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TREE-RING ANALYSIS OF TIMBERS  
FROM ABBEY FARM BARN, SNAPE  
SUFFOLK

M C Bridge

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**Summary**

This grade II\* listed aisled barn retains many timbers presumed to be from the primary phase of construction, along with a number of re-used timbers and more recent additions. Dendrochronological investigation was requested to assist in dating its origins and identifying non-primary timbers. None of the sampled timbers dated, the timbers having few rings, and there being little material with which to compare their ring sequences from this geographical area.

**Author's Address :-**

Dr M.C. Bridge  
INSTITUTE OF ARCHAEOLOGY, UNIVERSITY COLLEGE LONDON  
31-34 Gordon Square,  
London WC1H 0PY

## TREE-RING ANALYSIS OF TIMBERS FROM ABBEY FARM BARN, SNAPE, SUFFOLK

### **Introduction**

This aisled barn is situated 60m north west of Abbey Farm (NGR TM 390580) near the village of Snape (Fig 1). Its general form, illustrated in Figures 2 - 4, with passing braces and arcade posts curved outwards at the lower end, suggests a date of around AD 1300. Its relationship to other buildings on the site is illustrated in Figure 5. There is some disagreement as to whether the extant seven-bay structure is all original, the westernmost two bays appearing to many to have been reconstructed at a later date. Other later alterations and a largely twentieth-century roof are also evident. Dendrochronological dating was requested by the local English Heritage architect (Trudi Hughes) in order to try to ascertain the importance and chronology of this building and assess the impact of proposed changes to it. It was also of interest in trying to provide greater replication of dated oak material from Suffolk, which is at present poorly represented in the dendrochronological dataset.

This report only details the dendrochronological study of the building, which forms part of a wider study into its history and development.

### **Methodology**

The site was visited on two occasions in February and March 1999, when the timbers were assessed for their potential use in dendrochronological study. On the first occasion mains electricity was unavailable and much of the time was spent in assessing the potential for sampling. Samples were taken from twelve timbers, the locations of which are described in Table 1 and illustrated in Figures 2 and 4.

Core samples were obtained using a 15mm auger attached to an electric drill. The cores were glued to wooden laths, labelled, and stored for subsequent analysis. The cores were prepared for measuring by sanding using an electric belt-sander with progressively finer grit papers down to 400 grit. Any further preparation necessary, eg where bands of narrow rings occurred, was done manually. Only samples with more than 45-50 rings were measured and used in subsequent analyses as sequences with fewer than this number of rings rarely give reliable crossmatching. Suitable samples had their tree-ring sequences measured to an accuracy of 0.01 mm using a specially constructed system utilizing a binocular microscope with the sample mounted on a travelling stage with a linear transducer linked to an Atari desktop computer. The software used in measuring and subsequent analysis was written by Ian Tyers (pers comm 1992).

Ring sequences were plotted on translucent semi-log graph paper to allow visual comparisons to be made between sequences on a light table. This activity also acts as a measure of quality control in identifying any errors in the measurements when the samples crossmatch. Statistical comparisons were made using Student's *t*-test (Baillie and Pilcher 1973; Munro 1984). The *t*-values quoted below were derived from the original CROS program (Baillie and Pilcher 1973). Those *t*-values in excess of 3.5 are taken to be indicative of acceptable matching positions provided that they are supported by satisfactory visual matches, and give consistent matching positions.

When crossmatching between samples is found, their ring-width sequences are meaned to form an internal site mean sequence which is then compared with a number of reference chronologies

