25

The SAM record—past, present and future

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25.1 Introduction

English Heritage keeps a record of scheduled ancient monuments in order to fulfill its responsibilities for the management and protection of these monuments. The computerisation of this record has been underway since 1980, and has now reached the point where information about almost all of the 13,000 monuments is available on-line. The record will soon be complete, and a stage of editing and consolidation has started. Soon the monuments protection programme will result in a substantial rise in the number of protected monuments, and there will be a need for automated systems to support the processes involved in adding new monuments to the schedule—new systems will be required. This appears to be a good point at which to document the preceding 8 years work, and to look forward to future developments.

Any scheme of this size and duration must necessarily involve a number of individuals to bring it to a successful conclusion. The initial impetus for the computerised record, and support in its early days, came from Geoff Wainwright and Dai Morgan Evans; latterly David Fraser managed its progress; overall responsibility for the record of scheduled ancient monuments now lies with the English Heritage Records Officer, Nigel Clubb. At the outset the technical aspects of the record were the responsibility of Joe Jefferies, whilst the curation and compilation was undertaken by Hugh Jones; the present author took over as Computing Officer in 1985, and Amanda Chadburn succeeded Hugh Jones in 1987. The exacting task of data collation, entry and editing has been achieved through the work, at various times, of Sheila Keyte, Alison Allden, Lea Jones, Becky Payne, Kay Walsh, Jackie Lynne, Janice Charleworth, Russell Man, and Pat Allan.

This paper describes developments over the last 8 years, the present system, and plans for future systems. It also describes work which is taking place in preparation for the Monuments Protection Programme, in particular support to county sites and monuments records, and the development of a data transfer standard for site specific data. Only the textual portion of the record is covered here; complimentary systems for the map record are described elsewhere in this volume by Nigel Clubb; the issues involved in terminology control are documented by Amanda Chadburn (this volume).

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25.2 Development of the system

25.2.1 Content of the record

Sources for the record included already extant paper records, which included forms OW819, AM7, which documented the scheduling of a monument. Initially it was decided to colate all these records together before data entry—work on a trial batch including Cornwall and the Isles of Scilly started on 2nd June 1980. It was soon found that the task of collating the record, in addition to data entry, processing and output, was too much for available in-house staff resources.

The job of collating the record was therefore given to the field monument wardens, who would collect all the relevant information about a monument at the time they visited it. In order to do this the field monument wardens were issued with form AM 12, which was revised to AM107 (Fig. 25.1) and a manual on how to fill it in (DOE 1983). This routine had the obvious advantage that complete records about a monument would be delivered for input and processing; however a monument would not be included in the system until it had a visit from a field monument warden. At this stage second and subsequent visits by field monument wardens would not be entered; these would be saved for a second phase of correcting and making additions to the record.

