illustrated in Figure 3. The solid geology underlying the superficial deposits beneath the town comprises the Wilkesley Halite (rock salt) Formation, which forms part of the Triassic Mercia Mudstone Group.

In older geological publications the Wilkesley Halite Formation was previously named the Upper Keuper Saliferous Beds.

The lithological description of the Wilkesley Halite Formation is beds of halite of varied purity up to around 25m thick separated by thinner red, grey and green mudstone partings veined with salt. The overall thickness of the formation in this area is recorded as being up to 400m.

The halite beds do not crop out at surface, but regionally their projected surface position may be marked by subsidence hollows and collapse breccias formed in overlying strata. Such features are formed by natural dissolution and, elsewhere, the effects of brine pumping for salt extraction.

2.2.3 Superficial Geology

Alluvium

The Alluvium deposits are present along the River Weaver and typically form a floodplain of 50m to 100m wide through Nantwich. The Alluvium deposits typically extend to a thickness of 2m to 3m and usually consist of silt and fine sand with thin beds of clay.

Borehole logs provided by Cheshire County Council for the Kingsley Fields area (including Snow Hill) describe the alluvial materials as silty sands with clays and gravels or sandy clays, with occasional organic material. Borehole records held by the BGS for boreholes around Nantwich, particularly those located close to the River Weaver towards the northern periphery of the town, typically describe the alluvial materials as varying between silty sandy gravel with occasional (organic) peat to clayey fine to medium grained sand.

River Terrace Deposits

The Second River Terrace Deposits are continuously present along both sides of the River Weaver through Nantwich and are understood to extend to between 3m and 5m thickness

above the river. The Second River Terrace Deposits typically comprise loam, sand and gravel.

The First River Terrace Deposits are present on both sides of the River Weaver and occur in discreet patches through Nantwich alongside the river. The deposits are typically present to around 1m above the Alluvium. The First River Terrace Deposits typically comprise sandy silts in this area.

Borehole records held for Nantwich by the BGS, particularly those located to the south of Water Lode, do not differentiate between the first and second terrace deposits and typically describe the River Terrace Deposits as sandy fine to coarse gravels with occasional cobbles.

Elsewhere in the region, for example in the higher reaches of the River Weaver, the terraces have been confirmed as fluvio-glacial in origin and formed during the development of the Weaver valley as a meltwater channel carrying water from glacial lakes in the region (Poole & Whitehead, 1966).

Glacial Till

Glacial Till is present across wide areas to the east and west of the River Weaver and forms the main superficial geology beneath Nantwich. Previously, the Glacial Till was known as Boulder Clay and was divided into Upper and Lower divisions in the region, separated by the (fluvio-glacial) Middle Sands, although the divisions are not always recognisable along the Weaver. The Glacial Till is typically described as comprising stiff sandy reddish-brown gravely clays characterised by the presence of gravel derived from the Irish Sea area, Wales and the Shropshire-Cheshire basin. When fresh the clays appear blue-grey but weather to red-brown.

Borehole records held by the BGS for boreholes at locations across the town typically describe the Glacial Till as red, grey and brown silty sandy clay (occasionally laminated) with fine gravel and clayey silty sand.

Glaciofluvial Deposits (Middle Sands)

Patches of Glaciofluvial Deposits are present on areas of higher ground around Nantwich and are mapped as being underlain and overlain by Glacial Till. Therefore, it is considered likely that these deposits may comprise the Middle Sands, dividing the Upper and Lower Boulder Clays (Glacial Till). Only a single area is mapped as occurring beneath Nantwich, beneath the northeastern area of the town. The Middle Sands typically comprise thick deposits of sand and gravel, thin bands of laminated clay and thick fluvio-glacial gravel spreads. Borehole records held by the BGS indicate that at Nantwich the deposits have typically been described as silts, sands and gravels. The published geological map indicates that the deposits are much thinner in Nantwich than described elsewhere in the region.

2.3 Hydrogeological and hydrological background

In addition to the geological information presented above the following sources, providing hydrogeological and hydrological information, have been referred to:

- Environment Agency website - source protection zones
- Environment Agency website - web based flood maps

2.3.1 Hydrogeology

The regional geology is dominated by the Mercia Mudstone Group, which is generally considered to comprise a non-aquifer. It consists predominantly of relatively impermeable

mudstones interbedded with thin impersistent siltstones and sandstones (skerries). Although thin (commonly less than 1 m thick) and well cemented it is through fractures within these units that limited groundwater flow takes place.

The Wilkesley Halite formation that underlies Nantwich, is a thick saliferous, basinal deposit, that occurs within the Mercia Mudstone of the Cheshire Basin. Groundwater movement within the Halite may occur along fractures, bedding planes and dissolution features. However, due to the limited quantity of groundwater, and its poor brackish quality, this unit is also considered a non-aquifer.

The sands and gravels of the River Terrace Deposits may constitute a minor aquifer, capable of providing limited yields. This may also be the case within more permeable horizons of the Alluvium or where permeable horizons of glacial sands and gravels occur within the Glacial Till, either as local coarse lenses, or where the Glaciofluvial deposits (Middle Sands) are present.

The heterogeneous nature of the drift, and the presence of these more permeable horizons gives rise to the potential for lenses of perched water to exist within these deposits. These will either exist as isolated pockets or, where permeable deposits are extensive, or hydraulic continuity exists within the River Terrace Deposits, some lateral flow of groundwater may occur.

2.3.2 Recharge and groundwater flow mechanisms

Any recharge to bedrock is likely to be further limited due to the extensive cover of low permeability drift (Glacial Till). Where the glacial sands and gravels of the Middle Sands are exposed direct recharge to this Minor Aquifer may occur.

As previously described groundwater flow within the Wilkesley Halite formation will predominantly be influenced by fractures, bedding planes and dissolution features. It may also be influenced by the dip of the bedrock strata, which is to the south east in the Nantwich area.

Although limited, some groundwater discharge to the River Weaver is likely to occur.

2.3.3 Source Protection Zones

The site does not fall within any groundwater Source Protection Zone

2.3.4 Water strikes

A number of site investigation boreholes have been drilled within the study area. Records show that whilst the majority appear to be dry, or have no information pertaining to groundwater, the following observations are made:

- Strikes/seepages are encountered to the north of Nantwich in the Alluvial deposits adjacent to the River Weaver
- Seepages are encountered west of Nantwich within Made Ground deposits adjacent to the Shropshire union canal
- Seepage was encountered in the central area of Nantwich in the alluvial deposits adjacent to the River Weaver
- Brine has been encountered at depth (36 – 40 m bgl) in the central area of Nantwich adjacent to the River Weaver and;
- A number of water strikes/seepages were recorded in the east of Nantwich, coincident with an "esker-like" ridge of the glaciofluvial sands and gravel (Middle

Sands) which runs south-south-eastward through the eastern part of Nantwich (Fig. 3).

It is noted that, with the exception of three instances where the seepage encountered was within made ground, all the seepages observed were in sand units within the drift deposits. This is seen both on a small scale relating to finely interbedded clays and sands, and on a larger scale relating to the boundary between a distinct sand unit and underlying Boulder Clay.

2.3.5 Hydrochemistry

The quality of groundwater in the Mercia Mudstone Group in the Nantwich area is likely to be brackish due the presence locally of the Wilkesley Formation. The heterogeneous nature of the drift deposits is likely to give rise to variable groundwater quality, influenced by the nature of the deposits (e.g. organic content), groundwater movement and the presence of confining layers.

2.3.6 Hydrology

The principal surface water feature in the vicinity of the study area is the River Weaver and its broad shallow river valley (Fig. 4). The Weaver flows northward through the town, with a number of small tributaries draining the slightly higher ground to the west and east, to join the River Weaver at Nantwich. Cheney Brook flows north westward across the eastern valley side joining the River Weaver north of the town.

The River Weaver bisects the town of Nantwich, and the Environment Agency's web-based Flood Map indicates that the extent of the flood plain associated with the River Weaver is limited to a stretch approximately 100m in width.

The Shropshire Union Canal also runs approximately parallel to the River Weaver, marking the western extent of the town. It is likely that some leakage of surface water from the canal occurs, and makes some contribution to groundwater flow within the superficial deposits and therefore to surface water springs/issues.

Numerous springs, sinks and issues are observed, particularly on the western side of the River Valley. These may reflect the presence of dissolution features in the underlying Halite formation, and the variable permeability of the overlying drift deposits. In the Nantwich area the Upper and Lower Boulder Clays are not easily distinguished. A line of seepages and small springs may mark the top of the Lower Boulder Clay in many areas, as groundwater within the overlying Middle Sands encounters the low permeability basal clay. In some locations in the Nantwich area the top of the Lower Boulder Clay is obscured by erosive/slip material from the overlying strata, often resulting in sandy, waterlogged soils.

2.4 Archaeological and historical background

Archaeological evidence does not allow the origins of Nantwich to be traced back to prehistoric times, but Roman remains have been found with increasing regularity in recent years. A postulated Roman road runs east-west through the town and Roman artefacts, including coins and pottery, have been found in various locations on the west side, and mostly in the Castle area on the east side of the river. Of particular significance for this period were the excavations at Kingsley Field which revealed well-preserved waterlogged industrial remains, including timber-lined brine tanks (Plate 2) and wattle-lined pits in addition to wooden tools and other organic remains. On the east side of the river Snow Hill has also produced evidence for Roman industrial activity and deeply stratified wet deposits, but the circumstances of discovery were not ideal for archaeological recording.

During post-Roman and medieval times the town developed on both sides of the river, with a strip settlement along Welsh Row on the west side, and a series of streets radiating out from the hub created by the Norman castle on the east side of the river. Although few archaeological finds from the Anglo-Saxon or Norman periods have been found, physical traces of the motte and bailey have been revealed by excavation next to the river crossing. Medieval hospitals were founded at either end of the routeway through Nantwich, St Lawrence's at the west end of Welsh Row and St Nicholas' at the east end of Hospital Street. The medieval town has archaeological and documentary evidence to show it was an administrative centre and a thriving economic centre, with a mill, salt-working, tanneries, and related industries, as well as a major market centre. Archaeological evidence has revealed deeply stratified waterlogged deposits with organic remains and timbers in an extremely good condition of preservation, notably in 1st and 2nd Wood Streets, in the castle area, along the High Street and north side of Hospital Street.

The Great fire of Nantwich in 1583 laid the basis for the post-medieval development of the town, and has also contributed to the accumulation of archaeological deposits. Industrial and commercial activities continued to stimulate the growth of the town and the nature of many of these would also have contributed to the gradual accumulation of organic remains which, if inhibited from natural decay processes, would have led to the build-up of deposits within the town. The unhygienic living conditions are reflected in the incidence of disease and plagues, culminating in the cholera epidemic of 1850. Post-medieval organic remains have been found in areas of waterlogging within the historic town centre.

Nantwich Waterlogged Deposits: Archaeological Report data

Location	NGR	OD asl surface	OD asl top of organic remains	OD base of organic remains (& deposit thickness)	OD natural geology	Depth of deposits from surface	Nature of deposits	Dating	Historic context	Report reference	HER reference	Year of investigation	Organization involved
10 - 16 High St	SJ 65033 52369	(c.37.5)				2	Organic remains,pits, cobbled surface	12th - 17th c	Town centre	2129	3629, 179/0/50	1996	EAS
Bowers Row car park	SJ 65011 52315	100'.5 – 98'.9 (c.36)		(>1.6)		>2.5	Organic remains, wooden culvert,wattle fencing, castle platform	1218 - 1263, 14th - 16th c	Castle, Lothburne town sewer	2064	3577, 179/0/47	1995	Gifford
1 - 5 Welsh Row	SJ 64932 52364	(c.35)		(>0.57)		>0.72	Organic remains, timbers, salt working	12th - 14th c	Salt working	2538	4091	2004	EAS
St Anne's Lane	SJ 6480 5235	36.2	35.6	(>3.0)		4	Organic remains, timbers, ditches	Roman		2531, 2603	4085, 4145	2004 - 5	Gifford
The Lamb Hotel	SJ 6517 5228	40	38.8	37 (1.8)	37	3	Organic remains, timbers, surfaces, wooden artefacts	1162 - 1322, 11th - 20th c	Town centre	2484, 2545	3991, 4098	2003 - 4	Gifford
Cheshire Cat Welsh Row	SJ 64865 52426	(c.36.5)		(>3.0)		>3.25	Organic remains, wooden artefacts, leather		Salt working	2410	3894	2002	EAS
Second Wood St	SJ 64845 52443	34 - 37	32.9 - 35.9	(>1.25)		>1.65	Organic remains, timbers, peat	13th - 14th c	Salt working	2377	3861, 180/4	2001	EAS
Snow Hill car park	SJ 64985 52519	(c.36.5)		(>2.8)		3.5	Organic remains, timbers, wattle hurdles	Roman		2552	4218, 4055	2004	Malcolm Reid
Kingsley Fields	SJ 6455 5250	(c.38-40.5)		(c.1.2)		2.8	Timbers, wicker, wooden artefacts, ditches	Roman		2540	4094	2001-3	UMAU
Mill St	SJ 65013 52278	(c.35)		(c.0.4)		1 - 2.35	Timbers	Roman	Castle	2557	4213	2005	EAS

