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Sites and Monuments records in historic towns—problems in the development of computer records for urban areas

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7.1 Introduction

The identification and preservation of urban archaeological deposits has been of growing importance through the late 1970s and 1980s, as re-development pressure has increased the threat to extant deposits. Despite great advances in the development of archaeological record systems this decade, the need for a detailed machine-based record of historic towns has received limited attention. The purpose of this paper is to highlight some of the problems in establishing such a computerised record, and some of the most pressing needs in database design and development.

There are several agencies which consistently record data from historic towns. These include the National Archaeological Record (NAR), the Records Office of English Heritage (EH), and the County Sites and Monuments Records (SMRs). It is the latter recording system which would normally provide the most comprehensive dataset for the archaeological and historical development of a town, though many of the problems faced by SMRs are also common to these other recording bodies.

Most Sites and Monuments Records have either completed or are approaching the final phases of recasting their paper records to computer. The process of computerisation has been extensively encouraged and supported by English Heritage. This support has included the sponsorship of software for SMRs (initially 'Version 1' developed for the Central Excavation Unit, now replaced by Southdata's 'Superfile' package), and telephone support.

The involvement of English Heritage has had a considerable influence over the data structure and content used by the majority of the County SMRs. Many have adopted the 'AM107' structure (Fig. 7.1) used to record the schedule of ancient monuments, with minor modifications. It is generally acknowledged that the AM107 structure is adequate for most planning needs related to rural archaeological sites. The data fields used can also answer the majority of public and 'low level' academic enquiries. The potential use of SMR's to pursue wider goals may, however, be limited by close adherence to this structure. The purpose of this paper is to highlight the problems and possibilities inherent in recording one specific site environment, the urban area. It is contended that most SMRs are using a data structure which was developed primarily with the attributes of field monuments in mind. The limitations this structure presents for urban records has limited the content and discouraged widespread use of these databases, particularly in research.

For the purposes of this paper, 'urban deposits' refer to the total built historic environment (both above and below ground) in areas which may still be regarded as urban. This combination creates the principle problems of urban recording, and the particular set of data available to the SMR. This definition would exclude new

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Figure 7.1: AM107 recording form

towns which happen to have archaeological deposits underneath them (which are usually 'rural' in character), and deposits in towns which are no longer urban, (since in this case, the historic town plan is generally accessible, and access for evaluation is rarely restricted).

7.2   Inquiries to SMRs

Any consideration of the scope and structure of records of urban deposits must consider carefully the current and anticipated future usage of the SMR. Indeed, it should be recognised that the kinds of information recorded and the way in which these components of information are organised will, to some extent, dictate the future use of the information system.

The unpublished but widely circulated review paper, 'England's Archaeological Resource' prepared by David Fraser (Inspectorate of Ancient Monuments 1984) has been particularly influential in the computerised development of Sites and Monuments Records. This defined their primary role in terms of the most common types of enquiry received, and concluded that planning inquiries formed over 50% of all inquiries received. Although the report drew attention to the potential for considerable future changes in the source of inquiries, most SMRs have continued to regard planning as their primary function.

Most accounts of SMR usage since 1984 have tended to confirm this pattern. Planning inquirers include local government, central government, and developers and their agents (which may include archaeological units). In the West Midlands, these currently form over 65% of the inquiries received by the SMR.

County museums, and other local government 'leisure' and educational organisations were identified in Fraser's survey as another major user group. These account for 15% of inquiries received by the West Midlands SMR. The public (including external academic inquirers) forms the final 20% of inquiries received. These figures are likely to change significantly as public awareness of the facility develops. The provision of mainframe distribution of a subset of the data to terminals in libraries, and other public access points is under active consideration. If implemented, the public could form a substantial future user of the SMR.

The profile is likely to show considerable variation across different counties, though the general trend is thought to hold true. It should be remembered that the greatest potential for public inquiries exists within the urban areas, and especially in the historic towns. It is also in these areas that a system of public on-line access would be most easily implemented. For most SMRs, provision of such a service is essentially a problem of an appropriate hardware installation to distribute the information. Most counties have mainframe systems installed which could provide a simple database facility to main libraries.

While public use could clearly form a significant volume of future SMR inquiries, it is in the potential role as a research tool that SMRs will require the most extensive revision. For the researcher, ease of access is less likely to discourage use than data content, and compatibility with other SMRs.