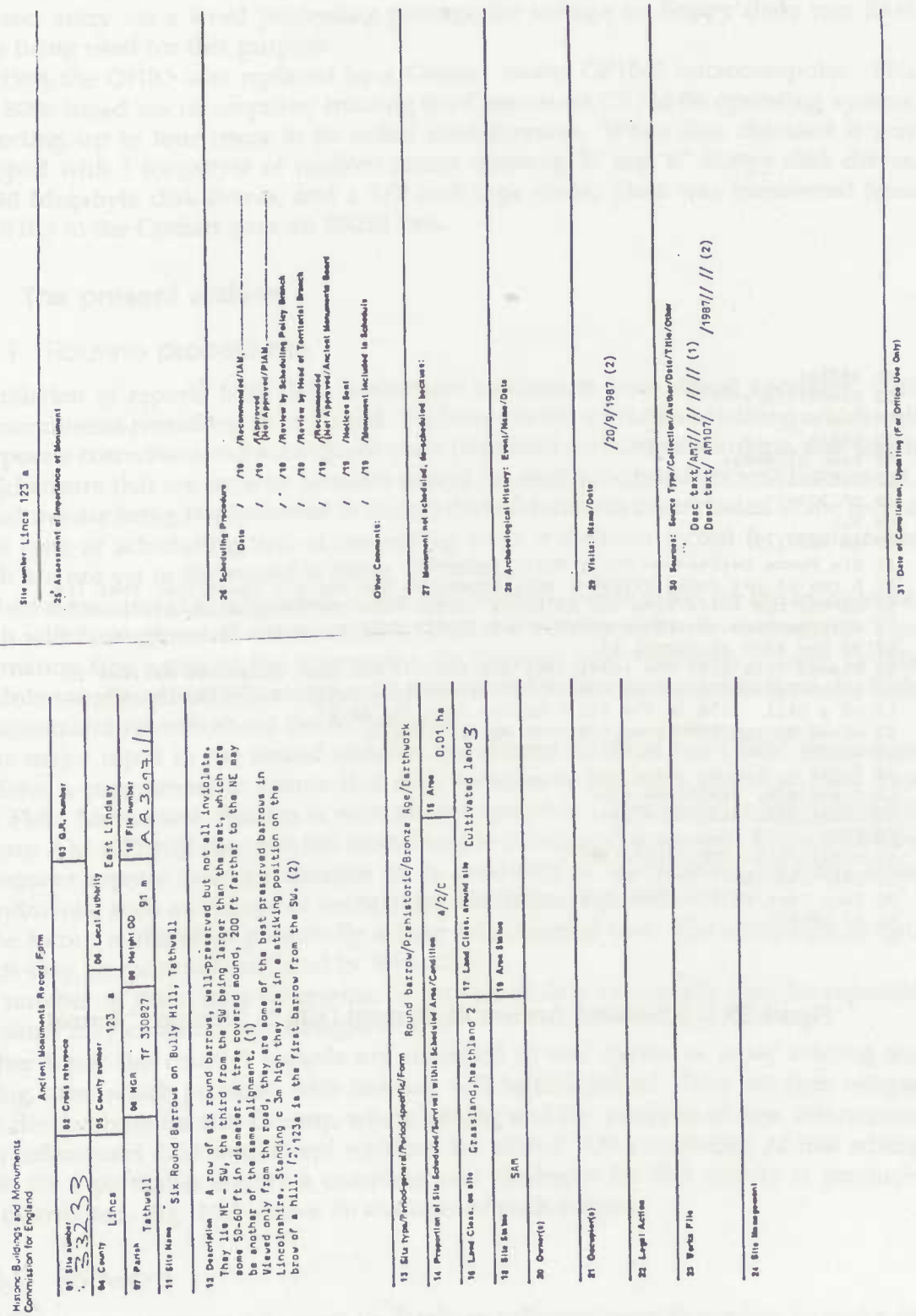
25.2.2 Software developments

When the project to produce a computerised record of scheduled ancient monuments started in 1980, there was little suitable database software available for microcomputers, and it was decided to use a suite of programmes which had already been developed for excavation records (Jefferies 1977, Hinchliffe & Jefferies 1985). The major feature of this package (colloquially known as 'Version 1 Software') is that it allows records to include long passages of free text, and for fields of data within records to be repeated as often as required. It is a batch processing package, which allows records entered via a word processor to be checked, reordered and output. Within a record each field has a two digit numeric tag, followed by the data; if it is necessary for a field to extend over more than one line the tag is repeated at the beginning of the line, followed by the remainder of the text. Fields are terminated by either a semi colon, or the end of a line followed by the tag for a different field. Records are terminated by a '$' on a line on its own. Fig. 25.2 shows a record in 'Version 1' format.

25.2.3 Hardware developments

The first hardware to be used was a Research Machines RML 380Z. This was a reliable Z80 based microcomputer, using the CP/M operating system. Data entry was a cumbersome and rather convuluted process; in the early days completed forms were sent to the Central Excavation Unit at Fort Cumberland for transfer to paper tape via a teletype; these tapes where then returned to London, where they were read by a tape reader attached to the Research Machines RML 380Z.

This initial configuration was augmented with an OHIO C3C microcomputer. The OHIO used the CP/M operating system, and as well as a non-standard 8" floppy disk drive this extraordinary machine had a Challenger 3 processor board with Z80, 6800 and 6502 processors, and boasted one of the first Winchester disks (23 Megabytes),



Historic Buildings and Monuments Commission for England

Ancient Monuments Record Form

01 Site number 332333 | 02 Cross reference | 03 G.A. number

04 County Lincs | 05 County number 123 a | 06 Local Authority East Lindsey

07 Parish Tathwell | 08 NGR TF 330827 | 09 Height OD 91 m | 10 File Number AA30931//

11 Site Name Six Round Barrows on Bully Hill, Tathwell

12 Description A row of six round barrows, well-preserved but not all inviolate. They lie NE - SW, the third from the SW being larger than the rest, which are some 50-60 ft in diameter. A tree covered mound, 200 ft farther to the NE may be another of the same alignment. (1)
Viewed only from the road, they are some of the best preserved barrows in Lincolnshire. Standing c 3m high they are in a striking position on the brow of a hill. (2) 123a is the first barrow from the SW. (2)

