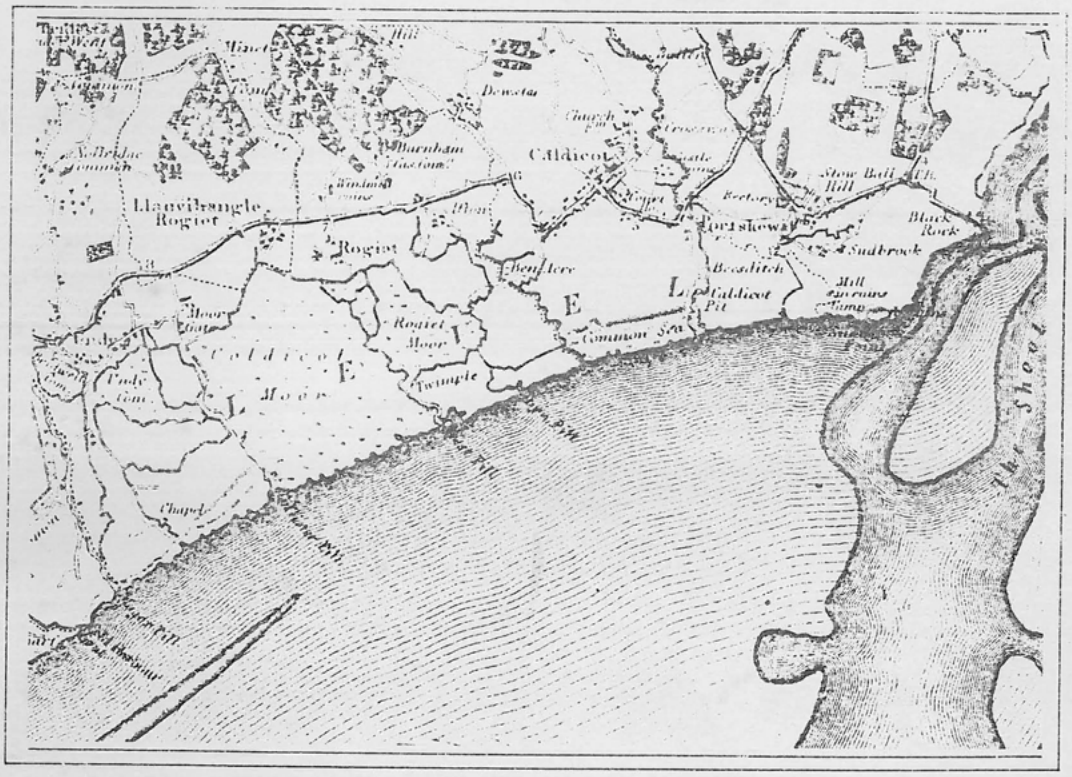
ARCHAEOLOGY of the SECOND SEVERN CROSSING



Assessment and Recommendations for Gwent

The GLAMORGAN GWENT ARCHAEOLOGICAL TRUST Ltd.

ARCHAEOLOGY OF THE SECOND SEVERN CROSSING:

Assessment and Recommendations for Gwent.

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The Glamorgan-Gwent Archaeological Trust Ltd

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Abbreviations:

BBCS	Bulletin of the Board of Celtic Studies
Gwent CRO	Gwent County Record Office
MMI	Monmouthshire Moors Investigation, 1954
NLW	National Library of Wales
OD	Ordnance Datum
PRN	Primary Record Number (in County SMR)
SMR	Sites and Monuments Record
SBPDR	Severn Barrage Project Detailed Report (vols 1-5) 1990

Front cover: the Crossing area in 1830 (from C and H Greenwood *Map of the County of Monmouth*).

Back cover: Intertidal flats, low tide

1
INTRODUCTION

Acknowledgements

The Trust acknowledges the support and assistance given by numerous organisations and individuals during the planning and execution of the assessment. It is appropriate that the co-operation of Adrian Wilson of Welsh Office Highways directorate be recorded. Aidan Davey and Audrey Calder of WS Atkins Consultants Ltd supplied many essential details of the Crossing, often at short notice, as did Mr A Trowell of G Maunsell and Partners. The Trust has always placed the goodwill of those individuals on whose land it works at a premium, and it is a pleasure to record the patience and courtesy of the many landowners and tenants along the route, as well as their agents. The Ministry of Defence kindly allowed the Trust to position its site offices and stores at the Caldicot Firing Range, and the Land Agent Mr Parnwell and the Range Warden Mr Hughes are to be thanked for their assistance in facilitating this.

Archaeological and specialist advice has been given by several colleagues. Special thanks must go to Dr Martin Bell for his help and advice throughout the project, particularly in co-ordinating aspects of the palaeoenvironmental work, and in the contributions made to that part of this report containing recommendations for further action. In this he was assisted by his colleagues at St Davids University College Lampeter, Ms Astrid Caseldine, Dr John Crowther and Dr Michael Walker. Ms Jenni Heathcote ably supervised the auger work. Dr HN Savory kindly examined the prehistoric artefacts recovered during the fieldwork, and Dr EM Evans the Romano-British material. Mr Derek Upton has, as always, been willing to share his considerable and valuable experience of the Gwent levels, particularly the intertidal zone where he has made so many discoveries. Mr Robert Trett, curator at Newport Museum, has also supplied useful data on some recent discoveries. A significant part of the assessment area lies within a Site of Special Scientific Interest, and it is a pleasure to acknowledge the efficient assistance given by Dr Peter Williams and Ms Alison Jones of the Nature Conservancy Council in obtaining the necessary consent to excavate within the SSSI. We are also most grateful to staff at the National Library of Wales, Gwent County Record Office, the Central Register of Air Photography for Wales at the Welsh Office, and the Library of the University of Cambridge Committee for Aerial Photography; their knowledge of their collections eased the search for documentary data considerably.

Background to the assessment.

Discussions with Welsh Office Highways Directorate and with WS Atkins were initiated early in 1988 following a public exhibition. In August 1988 a preliminary overview *A Question of Time* was submitted which supplied background information about the archaeology of the levels and a gazetteer of known sites which lay on or close to the likely route of the Crossing. The report also identified the necessity of conducting further assessment with the aim not only of identifying discrete sites but also the environmental development of the area. Detailed estimates of likely costs were forwarded to Cadw in November 1988 as part of a routine submission of proposals for work necessitated by Welsh Office Highways Directorate schemes. These costs did not however take account of the areas affected by the toll plaza or construction camps, details of which had not then been announced.

In February 1990 the Trust met with Welsh Office Highways Directorate, Cadw, and Atkins/Maunsell, by which time the timetable for the construction programme and the related parliamentary procedures had reached an advanced stage of preparation. The consequence of the meeting was an invitation to provide detailed proposals and costings for an assessment. After protracted negotiations with Welsh Office Highways Directorate and Cadw, a programme was eventually agreed early in April 1990.

The extremely restricted timetable inevitably meant that some modifications had to be made to the programme as originally conceived; in particular only a low-level palaeoenvironmental assessment could be undertaken, whilst archaeological dating was excluded altogether. The same constraints have resulted in two stages of reporting. A preliminary report with recommendations was submitted early in August 1990 in order to enable preparation of that part of the Environmental Statement concerned with archaeology to proceed. This document represents the second and final phase of reporting.

This information in this report is supported by the site archive, which contains the primary field data in an organised format together with additional material.

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THE SURVEY AREA IN ITS GEOGRAPHICAL AND ENVIRONMENTAL CONTEXT

Topography

The new carriageway which links the bridge to the existing road network crosses the Caldicot Level along most of its length. The Caldicot Level is a low-lying partially reclaimed coastal wetland which extends from the river Usk in Newport to the confluence of the river Wye at the Severn Bridge. The Caldicot Level is just one of several such areas bordering the shores of the Severn Estuary and known collectively as the Severn Levels. They are essentially of post-glacial origin, and share a depositional history influenced primarily by Holocene sea-level rise (Hawkins 1973, Kidson and Heyworth 1973, Heyworth and Kidson 1982, Shennan 1983).

The superficial deposits of the Caldicot Level are of low elevation (usually less than 7.5m aOD) and are generally at their lowest near the boundary with the more solid geology inland. The Severn estuary experiences one of the highest tidal ranges in the world, and periodic tidal flooding is prevented by extensive sea defences. Whilst it has been claimed (Allen and Fulford 1986) that reclamation was initiated during the Romano-British period, recent work which includes palaeomagnetic dating of sediments near Rumney on the Wentlooge Level (Parkhouse and Parry 1989) has suggested that there has been considerable accretion here after the Romano-British period, and that the question of when reclamation first took place must remain open for the time being. There is little doubt however that there was considerable reclamation during the Middle Ages, and these works have continued into the present century. The provision of sea defences has divided the levels into an inner and outer geomorphic surface (Allen and Rae 1988); on the inner surface the depositional regime has been arrested (apart from occasional episodes when the sea defences have failed, such as the great flood of 1607), and the drainage channels or reens give this part of the levels their characteristic appearance.

The inland margin of the levels is demarcated by boundary slopes where the superficial deposits of the Levels abut a solid geology which is perhaps a former cliff-line (Steers 1964; Allen and Fulford 1986). The remainder of the assessment area lies on this inland margin. At Rogiet this solid geology consists for the most part of Mercian mudstones (Keuper Marl) together with some limestone. The geological survey (sheet 250: 1958/1972) shows river terrace gravels close to the edge of the solid geology. Further east, the route of the road crosses another area of solid geology which projects seaward of the main mass in the vicinity of ST 4887; here the geology comprises Keuper marl and sandstone, again with overlying river terrace gravels indicated by the Geological Survey.

Sedimentary History of the Caldicot Level.

It is not intended to provide a detailed analysis of the sedimentary history and processes of the Caldicot Level. These are discussed elsewhere (eg Wills 1938; Allen and Rae 1987,1988; Allen 1987; SBPDR 1989 (vol 1 chap 3)). However the processes of accretion and erosion within the estuary have a direct bearing on the archaeology of the area, not only in terms of the human actvity which took place, but also in terms of the nature of the evidence for that activity which is recoverable and the techniques appropriate for such recovery.

The superficial sediments cover a platform of solid geology closely related to that on the inland margins. This platform is interrupted by deeply incised river channels (Anderson and Blundell 1965; Williams 1968). The platform and the buried valleys are generally buried by gravel deposits which are much thicker within the buried valleys than on the platform, and then by a sequence of Holocene estuarine silty clays and peats. The bedrock platform is exposed at low tide off Sudbrook Point.

Amino acid racemisation studies have suggested the possibility of a late middle Pleistocene origin (c 120-130,000 BP) for the basal gravels at Llanwern (Andrews, Gilbertson and Hawkins 1984). The gravel bar near low water off Sudbrook Point has produced finds of (Acheulian) Palaeolithic artefacts (Green 1989; D Upton *pers comm*); these are "rolled" and the deposits have clearly undergone some degree of redeposition, although they are quite possibly of similar date to the deposits below Llanwern.

Closer to Sudbrook Point, but still in the intertidal zone, another exposure of gravels is part of the main river terrace gravels deposited probably during the mid-Devensian (c 18000 BP). (Wills 1938; Whittle 1989; H Livingstone, *pers comm*)

Above the basal gravels the main Holocene sequence has been described in detail, principally by Professor Allen and his colleagues (1987; Allen and Rae 1987). There are four main lithostratigraphic units of which the most extensive is the Wentlooge formation. The entire post-glacial prehistoric sequence is registered in

these deposits. The greater volume of the Wentlooge formation consists of estuarine silty clays, but these are intercalated with peat horizons, the earliest of which date to c4000 BC, a date apparently consonant with a significant reduction in eustatic change. The peats tend to be thicker along the inland edge of the levels where they represent the results of backwater fen swamps supporting diverse biota, rather than open estuarine conditions. On occasion, desiccation of peat surfaces may have occured. However the peats represent temporary halts on an overall trend of gradual sea-level rise. It is difficult to provide models other than very general ones for estuary wide events. The particular factors controlling both deposition and erosion will have varied widely over quite small distances.

The most recent episodes of deposition are represented by the three formations described by Allen as the Rumney, Northwick and Awre formations.

Despite the overall erosive tendencies of the estuary at present, accretion is still taking place in the upper part of the intertidal zone in the saltmarsh area.