Three Pigeons, Welsh Row	SJ 64871 52427	34.82 - 35.06	34.12 - 34.36	(>0.4)		>1.1	Organic remains, timbers, salt ship, wattling	medieval	Salt working	2569	4201	2005	EAS
Nat West, High St	SJ 6510 5233	(c.40)				1.32	Organic remains, timber roadway, leather	1216 - 72 Henry III coin	Town centre	CAB10	179/0/39	1984	P Hutchings
Cheshire Cat car park	SJ 6483 5243	(c.36.5)		(>3.25)		4.5	Timber structure	12th c	Salt working		180/0/2	1980s	R Turner
High St	SJ 6498 5238	(c.40)		(>3.6)		>3.6	Timber drains, straw, leather, wooden artefacts		Town centre & salt working		180/0/8	1978	A Blacklay
First Wood St	SJ 6492 5255	35			32 - 32.5	2.75	Waterlogging, timbers, wooden artefacts, leather	12th c	Salt working	Med Arch 27	180/2	1979-80	R McNeil
Crown car park	SJ 6504 5235	(c.37.5)				3	Organic remains, timbers, peat, wood, leather		Castle		179/2	1978	R McNeil
31 Hospital St	SJ 6523 5225	(c.40.5)		(1.08)		2	Organic remains, timbers, wood, twigs	13th - 15th c	Town centre	CAB4	179/0/19	1976	J Ray
Nat West, High St	SJ 6507 5233	(c.40)					Organic remains, timber conduits, wattling, leather	Saxo-Norman	Town centre, salt working, tannery, pottery		179/3, 180/3	1974-6	D Hill
St Anne's Lane	SJ 6481 5231	(c.36.5)		(0.3)			Organic remains, timber tank, cess pit	Roman 132AD	Salt working		178/0/2	1985	R McNeil
47 High Street	SJ 6514 5227	(c.40)				2.85	Wooden fences, deep deposit	13th - 15th c	Town centre	CAB3	179/0/18	1975	J Dent
St Anne's Lane	SJ 6491 5233	(c.35.5)				2.5 - 3	Timbers, wattle hurdles		Salt working	Gas works remediation	180/0/1	1986	R Turner
37 Welsh Row	SJ 6484 5240	(c.35.5)				>2	Waterlogged wood, timber beams				180/0/3		R Turner

Snow Hill car park	SJ 6505 5256	(c.38)					Wood, posts, grey-black soil	Salt working	CAB10	180/0/7	1982	P Hutchings
Snow Hill New road BH10	SJ 6489 5258	35.4	32	>28.9 (>3.1)	unknown	>3.3	Soft brown sandy clay; pockets of organic matter, organic laminated clay & wood frags overlain by alluvium		CCC BH log		2001	
Snow Hill new road BH11	SJ 6495 5245	36	33.1	29.9 (3.2)	29.9	3.2	Loose black fine/med organic sandy silt; wood fragments		CCC BH log		2001	
Snow Hill new road BH12	SJ 6496 5241	36.3	33.6	29.8 (3.8)	29.8	3.8	Loose grey sandy silt, organic matter, wood fragments		CCC BH log		2001	

Table 1 Archaeological investigations that have demonstrated waterlogged deposits (organic remains, timbers etc)

n.b. An additional suspected location is beneath the war memorial where Cheshire County Council undertook stabilisation works in 2004/5 and found soft deposits to 3.5m depth (*Mark Leah pers. comm.)*


Plates 1 & 2: Waterlogged deposits found during excavations at 2nd Wood St and Kingsley Fields

Nantwich Investigations: no waterlogged remains
Table 2

Location	NGR	OD asl surface	OD natural geology	Depth of sequence	Nature of deposits	Dating	Historic context	Report reference	HER reference	Year of investigation	Organization involved
Riverside	SJ 6480 5223	34 - 37	33 - 36	1	Ditch, posthole, pottery	Roman	Settlement?	2217	3715, 177/0/12	1997	EAS
Cocoa Yard	SJ 6521 5219	(c.40.2)		1 - 1.5	Ditch, pits, no finds	13th - 14th c	Town centre	2237	3722, 179/0/53	1997	EAS
Bowling Green	SJ 6535 5230	(c.40.8)			Ditches	medieval		CAB8	179/0/55	1982	Liverpool University
West bank	SJ 6489 5250	(c.37)		2	Ash, charcoal, briquetage, clays	medieval	Salt working	CAB10	180/0/6	1985	P Hutchings
Townsend House	SJ 6458 5244	(c.41)			Brick walls	post-medieval	western suburbs	2175	3673, 179/7	1997	Gifford
Mill Street	SJ 6501 5228	(c.36)	49	>1.5	Ditch	13th - 14th c	Castle Bailey	2454	3952	2003	EAS
Mill Street	SJ 6499 5222	(c.36)		>1	Water turbine, drains, pottery, black fibrous material	18th - 19th c	Castle		179/0/48	1975	Keele University
35 Hospital Street	*SJ 6526 5224*	*(c.40.5)*	*No data on sequence but could be wet (leather)*	*>0.18*	*Pit, medieval leather shoes, oyster mussel shells, pipe, pottery*	*Medieval and 16th - 17th c*	*Town centre*		*179/0/20*	*1976 & 1991*	*J Ray*

Red Lion Lane	SJ 6471 5249	(c.38.5)	1	No waterlogging, natural sand		4099	2004	CCC
Pillory Street	SJ 6514 5220	(c.40)	1.2	Natural sand, no archaeology		3501	2001	CCC
62 Hospital St	SJ 6529 5220	(c.41.5)	>2	Made ground	20th c	4052	2004	CCC
68 Welsh Row	SJ 6469 5246	(c.41)	0.6	Natural sand, no organics		4109	2005	CCC
7 Dysart Buildings	SJ 6536 5237	(c.41)	1.2	Natural clay, no waterlogging		4124	2005	CCC
Mill House	SJ 6471 5201	(c.40)		Natural sand, no archaeology		4248	2007	CCC
88 Welsh Row	SJ 6466 5242	(c.42)		Topsoil to natural clay, no waterlogging		4054	2004	CCC
99/101 Welsh Row	SJ 6461 5237	(c.41)		No details		4126	2006	CCC
The Blankney	SJ 6512 5202	(c.39)		Topsoil only, shallow foundations		4249	2007	CCC

Table 2 Archaeological investigations that have demonstrated an absence of waterlogged deposits

2.5 Analysis of archaeological and historic evidence

The Historic Town Survey provides a very useful base on which to begin analysis of the origins and development of Nantwich. This survey brings together evidence from a variety of sources and presents a thumbnail sketch of the known extent of archaeological remains, allowing the historic core of the town to be divided into zones of archaeological potential and components based upon the primary characteristics of the historic environment in specific areas (Fig. 5). More detailed analysis can, however, be applied to this basic corpus of evidence in order to help understand the pattern of development and thus the potential reasons for build-up and survival of waterlogged remains.

Communications are of prime importance in the origins and development of all historic settlement, and for Nantwich this can be seen in the postulated west-east running Roman road, which crossed the Weaver in the vicinity of the present bridge, but a little to the south of it. The distribution of Roman finds clusters close to this route on both sides of the river, especially in the area of St Anne's Lane and Riverside on the west bank, and at Crown car park on the east. The linear pattern that these finds make is supplemented by medieval sites which follow a route along Welsh Row, through the High Street and eastwards along Hospital Street (HTS Archaeological Assessment Fig.1). The original Roman alignment can be traced along the western end of Welsh Row as it heads towards Acton, perhaps along the diagonal boundary to the rear of a collection of properties on the south side of Welsh Row, and then along Hospital Street on the east side of the river. The present course of Welsh Row kinks to cross the river at the existing bridge, and then loops around High Street to meet Hospital Street, is a later diversion, probably attributable to the foundation of the Norman castle to guard the river crossing. This route was of major importance in the medieval period and later times, as it formed the Kings Highway from London to Chester, and on to northern Wales, Holyhead and Ireland (Lake 1982).

The river valley might have formed another potential routeway in the past. Although there is no convincing distribution of finds spots to confirm this, a scatter of sites are recorded along its course to north and south. Within the town the course of the river today is the result of human engineering, rather than a purely natural one. To the south and (especially) to the north of the town the Weaver can be seen to be following a sinuous path, whilst within the town its approach from the south and exit to the north has been considerably straightened; the clearest indication of its original character is represented by the surviving loop it formed around Nantwich Mill, which was altered by the cutting of Mill Pond (18th Century town plan) i.e. the mill race, along the eastern side, and widening of the river below it. The Environment Agency flood risk map (Fig. 4) effectively shows the shape of the valley as it has been cut by changing meanderings of the river channel. The flood plain broadly coincides with an absence of ancient activity as recorded by archaeological evidence, except that the build-up of post-medieval man-made deposits has raised the ground levels on either side so that the EA map no longer represents the full historic extent of flood risk. The existence of recently discovered waterlogged Roman remains on west and east banks north of the bridge, at Kingsley Fields and Snow Hill, suggests that industrial activity was focused on the river down stream from the road and main area of linear settlement along it.

In later times the importance of salt-working from brine springs, related processing of hides and leather, as well as related activities such as common grazing rights (Beam Street and the Common (Garton 1972;p7)) and animal markets in the town, demonstrate that Roman antecedents continued in post-Roman times. Together with the need for horse care as part of the major routeway (stabling, fodder, bedding, and mucking out), the residues from all these activities would have contributed to the accumulation of large amounts of organic material which, if not removed from the town, would have led to a smelly and disease-prone environment. Evidence for this kind of activity was found at The Lamb Hotel where soil

micromorphological studies have been carried out (Gifford 2005). The serious cholera epidemic in the town of 1850 was the final episode of disease and plague that led to implementation of the Public Health Act and the introduction of sanitation into Nantwich, but by this time deep deposits of organic remains had accumulated. Various fires in the town would also have contributed to the build-up of this material, such as 1254 (Garston 1972; p9) or the Great Fire of 1583, laying down ash, debris and timbers which would have been levelled over the ground before rebuilding.

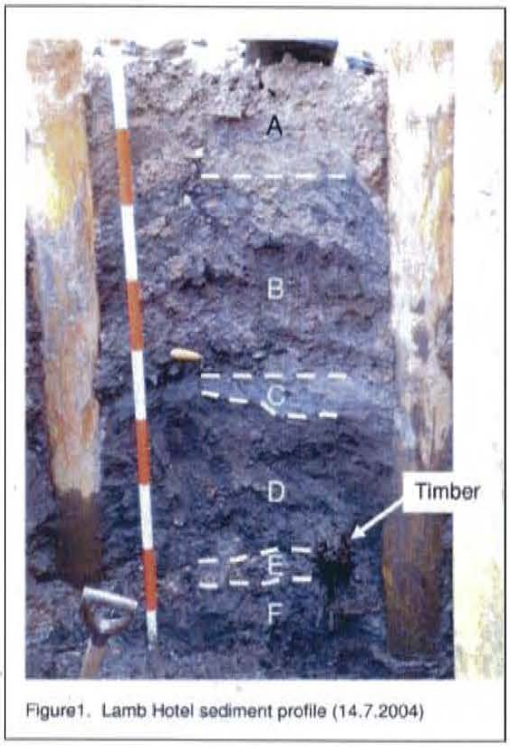


Figure1. Lamb Hotel sediment profile (14.7.2004)

Plates 3 & 4 Waterlogged deposits at The Lamb Hotel: micromorph sequence and timbers

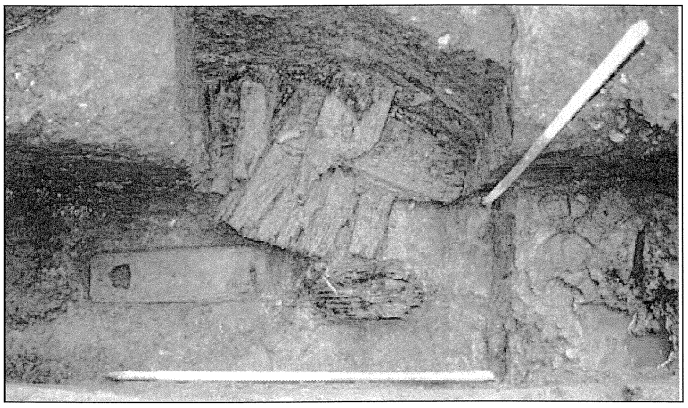
Archaeological evidence shows that waterlogged organic deposits are concentrated along the line of the routeway (Table 1; Fig. 1 & 5), along Welsh Row to spread out at the riverside south and north at St Annes Lane and the Wood Streets, and on the eastern side of the river at the Castle, and along High Street (Plate 6) and Hospital Street (4.5m at The Cheshire Cat, Welsh Row; 4m at St Annes Lane; greater than 3.5m at Snow Hill car park; greater than 3.6m along the High Street; and 3m at The Lamb Hotel). Some of the most comprehensive descriptions and analysis of these deposits come from 2nd Wood Street (Plate 1), Welsh Row and The Lamb Hotel (Plates 3 - 5) (McNeil 1983, EAS 2005, Gifford 2005).