13 Site type/Period-general/Period-specific/Form Round barrow/Prehistoric/Bronze Age/Earthwork

14 Proportion of Site Scheduled/Survival within Scheduled Area/Condition 4/2/C | 15 Area 0.01 ha

16 Land Class. on site Grassland/heathland 2 | 17 Land Class. around site Cultivated land 3

18 Site Status SAM | 19 Area Status

20 Owner(s)

21 Occupier(s)

22 Legal Action

23 Works File

24 Site Management

Site number Lincs 123 a

25 Assessment of Importance of Monument

26 Scheduling Procedure

	Date		
Recommended/IAM	/	/19	
Approved (Not Approved/PIAM)	/	/19	
Review by Scheduling Policy Branch	/	/19	
Review by Head of Territorial Branch	/	/19	
Recommended (Not Approved/Ancient Monuments Board	/	/19	
Notice Sent	/	/19	
Monument included in Schedule	/	/19	

Other Comments:

27 Monument not scheduled, de-scheduled because:

28 Archaeological History: Event/Name/Date

29 Visits: Name/Date /20/9/1987 (2)

30 Sources: Source Type/Collection/Author/Date/Title/Other
Desc text/AM7// // // (1) /1987// // (2)
Desc text/ AM107/

31 Date of Compilation, Updating (For Office Use Only)

Figure 25.1: Form AM107 obverse and reverse

```
01 33233;
02 Lincs 123/a-f;
04 Lincs;
05 123/a;
06 East Lindsey;
07 Tathwell;
08 TF 330827
09 91;
10 AA 30971/1;
11 Six Round Barrows on Bully Hill, Tathwell[
12 A row of six round barrows, well-preserved but not all inviolate. They lie
12 NE-SW, the third from the SW being larger than the rest, which are some 50-
12 60ft in diam. A tree covered mound, 200ft farther to the NE may be another
12 of the same alignment.1[
12 Viewed only from the road, they are some of the best preserved barrows in
12 Lincolnshire. Standing c3m high they are in a striking position on the brow
12 of a hill. 123a is the first barrow from the SW.2[
13 Round barrow/Prehistoric/Bronze Age/Earthwork;
14 4/2/C;
15 0.01;
16 Grassland, Heathland 2/-;
17 Grassland, Heathland 3/-;
18 SAM;
29 Other, A.N.,FMW/20/09/1987;
30 Desc text/AM7/-/-/-/-1;
30 Desc text/AM107/Other, A.N./1987/-/-2;
31 26 10 87;
$
```

Figure 25.2: Scheduled Ancient Monument Data in 'Version 1' format

which was used for the storage of the record. Paper tape input was soon superceded by direct entry via a word processing package for storage on floppy disk; two RML 380Zs being used for this purpose.

In 1984 the OHIO was replaced by a Comart model CP1542 microcomputer. This is an 8086 based microcomputer, running the Concurrent CP/M-86 operating system, supporting up to four users in its initial configuration. When first obtained it was equipped with 1 megabyte of random access memory, 5" and 8" floppy disk drives, two 40 Megabyte disk drives, and a 1/2 inch tape drive. Data was transferred from the OHIO to the Comart over an RS232 link.

25.3 The present system

25.3.1 Routine procedures

Assimilation of reports from field monument wardens is now almost complete, with few monuments remaining to be visited. We have started a process of editing which will incorporate corrections and subsequent visits from field monument wardens, and which should ensure that we have an accurate record for each scheduled ancient monument. Procedures are being implemented to ensure that monuments are included in the record at the time of scheduling, and at the editing stage a skeleton record for monuments which are not yet in the record is being included.

When a monument is scheduled, a minimal record is constructed for the monument, which will be augmented when a field monument warden visits the monument. This information (the name of the monument, its national grid reference, county, county schedule number, district/borough, and parish) will be computerised to form the basis for subsequent records about the monument.

The major input to the record remains the reports received from field monument wardens; a programme to ensure that each monument has been visited at least once by a Field Monument Warden is now almost complete. The initial report (compiled on form AM 107) will describe the monument in detail, and document its past history; subsequent reports describe changes in its condition or managemnt, and any other amendments, such as change of ownership, which are required.