7.3   Database managers and data-content

7.3.1   The data structure

In part due to the resources available to SMRs, but also to an inherent resistance to changing established systems, the structure of data in most SMRs is likely to be fossilized in its present format for the foreseeable future. However, since many SMRs

have not systematically approached the computerisation of their historic urban re-source (including listed buildings, 'grade III' buildings, many below ground deposits, and industrial monuments), there may be scope for some positive debate. Since many SMRs have indicated they do intend to computerise these site-categories, investment in new database management systems more sensitive to the complex needs of urban archaeology may be justifiable in the long-term.

The percentages of SMRs using micro and mainframe systems, and the software packages run on them is presented by Chadburn (Chadburn, this volume). From this, it is clear that relatively few SMRs currently use a relational structure for their database, most micro-users running Southdata's 'Superfile'. Even where packages with a relational function are being used, these are often run as flat file systems. However, as the size and complexity of records used by SMRs expand, a relational database structure will become increasingly attractive.

The principle of the relational structure breaks down data into 'tables' with the aim of minimising data redundancy (ie repeated information). The relational structure is a method of laying out a database that depends on the data alone, not on the questions that might be asked of it. Such systems are very powerful, and facilitate the future addition of 'blocks' of information as required. Because data is split up into separate, linked tables, records can be very large without becoming unwieldly. As relational systems permit multiple files to be viewed simultaneously, one can also compare different records on the same screen.

Finally, the process of defining the relational structure and normalising the data fields is (or should be) explicit, forcing the system designer to rigorously consider and document the data content and design for the system. This is particularly true where a development tool such as SSADM is used as an aid to the database construction (Longworth & Nicholls 1986).

7.3.2 Site classification

Within historic towns, several categories of site may be identified, each of which merits incorporation into the record. These may be distinguished on the basis of various criteria, but an initial distinction may be made between remains which are visible and readily accessible, and those which are not.

The 'visible' classification primarily consists of upstanding remains. These may be statutorily protected sites, such as Scheduled Ancient Monuments and Listed Buildings, though many locally important upstanding remains have received no statutory protection at all. Few SMRs record un-listed buildings, (though there are some important exceptions such as industrial buildings surveys). It could reasonably be argued that it is this non-protected group, not buildings on the 'greenback' lists, which should receive priority for computerised recording.

These buildings are not normally entered on development control maps, and, as a group, have received the least consideration as a quantifiable resource. Almost all SMRs record listed buildings to some extent (often where these have been recorded by the Ordnance Survey), or have access to some other computerised listed building record held within the County Council. However, the majority of SMRs have yet to systematically computerise even their statutorily protected buildings.

The category of 'Invisible' archaeology would include most below-ground deposits, and historic structures (such as timber frames) contained within later architectural skins. In most historic towns, even where there has been a history of archaeological research, the extent to which deposits may be inferred from existing information and recording systems is strictly limited. Even where information is available from watching briefs or excavations close to a development, this is not always incorporated into the SMR in a usable form.

Findspots of artefacts recovered as stray finds form a further category of information. These are usually recorded not for their own interest, but for their potential, as a collective group in a given area, to indicate stratified deposits. As such, they form a link between the 'visible' and 'invisible' categories.

For almost every historic town, there will be a volume of historical information relating to it, including paintings, early plans, epigraphic evidence, documents and placenames, of varying degrees of accuracy and reliability. These provide information on the extent of sites and settlement at given periods of time. Many are closely datable, but few record spatial details with close precision.

Each of these categories of information present different problems of recording and integration into the record. The first group ('visible' deposits) is relatively straightforward to record. The problems which might arise concern decisions to separate building phases into separate records or sub-records within a record (as, for example with a fifteenth century tower in a renovated nineteenth century church) and the detail with which attributes of buildings are recorded. For example, should building materials, type of windows, or guttering be recorded as separate site attributes or discussed within free text?

Neither problem is insoluble. The method of recording will depend partly on the rules already in force for the remainder of the record (in order to be consistent), and the current and anticipated uses to which the record is likely to be put (by buildings conservation officers as well as archaeologists).