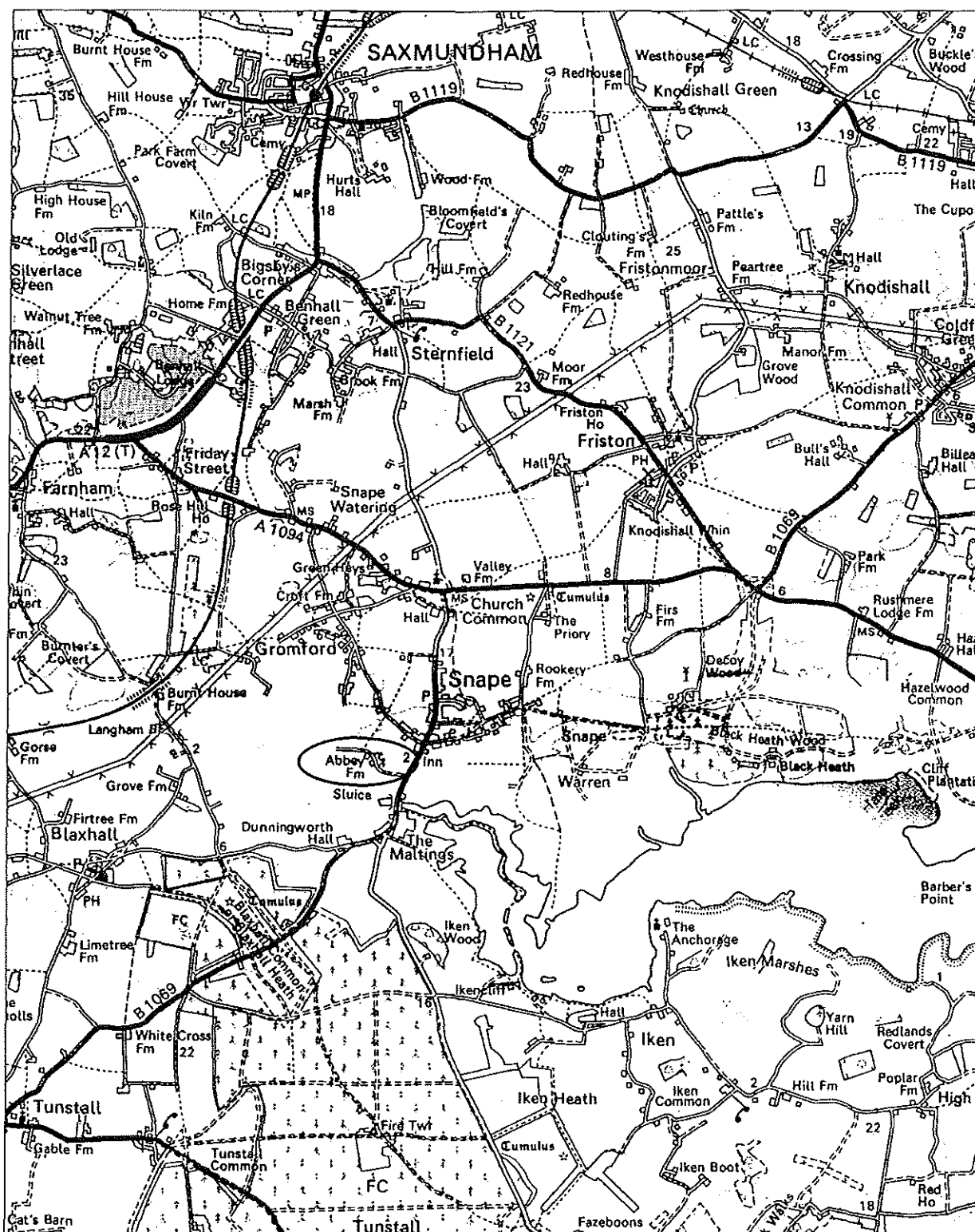
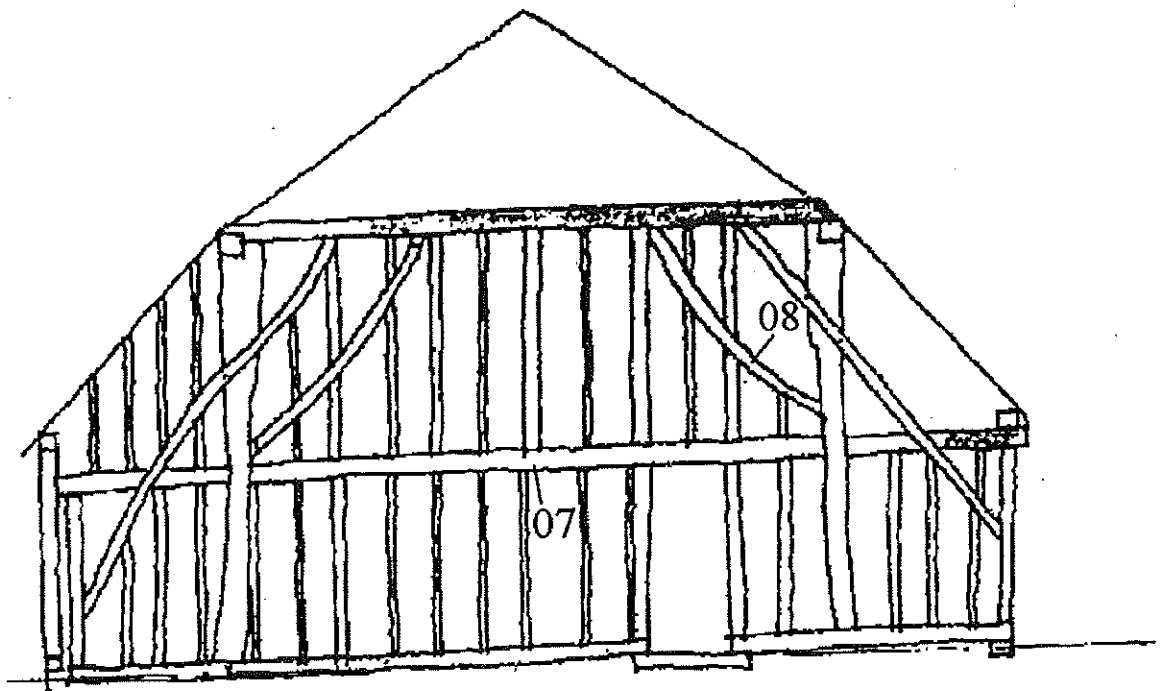