The record is therefore potentially a long and complex one. The categories of data which may be recorded are listed in Table 25.1.

A number of these data categories, or groups of data categories, may be repeated, and some may contain long passages of text.

After input (by county) records are subjected to two cycles of proof reading and editing, after which printout, with indexes, will be distributed. They are then merged with the database for that County, where editing and the addition of new information from subsequent field monument wardens are added. On completion of this editing phase for a particular county a complete new catalogue for that county is produced and distributed. Fig. 25.3 shows an example of such output.

25.3.2 Software

By 1984 it was apparent advances in database software were beginning to make the 'Version 1' suite look rather dated; in particular facilities for on-line data entry, editing and interrogation were required. However the selection of software to support this

Computer Record Number
Cross reference
County
County Schedule Number
District/Borough
Parish
NGR
Height OD
EH File Reference
Name of Monument
Description
Classification (Site type/period general/period specific/form)
Proportion of Site Scheduled
Survival within scheduled area
Condition
Area
Land classification on site
Land classification around site
Site status
Area status
Owner
Occupier
Scheduling Information
Archaeological History (event, name, date)
Visits (name, date)
Sources
Date of compilation

Table 25.1: Categories of data

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ENGLISH HERITAGE RECORDS OFFICE                    SCHEDULED ANCIENT MONUMENTS RECORD
Lincs  (SEMESTERS 12)                                                    21-MAR-1988
--------------------------------------------------------------------------------

COUNTY NO. Lincs 123/a

CROSS REF  Lincs 123/a-f
SAM PRN    33233                          DISTRICT/BOROUGH  East Lindsey
PARISH     Tathwell
NGR        TF 330827
HT OD (METRES)   91    -                                   FILE      AA 30971/1

SITE NAME
 Six Round Barrows on Bully Hill, Tathwell

DESCRIPTION
 A row of six round barrows, well-preserved but not all inviolate. They lie
 NE-SW, the third from the SW being larger than the rest, which are some 50-
 60ft in diam. A tree covered mound, 200ft farther to the NE may be another of
 the same alignment.{1}
 Viewed only from the road, they are some of the best preserved barrows in
 Lincolnshire. Standing c3m high they are in a striking position on the brow
 of a hill. 123a is the first barrow from the SW.{2}

SITE TYPE       Round barrow                    PERIOD  Prehistoric
SPEC. PERIOD    Bronze Age                      FORM    Earthwork

PROPORTION SCHED.  4   SURVIVAL WITHIN AREA  2   CONDITION  C   AREA    0.01 HA

LAND CLASS ON SITE        Grassland, Heathland 2  -
LAND CLASS AROUND SITE    Grassland, Heathland 3  -

SITE STATUS               SAM

ARCHAEOLOGICAL HISTORY

VISITS
Name    Other, A. N. ,FMW        Date  20  09  1987

SOURCES
Type    Desc text
Collection  AM7                                              Ref No.  1
Other   -

Type    Desc text
Collection  AM107                                            Date  1987
Author  Other, A. N.                                         Ref No.  2
Other   -