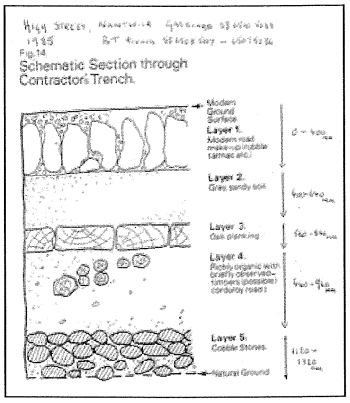
Archaeological investigations that show no evidence for waterlogged deposits (Table 2) provide a probable boundary to these deposits on the south side, and at the east end of Hospital Street (35 Hospital Street has insufficient information to determine depth). To a lesser extent they also suggest a western boundary at Red Lion Lane along Welsh Row.

The lower-lying areas of the town that contain waterlogged remains, either side of Welsh Row in the St Anne's Lane area and Wood Streets, and on the east bank in the castle and Crown Street car park areas, can attribute much of the preservation of organic remains to frequent flooding and a high water table due to their location within the valley bottom. This

advantage cannot, however, have helped with preservation at higher areas such as High Street and Hospital Street, or Kingsley Fields.

The lay-out of the motte and bailey castle may provide a clue as to why deep deposits and organic remains have been found up-hill along the High Street. It has been postulated that the curving nature of the High Street follows the line of the ditch and bank around the bailey (McNeil undated; p.14-15), with the castle moat lying beneath the present roadway. Such a model may account for the discovery of waterlogged deposits at the National Westminster Bank (and in service trenches along High Street (Plate 6)) preserved within the castle ditch. In addition this would have formed an obstacle to the natural patterns of drainage from the higher ground east of High Street, thus perhaps leading to backing up of water and the accumulation of deposits against the castle defences.





Plates 5 & 6 12th Century timber planking and tub-stave from The Lamb Hotel; waterlogged sequence from 1985 service trench in the High Street

The form of the medieval town appears to show a mixture of organic growth and planned layout, with a series of streets radiating out south, east and north of High Street, and probable market infill areas visible in the earliest mapping, between Market Street, Beam Street and the churchyard. In a similar manner long burgage plots stretch back from the High Street to infill the area of the castle and bailey after it went out of use. The earliest residential areas were probably along the traditional routeway of Hospital Street and, to a lesser extent, along Pillory Street. These, and the linear development along Welsh Row and Beam Street, can be seen to have a fairly regular pattern of properties fronting on to the street frontage, with backyards and gardens as strips behind. In these areas domestic rubbish would have been deposited, animals would have been kept and housed, and industrial activities would have been undertaken with consequent waste products accumulating; all of which would have stimulated the build-up of deposits. Any impediment to drainage within these areas would have helped promote wet and anaerobic conditions favouring preservation of organic deposits. The traditional routeway along Hospital Street may well have become raised through successive episodes of repair and resurfacing, thus forming a barrier to easy drainage southwards, and the clay sub-strata above the natural sand would have prevented drainage downwards.

Apart from the River Weaver other more minor watercourses originally existed. To the east of the town a tributary flowed northwards, the Cheney Brook, but this lies c.1km east of the edge of the historic core and would probably have had little influence on drainage patterns for the town centre. Possibly as many as three streams on the west side and four streams on the east, passed through the town as they drained into the Weaver (Garton 1972) and even modern maps show issues and sinks that must relate to the underlying natural system of drainage. Historic mapping shows small watercourses within the historic town, such as Frog

Channel running down the centre of Welsh Row on the 1851 Public Health Map, a series of lodes for riverside properties off Barker Street, and channels to the east of Pepper Street and north of Churchyard Side (1853 public sanitation map). On the 1851 Public Health Act map and on the 1876 1st edition OS map a distinct boundary line can be seen running from its junction with the Weaver opposite the weir, eastwards to form the northern boundary of the Masterton's Hall (Elm House) enclosure. This forms the southern edge for the historic town, and continues along the rear of the properties facing Hospital Street from a point at the junction of London Road and Hospital Street. Water is shown to issue from this point on the EA flood risk map. The presumption must be that this boundary formed a drainage channel on the south side of the town. A narrow lane linking Pillory Street and Elm House with Hospital Street, might indicate another of these ancient streams, and the GIS modelling of elevation data adds supporting evidence to these hypotheses (Fig. 4). This model shows Hospital Street as a watershed between two local catchment areas to north and south of it, which seems to fit with the boundary between waterlogged archaeological remains (on the north side) and absence of such remains (on the south side).

2.6 Analysis of borehole evidence and distribution of waterlogged deposits

Waterlogged deposits, which provide an anaerobic environment for the preservation of archaeological artefacts, have been recorded in a number of archaeological surveys undertaken in Nantwich. Where encountered, the deposits have been described as organic silts of up to around 3m in thickness. Not only have such deposits been recorded from low-lying areas in the vicinity of the River Weaver but also on higher ground beneath the current town centre. Particularly on the higher ground the deposits have been found to be typically underlain by natural granular (sand) strata, probably the second River Terrace Deposits.

Examination of publicly available records of existing borehole logs (Fig. 1 & Table 3) from other (non-archaeological) ground investigations[1] has identified additional evidence of the potential existence of waterlogged deposits alongside the river in the Snow Hill area of the town (included in Table 1). Here, materials described as dark grey / black organic sandy silt with pockets of clay and wood fragments have been recorded to depths of around 6m.

To date, waterlogged deposits have been recorded archaeologically in a relatively small area of the town. To the east of the River Weaver, the area lies between Snow Hill in the north and Hospital Street in the south; at this stage the eastern limit appears to extend to just east of the Church of St Mary. To the west of the river a smaller area has so far been defined, which straddles Welsh Row and, with the inclusion of Kingsley Fields, extends westwards towards the watercourse that crosses Welsh Row in the vicinity of Malbank School.

2.7 Analysis of hydrological modelling

A Geographical Information System (GIS) has been used to derive the hypothetical drainage routes that would exist on the undeveloped surface of the Nantwich town area. Whilst this shows a large number of minor drainage routes joining the tributaries of the River Weaver, which are unlikely to be truly representative of the actual historical drainage scenario, major tributaries do coincide with actual drainage features seen (Fig. 4). As further data relating to the presence of waterlogged deposits become available, correlations with this inferred drainage pattern may become apparent. The known distribution of waterlogged deposits appear to coincide with two significant river meanders and a potentially historical drainage confluence. Additional data will allow further interpretation as the project develops.

[1] Cheshire County Council Geotechnical Services, Investigation at Kingsley Fields, Nantwich, records for boreholes BH10 (364898 352580), BH11 (364957 352458), and BH12 (364964 352410)

LABEL	REFERENCE	NAME	GRID_REF	HEIGHT OD	LENGTH	YEAR_KNOWN	ID	SUMMARY
1	SJ65SE1	Elm House Pillory Street	SJ 66231 52287		23.16	1939	746679	0 - 1.83m Glacial Drift (soil and dry sand), 1.83 - 2.74m Glacial Drift (wet sand underlain by wet gravel), 2.74 - 16.82m Glacial Drift (marl, and clay, some sand), underlain by Keuper Marl
2	SJ65SE2	Elm House Nantwich	SJ 65286 51972		31.57	1939	746680	0 - 24.99m Glacial Drift (soil, sand, clay and loam), wet sand at 1.58 - 2.44m, underlain by Keuper Marl.
3	SJ65SE4 BH1	Bean Bridge Improvement - West Bank	SJ 65103 53503	31.96			746682	0 - 0.6m topsoil, 0.6 - 3.3m clay and sand with fines, 3.3 - 8.16m Boulder Clay (medium to low compressibility), 8.16 - 11.1m laminated clay (medium to high compressibility) with silt and san below 11.10m
3	SJ65SE4 BH2	Bean Bridge Improvement - East Bank	SJ 65103 53503	32.98				0 - 1.2m topsoil, 1.2 - 2.4m clay, 2.4 - 4.98m - sand and gravel with excess fines and peat, 4.98 - 8.1m Bouldey Clay, 8.1 - 13.98m Laminated Clay, 13.98 - 27.72m clay, underlain with Keuper Marl
4	SJ65SE5c	Proposed Sewerage Scheme Nantwich	SJ 65130 53420	34.26			746683	0 - 2.0m Made Ground (fill and topsoil), 2 -12.8m firm to stiff silty clay with sandstone pieces and pebbles, underlain by silty saturated sand
4	SJ65SE5g	Proposed Sewerage Scheme Nantwich	SJ 65130 53420					0 - 1.0 Made Ground, 1.0 - 1.75m clayey sand, 1.75 - 10.0m firm to stiff clay with sand partings between 10.0 and 10.8m, underlain by sand and clay
5	SJ65SE7	Nantwich Bypass 2	SJ 65240 53600		30.00		746685	0 - 6.3m Alluvium, 6.3 - 10.35m Boulder Clay, 10.35 - 13.75m Glacial Deposits, 13.75m - 16.35m Boulder Clay, underlain by Keuper Marl
6	SJ65SE8	Nantwich Bypass 5	SJ 65310 53640		21.70		746686	0 4.5m landslip in River Terrace deposits, 4.5 - 10.3m Boulder Clay, 10.3 - 13.05m Glacial Deposits, underlain by Keuper Marl

7	SJ65SE18	Barony Court Nantwich Tp 1	SJ 65330 53250			746696	
8	SJ65SE19	Barony Court Nantwich Tp 2	SJ 65350 53220			746697	
9	SJ65SE20	Barony Court Nantwich Tp 3	SJ 65360 53200			746698	
10	SJ65SE23	Barony Surface Water Sew 1	SJ 65680 52270			746701	
11	SJ65SE24	Barony Surface Water Sew 2	SJ 65680 52390			746702	
12	SJ65SE25	Barony Surface Water Sew 3	SJ 65750 52500			746703	
13	SJ65SE26	Barony Surface Water Sewbh4/4A	SJ 65600 52530			746704	
14	SJ65SE27	Barony Surface Water Sew 5	SJ 65480 52760			746705	
15	SJ65SE28	Barony Surface Water Sew 6	SJ 65250 52900			746706	
16	SJ65SE29	Barony Surface Water Sew 7	SJ 65300 53110			746707	
17	SJ65SE30	Barony Surface Water Sew 1	SJ 65330 52560			746708	
18	SJ65SE31	Barony Surface Water Sew 2	SJ 65500 52610			746709	
19	SJ65SE32	Barony Surface Water Sew 3	SJ 65530 52530			746710	
20	SJ65SE33	Barony Surface Water Sew 4	SJ 65630 52690			746711	
21	SJ65SE34	Barony Surface Water Sew 5	SJ 65610 52620			746712	
22	SJ65SE35	Barony Surface Water Sew 6	SJ 65500 52600			746713	
23	SJ65SE36	Barony Surface Water Sew 7	SJ 65530 52190			746714	
24	SJ65SE37	Barony Surface Water Sew 8	SJ 65140 53120			746715	
25	SJ65SE38	Barony Surface Water Sew 9	SJ 65100 53250			746716	
26	SJ65SE39	Barony Surface Water Sew 10	SJ 65100 53250			746717	
27	SJ65SE40	Barony Surface Water Sew Tp 1	SJ 65500 52620			746718	
28	SJ65SW5	Bathfields Nantwich	SJ 64944 51896	125.88		644019	0 - 6.56m Glacial Drift (course clay, gravel and sand), 6.56 - 43.55m Glacial Drift (clays, sand and gravel), underlain by Keuper Marl
29	SJ65SW6	Shrewbridge	SJ 64919 51118	125.88	1883	644020	
30	SJ65SW8	Shrewbridge	SJ 64919 51111	35.05		644022	
31	SJ65SW9	Nantwich	SJ 64926 51697	91.44	1883	644023	0 - 3.05m Glacial Drift (course clay), 3.05 - 6.55 Glacial Drift (water bearing course clay and red sand), 6.55 - 43.28m Glacial Drift (clays and sand with pebbles and brine), underlain by Keuper Marl
32	SJ65SW10	Nantwich	SJ 64950 52415	60.66		644024	0 - 7.62m Glacial Drift (alternating sand and gravel), 7.62 - 42.06 Glacial Drift (alternating Red Marl and Red Marl