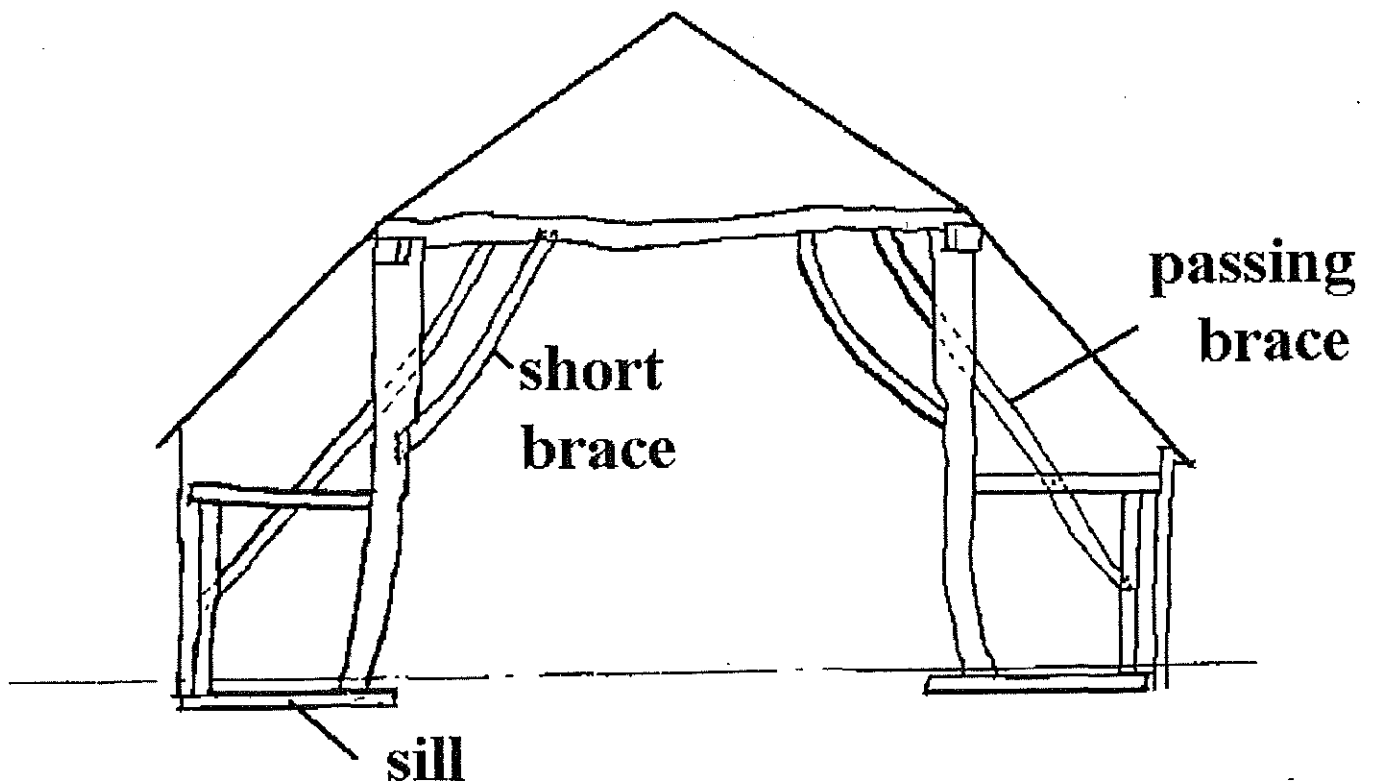