The second category ('invisible' deposits) present greater difficulties for the SMR, since underground deposits are not easily accessible, whether by manual excavation or by remote survey, and details of past observations are not easily checked. Urban deposits are found in great variety, normally in sequences which are both complex and of greatly varying levels of preservation. Different periods have tended to deposit radically different quantities of material remains. For example, layers dating to the Roman and Victorian periods are both noted for the depths of material laid down, while Anglo-Saxon layers are generally thin by comparison.

There is generally a high proportion of definable forms within urban deposits, including imported materials (stone, brick etc..), or waterlogged areas frequently containing preserved timber and considerable environmental information. The variety of contexts which might be encountered within a small area is often far greater than those on rural sites, with consequent implications for the scale of archaeological effort which their preservation—in situ, or by record—will require. Most, if not all, of these facets of information could be usefully incorporated in a Sites and Monuments Record, and would aid the usefulness of the record in the future.

The third category, findspots, should present little difficulty in most recording systems. There is, however, an overlap with the problem of systematic recording of artifacts from excavations. SMRs could become the broad database that certain County archaeologists have argued for, incorporating a level of recording capable of answering artefact-specific questions—for example the number of excavation sites within a town producing Severn Valley jars, or East Gaulish samian beakers. At the moment, it is doubtful if there is an SMR in the country which could do this. If SMRs are to develop in this way, it will be necessary to rethink the data structure used, as well as the resources for collating and inputting data.

Finally, there is the vast array of information which can be derived from historical sources—old maps, place-names, charters etc.. Most of these certainly have a place in a sites and monuments record; many will be incorporated today in some form or other. Surprisingly few will have been incorporated systematically, and fewer still will be actually computerised, in a thorough, comprehensive manner. Some of this information relates more closely to a graphics information system (GIS) than a text-based database manager.

7.3.3 Defining the town

A major consideration in the recording of the historic town is whether this constitutes a single site or a series of 'sites' comprised of town components (physical entities such as shops, houses, market etc) or window opportunities (excavations and observations made possible by re-development). Thus the town can be seen as a single archaeological entity, a series of archaeological entities, or a series of spatial entities not necessarily related to archaeological integrity.

The historic town exists in three spatial dimensions and while some historic towns consist of a single phase, the majority have occupation deposits of more than one period, which are not necessarily spatially contiguous. Within this complex matrix, there is normally a set of negative information to be fed in (areas known to be destroyed by cellarage, deep foundations or mining activities). Thus, there is a complex montage of information to be ordered and classified.

Within this tableau, components of towns are usually given a period classification by reference to 'cultural' terminology. Hence, Roman Wroxeter (Viriconium), Saxon Southampton (Hamwih) or Viking York (Jorvik). But unlike many of the (largely rural) prehistoric sites, there are many towns whose development can be tied down to the precision of centuries. For some periods, developments can be assigned to individual years. While the use of broad 'cultural' terms certainly has a place in the record structure, there is also a need for the close definition of known periods within towns, to be able to quantify surviving areas by period. Yet there are few SMRs (if any) that would currently claim to have this capacity. Many do not have the data fields or structure to answer such questions, even if sufficient resources could be directed to the data collation.

The problems associated with defining the urban record are relevant to the statutory protection of sites. Both English Heritage and the County Sites and Monuments Records share a common aim of wishing to bring about systemised recording of sites so that decisions to preserve or destroy sites are taken from a position of knowledge, and that those sites which are preserved should be examples offering the best potential from their particular class.

To this end, English Heritage have initiated the Monuments Protection Programme as a re-evaluation of recorded archaeology of the country in order that the Schedule of Ancient Monuments protected under the Ancient Monuments and Archaeological Areas Act. 1979, can be brought up to date. The primary data used by this programme will be derived from the County SMRs and the RCHM(E) NAR. If urban areas are to fully benefit from the programme, it will be necessary to document areas which might be of 'national importance' with sufficient precision to enable addition to the Schedule, protection under planning legislation, or, where deposits cannot be preserved *in site*, proper provision for rescue recording.

In historic towns, scheduling has been infrequently invoked, specifically to protect underground deposits. The corpus of historic towns is substantial (Carver 1987b, Carver 1987a) and there can be little doubt that many of these deposits would be scheduled in a rural context. By contrast, urban standing structures have been more methodically evaluated. These, of course, are a more easily defined entity. However, they are often the visible tip of a more complex and extensive archaeological sequence beneath the ground, which is not reflected in the schedule boundary.