DATE OF COMPILATION   26 10 87
```

Figure 25.3: Scheduled Ancient Monument Data in output format

data structure was not easy; in addition to our own record the software would also have to be suitable for the many county based sites and monuments records which have similarly structured records; it would thus have to be flexible, and run on a wide range of microcomputers. After examining the more obvious choices (including dBaseIII, Informix, and the micro versions of such heavyweights as Oracle) Superfile was selected. This package allows data entry, editing and output via a flexible screen form; all options are menu driven—this has the advantage of simplicity for the user, but lacks the flexibility of a query/programming language such as that supplied with dBaseIII. Initially the major problem with Superfile was its lack of speed in displaying long records; reasonably satisfactory performance in this area has now been achieved as a result of improvements from its makers, and from the acquisition of more powerful hardware.

25.3.3 Hardware

Initial experiments with the Comart showed it to be painfully slow in running Superfile, and it was therefore upgraded to an 80286 processor; at the same time an additional megabyte of random access memory was added permitting disk cacheing and the running of larger processes concurrently and the second 40 megabyte hard disk was replaced with an 80 megabyte disk, as it was apparent that our data holding would be in excess of 40 megabytes. We have found that with its 120Mb of storage, 1/2 inch tape, 5 1/4 and 8 inch floppy drives it is well suited to the task of storing, archiving and disseminating this data. However it is not sufficiently fast to allow satisfactory on-line interrogation or data entry; data entry and editing are now performed on two IBM PC ATs, the two RML 380Zs having been retired. A summary of the entire database is kept on a Compaq Deskpro 386 to enable it to be rapidly interrogated. Transfer of data between these microcomputers is achieved via floppy disk.

25.4 Future developments

25.4.1 Systems for the SAM record

The increase in the number of scheduled ancient monuments occasioned by the Monuments Protection Programme (Darvill *et al.* 1987) will make it necessary to replace, or substantially upgrade, our present hardware and software. In addition to a relatively static catalogue of monuments the new system would have to automate much of the scheduling process (involving amongst other things the writing of c50 letters per monument), and provide a dynamic system for the management of monuments. Communication with the RCHM National Archaeological Record at Southampton, and with County Sites and Monuments Records would be important.

An initial survey conducted internally documented current systems for scheduled ancient monuments. This report identified processes involved in the scheduling of a monument, the current record for the monument, and various casework events which effect the monument during its life (Scheduled Monument Consent, Damage, Metal Detector Applications, Management Agreements, Capital Grants, Archaeological Recording Grants, Rescue Grants).

A subsequent study, by consultants DWH Associates, has identified what is termed the 'Scheduled Ancient Monuments Core System', which encompasses the scheduling

processes, and the monitoring of monuments via Field Monument warden visits. Systems for case-work events will be interfaced to this core system when required. We will initially develop the core system, with the option to add casework events at a later date.

Following an examination of hardware and software options the decision has been taken to use the Oracle relational database management system, running on a DEC Vax minicomputer. Subject to approval from the Department of the Environment we should be acquiring these during the financial year 1988–9.

Meanwhile, in conjunction with our consultants we are producing a detailed software specification, in preparation for the implementation of the system.

25.4.2 Support for Sites and Monuments Records

An early stage in the Monuments Protection programme will be the identification of sites which may be of schedulable quality; a major source for this will be the county sites and monuments records. In preparation for this, and as part of English Heritage's broader role in archaeology we have been encouraging sites and monuments records to have effective computer systems. Where county SMRs have have requested it, we have supplied them with our recommended software which is Superfile. Currently just over half of the counties in England (24) are using Superfile, 6 use dBaseII and III, and 4 use the North Yorkshire system running on ICL mainframes. Of the remaining 12 all have different systems, 2 being on microcomputers, and 10 on mainframes.

25.4.3 Standard for data transfer of site specific data

A further initiative aimed at easing the transfer of data between records, for MPP and other purposes, is the construction of a data transfer standard for site specific data. Records of this type include the present HBMC Scheduled Ancient Monument Record (SAM), the RCHM National Archaeological Record (NAR), and County and other Sites and Monuments Records (SMRs). Currently there is routine transfer of data from the SAM record to the NAR and to SMRs; during the course of MPP there is also likely to be transfer of agreed data from NAR and SMRs to the SAM record; and there is also data interchange from the NAR to SMRs. This data transfer standard is currently in draft form, and is being agreed by English heritage and RCHM(E), before wider circulation.

Where records are not identically structured it is necessary to perform a translation when data is transferred from one record to another. If a single transfer is required it may be most economical to write software to perform the necessary 'massaging' of the data; however where a number of transfers are required this becomes costly. The proposed approach, which requires more careful initial preparation, is the definition of a 'Data Transfer Standard'. In transferring data between records it is necessary for the originator to be able to format data according to the standard, and for the receiving body to be able to translate it from the standard.

The following aspects of the record are being considered for the data transfer standard:

1. The physical media for the data transfer
2. What the record refers to—the scope of the record

3. What syntax is used for arranging the data categories within the record (*i.e.* whether data is in comma delimited, tagged, or fixed field format)
4. The Types of data contained within the record—the permitted data categories.
5. The data allowed within data categories—the structure and vocabulary of data categories.

Standardisation of archaeological data storage is difficult to achieve, and in a discipline as young as ours may not be either desirable or possible. However the use of this data transfer standard may be an important step towards allowing archaeologists to share similar types of data, as well as answering the specific requirements of MPP and the more routine transfer of data between institutions.

25.5 Conclusion

This paper has attempted to document the last 8 years work, and to look forward to the future. In future years we hope to be able to describe developments for our new system, and to report on progress with MPP and the data transfer standard.

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