Even during accretionary phases there will have been erosion due to discharge from the various streams and rivers draining into the Severn (Anderson 1974; Anderson and Blundell 1965; Williams 1968). Elements of older drainage networks are still incorporated into the artificial drainage networks inland of the sea walls, whilst other elements have been abandoned, either at the time of reclamation or more recently. The abandoned drainage elements are represented by palaeochannels, some of which are clearly visible on air photographs. Amongst those natural channels incorporated within the terrestrial drainage network there has been some slight movement through the normal processes of fluvial dynamics.

The palaeoenvironment: constraints and opportunities.

Much of the past human behaviour which is the focus of archaeological endeavour was concerned with adaptation to the environment, or modification of it. Study of palaeoenvironments is thus a crucial factor in archaeological studies. An appreciation of the constraints and opportunities provided by particular environmental circumstances may allow some degree of predictive modelling in respect of settlement locations and exploitative strategies.

Coastal and littoral situations offer a particular combination of features which makes them attractive to settlement; in particular a diversity of resources. Prior to the Neolithic adoption of agriculture, earlier hunter/gatherer/fisher economies often show a greater or lesser degree of dependence on aquatic resources, which has been variously analysed as adaptation to environmental change or as a step in the processes which eventually resulted in Neolithic farming (Jarman Bailey & Jarman 1982).

In this connexion it is perhaps worthwhile to note the opportunities which the Severn Estuary offers to study these changes further. At Goldcliff, downstream of the Crossing area, an assemblage of animal bone and flint with Mesolithic characteristics has very recently been dated to c4500 bc (uncalibrated) (R Trett *pers comm*). This assemblage has been recovered from a location very close to the area of foreshore peat which has yielded evidenceof a relatively early Neolithic clearance horizon c5690 (calibrated) BP (=3740 BC) (Smith and Morgan 1989).Further evidence for human activity in the Levels during the late Mesolithic is provided by the human footprints impressed into the Lower Wentlooge formation at Uskmouth (D Upton *pers comm*). The deposits examined at Goldcliff have their counterparts along virtually the entire Welsh shore of the estuary, including the area of the present study.

Considerations of biodiversity, coupled with the principle of least effort strategies, mean that the narrow zone representing the contact of the wetland with the dryland was of particular importance. Settlements, whether permanent or temporary, on or immediately landward of this boundary would have been located to exploit a diverse selection of resources and therefore ensure a more stable food supply.

It should also be emphasised that not only were the wetlands significantly different from the adjacent drylands, but also that the wetlands themselves would have exhibited a considerable variation of ecosystems over a relatively short distance, ranging from wholly marine, through mudflats and saltings, to fen carr and backwater swamps further inland. There would have been significant differences in tidal influences and in salinity.

There were also episodes when human activity on the wetlands, rather than simply being exploitation from a dryland base, involved occupation of sites on desiccated raised peat beds. Structures at Chapel Tump 1 and 2 (Whittle 1989; R Trett *pers comm*) belong to this category; it is difficult to be certain at present whether they were occupied on a seasonal basis or throughout the year. Radiocarbon dates indicate a Late Bronze Age date for the Chapel Tump structures.

Wetland exploitation was also facilitated by the construction of trackways, which not only assisted movement but may additionally have provided hunting platforms. Although the Gwent levels have not as yet produced any trackways comparable in extent with those from the Somerset Levels (Coles and Coles 1986), hurdlework structures have been recorded from various locations in the estuary, including the area affected by the Crossing (below p 29). The Upton Trackway, close to the Chapel Tump sites, has in fact been dated to a period significantly later than the two settlement sites: 450±70 bc (CAR 960) (Whittle 1989), and shows continuing activity in the Levels even during a period of marine transgression. Such structures were most likely to have been constructed in palaeochannels and tidal creeks.

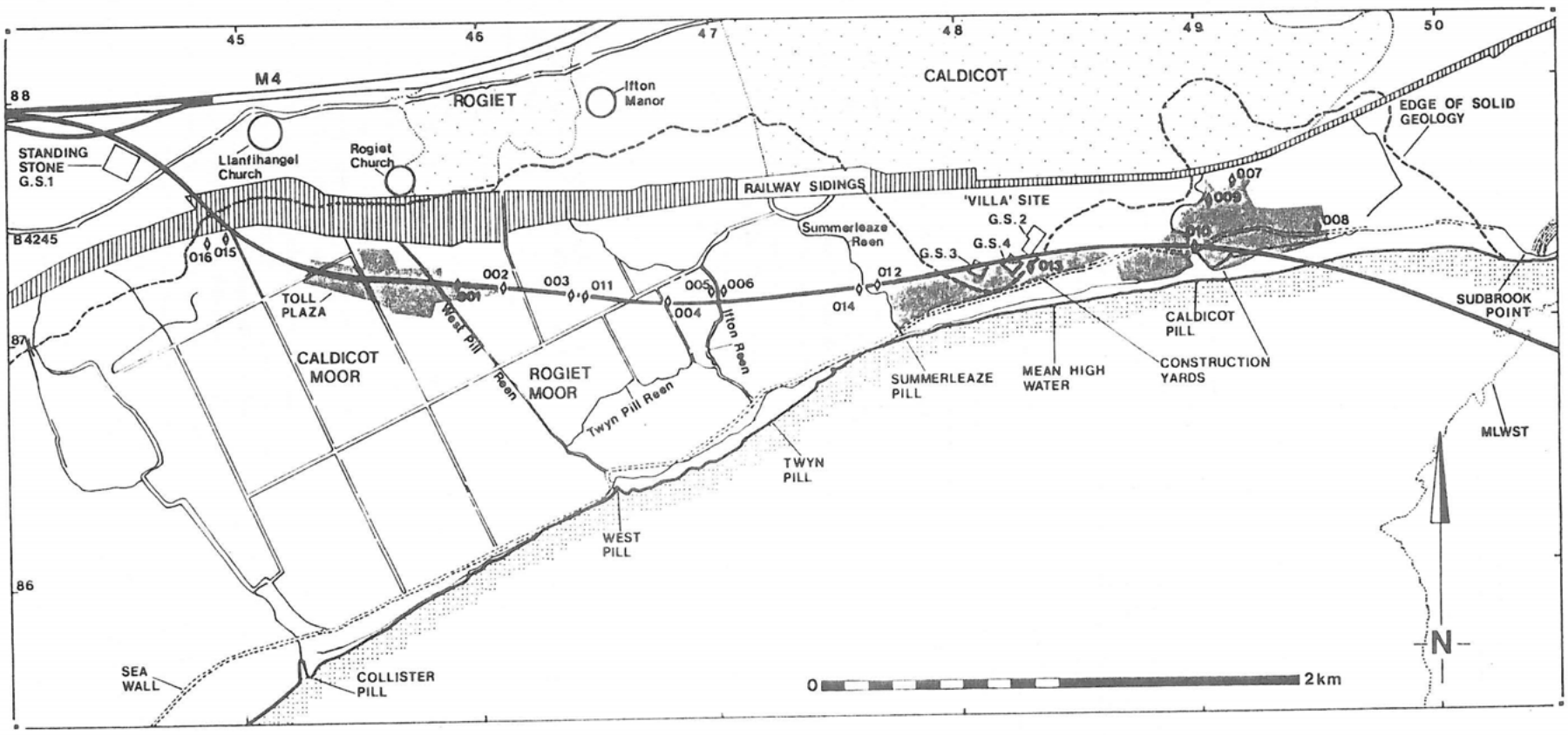

Fig 1. Location of trial pits (◊) and geophysical survey areas (gs).

3

ASSESSMENT METHODOLOGY

The previous chapter refers to the various landscape types represented in the areas affected by the Crossing, and to the types of human activity which are likely to have taken place within these landscapes. The methodology of the assessment would have to be one which not only took account of the nature of past human activity, but also the various subsequent processes which have modified the evidence of that activity to the data now recoverable. Study of such post-depositional processes is crucial to understanding the meaning of the data (Schiffer 1987).

Initial desktop evaluation based on the Gwent Sites and Monuments Record (presented in *A Question of Time*) showed the presence of a number of sites in the terrestrial dryland zone and in the intertidal zone, but no sites registered within the area of reclaimed wetlands. This demonstrated that site recognition (as opposed to site frequency) was directly related to landscape type. The methods adopted for the programme of field evaluation undertaken in June/ July 1990 therefore had to take account of the particular characteristics of each type of landscape. In addition to fieldwork, further research was undertaken using documentary material, cartographic evidence, and aerial photographs.

Fieldwork

Three broad landscape types may be recognised along the line of the Crossing and related works: terrestrial dryland based on solid geology, reclaimed coastal wetlands, and unreclaimed coastal wetlands (the intertidal zone and adjacent saltmarsh).

Terrestrial dryland. Solid geology occurs close to the surface at two locations: in the area between the junction of the new road with the M4 and the railway (ST 4405 8795 to ST 4495 8748), and as a "peninsula" south of Caldicot (ST 4802 8722 to ST 4833 8728). Archaeological features on this terrain tend to have a higher visibility and these areas are therefore more susceptible to traditional forms of archaeological fieldwork. In each of these two areas sites of archaeological significance were known to exist: a standing stone at ST 4451 8776 and a cropmark noted on air photographs in 1953 and interpreted as a Romano-British villa at ST 4837 8740. Routine fieldwalking was undertaken in both locations, as well as a programme of geophysical prospection.

Terrestrial wetlands. The major part of the area under consideration consists of reclaimed coastal wetlands, where the solid geology is deeply buried by estuarine deposits. Only the latest episodes of the landscape formation processes which characterise the Gwent Levels are visible at or near the present land surface, and consequently the early depositional units, and the archaeology registered within them, are rendered effectively invisible by the same depositional processes which have ensured their preservation. Traditional fieldwork methods (such as fieldwalking, aerial photography and geophysical prospection) are of limited use, and archaeological strategies are dependent on the excavation and examination of a sample of the deposits. A major part of the assessment fieldwork was devoted to this end. A series of test pits was excavated which allowed the various stratigraphic units to be examined in detail, particularly where they could be related to the wet/dry interfaces. This work was supplemented by augering. Variability of the stratigraphy could thus be examined in detail, and related to previous human activity ranging from prehistoric exploitation to more recent phases of land reclamation. Some of these more recent phases can be supplemented by documentary and cartographic evidence, which has helped to set some episodes of sedimentary deposition and landscape evolution into a chronological context.

Intertidal zone. The intertidal zone is similar to the reclaimed wetlands, but here the processes of landscape evolution have not been arrested by the provision of sea defences. These processes are neither continuous nor uniform, but exhibit erosive as well as accretionary episodes; indeed it is probable that the net effect of these processes is erosive (SBPDR 1989 1, 3.2). Thus exposures of much earlier sediments occur in this area; frequently these contain archaeological artefacts as well as more substantial features. The intertidal zone is therefore one which lends itself to surface examination. Such examination is however limited not only by the tides with their particularly high amplitude, but more importantly by the variability of the mobile sediments deposited over the earlier exposures. The depth of these deposits can vary considerably, and it is impossible to predict when particular areas will be sufficiently free of "slop" to make investigations worthwhile or indeed safe. Actual excavation in these conditions, whilst by no means impossible, carries its own particular package of logistical difficulties. Assessment of the intertidal zone is dependent therefore on tide and weather. Optimum conditions tend to occur after high tides and strong winds, and were not met during the period of the fieldwork, although some useful work was undertaken.

Documentary evaluation

With land reclamation came the concept of land ownership as well as complex systems of land management. Indeed, documentary research has shown that the right to exploit resources such as summer pasture was probably claimed even before reclamation was initiated. Manorial surveys of the medieval and later periods help to illustrate the intricate relationships between environmental diversity and the rights and responsibilities of the tenants.

Documentary research was carried out with two specific objectives:

a) Identification of potential archaeological remains likely to be affected by the Crossing route

b) Understanding the relationship between the sedimentary sequences revealed in the trial pits and the changing pattern of human activity and land use on the Levels since the Middle Ages, including particular episodes of drainage and land reclamation.

Relevant material was gathered from *inter alia* the Gwent County Records Office, the National Library of Wales and from certain published sources. This included post-medieval estate maps and surveys (and, in particular, among the Tredegar deposits at the National Library), the records of the nineteenth century Court of Sewers at Gwent CRO, successive eighteenth and nineteenth century enclosure plans and awards, the Tithe survey plans and schedules, nineteenth century Ordnance Survey maps and collections of aerial photographs at the Welsh Office and the library of the Cambridge University Committee for Aerial Photography.