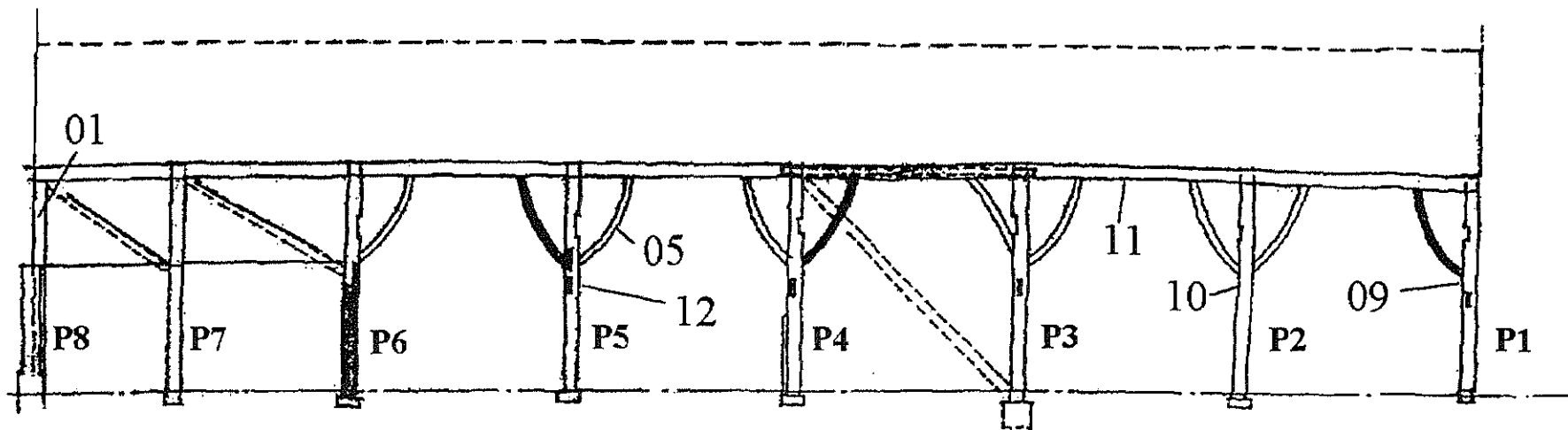
Figure 1: Map to show the general location of Abbey Farm, Snape