						with pebbles), underlain by Keuper Marl
33	SJ65SW11	Mr Boult	SJ 64984 52422	129.84	644025	0 - 21.64m Glacial Drift (Red Marl and sand), 21.64 - 42.67m Glacial Drift (sand, clay and Red Marl), underlain by Keuper Marl
34	SJ65SW14	Acton Connecting Sewer Tp 1	SJ 64360 52480		644028	
35	SJ65SW15	Acton Connecting Sewer Tp 2	SJ 64210 52570		644029	
36	SJ65SW26	Nantwhich Embankment 1	SJ 64190 52710	50.19	9.00	644040	0 - 2.0m Made Ground (silty, sandy clay with some gravel), 2.0 - 6.7m Made Ground (clay becoming firm to stiff with depth) damp at 3.4m, 6.7 - 9.0m Glacial Drift (stiff to very stiff silty sandy clay)
37	SJ65SW27	Nantwhich Embankment 2	SJ 64240 52630	50.28	8.00	644041	0 - 6.3m Made Ground (silty sandy clay with some gravel), 6.3 - 8.0m Glacial Drift (stiff silty sandy clay with some gravel) damp at 6.3m
38	SJ65SW28	Nantwhich Embankment 3	SJ 64320 52660	50.22	8.50	644042	0 - 4.5m Made Ground (soft to firm silty sandy clay with some gravel), 4.5 - 8.5m Glacial Drift (clay)
39	SJ65SW29	Nantwhich Embankment Tp 1	SJ 64250 52610	45.10	2.00	644043	0 - 1.9m Made Ground (silty clay to coarse gravel), 1.9 - 2.2m Glacial Drift (silty very sandy clay)
40	SJ65SW30	Nantwhich Embankment Tp 2	SJ 64260 52620	44.30	2.00	644044	0 - 1.0m Made Ground (silty clay to coarse gravel), 1.0 - 2.0m Glacial Drift (silty and sandy clay)
41	SJ65SW31	Nantwhich Embankment Tp 3	SJ 64250 52660	44.60	2.00	644045	0 - 1.0m Made Ground (clayey silty sand to coarse gravel), 1.0 - 1.8m Glacial Drift (damp clay), 1.8 - 2.1m Glacial Drift (clay firm to stiff becoming very sandy)
42	SJ65SW32	Nantwhich Embankment Tp 4	SJ 64220 52690	45.40	1.00	644046	0 - 1.6m Made Ground (firm to stiff sitly very sandy clay), 1.6 - 1.7m Glacial Drift (firm to stiff silty sandy clay)
43	SJ65SW33	Nantwhich Embankment Tp 5	SJ 64200 52720	45.70	1.00	644047	0 - 1.1m Made Ground (silty very sandy clay), 1.1 - 1.5m Glacial Drift (firm to

								stiff silty sandy clay, some gravel)
44	SJ65SW34	Nantwhich Embankment Tp 6	SJ 64200 52710	47.90	1.00		644048	0 - 1.5m Made Ground (silty very sandy clay), 1.5 - 1.8m Glacial Drift (stiff silty sandy clay)
45	SJ65SW35	Nantwhich Embankment Tp 7	SJ 64140 52770	48.70	1.00		644049	0 - 0.9m Made Ground (silt sand and clay), 0.9 - 1.4m Glacial Drift (stiff clay)
46	SJ65SW36	Nantwhich Embankment Tp 8	SJ 64090 52810	48.00	1.00		644050	0 - 0.8m Made Ground (sandy clay with gravel, rootlets and organic matter), 0.8 - 1.4m Glacial Drift (stiff unfissured clay)
47	SJ65SW37	Nantwhich Embankment Tp 9	SJ 64240 52670	46.20	1.00		644051	0 - 1.3m Made Ground (silty sandy clay, with sand and gravel)
48	SJ65SW38	Nantwhich Embankment Tp 10	SJ 64250 52640	45.80	1.00		644052	0 - 0.5m Made Ground (sine to medium sand, occassional gravel), 0.5 - 1.4m Glacial Drift (very clayey sand)
49	SJ65SW39	Malbank Embankment Nant 1	SJ 64180 52710				644053	
50	SJ65SW40	Malbank Embankment Nant 2	SJ 64230 52630				644054	
51	SJ65SW41	Malbank Embankment Nant 3	SJ 64220 52670				644055	
52	SJ65SW42	Malbank Embankment Nant Tp 1	SJ 64240 52620				644056	
53	SJ65SW43	Malbank Embankment Nant Tp 2	SJ 64250 52630				644057	
54	SJ65SW44	Malbank Embankment Nant Tp 3	SJ 64230 52670				644058	
55	SJ65SW45	Malbank Embankment Nant Tp 4	SJ 64210 52690				644059	
56	SJ65SW46	Malbank Embankment Nant Tp 5	SJ 64180 52720				644060	
57	SJ65SW47	Malbank Embankment Nant Tp 6	SJ 64180 52710				644061	
58	SJ65SW48	Malbank Embankment Nant Tp 7	SJ 64130 52760				644062	
59	SJ65SW49	Malbank Embankment Nant Tp 8	SJ 64080 52800				644063	
60	SJ65SW50	Malbank Embankment Nant Tp 9	SJ 64230 52680				644064	
61	SJ65SW51	Malbank Embankment Nant Tp 10	SJ 64240 52650				644065	
62	SJ65SE41	Manor Road Nantwich 1	SJ 65090 53140			1988	746719	
63	SJ65SE42	Manor Road Nantwich 2	SJ 65090 53180			1988	746720	
64	SJ65SE43	Manor Road Nantwich 3	SJ 65090 53230			1988	746721	
65	SJ65SE44	Manor Road Nantwich 4	SJ 65110 53270			1988	746722	
66	SJ65SE123	Peregrine Land Sewer Nantwich 101	SJ 65280 53600	33.20	8.00	1994	746801	0 - 2.9m Made Ground, 2.9 - 8.0m Boulder Clay (soft to firm sandy clay with fine gravel)

67	SJ65SE124	Peregrine Land Sewer Nantwich 102	SJ 65270 53600	33.20	8.00	1994	746802	0 - 1.9m Made Ground, 1.9 - 3.1m fine to medium sand, underlain by Boulder Clay (firm to stiff sandy clay)
68	SJ65SE125	Peregrine Land Sewer Nantwich 103	SJ 65430 53610	38.00	6.10	1994	746803	0 - 1.6m clayey sand with gravel, 1.6 - 6.1m Boulder Clay (firm clay with gravel)
69	SJ65SE126	Peregrine Land Sewer Nantwich 104	SJ 65480 53610	38.25	6.00	1994	746804	0 - 1.2m clayey silty sand, 1.2 - 6.0m Boulder Clay soft through to stiff with depth
70	SJ65SE127	Peregrine Land Sewer Nantwich Tp 1	SJ 65310 53610		3.80	1994	746805	0 - 0.5m Made Ground (limestone gravel and cobbles), 0.5 - 3.8m Glacial Drift (firm clay occassional gravel)
	SJ65SE128							0 - 0.4m Made Ground (limestone gravel and cobbles), 0.4 - 3.5m Glacial Drift (soft to firm clay)
71	SJ65SE129	Peregrine Land Sewer Nantwich Tp 3	SJ 65400 53620		1.50	1994	746807	0 - 0.4m Made Ground (limestone gravel and cobbles with a plastic layer at 0.6m), 0.4 - 3.5m Glacial Drift (firm clay)
72	SJ65SE130	Peregrine Land Sewer Nantwich Tp 4	SJ 65410 53620		2.50	1994	746808	0 - 2.5m Made Ground (limestone gravel and cobbles, into firm to stiff clay)
73	SJ65SE131	Peregrine Land Sewer Nantwich Tp 5	SJ 65540 53610		3.70	1994	746809	0 - 1.2m Made Ground (very fine to medium sand, some gravel), 1.2 - 3.7m Glacial Drift (stiff to very stiff clay, some gravel and sand)
74	SJ65SE132	Land Adjacent To Elm House Nantwich Tp 1	SJ 65170 51910		3.00	1991	746810	0 - 0.8m Made Ground (sandy topsoil with brick fragments), 0.8 - 3.0m Glacial Drift (sand, gravel to stiff silty sandy clay)
75	SJ65SE133	Land Adjacent To Elm House Nantwich Tp 3	SJ 65160 51920		3.00	1991	746811	0 - 0.85m Made Ground (topsoil), 0.85 - 3.0m Glacial Drift (sand and gravel becoming stiff sandy clay at depth), moist at 1.6m
76	SJ65SE134	Land Adjacent To Elm House Nantwich Tp 4	SJ 65170 51940		3.50	1991	746812	0 - 2.1m Made Ground (sand and gravel), 2.1 - 3.5m Glacial Drift (firm to stiff clay)
77	SJ65SE135	Land Adjacent To Elm House Nantwich Tp 5	SJ 65140 51940		3.00	1991	746813	0 - 1.1m Made Ground (clayey sandy topsoil), 1.1 - 3.0m Glacial Drift (sand

							and gravel, with firm clay below)
78	SJ65SE136	Land Adjacent To Elm House Nantwich Tp 7	SJ 65150 51990	3.10	1991	746814	0 - 1.1m Made Ground (clayey sandy topsoil with gravel), 1.1 - 3.1m Glacial Drift (sand and gravel, with firm to stiff clay below)
79	SJ65SE137	Land Adjacent To Elm House Nantwich Tp 8	SJ 65140 51990	3.50	1991	746815	0 - 0.8m Made Ground (sandy clayey topsoil), 0.8 - 3.5m Glacial Drift (sand and gravel with firm to stiff sandy silty clay below)
80	SJ65SE138	Land Adjacent To Elm House Nantwich Tp 9	SJ 65140 52000	3.30	1991	746816	0 - 0.75m Made Ground (sandy topsoil), 0.75 - 3.3m Glacial Drift (sand, moist at 1.1 - 1.2m, stiff clay at 3.3m)
81	SJ65SE139	St Josephs School Nanwich Tp1	SJ 66290 51980	3.10	1989	746817	0 - 3.1m Glacial Drift (clayey with some sand and gravel), water seepage at 1.6m
82	SJ65SE140	St Josephs School Nanwich Tp2	SJ 66280 52030	3.00	1989	746818	0 - 3.0m Glacial Drift (sandy with some clay) damp from 2.1m, slight water seepage at 1.45m
83	SJ65SE141	St Josephs School Nanwich Tp3	SJ 66270 52080	3.00	1989	746819	0 - 3.0m Glacial Drift (sandy with some clay lenses), slight water seepage at 2.2m
84	SJ65SE142	St Josephs School Nanwich Tp4	SJ 66360 52120	3.10	1989	746820	0 - 3.1m Glacial Drift (sand with clay content increasing with depth), slight water seepage at 1.15m and 2.75m
85	SJ65SE143	St Josephs School Nanwich Tp5	SJ 66380 52050	3.00	1989	746821	0 - 3.0m Glacial Drift (sand with clay content increasing with depth)
86	SJ65SE144	St Josephs School Nanwich Tp6	SJ 66380 51980	2.80	1989	746822	0 - 2.8m Glacial Drift (sand), water seepage at 1.47m
87	SJ65SE145	St Josephs School Nanwich Tp7	SJ 66480 52000	3.20	1989	746823	0 - 3.2m Glacial Drift (sand, with clay and gravel below 2.9m), slight water seepage at 2.3m
88	SJ65SE146	St Josephs School Nanwich Tp8	SJ 66500 52070	3.05	1989	746824	0 - 3.05m Glacial Drift (sand with silty clay and some gravel below 2.95m), slight water seepage at 1.2m and 2.5m
89	SJ65SE147	St Josephs School Nanwich Tp9	SJ 66440 52140	2.95	1989	746825	0 - 2.95m Glacial Drift (sand), slight water seepage at 2.0m
90	SJ65SE148	St Josephs School Nanwich Tp10	SJ 66430 52060	3.10	1989	746826	0 - 3.1m Glacial Drift (sand becoming