The results of this work are discussed further below (chapter 6)

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RESULTS OF ASSESSMENT: FIELDWORK

The area of the assessment is divided here into twelve different sections, from west to east, as follows:-

1) M4 to Railway

2) Vurlong Reen area

3) Rogiet Moor and Nine Meads

4) Rogiet to Ifton Reen

5) Ifton Reen

6) Ifton Reen to Summerleaze Reen

7) Summerleaze Reen

8) The "villa" site and environs (Stoop Hill)

9) The "villa" area to Caldicot Pill

10) Land east of Caldicot Pill

11) Caldicot Pill to MHWST

12) MHWST to MLWST

Stratigraphy along the route of the Crossing was examined in a series of sixteen mechanically excavated Trial Pits (numbered 001 - 016), together with a series of auger holes (numbered 051 - 089). After cleaning with pointing trowels, the sections in the trial pits were recorded as a series of *contexts*, each context relating to an individual sedimentary facies, lithostratigraphic unit, archaeological horizon, or indeed any definable entity. So, for example, trial pits, artefacts and individual samples were also considered to be contexts.

The following parameters were recorded for each context:-

*Context number. (A sequential system was adopted with "blocks" of numbers being adopted as follows - 001-050 trial pits; 015-100 auger holes; 101-1000 contexts *per se*; 1001-1499 samples; 1500-1600 finds).

*Location

*Context type

*Munsell soil colour number and description

*Deposit texture

*Description

*Height of top and bottom relative to OD

*Stratigraphical relationships to other contexts and cross-references (eg to finds, samples etc)

On the section drawings therefore, three digit numbers relate to trial pits, auger holes, and layers, four digit numbers to samples or finds.

In a few cases auger holes were bored from the bottom of trial pits in order to investigate the underlying stratigraphy. This additional information has been incorporated in the transect shown as figure 13.

For reasons of safety, it was not possible to expose deep standing sections without cutting a series of "steps" in the face of the section. For the sake of clarity, these steps have been omitted from the illustrations presented here, except where their absence would cause an unexplained hiatus in the stratigraphy.

1) M4 to Railway

The land slopes down from the motorway at about 28m aOD to the northern edge of the railway line at about 12.5m aOD. Holocene sediments above the solid geology are shallow (as shown by the test pits and borehole data supplied by WS Atkins) and any archaeological features were not therefore likely to be buried to any great depth. The area was therefore susceptible to surface inspection and geophysical prospecting.

The Standing Stone

A standing stone (PRN: 468G) at ST 4451 8776 lies at the edge of the route. The stone is 2.3m high, and 1.6 x 0.5m at the base, where it is broadest. It is scheduled under the Ancient Monuments and Archaeological Areas Act, 1979 (Mm 68). It lies within the medieval "Great Field" of Llanfihangel, and was surrounded by partly unenclosed arable strips as late as 1766 (NLW Tredegar Deposit 1016). Investigations elsewhere have demonstrated that standing stones may be surrounded by complexes of archaeological features below ground, including pits and ring ditches (eg Longstone Field Dyfed (Williams 1986); Mynydd Llangyndeyrn (Ward 1983)) and, in the west of Britain, cremation burials (eg Stackpole Warren, (Benson 1978;1979)). Local enquiries suggest the possibility that there may originally have been other standing stones in this immediate area until the construction of the motorway (SJ Parry *pers comm*). The Ordnance Survey archaeological record card refers to a stone close by at ST 4447 8758 (PRN 4417G) which in 1957 "has apparently been removed".

Surface Survey

An additional possible site a little further from the road, but nevertheless perhaps significant, was discovered by chance whilst negotiating access with a local farmer. This consisted of a series of Romano-British finds including coins discovered by means of a

metal-detector from the area around ST 438 877 in an area where a local aviator reports having seen parch-marks. Whilst neither metalwork nor cropmark were seen, the evidence is not inconsistent with some form of Romano-British farmstead. The motorway junction area may very well lie within the land allotment of such a site.

Surface inspection did not however reveal any features apart from relatively recent field boundaries and what was evidently the former site of a cattle trough.

A "Millmotte" place name, thought to describe the base of a lost windmill, is suggested to lie south of the B4245 and in the vicinity of the Crossing route, though there are no surface traces of such a feature (Stopgate 1986).

Geophysical Survey

Geophysical survey was undertaken in the vicinity of the standing stone in order to locate any subsurface features associated with it. No anomalies were detected which could be associated with the standing stone, and whilst there were low-level anomalies elsewhere within the area surveyed which were of potential archaeological interest, they did not encroach directly upon the route of the road (appendix 2).

In the absence of any anomalies which warranted trial trenching, and given the nature of the surface geology as indicated by the WS Atkins test pits, no trial pits were excavated in this area. However in order to clarify the position of the edge of the superficial estuarine deposits of the Levels more precisely, a single auger hole (079) was bored immediately adjacent to the railway at ST 4481 8755. This confirmed the impression gained from the topography of the area that the contact point was situated further to the southeast.

The area of the railway line and associated sidings was not accessible. WS Atkins borehole logs (nos 5108 and 5109, situated at ST 44950 87523 and ST 44874 87486 respectively) were not available until after the fieldwork; it shows that these points are on the "dry" side of the contact between solid geology and superficial Holocene Levels deposits.

2) Vurlong Reen area

The railway line from Cardiff to Gloucester and London runs for much of its length on or near the landward edge of the Levels. Seaward of the railway line the route of the proposed road begins to cross the Levels deposits. Trial pit and borehole logs supplied by WS Atkins indicated that the superficial deposits here contained significant deposits of peat, up to 3.3m in depth in the vicinity of ST 4518 8731. This was also the lowest elevation along the route (c 3.6m aOD). These factors are strongly indicative of a well developed and relatively long-lived fen peat development in a backwater swamp with high freshwater input. Such a habitat would have had a high resource potential in terms of biotic diversity, and there was therefore a high likelihood that human activity would be registered on the margin of the peat deposits.

The surface of much of the field is extremely bumpy, suggesting some degree of desiccation of underlying peat and resulting subsidence. It is possible that prior to wastage the peat occupied a slightly more extensive area. Much of the shrinkage here is due to relatively recent drainage improvement (CH Dobbie in MMI 1954, 38), and indeed the present owner has noted a deterioration in the surface within the last five or so years.

Maps prior to the present editions show a reen, Vurlong Reen, running approximately northeast - southwest which corresponds very roughly with the edge of the flat part of the field. This feature is no longer obvious on the ground and is not especially clear from the air (although it is clearer on 1947 RAF prints; CPE UK 2081).

However, its former position, even though physically invisible, is still the parish boundary of Llanfihangel Rogiet. This hedged reen divided the former common meadow (the "furlongs" or "Vaurlands") on the margin of the solid geology from the open peat moorland (NLW Tredegar Deposit 1066; Tred mss 169). It is possibly an artificial seventeenth or eighteenth century drainage channel.

Immediately west of the proposed road route the land rises up to and beyond a terrace feature (probably a lynchet). Auger survey (Transect C) was undertaken with a view to identifying the contact point of the wetlands with the solid geology and to investigate processes of sediment development and movement, whilst two trial pits (015, 016) were opened to inspect the sedimentary sequence in greater detail and to take samples for palaeoenvironmental analysis.

Trial Pit 016

Trial pit 016 (fig 3) showed a complex depositional sequence of sands silts and clays overlain by a layer of woody fen peat up to 0.63m thick. Despite its proximity to the slight slope to the west, the sequence seen here did not apparently contain any significant quantity of colluvial material except perhaps in the topsoil. The sequence below the peat was diagnostic of estuarine origin.

In addition to the natural succession of sediments there was also one feature which appears to have been of anthropogenic origin, although it is perhaps possible that it was the result of tree-throw. This was a cut feature (context 307), either a pit or a gully, which had been cut through the lower part of the peat sequence. Peat formation had also however occurred over the cut feature after it had become filled in. The fills of this feature consisted of a series of silts and clays with some admixture of peat, and the nature of the succession of fills was such as to suggest deposition in a number of short episodes of sedimentation, perhaps

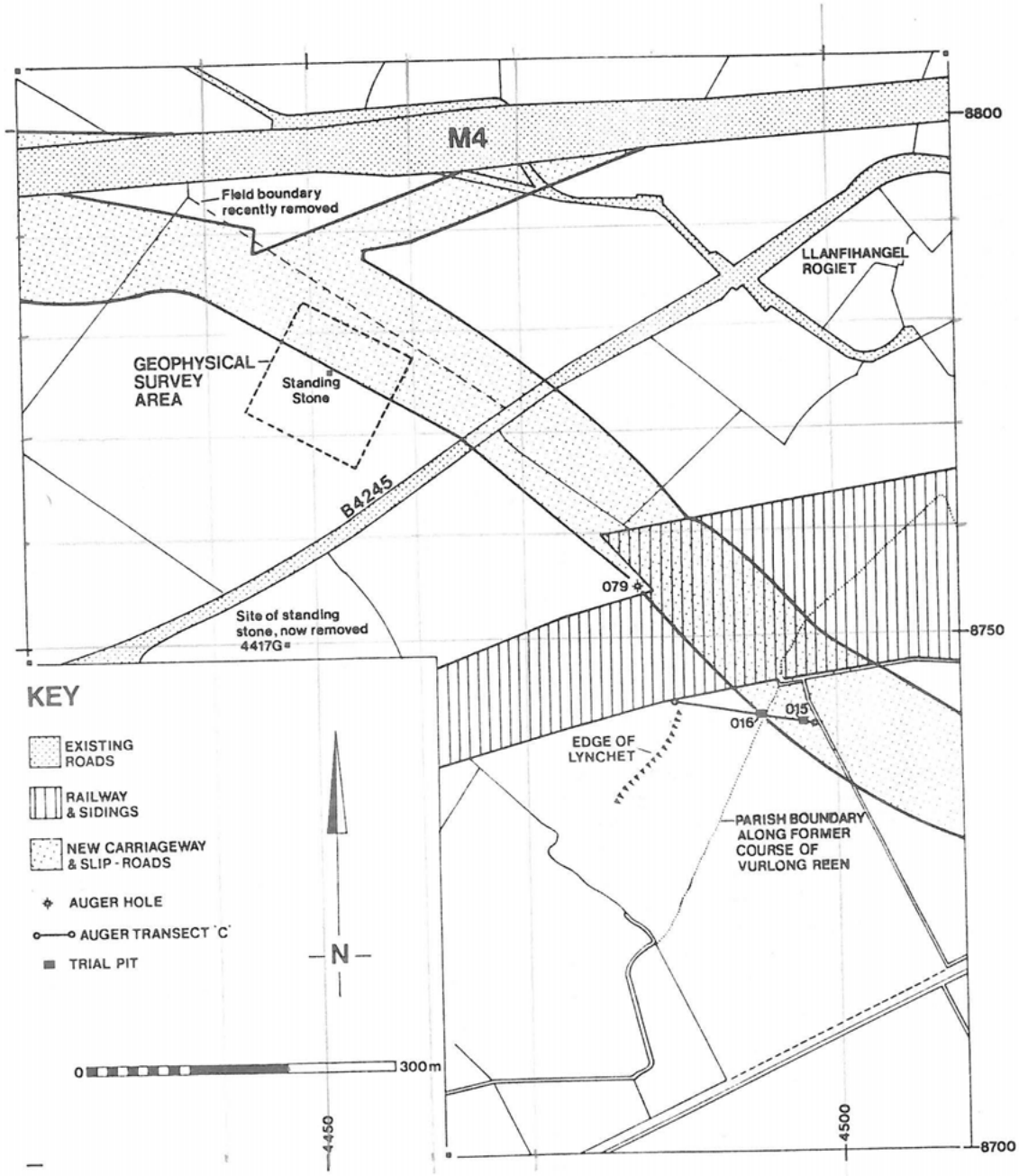


Fig 2. Plan of area around standing stone and Vurlong Reen.

by periodic flooding. The side of the trial pit cut the feature at an oblique angle. The feature was not visible in the opposite or adjacent faces, suggesting that if it was a drain or gully, as opposed to a pit, the section observed in the trial pit was at a bend or terminal. The feature also produced a flint flake (Appendix 1; no 1545) which when taken with two others (1536, 1547) from the test pit and a further unworked piece (1500) from a nearby auger hole (077) indicates a significant level of activity in the area.

Summary of Contexts in Trial Pit 016

(These descriptions are based on field notes. More detailed descriptions will be found in chapter 5 below, p 31).