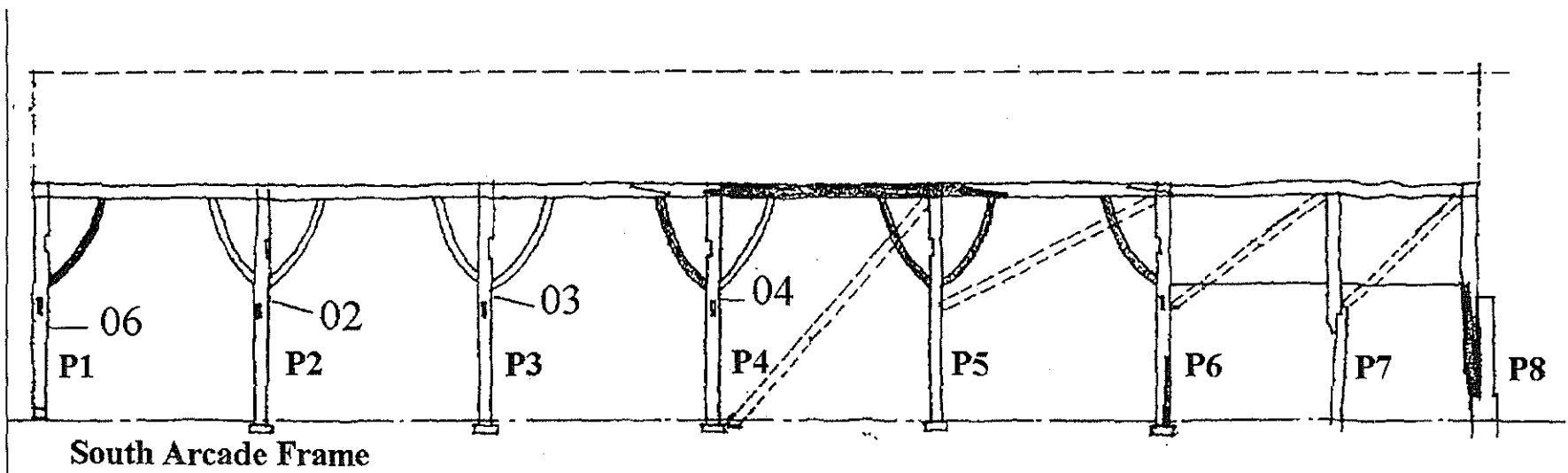
**Figure 2:** Internal view of the east gable, showing the locations of samples taken for dendrochronology