								silty below 0.45m)
91	SJ65SE149	Cronkinsons Farm Nantwich Tp 1	SJ 65710 51880		2.30	1989	746827	0 - 0.4m clayey sandy topsoil, 0.4 - 2.3 stiff sandy clay
92	SJ65SE152	Cronkinsons Farm Nantwich Tp 4	SJ 65940 51830		3.20	1989	746830	0 - 0.3m clayey sandy topsoil, 0.3 - 1.3m sandy clay, 1.3 - 2.4m sand with organic material, wet, 2.4 - 3.2m stiff sandy clay with gravel
93	SJ65SE153	Cronkinsons Farm Nantwich Tp 5	SJ 65990 51860		3.00	1989	746831	0 - 0.6m sandy topsoil, 0.6 - 3.0m stiff sandy clay with gravel
94	SJ65SE154	Cronkinsons Farm Nantwich Tp 6	SJ 65990 51810		3.70	1989	746832	0 - 0.7m Made Ground (ashes and pottery), 0.7 - 3.7m stiff sandy clay with peat lenses
95	SJ65SE155	Cronkinsons Farm Nantwich Tp 7	SJ 65980 51750		2.80	1989	746833	0 - 0.3m sandy silty topsoil, 0.3 - 1.0m medium sand, 1.0 - 2.8m stiff sandy clay occasional gravel
96	SJ65SE156	Cronkinsons Farm Nantwich Tp 8	SJ 65970 51700		3.40	1989	746834	0 - 0.3m sandy topsoil, 0.3 - 1.0m clayey sand, 1.0 - 3.4m stiff sandy clay, occasional 75mm medium sand bands with seepage
97	SJ65SE157	Cronkinsons Farm Nantwich Tp 9	SJ 65910 51700		3.00	1989	746835	0 - 0.75m Made Ground (ash, pottery and occasional bricks), 0.75 - 3.0m firm-stiff clay with some gravel
98	SJ65SE158	Cronkinsons Farm Nantwich Tp 10	SJ 65910 51770		3.00	1989	746836	0 - 0.2m sandy topsoil, 0.2 - 0.7m sandy clay, 0.7 - 3.0m stiff sandy clay with some gravel, fragmented and wet below 2.2m
99	SJ65SE159	Cronkinsons Farm Nantwich Tp 11	SJ 65910 51820		3.00	1989	746837	0 - 0.3m sandy topsoil, 0.3 - 3.0m firm sandy clay, some tile fragments, some gravel
100	SJ65SE160	Cronkinsons Farm Nantwich Tp 12	SJ 65850 51820		2.80	1989	746838	0 - 0.3m sandy topsoil and sandy clay, 0.3 - 2.8m very stiff sandy clay with gravel, friable below 2.65m
101	CCC 11487	Kingsley Fields BH 8	SJ 64857 52623	33.30	19.95	2001	BH8	First 7m of log missing, 8.0 - 19.95 firm and stiff red clay occ gravel
102	CCC 11487	Kingsley Fields BH 9	SJ 64872 52622	33.50	4.45	2001	BH9	0 - 1.95 loose brown silty fine sand with clay layers below 1.45, 1.95 - 3.45 soft grey brown sandy clay occ.gravel & organic frags, 3.45 - 4.45 loose brown silty fine sand occ gravel organic frags

103	CCC 11487	Kingsley Fields BH 9A	SJ 64872 52622	34.50	14.95	2001	BH9A	0 - 1.0 dk brown clayey silty fine sand, 1.0 - 2.3 loose dk brown v silty fine sand, 2.3 - 3.8 soft dk brown & dk grey sandy organic clay organic matter & silt layers, 3.8 - 4.8 dense sand & gravel, 4.8 - base laminated silty sand and stiff red clay
104	CCC 11487	Kingsley Fields BH 9B	SJ 64872 52622		30.50	2001	BH9B	0 - 0.9 topsoil, 0.9 - 3.2 soft brown clayey silt, 3.2 - 4.3 soft brown silty clay,4.3 - 5.0 small gravel & fine brown sand, 5.0 - base laminated deposits of firm brown silty clay
105	CCC 11487	Kingsley Fields BH 10	SJ 64898 52580	35.40	6.50	2001	BH10	0 - 1.9 made ground loose black silty clayey v sandy soil occ gravel pottery and layers of red brown soil clay, 1.9 - 3.4 v soft dk grey sandy organic clay with silt layers, 3.4 - base soft brown sandy clay with organic matter occ gravel layers of dk brown organic laminated clay & wood frags
106	CCC 11487	Kingsley Fields BH 11	SJ 64957 52458	36.00	8.45	2001	BH11	0 - 2.9 made ground loose black v silty sandy soil with bricks wood glass wire, 2.9 - 6.1(alluvium) loose black fine organic sandy silt wood frags occ gravel pockets of sand & clay, 6.1 - 7.8 red brown sandy clay occ gravel, 7.8 - base medium dense red brown silty sand
107	CCC 11487	Kingsley Fields BH 12	SJ 64964 52410	36.30	10.45	2001	BH12	0 - 2.7 made ground soft sandy organic clay occ gravel brick frags ash, 2.7 - 5.8 loose dk grey v sandy silt occ gravel organic matter & wood frags, 5.8 - 6.5 soft grey sandy clay organic matter & wood frags, 6.5 - 7.9 loose grey silty sandy gravel, 7.9 - base brown sandy clay and medium dense sand
108	CCC 11487	Kingsley Fields TP14	SJ 64910 52555	36.40	2.70	2001	TP14	0 - 2.4 made ground black sandy soil bricks wire concrete wood, 2.4 - 2.6 black sandy soil, 2.6 - 2.7 firm grey

								sandy clay,
109	CCC 11487	Kingsley Fields TP15	SJ 64939 52505	36.20	3.00	2001	TP15	0 - 1.7 topsoil & made ground black silty soil bricks tile pottery concrete woods rags, 1.7 - 2.7 black sandy topsoil occ gravel & coal, 2.7 - 3.0 red brown v soft sandy clay black organic pockets

Table 3 BGS borehole data

2.8 3-D modelling of deposits

The data compiled from archaeological investigations, borehole logs and elevation survey has been modelled to study various possibilities for interpolation to derive thickness and depth-to plots. With the current information, there is insufficient data (9 out of 29) to derive any form of meaningful surface illustrating the depth-to organic deposits. An interpolation of deposit thickness (Figs. 6 & 7) has been attempted, however, caution must be used in deriving any interpretation from it. The variation largely reflects the distribution of data rather than thickness characteristics. In performing the kriging, it was noted that there was little spatial autocorrelation between distance and thickness. This is likely to reflect data quality rather than archaeological variation.

Effectively, we can conclude that there is a definite need to systematically collect more data (borehole programme), and that the borehole design should cover ground that currently has little data, as well as ground previously investigated.

3.0 DISCUSSION

3.1 Relationship between waterlogged deposits, natural geology & topography

A review has been undertaken of the mapped geology beneath Nantwich in relation to those locations where waterlogged deposits have either been proved as present or absent in previous archaeological surveys and other ground investigations. The results of the review indicate that the waterlogged deposits appear to be restricted mostly to the areas of the oldest parts of the town which are underlain by Alluvium and/or River Terrace Deposits along the Weaver; to date the waterlogged deposits have not been encountered where the ground is underlain by Glacial Till. This relationship is illustrated in Figure 3. The apparent reverse logic for waterlogging to have occurred on sands rather than clay can be explained by the fact that the River Terrace sands would be prone to becoming saturated as they are bedded on Boulder Clay (Glacial Till) and are located within a zone of many aquifers.

A reasonably certain boundary between waterlogged deposits and non-waterlogged deposits can be traced along Mill Street and Hospital Street, with preserved organic remains confined to the north side, as far east as the boundary between River Terrace Deposits and Glacial Till, immediately west of 35 Hospital Street. A similar boundary to the south of Welsh Row can be drawn at the southern end of St Anne's Lane, although this appears to have no relation to the geology; it may instead relate to topographic location in that the southern end of St Anne's Lane joins with the ancient loop of the river around the mill and that a low-lying basin lay in this area (possibly part of an earlier meander) which has been filled by medieval and post-medieval deposits (Gifford 2006a & b). The local relief would also indicate the probable western extent of waterlogged deposits along Welsh Row (Figs. 2 & 4) with a relatively low-lying area defined by the Wood Streets and St Anne's Lane area, and then a steeper slope to the west of them; Figure 1 and 6 show that archaeological evidence for deep stratification and organic remains is confined within this area.

The northern boundary is less easily defined but it is clear that the Wood Streets, Snow Hill and the southern area of Wall Lane are included within the area of waterlogging. A single absence of evidence location is plotted at the northern end of Wood Street (Figs. 1 and 4), which comes from an observation made in 1982 of a 2m deep shaft through riverine clays, but this also refers to briquetage, ash and charcoal. There is therefore some ambiguity because the level at which these industrial deposits were found is not recorded (Hutchings 1985). On the east side of the river at Snow Hill, however, Paula Hutchings observed another deep shaft at the same time in which she clearly records wooden posts and "grey-black crumbley soil", and so has differentiated between the sequence on either side of the river. The balance of evidence would suggest that alluviated deposits lap up against the north end of the Wood Streets, perhaps due to another meander in the ancient river (Fig. 4), and thus provide an edge on this side of the waterlogged deposits. Boreholes for the new Snow Hill – Kingsley Fields road in 2001 identified deep organic deposits on the east side fo the river, at one point overlain by alluvium (Table 1: BH10). The northern extent on the east side of the river therefore, remains to be defined.

Kingsley Field appears to be an anomalous location in relation to the spatial pattern of waterlogged deposits that has been plotted (Fig. 1). Although this conforms with the geological pattern, lying on 2nd River Terrace deposits, it lies at c.4m higher than the focus of waterlogged deposits clustered around Welsh Row, and is separated from this focus by a number of investigations on the north side of Welsh Row which have demonstrated an absence of organic remains. The altitude of Kingsley Field at c.40m AOD is, however, consistent with waterlogged deposits on the east side of the river along the High Street and Hospital Street, but the deposits do not manifest themselves in the same way. On the east side the evidence suggests an extensive spread, or blanket waterlogging. In contrast at

Kingsley Field excavations have revealed well-preserved organic remains within isolated features cut into the underlying geology. The interpretation for this dichotomy would seem to lie with the social context, i.e. Kingsley Field deposits were formed from Roman industrial activity over a limited period of time, whereas the eastern town deposits were formed over many centuries from concentrated domestic and industrial activities.

3.2 Proposed Investigation

Based on the above information it is proposed that the archaeological coring investigation should be undertaken in two phases. The first phase would aim to better define the lateral extent of waterlogged deposits beneath Nantwich with investigation locations being selected to confirm the southern and eastern extent of the deposits and better define the northern and western extent (within the constraints of accessibility within the town). The second phase would then provide a more targeted investigation of features of potential archaeological interest within the area of the waterlogged deposits defined at phase 1.

The prime location for stage 1 will include the Bus Station/Town Hall area which straddles the geological boundary and has also not been subject to previous archaeological investigations. In addition the Dog Lane – Wall Lane – Snow Hill area needs investigation to define deposits northwards from Beam Street. No archaeological investigations or borehole information is available for Bean Street itself, and therefore coring to the rear of properties facing Bean Street would be informative. On the south side coring needs to be targeted in the area between Barker Street and Mill Street.

On the west bank of the river coring should aim to define the southern limits to waterlogging by investigating the south end of St Anne's Lane and north end of Riverside. The western edge could be tested by coring in the backs of properties facing Welsh Row and east of Queens Drive, and also in the back plots south of Kingsley Nursery, with further boreholes at the northwestern edge of the Wood Streets to confirm the northern extent of waterlogging in this area.

3.3 Recommendations and further options

A staged approach to the coring programme is recommended, suggested as an option in the tender documents, and further substantiated above. Access arrangements will constrain locations and timing for proposed coring, and therefore a greater number of potential locations should be identified than will eventually be drilled. Choices can be made dependent on strategic importance and/or availability of access. The results of the first stage of coring may well help to define what would be most useful for a second, and possibly third stage of coring, so that an iterative process can be adopted to maximise the results from this programme of work.

The heterogeneous nature of the drift deposits is likely to give rise to variable groundwater quality, influenced by the nature of the deposits (e.g. organic content), groundwater movement and the presence of confining layers. It has therefore been recommended in proposals for this work that groundwater quality monitoring be undertaken over the long-term from at least three locations either side of the river (from designated piezometer installations). This would involve the use of a multi-parameter water quality meter capable of measuring;

- dissolved oxygen
- pH
- redox potential
- total dissolved salts and
- conductivity

Additional groundwater samples may also be taken for laboratory analysis.

This information would allow continuing assessment of the aerobic/anaerobic conditions in groundwater in the study area and its chemical content to be made in the future and as a comparative exercise with the baseline established by the coring programme.

4.0 CONCLUSIONS

The study has compiled diverse forms of evidence in order to plot the known distribution of waterlogged deposits against the geological, hydrological, topographical and social background. It has established a baseline understanding for the factors that have contributed to formation of such deposits and has identified key areas where strategic investigation should be carried out as part of the coring programme in order to better define the extent of the waterlogged deposits. It has also identified two different types of waterlogged environment: the blanket deposits associated with domestic and industrial activities of considerable longevity within the core of the historic medieval settlement, as opposed to isolated pockets of waterlogging derived from limited periods of activity at more peripheral locations. In effect this means that it is relatively simple to predict the presence of well-preserved medieval remains, but far less easy to undertake this exercise for Roman remains.