Main sequence:-

301 Weathered topsoil

302 Peaty silty clay with desiccation cracks. Boundary with 308 indistinct.

308 Humified peat

303 Peat with some coarse sandy patches and silty clay lenses

304 Root, identified as *Quercus*

306 Organic silty clay

311 Fine sandy silt with a very few stones.

312 Silty medium sand with frequent pebbles

313 Sandy silty clay with occasional pebbles, also occasional sand lenses

314 Silty sandy clay; no pebbles.

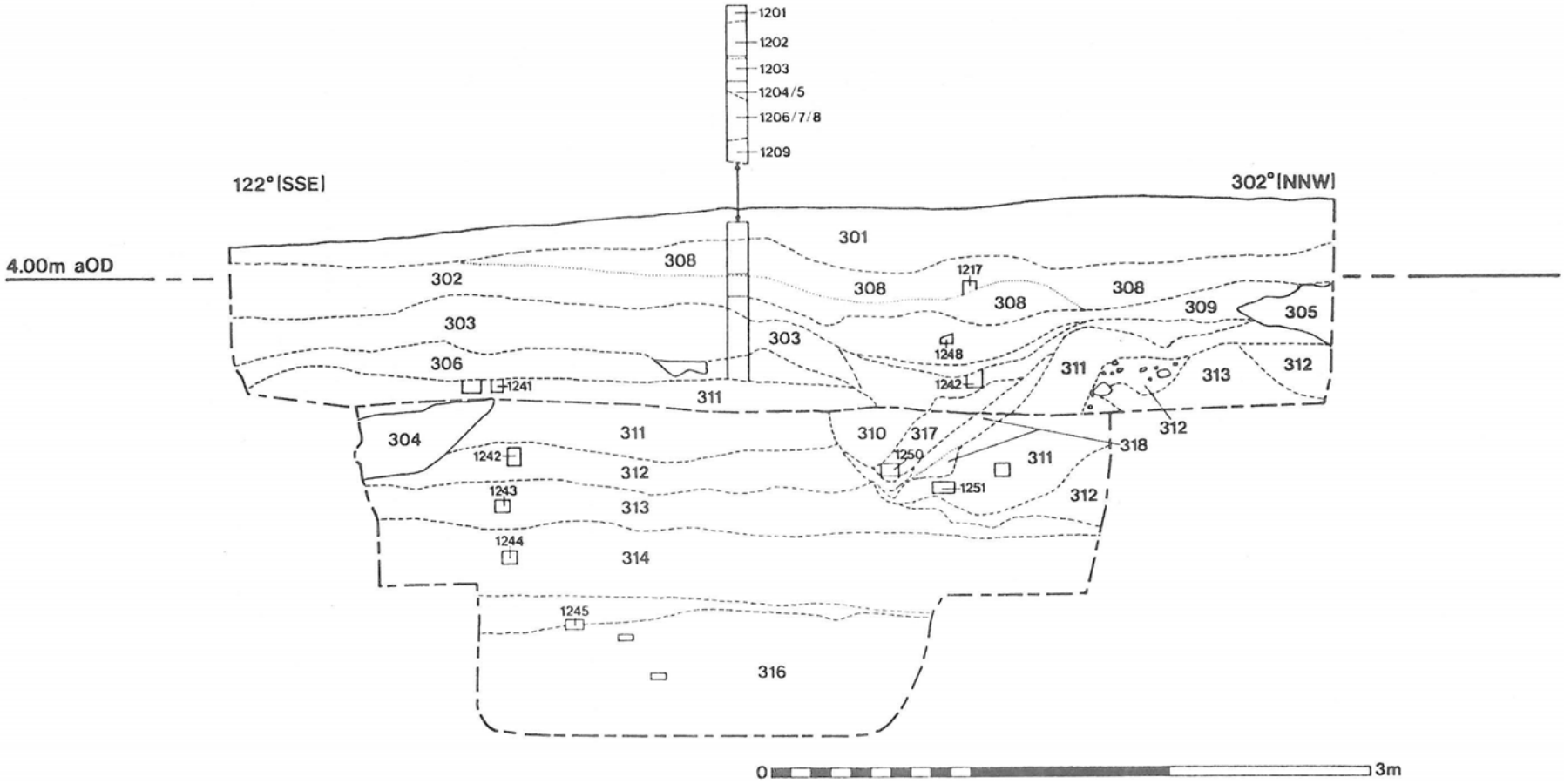


Fig 3. Section across Trial Pit 016.

315 Silty fine sandy clay

316 Very silty fine sandy clay; greater clay content further down profile with laminations near base. Occasional rotten sandstone clasts.

Other contexts (307 and fills):-

307 Cut feature, possibly gully or pit. 0.85m wide; 0.42m deep. Cuts lower part of peat sequence (context 303), but some peat formation (context 308) has occurred over the top of 307. The relationship of context 311 to this feature is unclear, as 311 is evidently cut by 307 on the southeast side, whilst on the other side 311 has apparently slumped into 307 prior to deposition of the main series of fills.

309 Highly organic silty clay; upper fill of 307 and also extending beyond the sides of the cut. Heterogeneous; laminations of fine sand, clay, peaty silts.

310 Very organic clay, similar to overlying 309

317 Wet plastic organic clay with fine sand laminations

318 Basal fill; grey silty clay

Trial Pit 015

Trial pit 015 although only 36m distant from 016 showed a much simpler sequence of deposits, with 1.34m of woody fen peat overlying a thin layer of estuarine clay which in turn overlay silty clay. There were no indications of anthropogenic activity. A sequence of samples was taken to analyse the quality of pollen preservation within the peat.

The results of laboratory analyses of the various samples from the two trial pits 015 and 016 are discussed in the following chapter.

Auger transect C by J Heathcote

The deposits along this transect can be differentiated by their position in relation to the gradient of the land. On the slope, the sediments are predominantly terrestrially derived, whilst at the base these interdigitate with deposits formed in a water saturated environment. The slope bears a series of units of brown clay with a varying amount of silt/ sand; these are secondary clay minerals weathered from other deposits and have undergone colluviation indicated by the slope profile, thickening of certain units and the accumulation of larger pebbles towards the base of the slope.

The flat land sediments are dominated by peat formation which thickens and becomes more homogenous and overlies increasingly less consolidated deposits towards the present day reen. In Trial Pit 016 which lies around 4m from the base of slope, the peat shows numerous fine lenses and laminae of organic silt and clay indicating mineralogical input from small-scale fluvial systems, eg surface water run-off and occasional slight local inundation, in a regressing marginal estuarine environment. The peat has a base contact with a thin (c0.07m) band of organic rich clay whose deposition would be consistent with flooding prior to the initiation of peat growth in a well vegetated area. Peat desiccation is seen from the ground surface of the field which has a hummocky appearance due to differential shrinkage rates.

3) Rogiet Moor and Nine Meads

Inspection of air photographs and the WS ATkins trial pit and borehole data suggests the likely extent of the peat (fig 15b). The eastern edge is close to an area of land which is sharply defined on air photographs by palaeochannels and associated banks which appear to have been deliberately cast rather than having developed as levees. Documentary and cartographic research (below chapter 6) suggests the strong probability of a very early episode of land reclamation involving a narrow tongue of land (or even an island) known as Nine Meads. An early nineteenth century droveway is shown passing along the east side of of Nine Meads Reen down to the coastal meadows; this is likely to have been one of the principal medieval and perhaps earlier routes, and like the "Summerway" described below (p16) it lies along a natural boundary feature. There are no obvious indications on the surface of the land why this particular area of the Levels was attractive to reclamation, but it may have been at a marginally higher elevation than the surrounding area.

The reen on the eastern side of the area was known as Nine Meads Reen, but it was that on the western side, however, which formed the manorial and parochial boundary and also marked the physical divide between the reclaimed meadows and the open peat moors. This particular reen was described in 1599 (and in subsequent boundary surveys) as "New Dicked Ditch" (Gwent CRO D.668.19), but such boundary recitals are frequently passages transcribed from earlier surveys, and it is uncertain just when this reen was "newly digged". The name itself seems to have been genuinely in use in seventeenth century contexts other than boundary descriptions (eg Bradney 1907 IV (i), 111 (1613)) and probably indicated something more than just the regular event of reen cutting.

Both "New Dicked Ditch" and Nine Meads Reen survived until after the area had been enclosed during the mid nineteenth century within its present trapezoidal field, and which, at least in the case of Nine Meads Reen, are still clearly extant on the 1947 RAF prints.

Two trial pits (001, 002) were excavated in order to investigate the stratigraphy of this area, and the stratigraphic sequence hints that this area may have enjoyed a higher relative elevation at a significantly earlier date than that of its reclamation. Both trial pits showed two bands of humified organic clay silts (104 and 106 in 001; 124 and 127 in 002) which were more prominent than comparable contexts elsewhere on Caldicot Moor / Rogiet Moor. These bands may be taken to represent episodes, of unknown but perhaps relatively brief extent, when conditions were drier. This area appears therefore to have been one which showed a tendency towards being relatively drier than surrounding parts of Caldicot Moor, and this factor may have implications for patterns of human exploitation, although no direct evidence for prehistoric human activity was discovered during the assessment. Surface

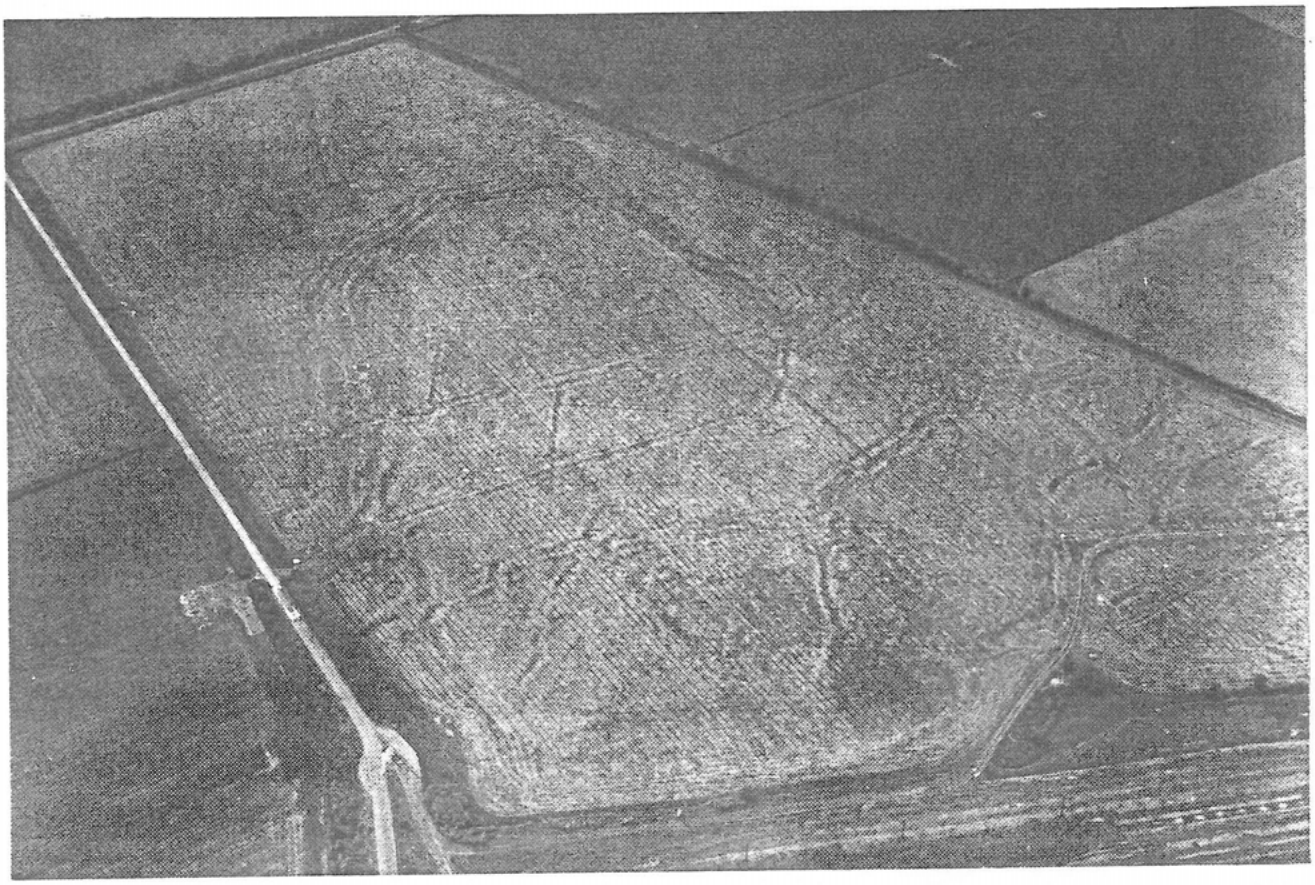


Plate 1. Aerial view of the Nine Meads area. The "island" is still clearly visible.

indications of later activity were recorded in this area which can be related to field boundaries shown on the Ford Estate map of 1766, but some of these were evidently associated with construction of the railway, including a series of borrow pits for make-up of the raised railway level. Other features were drainage gullies which are portrayed on estate maps (NLW Tredegar Deposit 961; 1016).