**Figure 3:** Sketch of truss 6, showing the general form of the trusses

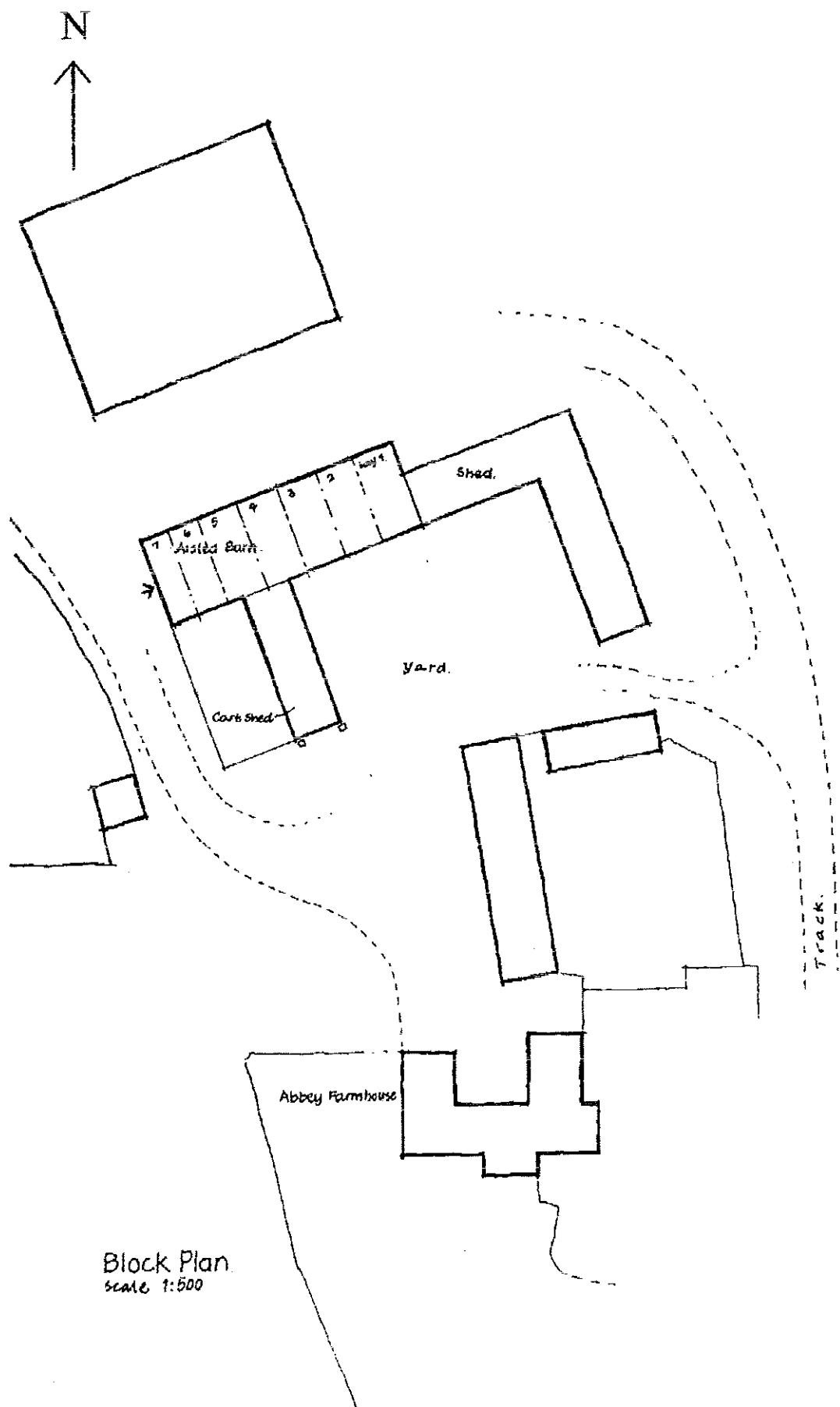


North Arcade Frame



South Arcade Frame

Figure 4: Drawings of the arcade frames showing the locations of samples taken for dendrochronology



**Figure 5:** Site plan of Abbey Farm, Snape, showing the relationship of the aisled barn to other buildings on the site

(multi-site chronologies from a region) and dated individual site masters in an attempt to date it. Individual long series which are not included in the site mean(s) are also compared with the database to see if they can be dated.

The dates thus obtained represent the time of formation of the rings available on each sample. Interpretation of these dates then has to be undertaken to relate these findings to the construction date of the phase under investigation. An important aspect of this interpretation is the estimate of the number of sapwood rings missing. In this instance, the sapwood estimates are based on those proposed for this area by Miles (1997), in which 95% of samples are likely to have from 9 to 41 sapwood rings. Where bark is present on the sample the exact date of felling of the tree used may be determined.

The dates derived for the felling of the trees used in construction do not necessarily relate directly to the date of construction of the building. However, evidence suggests that, except in the re-use of timbers, construction in most historical periods took place within a very few years after felling (Salzman 1952; Hollstein 1965).

## **Results**

All the timbers were of oak (*Quercus* spp.). Details of individual samples are given in Table 1. The nature of the timbers was such that many of the cores had breaks in and there was thus some uncertainty about the sequences measured. The plots of the series showed some similarities, but even after careful reassessment at break points in the core where rings may have been missing, no series were satisfactorily crossmatched. The ring width data for the measured series is given in Table 2.

Only one sample (SNP01) was taken from the two westernmost bays which it was thought may have been reconstructed and/or made from re-used timbers. This timber retained its bark and had been fashioned in such a way that it did not look original to the building. None of the other timbers in these two bays were judged to be suitable for further dendrochronological study.

Although the original brief was to attempt to identify primary and non-primary timbers, too few timbers were found to have sufficient rings to make a more extensive study possible.

Each measured series was compared individually with a range of site and regional chronologies, but no replicated significant matches were found.

**Table 1:** Oak (*Quercus* spp.) timbers sampled from Abbey Farm Barn, Snape, Suffolk

h/s = heartwood-sapwood boundary

Sample No	Origin of core	Total No of years	Average growth rate (mm yr <sup>-1</sup> )	Sapwood details
SNP01	Arcade post 8, north	64	2.58	20 + bark
SNP02	Arcade post 2, south	65	1.95	5
SNP03	Arcade post 3, south	52	2.29	-
SNP04	Arcade post 4, south	47	not measured	-
SNP05	East brace to post 5, north	35	not measured	h/s
SNP06	Arcade post 8, south	77	1.92	-
SNP07	Mid-rail, east wall	75	1.13	5



SNP08	South curved brace, east wall	38	not measured	-
SNP09	Arcade post 1, north	70	2.26	-
SNP10	Arcade post 2, north	80	2.33	h/s
SNP11	Arcade plate, bay 2, north	30	not measured	-
SNP12	Arcade post 5, north	54	2.17	-

### **Interpretation and Discussion**

Although a number of ring sequences had sufficient rings to make crossmatching a possibility, the lack of replicated internal crossmatching between the timbers meant that no site chronology could be formed. If indeed the building does contain more than one phase of construction, then the few samples taken here as being suitable for dendrochronological purposes, may come from more than one phase, making the likelihood of internal crossmatching less likely. Individual timbers were compared with the reference dataset, but again, no timbers gave replicated significant matches. All the samples therefore remain undated.