5.0 CLOSURE

This report has been prepared by SLR Consulting Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Cheshire County Council and English Heritage; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

6.0 ACKNOWLEDGEMENTS

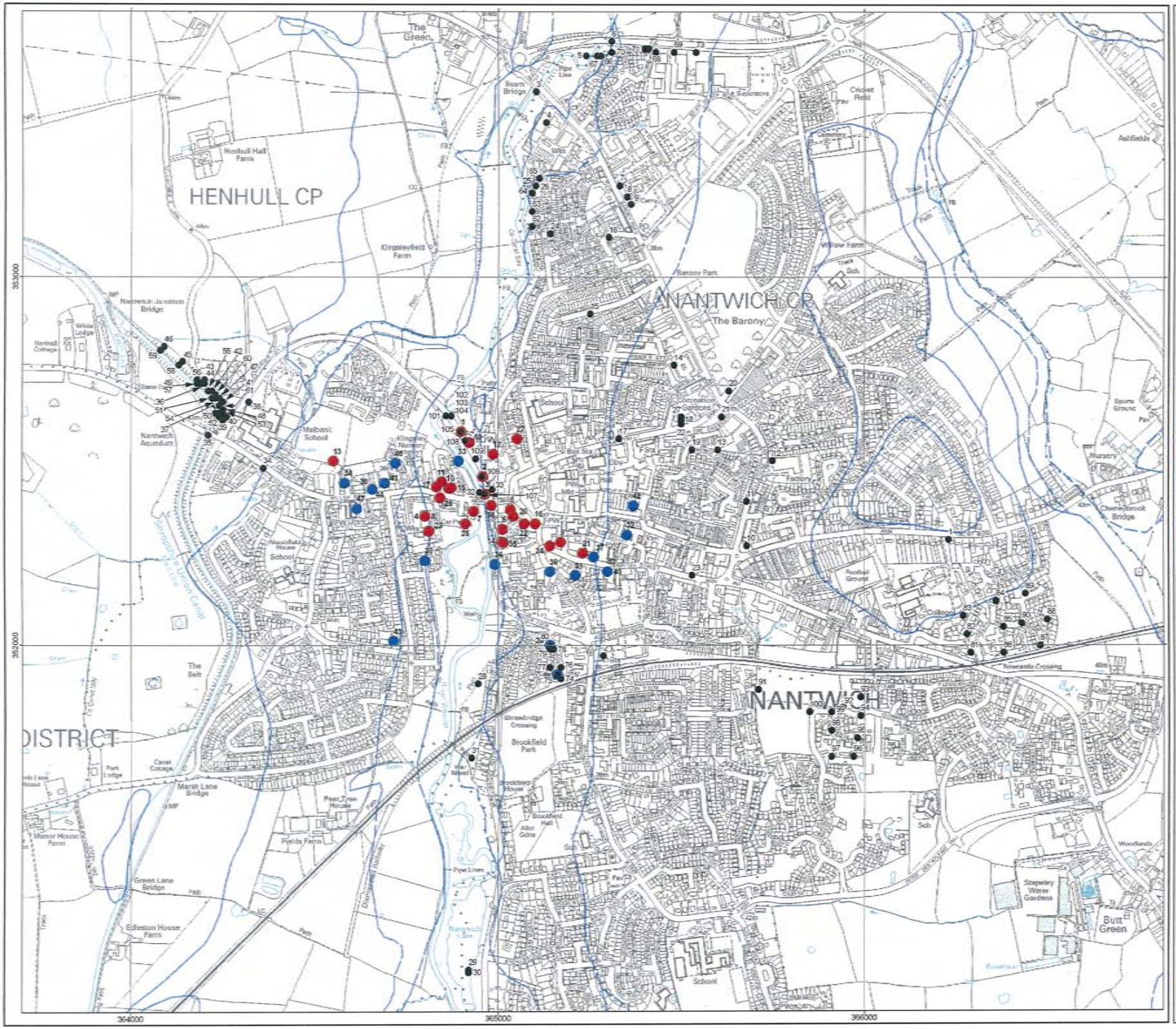
This study has been undertaken by the following SLR personnel:

Tim Malim (Archaeology and Project Management); John Mathews (Geology); Claire Parsons and James Holt (GIS); Grace Chillingworth (Hydrogeology). Thanks are due to Rob Edwards of Cheshire County Council's Historic Environment Record, Mark Leah HE Planning Archaeologist and to Dave Smith of CCC's Engineering Service for their help in supplying background information. The steering committee consists of Jill Collens (CCC HE team leader), Jennie Stopford (English Heritage Inspector of Ancient Monuments) and Sue Stallibrass (English Heritage Regional Science Advisor).

7.0 BIBLIOGRAPHY

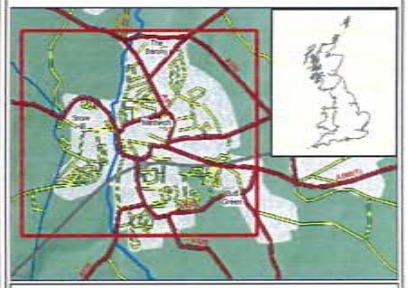
Earthwork Archaeological Services 2005	Proposed Redevelopment at The Three Pigeons Inn, Welsh Row, Nantwich: A Programme of Archaeological Evaluation Project No. E828
Garton E 1972	*Nantwich Saxon to Puritan* Johnson & Son, Nantwich
Gifford 2005	The Lamb Hotel An Archaeological Watching Brief Report No. 11000.04.R01
Gifford 2006a	St Anne's Lane: Archaeological Evaluation Report No. 11998.R03
Gifford 2006b	St Anne's Lane: Post-Excavation Assessment Report No. 11998.R06
Hutchings P 1985	Cheshire Archaeological Bulletin 10
Lake J 1982	*A History and Guide to Nantwich* Print Seventy, Crewe
McNeil Sale R et al (undated)	Crown Car Park Excavations Interim Report
McNeil R 1983	Two 12th – century Wich Houses in Nantwich, Cheshire *Medieval Archaeology XXVII*
Poole, E.G. and Whiteman, A.J 1966	Memoirs of the Geological Survey of Great Britain, England and Wales, Geology of the country around Nantwich and Whitchurch (explanation of Sheet 122), HMSO

FIGURE 1



LEGEND

- BGS - held boreholes
- Waterlogged
- Not Waterlogged
- Geology - drift



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Latitude Of Origin = 49 °

CHESHIRE COUNTY COUNCIL

Site	Nantwich
Project	Waterlogged Deposit Investigation

Drawing

Distribution of Existing Subsurface Information

Date	MAY 2007	Drawing No. 1
Scale at A3 paper size	1:10,000	

406.0888.00003

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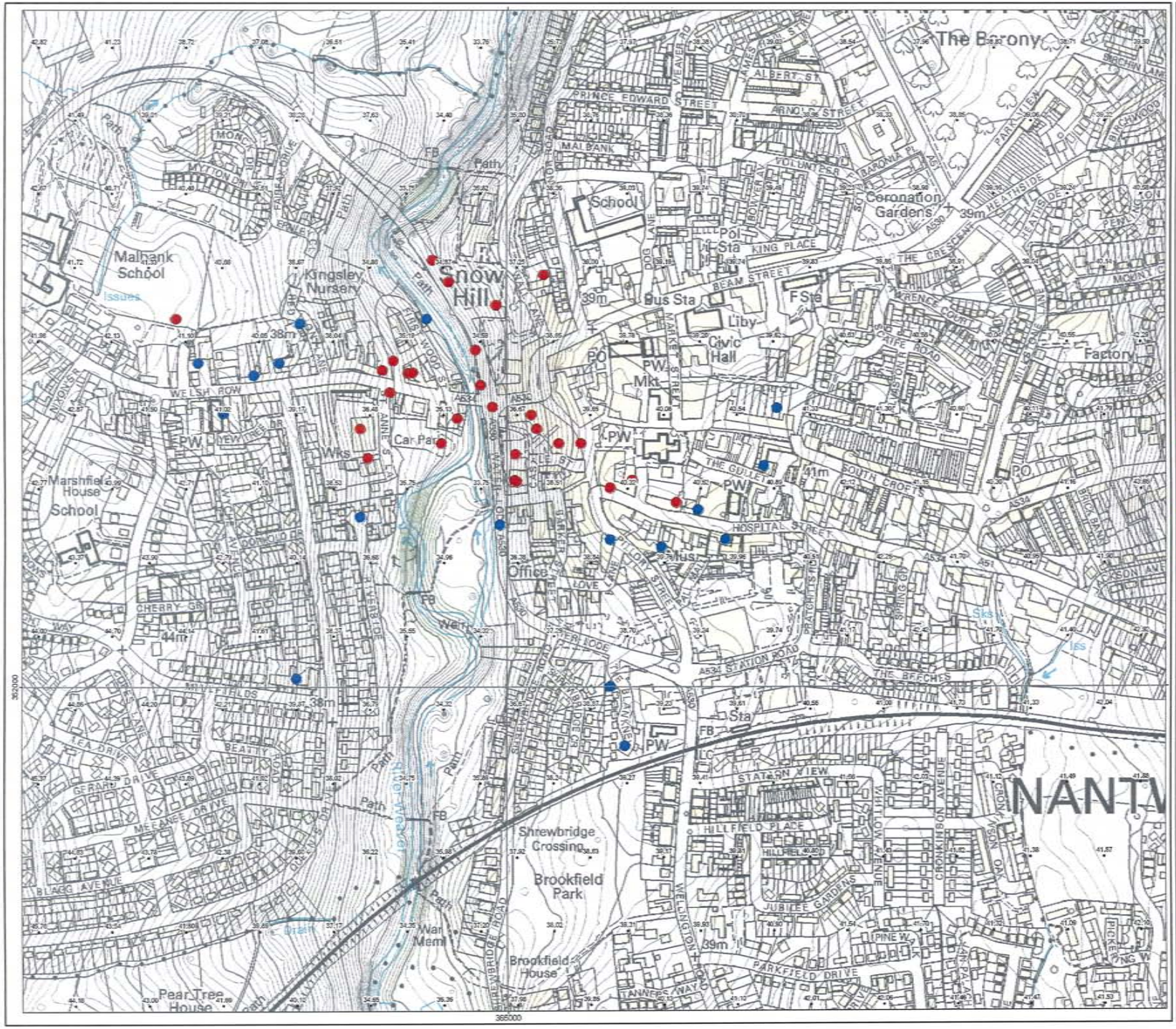
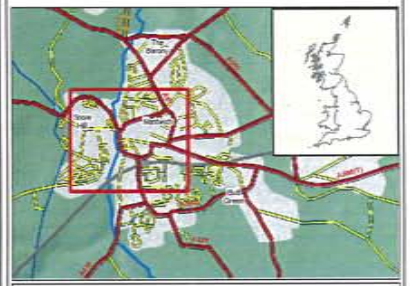
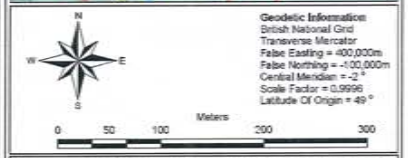
FIGURE 2



