Hidden Heritage at Nantwich and York

Groundwater and the Urban Cultural Sequence

Tim Malim, Ian Panter, and Mark Swain

16th May 2013, Trondheim
Main areas of rural wetland survey in England. Left: general regions. Right: full areas of EH funded survey shown in grey tone.
Nantwich Conservation Area Georgian & timber-frame built heritage

Historic core
2007-8 Nantwich Survey and Management Strategy

Aims:
• predictive model, strategy, promotion

Objectives:
• map and date spatial extent of waterlogged deposits
• 30 boreholes in 2 phases of coring
• Research burial environment physical/chemical character
• Understand causes of preservation
• Assess significance
• Identify threats/opportunities
• Design management strategy

global environmental solutions
1. Wood St Salt boat 2003
2. High St sequence 1985
3. Wood St Salt house wattle wall 1980

Legend
- Archaeological information
  - Not Waterlogged
  - Waterlogged
  - Not Waterlogged
  - Saturated (but no remains)
  - Wood fragments only
  - Archaeological remains
  - Organic remains
  - Dip Well
  - Water channels on 1851
  - Public Health Map
  - Drain 1853 Public
  - Sanitation Map
  - Saltship
  - Archaeological investigations
  - Projected line of Mitre & Bailey ditch
  - Dendro-chronology dates
Baseline testing:
Using the dipwells to check water level, water chemistry, salinity, pH, reduction and oxidisation, etc.

GIS modelling of natural drainage pathways and identification of two principal zones of preservation
Nantwich: 1 Victorian drain, 2 timber track, 3 Lamb Hotel, 4 timber-framed heritage
Water Levels and Stratigraphy adjacent to the River (BH AF) and the Church (BH F)

**Borehole AF**
Adjacent to the River Weaver

<table>
<thead>
<tr>
<th>Reduced Level</th>
<th>Legend (Thickness)</th>
<th>Depth</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>34.48</td>
<td></td>
<td>0.43</td>
<td>MADE GROUND/OVERBURDEN</td>
</tr>
<tr>
<td>33.50</td>
<td></td>
<td>1.36</td>
<td>MINERAL RICH DEPOSIT</td>
</tr>
<tr>
<td>32.89</td>
<td></td>
<td>2.00</td>
<td>NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT</td>
</tr>
<tr>
<td>30.82</td>
<td></td>
<td>4.00</td>
<td>SAND</td>
</tr>
</tbody>
</table>

Average Depth to Water = 2.8m

**Borehole F**
Adjacent to the Church

<table>
<thead>
<tr>
<th>Reduced Level</th>
<th>Legend (Thickness)</th>
<th>Depth</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.07</td>
<td></td>
<td>0.67</td>
<td>MADE GROUND/OVERBURDEN</td>
</tr>
<tr>
<td>38.99</td>
<td></td>
<td>1.36</td>
<td>NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT</td>
</tr>
<tr>
<td>38.65</td>
<td></td>
<td>1.96</td>
<td>Slight sulphide odour.</td>
</tr>
<tr>
<td>37.74</td>
<td></td>
<td>2.00</td>
<td>SAND</td>
</tr>
<tr>
<td>36.74</td>
<td></td>
<td>3.00</td>
<td>CLAY</td>
</tr>
</tbody>
</table>

Average Depth to Water = 1.06m
Coppergate excavations
1976 - 1981

global environmental solutions
Speed’s 1610 map of York
Valleys of the Rivers Ouse and Foss, with clusters of wet and dry sites identified from archaeological investigations.
Marks & Spencer site, 44 – 45 Parliament Street 1995 - 8

global environmental solutions
Redox potential of water samples

Marks and Spencer site monitoring results

global environmental solutions
©York Hydrology Study:
What conclusions can be drawn from these studies?

York Hydrology Study recommended a three-staged approach:

1. Improved recording of soil and water characteristics and classification of preservation state
2. Development of a 3D model of natural and archaeological deposits
3. Characterisation, monitoring and modelling of selected sites, production of vulnerability map

Nantwich’s Supplementary Planning Document (SPD): has identified a pH neutral environment with high sulphide and low nitrate content, conducive to preservation of organic remains, but areas of active decay have also been found, in previously waterlogged deposits. There is grave concern that this process of desiccation may be accelerating as a result of modern intrusions and management of the town centre. The SPD recommended engagement with spatial planners and:

1. Creation of An Area of Special Archaeological Potential for added protection from development
2. Strategic planning to reintroduce permeable surfaces & natural drainage for rainwater recharge
3. Strategic management to reduce water loss, prevent changes in water quality/groundwater flow
4. Careful foundation design: ring beams, concrete slabs, sleeved, small-bore piles widely spaced, to avoid intrusion into waterlogged deposits. At York developers design for 95% preservation
5. Geoarchaeological investigations plus long-term strategy and partnership approach to install dipwells as part of development permissions

global environmental solutions
Urban groundwater and cultural heritage

• New studies
• Increased understanding
• Multidisciplinary approach
• Integrated spatial planning and urban drainage policies
• Sustainable environment
• Enhanced quality of life
• Enhanced economic vitality