There are several reasons why the timbers have not successfully dated. Firstly, the cores themselves often split during coring, and although the breaks appeared to be such that a continuous ring sequence could still be measured, it is possible that rings were lost between the sections of those cores affected. Secondly, whilst several sequences exceeded fifty rings, none was longer than eighty rings. Given that very little dated material is available for Suffolk as yet, these relatively short sequences are less likely to date than they may in other regions. It is possible that in years to come, as the available data set for Suffolk increases, some of these samples may be dated.

### **Acknowledgements**

I am very grateful to Richard Bond, English Heritage, for arranging access to the site and his useful discussions and encouragement during the fieldwork. Graham Hussey provided the drawings which were adapted for use in this report and assisted me in finding a hire company to get a generator when mains electricity was unavailable. I should also like to thank the owners, Mr and Mrs Raynor for their hospitality during my visits.

### **References**

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Munro, M A R, 1984 An improved algorithm for crossdating tree-ring series, *Tree Ring Bulletin*, 44, 17-27

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**Table 2: Ring-width data for the measured undated oak sequences from Abbey Farm barn, Snape, Suffolk**

Year	ring widths (0.01mm)
<b>SNP01</b>	
1	672 348 466 455 396 483 451 336 391 392 313 281 284 328 271 303 379 339 302 261 296 536 368 270 204 190 240 221 275 231 186 181 176 200 297 247 300 270 266 210 258 413 264 266 260 189 183 154 111 88
51	70 152 108 116 134 91 109 151 129 126 106 139 138 132
<b>SNP02</b>	
1	221 162 206 210 97 184 242 195 167 139 187 254 301 269 165 270 307 273 159 133 154 168 141 163 171 189 123 177 204 267 198 143 146 148 164 208 131 149 205 177 198 122 174 211 296 225 345 238 279 157
51	219 147 208 148 164 173 121 107 129 199 364 182 210 291 214
<b>SNP03</b>	
1	360 421 480 313 288 291 374 388 241 231 221 260 239 289 208 231 148 151 137 278 391 339 270 279 255 211 238 169 171 151 203 261 144 133 180 198 195 173 266 289 176 169 195 192 188 193 125 108 93 99
51	119 168
<b>SNP06</b>	
1	386 422 334 424 351 366 395 289 352 490 330 282 260 302 224 260 250 200 234 216 223 168 145 159 162 122 154 152 172 115 93 105 215 260 213 207 144 141 124 110 108 124 119 165 156 178 145 177 164 188
51	197 171 118 130 138 110 118 113 133 94 81 107 126 153 145 128 152 113 166 121 114 99 135 181 169 204 211
<b>SNP07</b>	
1	326 454 404 288 316 206 190 216 133 134 206 192 137 132 150 140 168 147 108 121 110 149 141 123 109 94 77 133 111 104 106 77 99 92 101 114 71 81 55 60 57 58 60 51 54 69 59 47 59 65
51	58 57 54 56 60 75 51 59 49 48 48 37 52 36 38 63 65 49 64 69 104 104 126 151 136

Year	ring widths (0.01mm)											
SNP09												
1	341	318	462	349	303	386	313	308	402	443		
	296	365	363	408	292	355	260	234	196	249		
	267	230	163	114	159	199	261	227	189	185		
	146	168	192	164	164	177	193	270	202	163		
	121	192	157	205	205	208	152	187	223	195		
51	165	184	225	146	151	167	175	230	216	236		
	203	162	199	145	145	152	145	137	151	190		
SNP10												
1	513	256	239	296	355	322	269	309	307	305		
	167	203	242	325	357	215	250	283	220	248		
	206	233	209	187	167	193	172	216	261	255		
	222	234	291	282	238	264	158	176	207	218		
	160	180	187	153	153	133	162	250	232	251		
	210	217	194	224	214	247	216	164	150	132		
	146	127	169	206	203	169	195	168	275	196		
	135	239	226	295	377	326	322	364	301	340		
SNP12												
1	405	421	303	354	394	228	367	390	356	276		
	258	266	402	476	385	320	311	254	362	295		
	355	272	243	211	217	207	238	190	170	235		
	202	248	212	155	146	120	97	112	129	99		
	83	80	105	71	63	54	53	61	89	85		
51	103	66	73	75								