LEGEND

- Waterlogged
- Not Waterlogged





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Latitude Of Origin = 49 °

CHESHIRE COUNTY COUNCIL

Site	Nantwich
Project	Waterlogged Deposit Investigation

Drawing

Waterlogged Deposit Distribution: Elevation

Date	MAY 2007	Drawing No. 2
Scale at A3 paper size	1:5,000	

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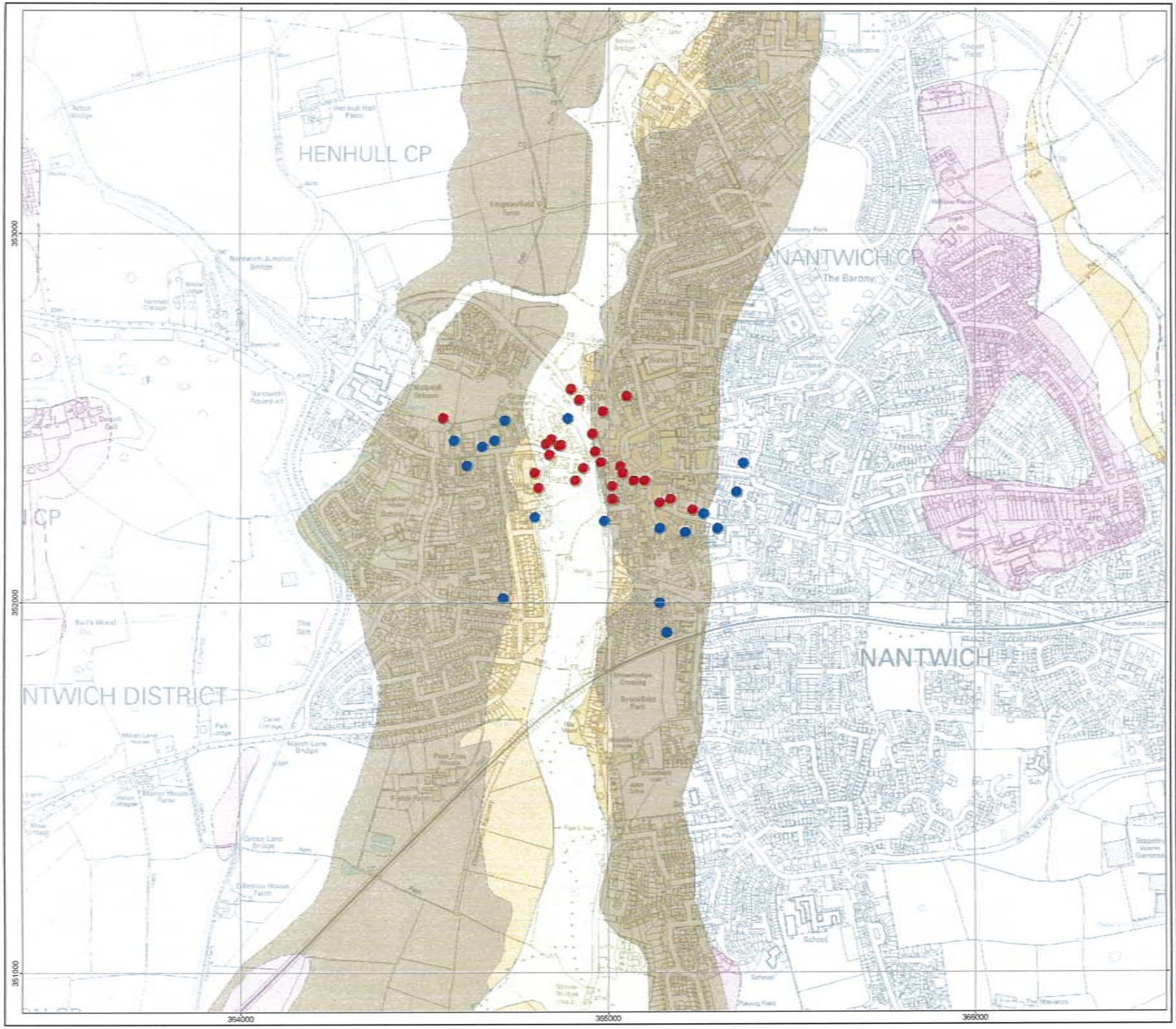
FIGURE 3

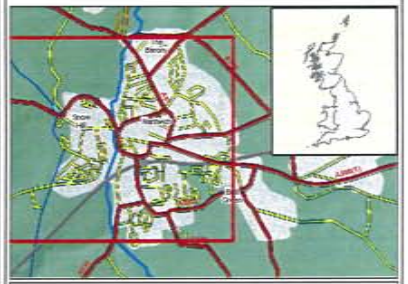


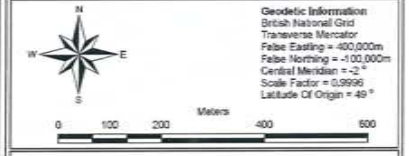
LEGEND

- Waterlogged
- Not Waterlogged

Geology - drift

- Alluvium
- River terrace deposits, 1
- River terrace deposits, 2
- Glaciofluvial deposits (undifferentiated)
- Till





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CHESHIRE COUNTY COUNCIL

Site	Nantwich
Project	Waterlogged Deposit Investigation

Drawing

Waterlogged Deposit Distribution: Local Geology - drift

Date	MAY 2007	Drawing No. 3
Scale at A3 paper size	1:10,000	

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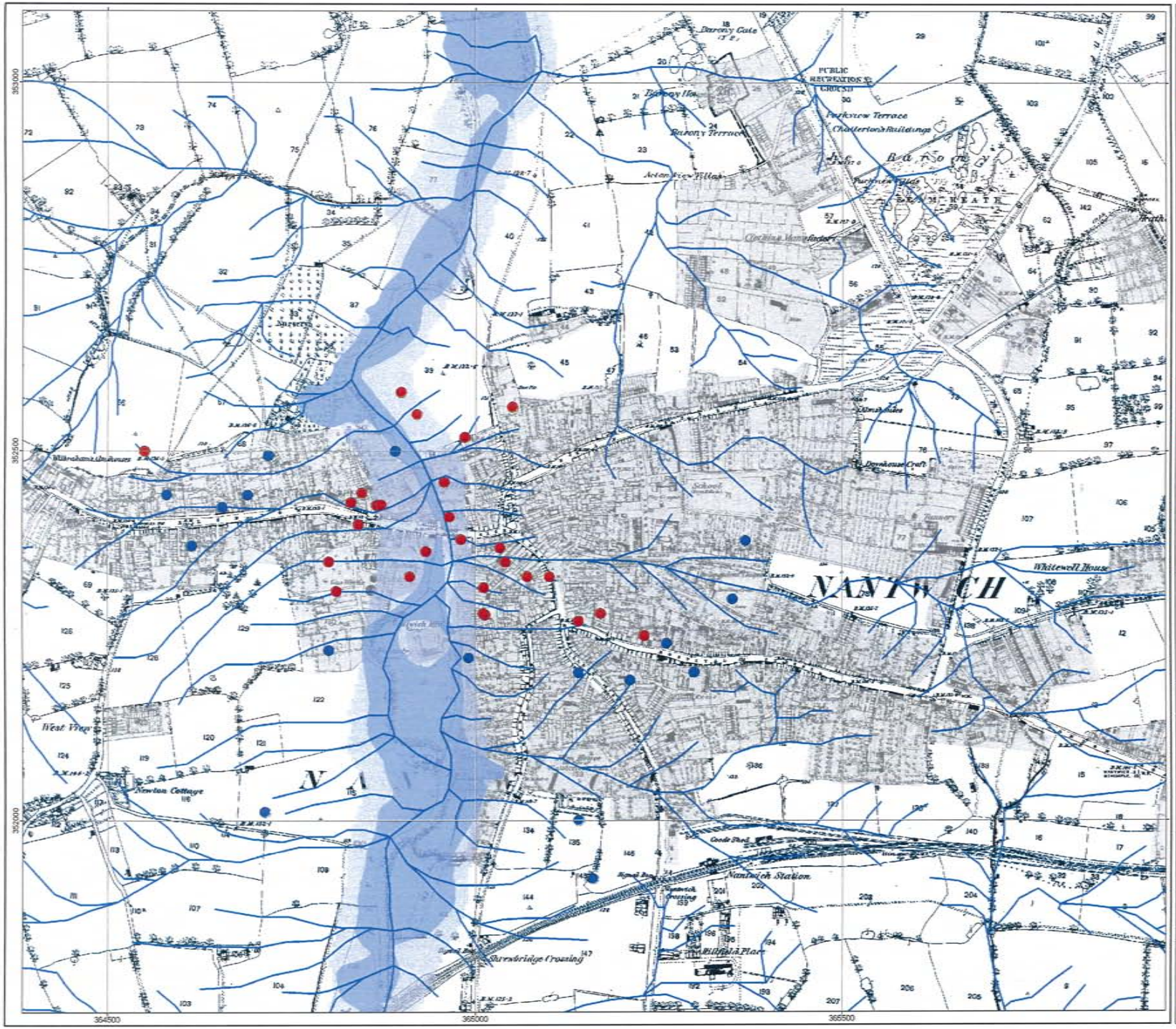
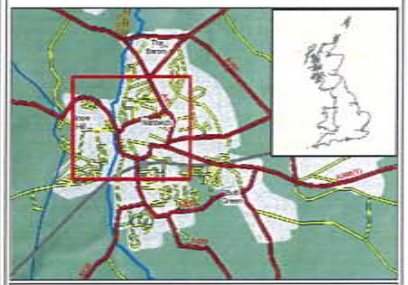
FIGURE 4



LEGEND

- Waterlogged
- Not Waterlogged
- Natural flow accumulation paths
- Flood zone 3
- Flood zone 2
- Settlement



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CHESHIRE COUNTY COUNCIL

Site	Nantwich
Project	Waterlogged Deposit Investigation
Drawing	**Waterlogged Deposit Distribution: Hydrology: Flood zones, Natural surface flow accumulation paths OS first edition: circa 1876-1877**
Date	MAY 2007
Scale at A3 paper size	1:5,000
Drawing No.	4

406.0888.00003

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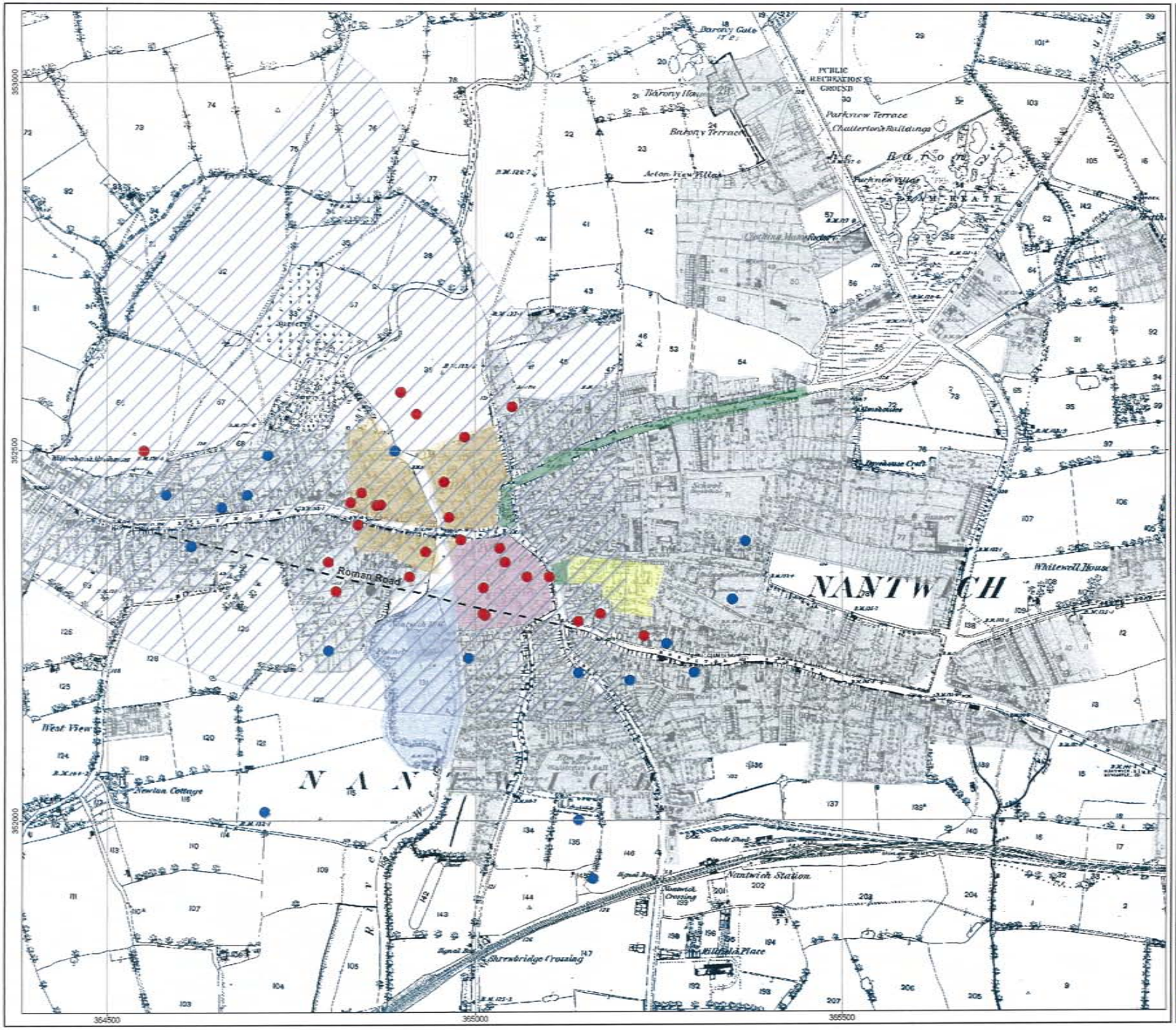
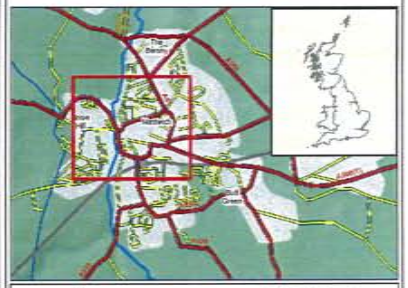
FIGURE 5



LEGEND

- Waterlogged
- Not Waterlogged
- Roman Road
- Market Place
- Area of roman activity
- Nantwich Castle
- Water Mill
- St Mary's Church
- Saltworking Area
- Settlement



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Scale Factor = 0.9996
Latitude Of Origin = 49°