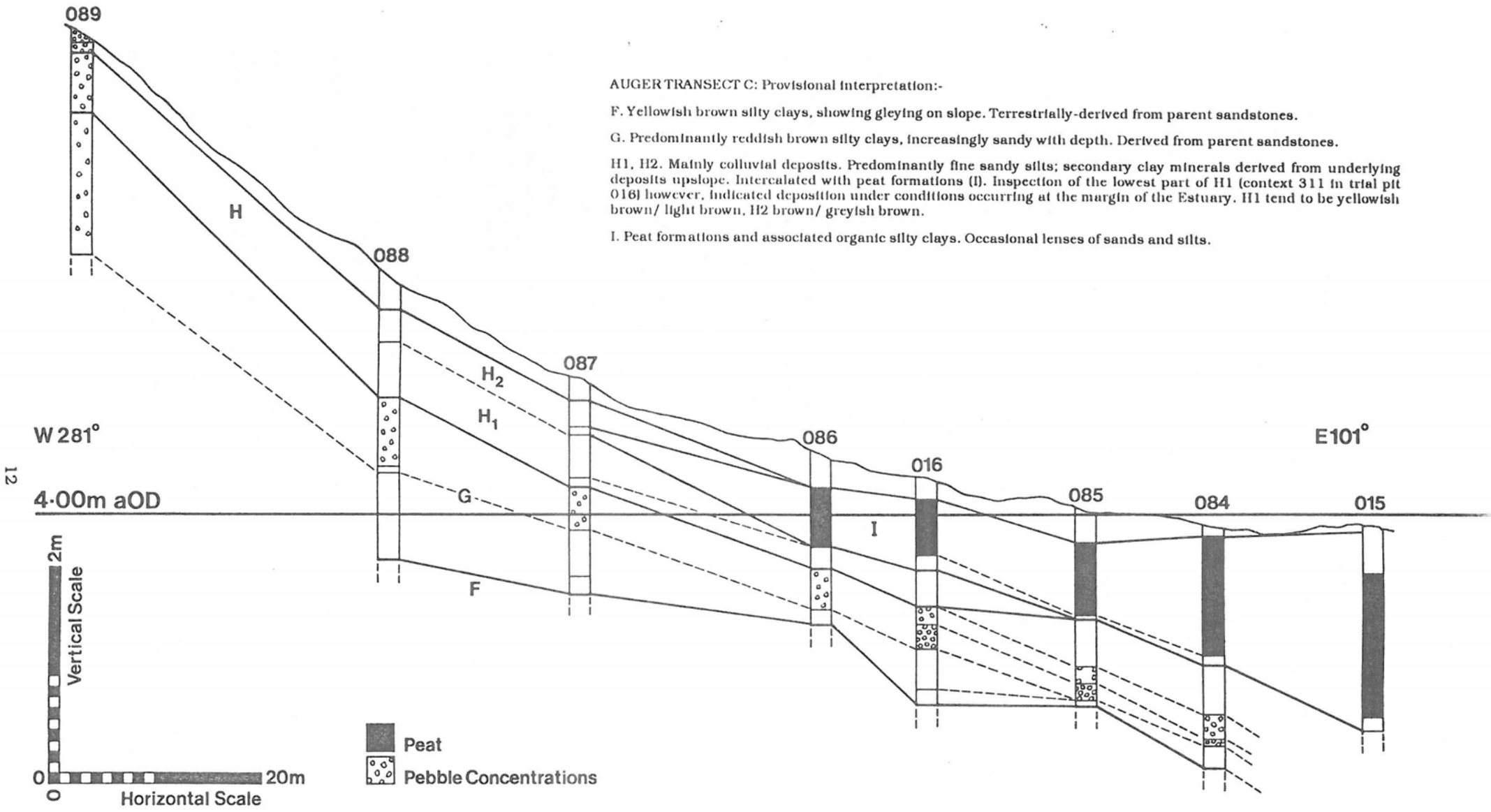
4. Rogiet to Ifton Reen.

The next principal landscape feature east of the Nine Meads area is Ifton Reen. With the exception of the Nine Meads "island" the moors here have a markedly rectilinear drainage pattern. This was for the most part a very recent area of reclamation extending as far west as Collister Pill. Earlier enclosure may well have taken place however in the small area between the sea wall and Towym Pill (formerly known as Twmpwll, ie the pill by the hill) Reen. The only feature which was detected on the surface of Rogiet Moor was a low mound situated at ST 4643 8714 measuring approximately 22.4m x 8m and about 0.8m high with a few small pieces of limestone visible in its surface. This was investigated by means of a hand dug trial pit (011), but it did not appear to have any internal structure and it is probably a post-medieval warren - a typical feature of moorland fringes. An area on the northwestern margins of the peat moor is described as "the conigare" in 1697 (NLW Tredegar mss 169).

The general stratigraphy was investigated by means of two trial pits: 003, located at ST 46335 87184, and 004 at ST 46791 87120. The thin bands of organic material noted in the Rogiet "island" were absent here. Further stratigraphic details were obtained by an auger hole (055) at ST 4614 8734. The general stratigraphy of the Levels deposits east of the Nine Meads area and away from the inland margins of the Caldicot Level is discussed further below (p 26).

5. Ifton Reen.

Like two of the other major channels across this part of the Levels, Ifton Reen has formed a natural territorial boundary for most of the period for which records are available. This is almost certainly the same boundary ("from the hill called Timuil...") that defined the early tenth century lordship of Tref Peren and, probably, the commote of Llebenydd (Evans and Rhys 1893; Richards 1969). It was subsequently the manorial and parochial division between Ifton and Rogiet. Like the other moorland boundaries, this was no single channel but a linked sequence of ancient meandering watercourses. The stretch now known as



AUGER TRANSECT C: Provisional interpretation:-

F. Yellowish brown silty clays, showing gleying on slope. Terrestrially-derived from parent sandstones.

G. Predominantly reddish brown silty clays, increasingly sandy with depth. Derived from parent sandstones.

H1, H2. Mainly colluvial deposits. Predominantly fine sandy silts; secondary clay minerals derived from underlying deposits upslope. Intercalated with peat formations (I). Inspection of the lowest part of H1 (context 311 in trial pit 016) however, indicated deposition under conditions occurring at the margin of the Estuary. H1 tend to be yellowish brown/ light brown, H2 brown/ greyish brown.

I. Peat formations and associated organic silty clays. Occasional lenses of sands and silts.

Fig 4. Auger Transect C.

Ifton Reen, formerly a part of Tymple Pill, or "Dimple Ditch", linked the inland section of this reen system ("Middle Pill" - modern Ifton Bank Reen) with the coastal pill (NLW Tred Dep 934; Gwent CRO D.668.19). In theory the commons were freely available to graziers from the surrounding parishes, and there must therefore have been crossing points over the reen, though none are known, unfortunately, from before the mid-nineteenth century. It is also likely that a north-south droveway existed on the edges of the reen to provide access from the settled hinterland to the coastal meads.

There is no substantial bank such as that seen for example at Summerleaze Reen, and what there is is evidently the result of reen casting.

A small hoard of fourth and early fifth century (Honorius) coins was found "at Ifton (Caldicot)" at an unknown date (Nash-Williams 1928), but the exact findspot is not recorded.

Trial pits (005, 006) were excavated either side of Ifton Reen so as to investigate differences in accretion which might possibly be linked with different stages in land reclamation, since accretion of sediments had evidently continued for a little longer, perhaps three quarters of a century, on the western side of the reen (trial pit 005) (fig 5).

The data however is rather equivocal, for the sequence had been considerably affected by reen casting (probably largely modern), particularly on the western side of the reen. Furthermore the later sediments on one face of the western trial pit 005 had been removed by the cutting and subsequent complete siltation of a minor drainage gully. However, the stratigraphy either side of the present ditch shows that Ifton Reen was, prior to reclamation, considerably wider and deeper than it is today.

Plate 2. Aerial view of the Ifton Reen area, showing Ifton Reen (IR), Ifton Bank Reen (IBR), Woolpits Reen (WR) and the positions of Trial Pits 005 and 006. Another palaeochannel is clearly visible in the foreground.

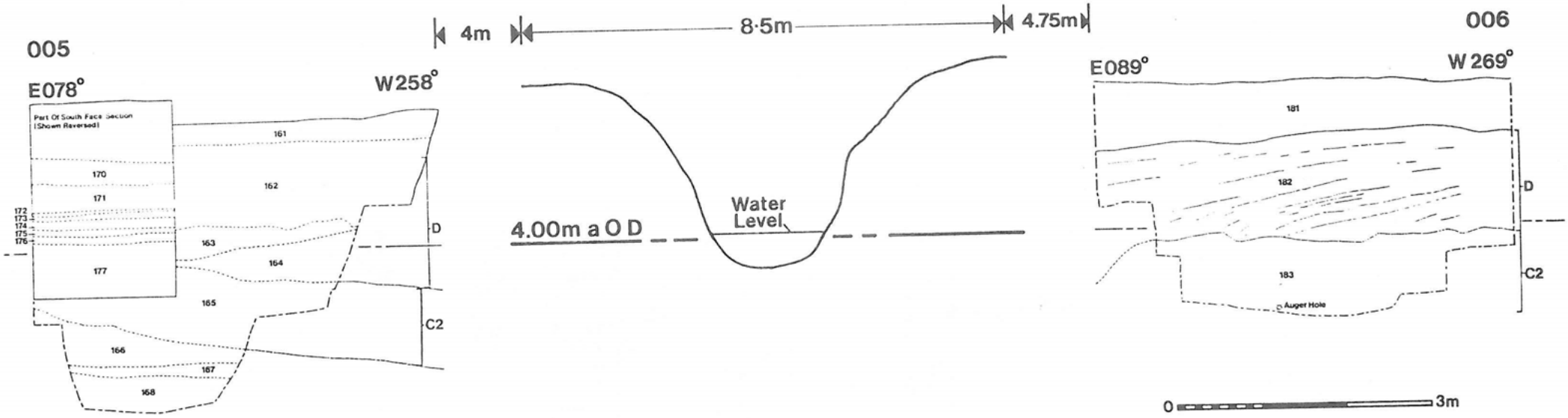


Fig 5. Sections across Trial Pits 005 and 006, incorporating profile of Ifton Reen. Letters C2,D refer to general estuarine stratigraphy; see p26. Reen profile compressed; scale relates to trial pit sections.

6. Ifton Reen to Summerleaze Reen

Reclamation of the land (known in the eighteenth century as Ifton Moor) between Ifton Reen and Summerleaze Reen is to be associated with a private enclosure act of 1776 (NLW Tred mss 34/61), though a wet meadow system had developed along the western side of Summerleaze Reen itself from the seventeenth century (Bradney 1907 IV (i), 124).

No trial pits were dug in this area. There were some palaeochannels visible on the MoD firing range, but military requirements meant that it was not possible to investigate these.

7. Summerleaze Reen.

Like Ifton Reen, Summerleaze Reen is a natural channel which became incorporated into the drainage system. It also an administrative boundary of long standing, forming the manorial and parochial boundary between Caldicot and Ifton. There is a very distinct bank along the eastern side, which is probably to be associated with the extensive post-medieval wet meadow system on either side of the reen.

The boundaries of the manor of Ifton (held as a fee of the Honour of Caerleon) are described in a survey of 1622-24 (Gwent CRO Acc 1740; misc mss 1453). By that date a droveway (the Summerway) existed, running from the arable fields on the solid geology down to the coast along the west side of the reen itself. (The "Somerwaye" is also described in 1613 (Bradney IV (i), 124)). This, like the comparable droveway alongside Nine Meads Reen, was probably a medieval survival, though in this case it does not appear on subsequent maps and seems to have become displaced by the enclosure of the wet meadow strips fringing the reen.

Trial pits (012, 014) were excavated either side of Summerleaze Reen in order to examine differential accretion. It was not possible however to excavate these trial pits directly opposite each other owing to the constraints imposed by the firing range on the western side. The trial pit on the eastern side (012) proved to be of some interest as there were features which appeared to relate to an earlier drainage channel, whilst Trial Pit 014 on the opposite bank showed clear signs in the upper part of the section (horizon between contexts 242, 252 and 253) that Summerleaze Reen had been wider than at present (fig 6).