The current statutory powers for protection include the provisions for scheduling under the 1979 Ancient Monuments and Archaeological Areas Act, and local government planning powers under the 1972 Town and Country Planning Acts. However, the most extensive urban application of the Act, the designation of Areas of Archaeological Importance, under part II, does not in itself provide protection, or even guarantee preservation by record. The terms of the Act make no provisions for the funding

of archaeological work, or relate the time permitted on site to the complexity of the deposits encountered.

7.3.4   'Urban' records and their potential uses

In the foregoing discussion, it has been argued that the potential uses for SMRs in urban areas are not adequately catered for by the data structures currently used. What then, are the benefits of an expanded 'urban' SMR?

Several of these relate to an enhanced planning role. With the increased prominence of developer funded projects, and the need to plan for the incorporation of archaeological work as part of the developers' proposals, the County SMRs need to become an efficient predictive tool in towns. This would benefit both the prospective developer, through the early notification of archaeological constraints on development, and planning departments in negotiating with the developer to ensure an adequate provision for the archaeological remains before granting planning consent.

The majority of urban archaeology is not statutorily protected. While the computer cannot, of itself, detect 'hidden' archaeology, it does provide the basis for a more rational and quantifiable analysis of urban deposits, and a regular repository for updated information. It would not be unrealistic to think in terms of statistical prediction of deposits in the future.

Ideally, planning departments would insist on evaluation to determine the depths and survival of deposits prior to approving planning applications. In practice, this is not always the case. There may be buildings already on the site which will not be demolished until planning permission is granted. Planning consent may also be requested to develop a land parcel not owned by the prospective developer.

As the pace of urban re-development increases, planning agencies are finding an early warning system for urban deposits, and the likely elements which these will comprise particularly desirable. As noted above, the need for advance warning is exacerbated in the five Areas of Archaeological Importance, designated under part 2 of the 1979 Ancient Monuments and Archaeological Areas Act, which permit access time, but not funding, for archaeological investigation.

In turn, the results of excavation work necessitated by development must also be fed back into the SMR. Through the incorporation of detailed information derived from excavations, this would become far more efficient in fulfilling this 'early warning' function. The process of feedback would be particularly beneficial where the local archaeological unit (usually the team carrying out the day to day work) is remote from the planning process.

The last 'planning' consideration relates to the question of the appearance of historic towns as a result of development. The historic built environment has become increasingly important as a framework to structure the scale and appearance of re-development. Many (though by no means all) planning authorities are recognising a need to harmonise new developments with their surroundings. This involves reference to the sense of proportion and style which give particular historic towns their character. An SMR could be an integral part of this process, as a comprehensive, consistent and retrievable record of the phases of development characterising the present layout of the historic town.

Perhaps the most underdeveloped function for the SMR relates to academic research. The considerable growth in the 'rescue industry', particularly since the commonplace implementation of developer-funded archaeology has resulted in a greatly expanded quantity of data available for the archaeologist to analyse. Much of this has yet to be made accessible for analysis.

Vince has suggested (Vince 1987) that there is considerable potential for the recognition of common themes in urban development, inferences drawn from the physical growth of deposits over long periods. Indeed, one of the most useful aspects of

urban archaeology is the potential afforded by the very long time sequences which characterise such deposits. In due course, SMRs could provide the database to begin to answer such problems.

The archaeologist could have, then, a large body of information available for comparitive study. But in order to fully exploit this, SMRs (and Units) may need to broaden the periods recorded to be able to understand the period considered to be of interest. It would be unreasonable, for example, to expect to to understand the development of early industrial towns without knowing something of their late Medieval predecessors, or the developments succeeding from these in the seventeenth, eighteenth and even the early nineteenth centuries.

Finally, there is the wider use of SMRs by the public to consider. The promotion of public use of an SMR could benefit the counties in a variety of ways. By making archaeology accessible, public interest can be fostered, which in turn can be a more persuasive argument for archaeological action than academic considerations alone.

There may, of course, be a reluctance to make information accessible without any monitoring of who is making inquiries (for example the fear of the undiscriminating metal detector user). But there is an equal danger that useful information known to the public is not fed into the SMR, because a dialogue has never been encouraged.

7.3.5 The future development of SMRs

Underlying all these considerations are three particular needs; the first is the software environment under which SMRs run. It seems likely that the need to develop more flexible software systems, capable of handling very large records at reasonable speeds will be felt more keenly as the computerised databases expand.