CHESHIRE COUNTY COUNCIL

Site	Nantwich
Project	Waterlogged Deposit Investigation
Drawing	**Waterlogged Deposit Distribution: Features of Archaeological Interest - from Historic Towns Survey (2002) OS first edition: circa 1876-1877**
Date	MAY 2007
Scale at A3 paper size	1:5,000
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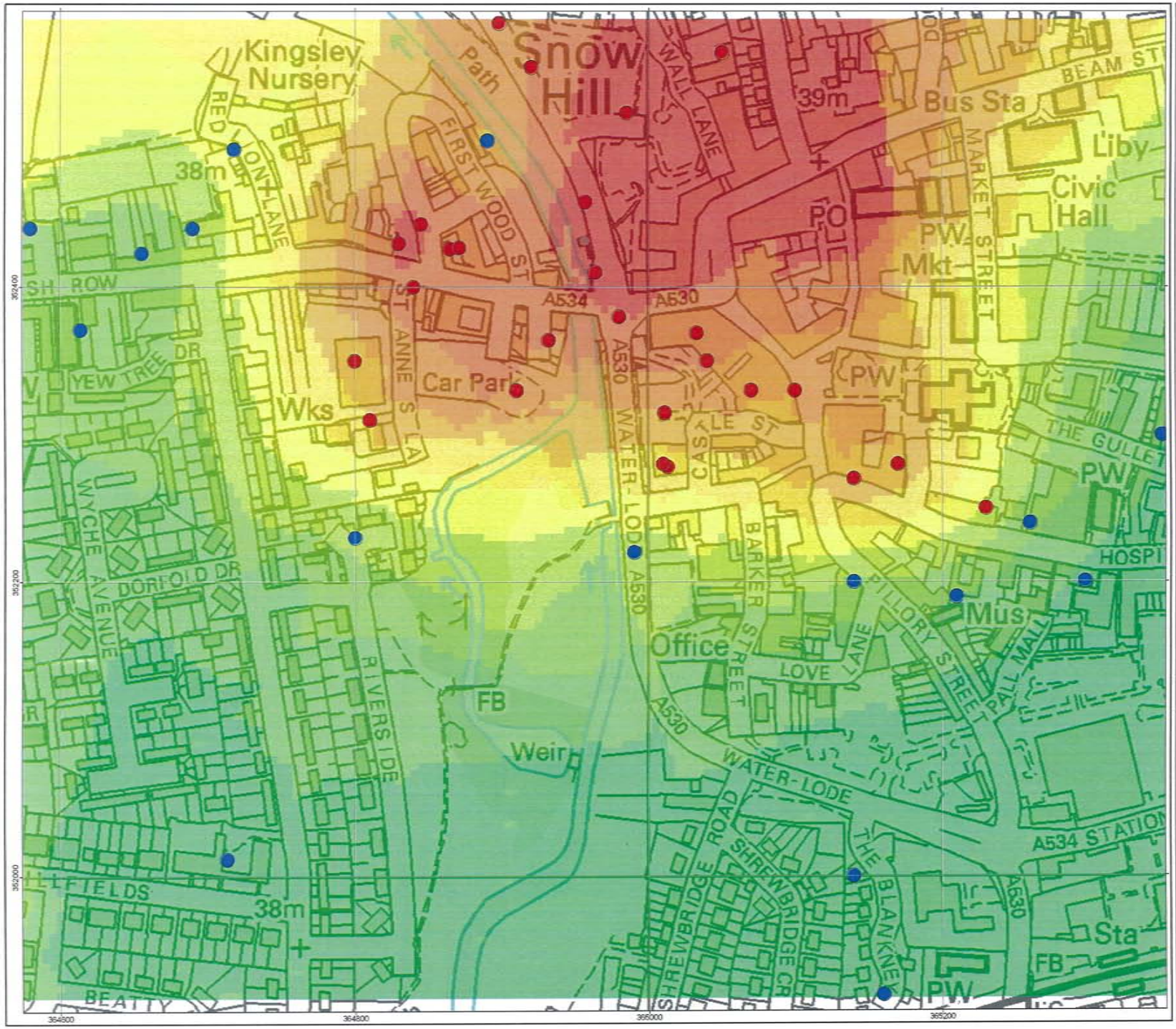
FIGURE 6

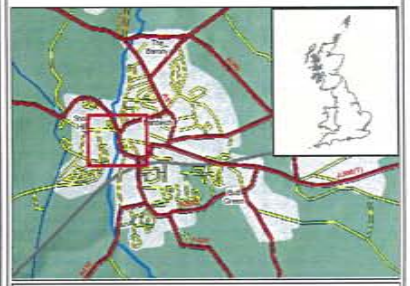


LEGEND

- Waterlogged
- Not Waterlogged

Thickness of organic deposits (m)

- 0 - 0.3
- 0.31 - 0.58
- 0.59 - 0.85
- 0.86 - 1.11
- 1.12 - 1.39
- 1.4 - 1.69
- 1.7 - 1.99
- 2 - 2.29
- 2.3 - 2.61
- 2.62 - 4.5



N, W, E, S

Meters: 0, 25, 50, 100, 150

Geodetic Information
British National Grid
Transverse Mercator
False Easting = 400,000m
False Northing = -100,000m
Central Meridian = -2 °
Scale Factor = 0.9996
Latitude Of Origin = 49 °

CHESHIRE COUNTY COUNCIL

Site	Nantwich
Project	Waterlogged Deposit Investigation

Drawing

Waterlogged Deposit Distribution: Interpolated Thickness (m)

Date	MAY 2007	Drawing No. 6
Scale at A3 paper size	1:2,500	

406.0889.00003

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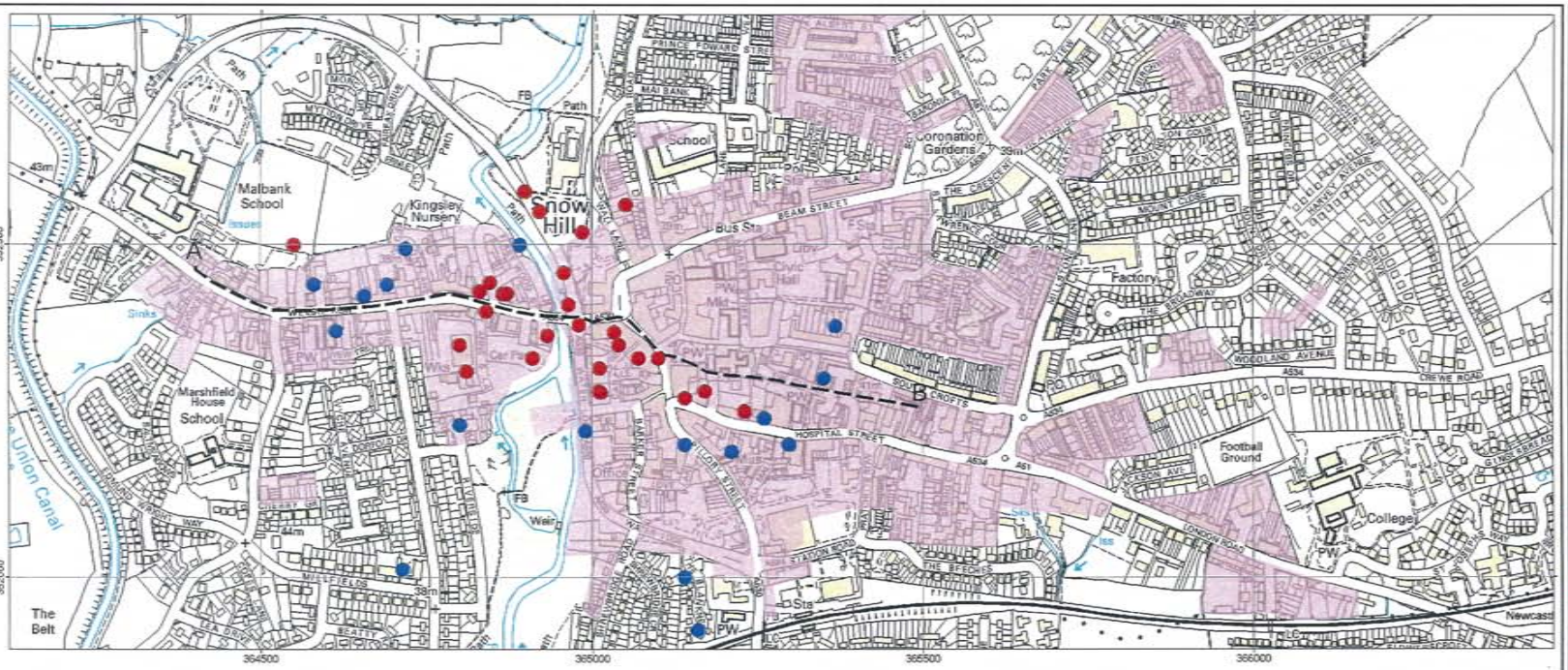
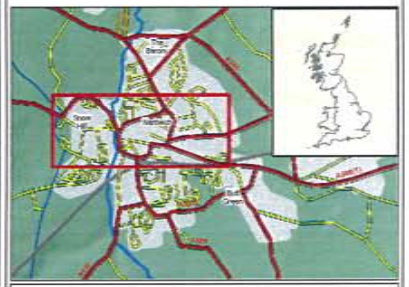
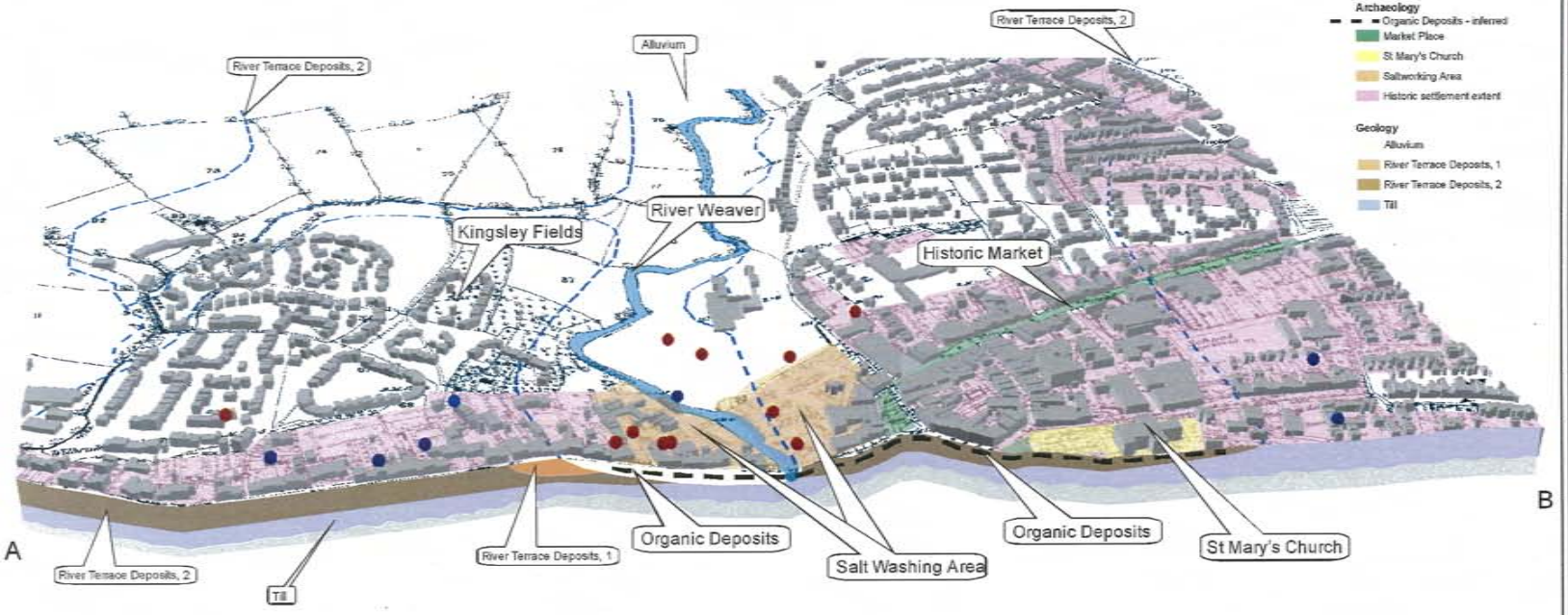
FIGURE 7







Note: 3d cross-section model is conceptual, and is not to scale

Geodetic Information
British National Grid
Transverse Mercator
False Easting = 400,000m
False Northing = -100,000m
Central Meridian = -2 °
Scale Factor = 0.9996
Latitude Of Origin = 49 °

CHESHIRE COUNTY COUNCIL

Site	Nantwich
Project	Waterlogged Deposit Investigation
Drawing	**Waterlogged Deposit Distribution: 3d Deposit Model OS first edition: circa 1876-1877**
Date	MAY 2007
Scale at A3 paper size	1:7,500
Drawing No.	7
	406.0886.00003

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