8. The "villa" site and environs (Stoop Hill)

The site at ST 4837 8740 (PRN: 482G) was discovered by aerial photography in 1953 (St Joseph 1953, Robinson 1988), and interpreted as a Romano-British villa site, although these are rarely to be found in such exposed coastal locations. The form and dimensions of the cropmark however are by no means incompatible with such an interpretation.

The position of a settlement site at the very edge of the levels was clearly of some significance, particularly as the route of the road crosses the corner of the area scheduled as an Ancient Monument.

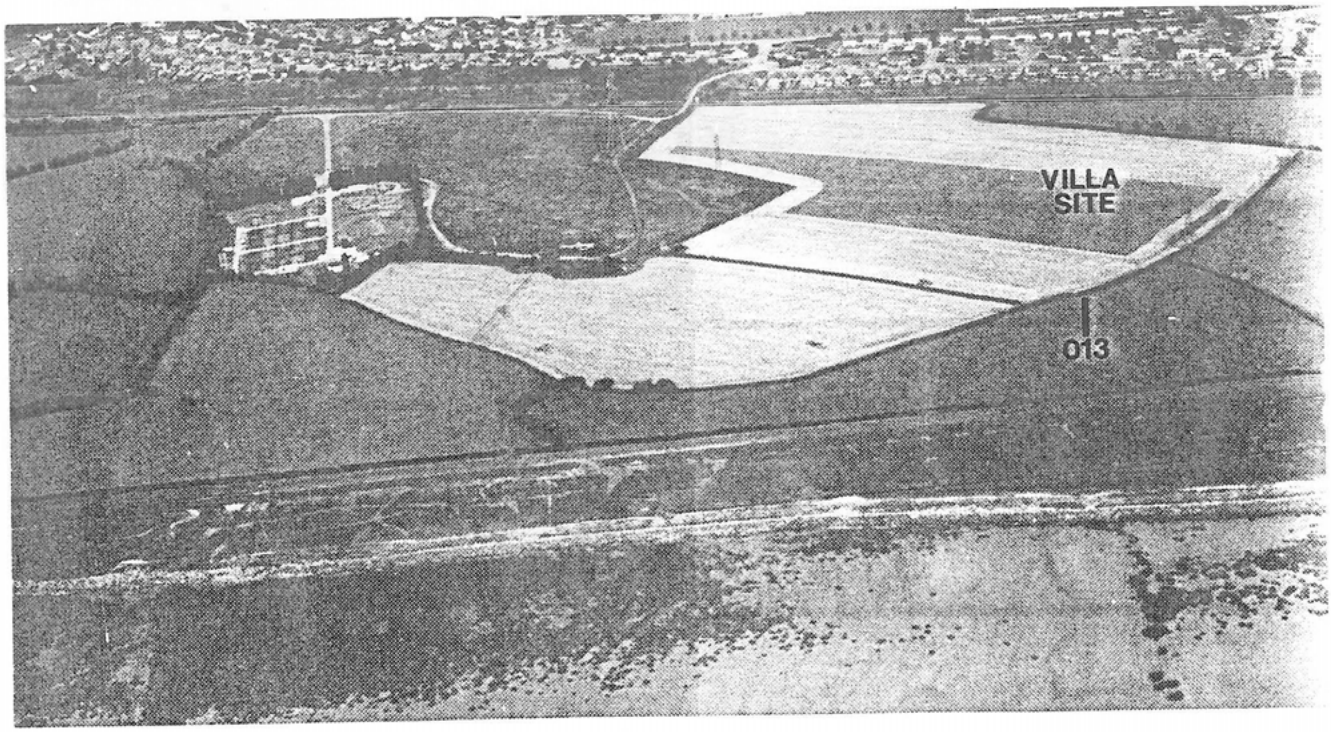


Plate 3. The area around Stoop Hill and the villa site.

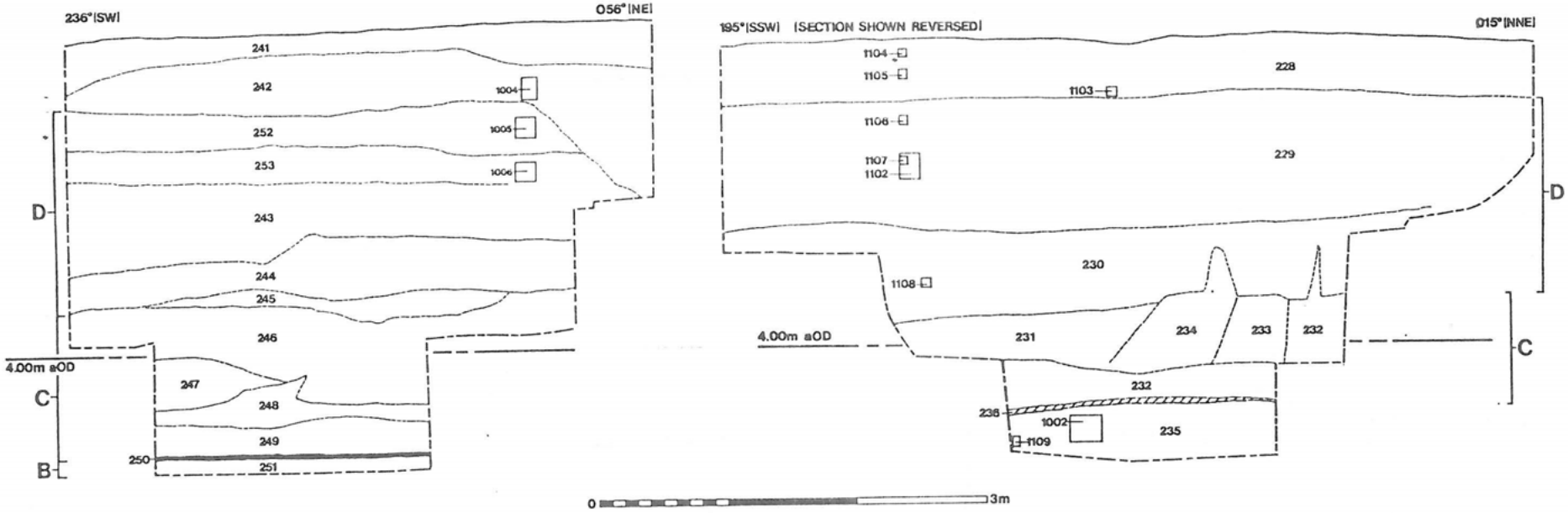


Fig 6. Sections across Trial Pits 012 and 014 (situated either side of Summerleaze Reen, with possible correlations of contexts. Letters (B,C,D) refer to principal depositional units (see page 26).

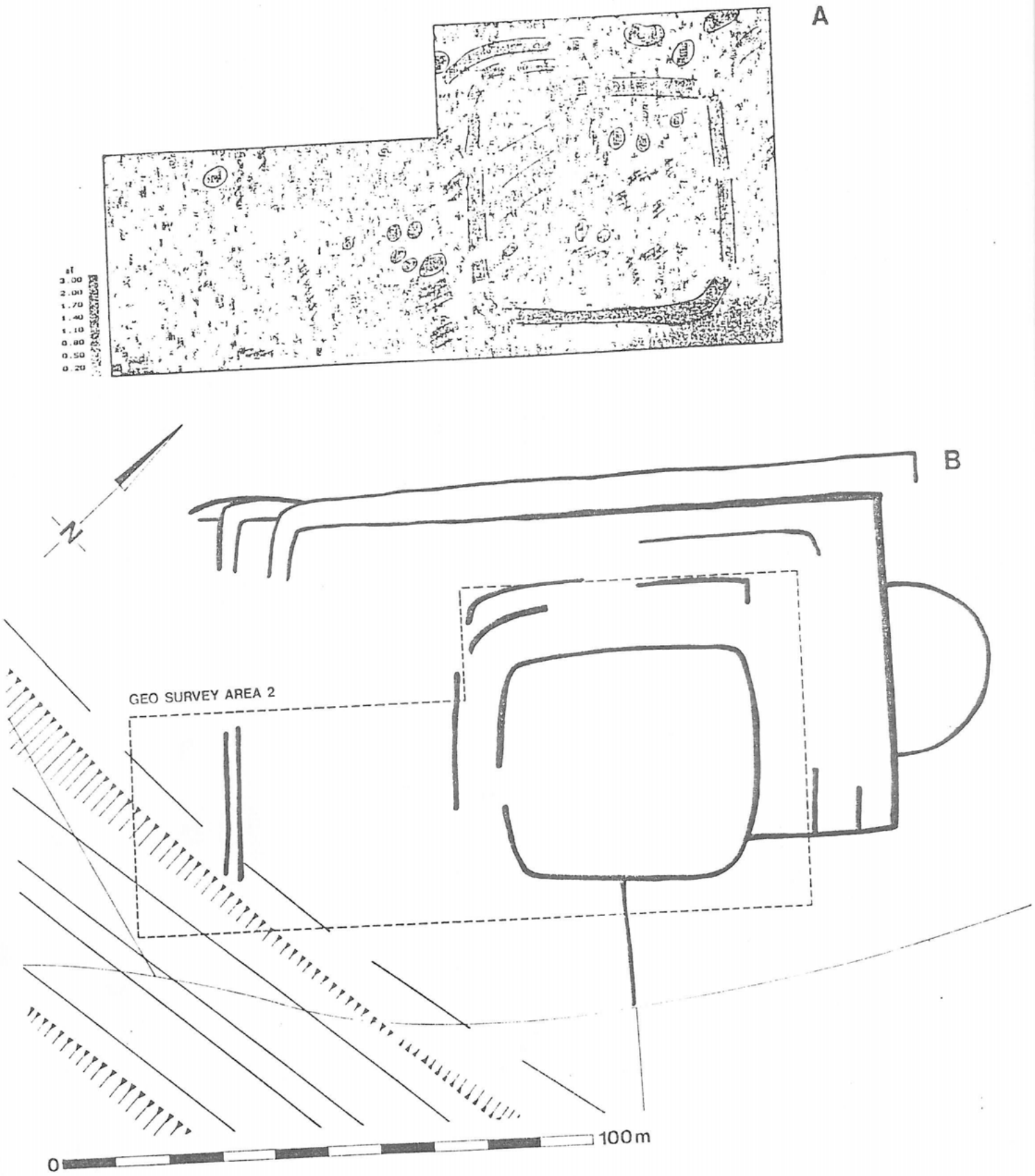


Fig 7. Part of the villa site, showing features revealed by (a) geophysical survey and (b) aerial survey.

The villa site had not been seen from the air since its initial discovery, and it was important therefore to assess whether the subsurface features which had caused the cropmarks still survived, and to assess the likelihood of additional features, not visible in 1953, surviving below ground.

Geophysical survey was therefore undertaken in order to elucidate these points. An area was surveyed within the known villa site in order to test the "visibility" of archaeological features, and the results of this survey were wholly consistent with the details shown in the St Joseph photograph (fig 7).

Both the geophysical and the aerial evidence showed the site "fading" to the south, and the known features barely encroach upon the area affected by the road. It was however important to establish whether this was due to erosion or other damage which had entirely removed all archaeological traces, or to the deep burial (and therefore preservation) of features due to movement of deposits downslope by colluviation.

Work was also undertaken to locate and examine the contact between the solid geology and the estuarine Levels deposits. Data from the WS Atkins trial investigations suggested that this contact area was different from that near the railway line in that there was no peat near the surface. The problems posed by the adjacent villa site also meant that it was desirable to look at post-depositional processes such as colluviation.

Auger surveys were therefore undertaken along two transects located approximately at right angles to the wet/ dry contact. (figs 11, 12). These enabled a suitable location for a trial pit to be located with some accuracy, and also provided a broader context for the deposits encountered in the trial pit.

Trial Pit 013

More detailed investigation of the interface between the Levels deposits and the dryland deposits was undertaken by a trial pit (013) substantially longer and deeper than any of the others excavated during the course of the assessment. This was located immediately downslope of the villa site.

Figures 9 and 10 show the stratigraphy on the two faces of the section which were recorded and the location of the samples taken for various palaeoenvironmental analyses. The physical description of the contexts as recorded in the field (which have in some cases been modified in the laboratory) is given here, although more detailed descriptions by Dr John Crowther based on laboratory analyses were subsequently undertaken. These will be found along with the results of the analyses in chapter 5 and appendix 3.