For most counties, the computerised SMR is still something of a novelty, with many aspects of the relation to planning, academic, educational and leisure spheres yet to be explored. An answer may lie in the development of relational databases, splitting record components into several files to cater for the different attributes of sites.

In the West Midlands, the approach currently being adopted is the development of a relational database in dBase IV/Clipper which divides records into four primary data sections. These provide a header with locational information, a selection of specific site descriptions, a management section and a series of sources. Each record is defined on the basis of 'archaeological integrity'. There are five possible site description sections, covering standing structures, sub-surface archaeology, cropmarks, findspots and ecological sites (such as ancient hedgerows and woodland).

These may be repeated or mixed as desired to create a series of sub-records. Since fields covering location, and management refer to the same physical piece of land, these are not repeated within the record. Sources are linked to record sections by sequential numerical labels. Thus, the system provides the capacity for the SMR officer to create records of variable length, dedicated to the specific forms of site to be recorded. The system should provide a sufficiently flexible format for the recording of urban sites. The relational format would make the addition of data files covering more detailed recording levels (such as contexts and artefacts from excavations) perfectly feasible.

The second area for development is the hardware and software to provide graphical information systems, with an interface to text-based data for the end-user. There can be little doubt that the conceptual power of a 3-D display of known archaeology in a town is a more powerful tool than a text-based record alone. There would be few archaeologists who would mourn the passing of tired overlays bearing the battle scars of years of amendment by frustrated technicians.

However, the major use of GIS systems seems to be in archaeological field units, rather than SMRs. Partly this may be explained by their cost. Many GIS systems are not within the financial reach of the average SMR, especially in view of the cost

of data-storage. They will undoubtably become more affordable in the future, but there are low-cost systems which are available now, and which will work efficiently on micro-computers.

The use of WORMs or CD-ROM as a mass storage media for graphics information—site maps, plans, OS extracts, and 3-D drawings of extant deposits—can be linked to databases in use at present, (including Superfile) providing a graphic display alongside a textual record. However, while the availability and comparitive low-cost of this technology is certainly attractive, it may become rapidly outdated. Inevitably, the development of new technology will result in the cost of such equipment falling. The problem for the SMR is to buy systems with sufficient 'utility' to justify that investment before they become superceded.

The third consideration, and the most pressing for many, is the resource implications of developing more sophisticated systems. Most SMRs are under-resourced, are unable to persaude their organisations of the need for investment in new technology, or for additional staff to compile and curate the record. Similarly, the varied demands of SMR posts often leave little time for changing established practices. Should this final consideration, the pressures of the 'real world', be allowed to fossilise the sites and monuments records?

The answer must be 'no'. The process of investment appraisal for new projects is dealt with elsewhere by Clubb (this volume). There is a real danger of SMRs becoming very shortsighted in their outlook. The cost of developing a highly efficient SMR could conceivably be recovered through the successful identification of a single, previously unknown, urban site. Where public pressure persuades local authorities to 'save' sites discovered during development, the cost can be far greater than that of developing the SMR. The unmeasurable—but equally valuable—role of promoting archaeological research and awareness also argues strongly for re-appraisal of the content, structure and distribution of the sites and monuments records.

7.3.6 Conclusion

This paper has reviewed some of the considerations in database design for County Sites and Monuments Records, and has attempted to re-appraise their role in historic towns. It has argued for a more detailed computer record of urban deposits, and the need to consider carefully the different needs of potential users in the process of systems analysis and database design.

There can hardly be a County SMR in England which does not owe a debt of gratitude to English Heritage for the financial support and encouragement provided in taking the first steps towards computerising their records, and to the technical support provided through the Records Office. However, the influence of English Heritage in the development of the record structure and content of many SMRs should also be recognised.

The wisdom of maintaining compatibility with national record systems is undeniable, and this problem has been addressed in the production of a data transfer standard (Booth 1988). However, County Sites and Monuments Records should not become complacent in their present data structures, hardware and software. All archaeologists responsible for computerising data from urban areas should consider carefully whether our present priorities will answer the questions and problems of system users in the 1990s.

The exploitation of the potential boom in archaeological information technology could transform the role of sites and monuments records in the next decade. However, this potential will only be realised if common ground is achieved on the proper areas for data collection, with information fed into coherent databases and made accessible to a broader spectrum of end users.

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