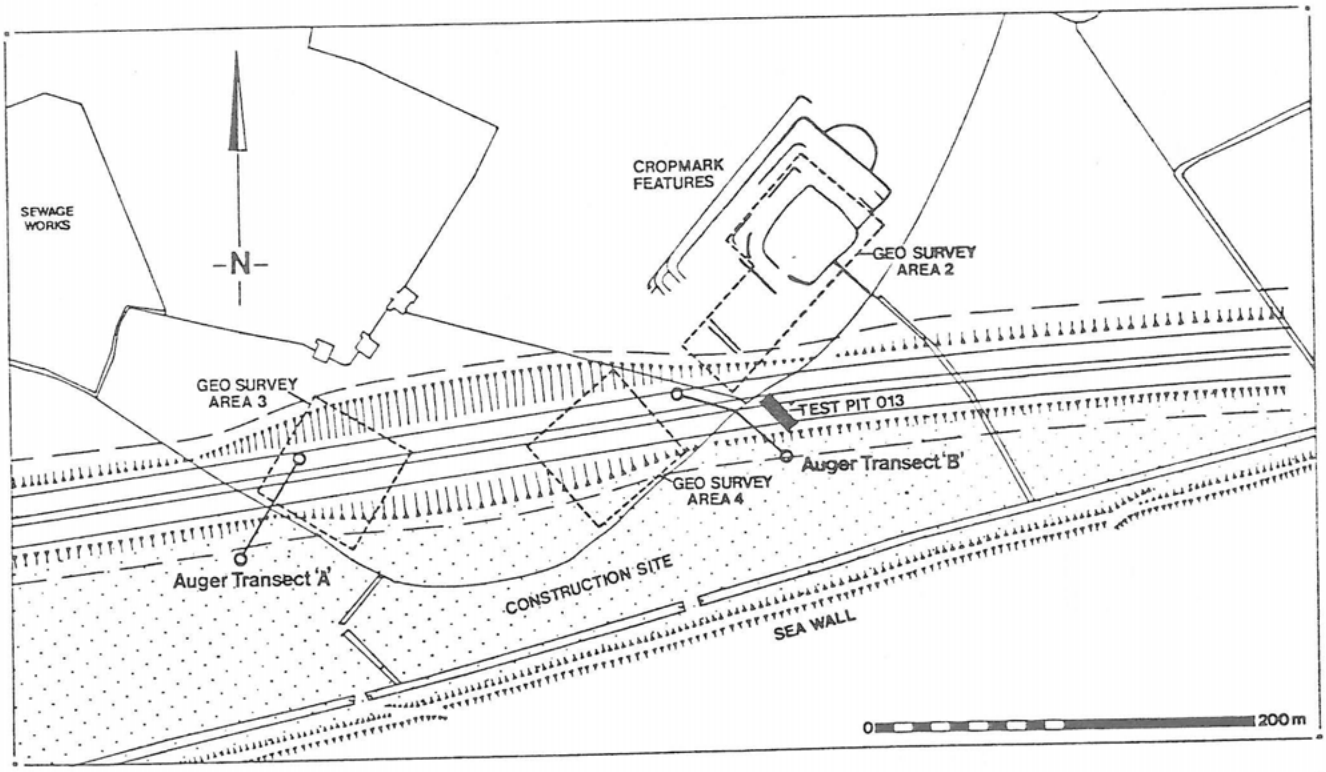


Fig 8. The area around the villa site, showing the location of Trial Pit 013, Auger transects A and B, and geophysical survey areas.

Trial pit 013: Context descriptions.

(Note: colour descriptions are based on the Munsell soil colour chart)

261 Topsoil. Desiccated light yellowish brown (10YR 6/4) (when dry) silty clay loam with virtually no stones. Medium to coarse granular ped structure. Numerous very fine roots.

262 Desiccated light yellowish brown (10YR 6/4) mottled with brownish yellow (10YR 6/6) sandy clay. 2-5% very small and small rounded pebbles. Manganese staining. Fine granular ped structure.

263 Light brownish grey (10YR 6/2) sandy clay with 5% small and medium rounded pebbles. Breaks into fine and medium blocky and angular peds. Finds included Romano-British tile and fired clay. The sandy nature and stone content suggest that this is a layer of colluvium derived from upslope.

264 Light brownish grey (10YR 6/2) clay, virtually stoneless. Breaks into coarse blocky peds. Gleyed. Appears to be probably of marine origin.

265 Pale brown (10YR 6/3) mottled with yellowish brown (10YR 5/4) clay, mottled with iron and manganese. <1% medium and large stones at base. Probably marine clay with some colluvial input. A sherd of pottery (Appendix 1: no.1508) was recovered from this context. Context 265 and the overlying 264 are essentially an inland extension of context 274.

266 Light brown (7.5YR 6/4) sandy clay with strong brown (7.5YR 5/6) iron mottles and dark brown (7.5YR 4/2) manganese mottles. Some grey clay on biopores. c10% of the surface of the context consists of medium sized rounded pebbles. Several pieces of charcoal were noted in this context, which is largely of colluvial origin.

274 Grey (10YR 5/1) silty clay devoid of stones or coarser bands. This forms the upper fill of the palaeochannel 280 and continues as a uniform deposit towards the surface at the seaward edge of the trench (note: although the figure shows 265 and 264 extending along the entire section, these contexts are effectively indistinguishable away from its landward end). This context is interpreted as a marine deposit which gradually encroached upslope with rising sea-level. The base of this deposit is likely to be diachronous; ie it is likely to be earlier at the southeast end of the trench than where it gives out against the slope at the northwest end.

280 Gully or palaeochannel, containing two fills 271 and 272, and cutting the marine clay sequence 279-276. 280 is overlain by 274 which also fills the uppermost part of it.

271 Main fill of gully/ palaeochannel 280. Dark bluish grey (5B 4/1) clay containing some organic patches and charcoal, as well as an animal bone and flint debitage.

272 Basal fill of gully/ palaeochannel 280. Small and medium sized rounded gravel in matrix of yellowish brown (10YR 5/4) sandy clay. There is iron staining at the base of the channel. Deposited under higher energy conditions in the channel.

279 Greenish grey (5GY 5/1) clay

278 Grey (5Y 6/1) clay with some strong brown (7.5YR 5/6) iron mottling.

277 Light brown (7.5YR 6/4) silty clay [with fine sand?].

276 Grey (5Y 5/1) clay at base of main marine clay sequence.

279-276 represents a series of horizontally bedded deposits picked out in the field by various tinges of grey-green and blue. These are interpreted as representing a number of distinct marine deposition episodes, in some cases separated by phases of weathering and in one case by a band of sediment (277) with a reddish colour which is almost certainly reworked context 273/268 eroded by marine activity at the interface.

275 Brown (7.5YR 5/4) silty clay stained with strong brown (7.5YR 5/6) iron and black (7.5YR 3/6) manganese. This is perhaps a weathering horizon on the surface of 273.

267 Yellowish brown (10YR 5/4) silty clay with grey (10YR 5/1) clay on biopores, and some iron and manganese mottling. Gradual wavy boundary with overlying context 266 and landward end of section. The bottom boundary is abrupt and irregular, marked by extensions of context 267 into the underlying horizon. Probably the same as 275.

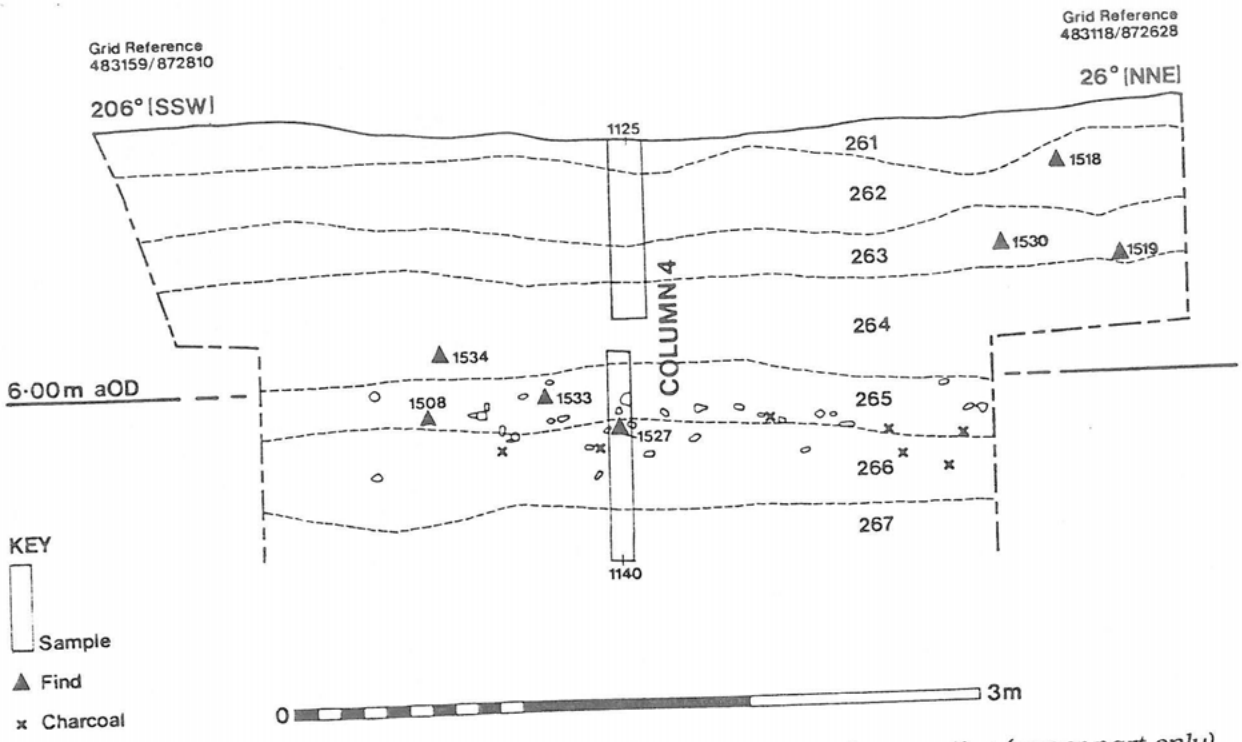


Fig 10. Trial Pit 013, section at northwestern ("landward") end of excavation (upper part only).

267 and 275 are probably old land surfaces/ weathering horizons, with evidence of rooting, marking the boundary between oxidised clays at the bottom of the sequence and gleyed/ marine deposits above

273 Yellowish red (5YR 4/6) clay with some grey (5YR 5/1) mottles. Probably the same as 268.

268 Strong brown (7.5YR 4/6) stoneless silty clay. Probably the same as 273.

269 Brown (7.5YR 5/4) medium sand. Occurs in lenses and bands interleaved with silty clay 268/273 above and sandy gravel 270 below. Some bands picked out by strong brown (7.5YR 5/6) iron staining.

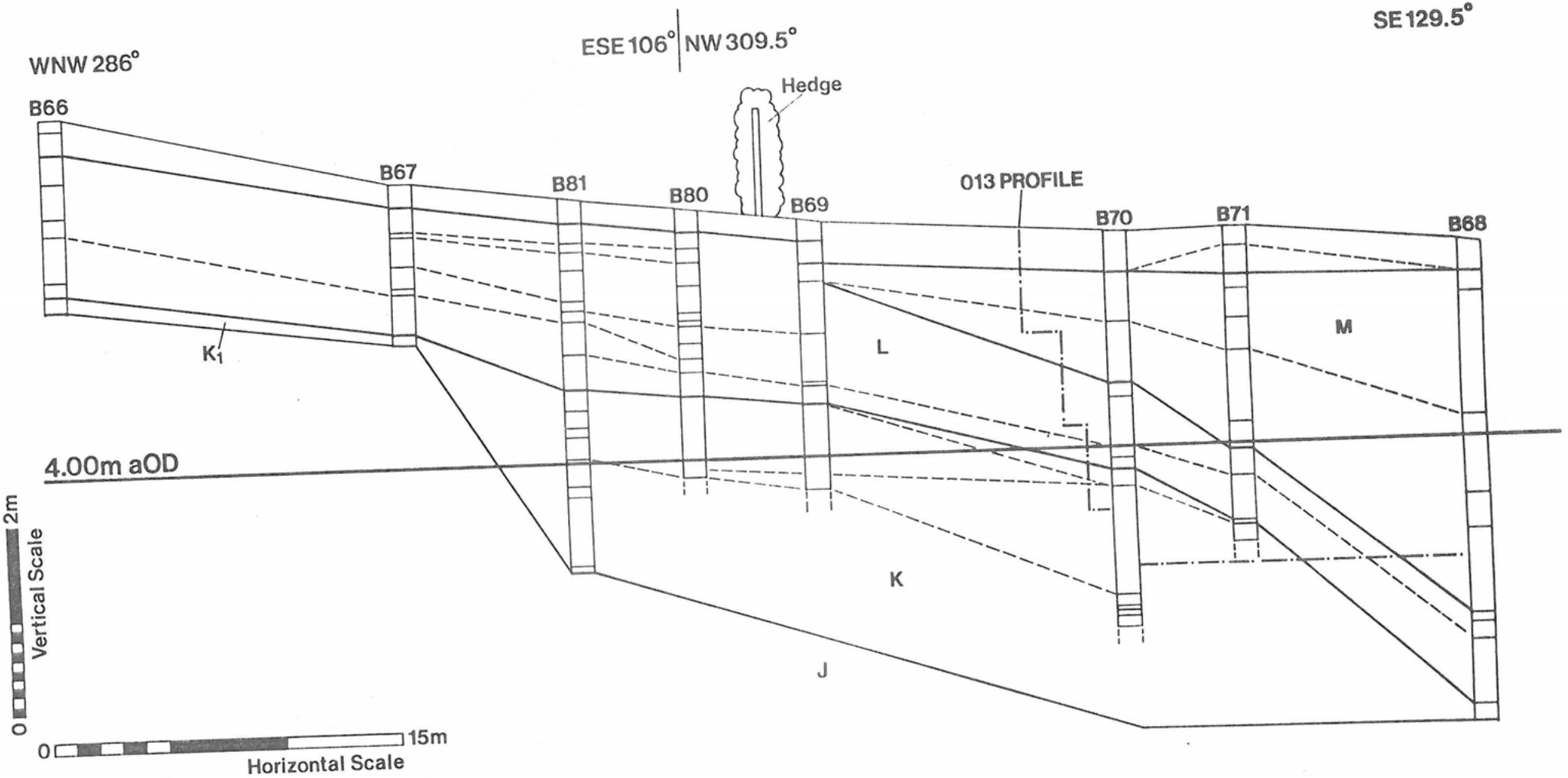
270 Reddish brown (5YR 5/4) sand with 35% very small to medium rounded pebbles and occasional weathered sandstone boulders. (An area of this sediment c 0.5 x 0.2 m deep was sieved in the field but did not produce any molluscs or other biota).

(The stratigraphy below Trial Pit 013 was explored further by means of two auger holes (082, 083) bored from the bottom of the trial pit, one at each end. The data does not relate directly to the archaeological and palaeoenvironmental sequences described in this section and is not therefore presented here).

Interpretation of Stratigraphy by M Bell

The main problem of interpretation in relation to this sequence concerns contexts 267 and below, which were characterised by predominantly reddish brown colours indicative of oxidation, in contrast to the upper part of the sequence where the sediments were reduced. The question is, do the basal gravels (270) and sands (269) represent much earlier terrace deposits? D Upton (*pers comm*) has suggested that these deposits resemble Pleistocene terrace gravels which are occasionally exposed on the ridge to the west. A further point is that augering of the slope to the northwest (see below) did reveal similar sand layers to 269 and pebbles of similar lithology to those in 270 particularly at the base of the slope. An alternative hypothesis, which on balance we favour, is that the basal horizons in pit 013 represent a former high energy beach environment at the estuary edge. If that is the explanation then the tendency for the sediments to become finer upwards into 268 would represent a transgression phase resulting in a lower energy environment. If inundation was sufficiently infrequent to allow oxidation of the sediments, that could explain the contrasting colour of 268 by comparison with the overlying gleyed sediments. Context 267/ 275 may represent a stable weathered surface during which no inundation took place. The banded sediments would then represent a subsequent transgression. High loss on ignition and magnetic susceptibility values for the uppermost of these bands (see below p 34) suggest a period of exposure and weathering. The palaeochannel (280) cutting these bands produced pollen evidence

Plate 4. Trial Pit 013; the main section.



AUGER TRANSECT B

For interpretation see figure 12.

Fig 11. Auger Transect B.

AUGER TRANSECT A: Provisional interpretation:-

J. Parent Bedrock

K. Coarse sands with occasional silt and clay. Probably predominantly deposited in high-energy beach environment, though some parts of the unit may be derived from parent material.

L. Predominantly sandy clays, representing colluviation. In A68 these are interdigitated with estuarine deposits from unit M. L1 consists of sandy clays, L2 comprises principally clays (with organic material in A68 estuarine interdigitations) , L3 consists of sandy clays with cobbles, pebbles and clasts, sometimes in distinct bands, whilst in A68, L3/M comprises alternating sands, sandy silts and clays, which appear to be laid in a low energy water-borne environment.

M. Clays and silts of estuarine derivation. The lower members of the unit tend to contain a higher sand fraction. The estuarine clays are also overlain by L deposits, representing recent colluviation.

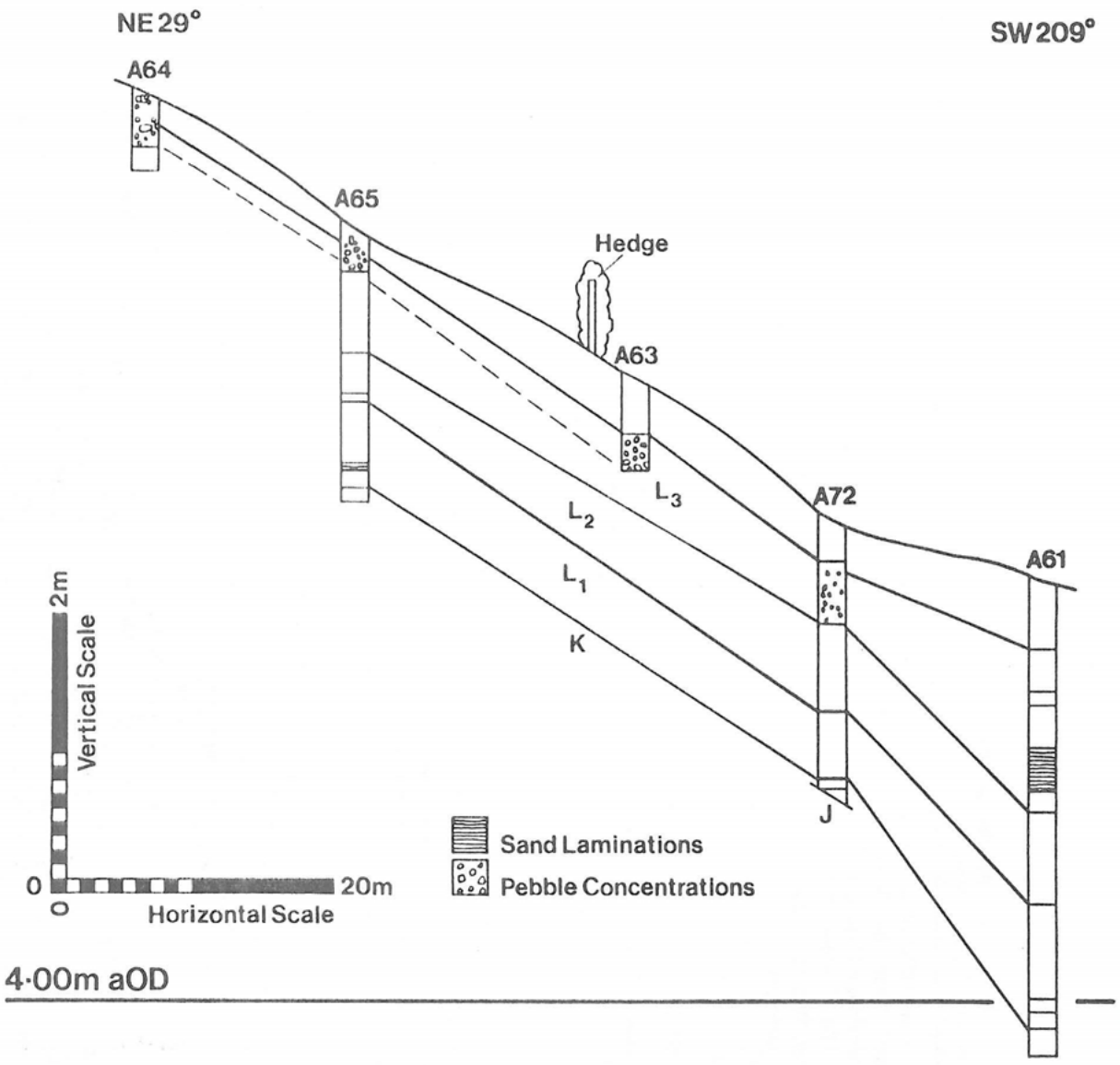


Fig 12. Auger Transect A.

(chapter 6 below) in its basal fill for saltmarsh conditions, overlain by evidence of a regressive phase during which fen developed within the pollen catchment. It is possible that this corresponds to the main peat band which elsewhere separates the Upper and Lower Wentlooge Formations (Allen 1987, fig 2). If so, context 274 corresponds to the Upper Wentlooge Formation. Where it gives out against the slope it is stratified between colluvial sediments which are tentatively related to cultivation episodes in c the Bronze Age and Romano-British periods.

Archaeological evidence from Trial pit 013

The stratigraphy shows a sequence with both terrestrial and estuarine influences. The archaeological evidence may be summarised as indicating two main periods of activity.

Firstly a significant level of human activity in the prehistoric period (and perhaps centring around the second or early first millennium) is represented by several flint flakes and a sherd of what is possibly Bronze Age pottery (but see Dr Savory's comments in appendix 1 below). The flints appear in several cases to be freshly struck and do not appear to have travelled any significant distance. The gully near the southeastern end of the trial pit also produced animal bone in addition to flint, and was therefore open during (or not significantly later than) the period(s) at which the artefacts were discarded, although the gully need not be anthropogenic in origin. The spatial extent of the activity represented by these finds and its chronological duration are currently indefinable, but the quantity of material, whilst relatively inconsequential in a hand-dug trench of comparable volume, is significant given the means by which it was recovered (ie mechanical excavation, and no sieving in the field).

Secondly there were also finds of charcoal and Romano-British material found at considerable depth below the existing ground surface. Unlike the majority of the flints, these finds were abraded and appeared to have been carried downslope from their original position (on the cropmark site) by colluviation. The depth of this horizon may therefore suggest that the invisibility of the "missing" parts of the cropmark complex might be due to burial to a depth where significantly *less* disturbance and damage has occurred than on those parts of the site visible from the air or by geophysical prospection.

Auger transect B by M Bell

Three auger holes were put down in order to identify a suitable place for Trial pit 013 and the line was then continued upslope to the northwest. At the base of the sequence a number of holes encountered weathered sandstone which eventually stopped the auger. This probably represents a facies of the Keuper Sandstone encountered in the WS Atkins test pits 5403 (50m WNW) and 5404 (70m SW). The sandstone was encountered at a depth of just over 5m at a point (068) corresponding to the southeastern end of Trial Pit 013 but in auger hole 081 to the northwest it was less than 2m down. The difference in depth between boreholes 081 and 067 may imply the existence of a former marine erosion cliff in which case contexts 270 and 269 might represent a former beach on a wave-cut platform and the sandstone blocks within 270 would represent material eroded from the former cliffline. If this interpretation is correct then the original position of the terrestrial/estuarine interface has been moved 10 - 15m southeast as a result of the gradual encroachment of colluvial sediment. That would explain the presence of sands similar to 269 and gravels similar to 270 at the base of the slope in auger holes 080-081 northwest of the present slope/estuary interface which is marked by grey silty clays which stop along the line of the present hedge.

Auger Transect A by J Heathcote

The transect profile follows a gentle slope which rises northeast of the hedge and falls off to flat land to the southwest. The hedgeline lies c12m southeast of the break in slope and the area between these two features shows an increased frequency and size of clasts within the top 1m of deposits, suggesting redistribution of material by colluviation processes towards the slope base.

The break in slope delineates a differentiation of deposits. Above the break (ie on the slope) the sediment has terrestrial characteristics denoting colluvial accumulation and/or weathering from *in situ* geological deposits. Clays formed at this level are generally reddish brown with a relatively high sand content, suggesting that they are weathering products from sandstone. Below the slope profile the terrestrial deposits are underlain by a series of grey silts and clays with organic inclusions indicative of a low energy water depositional environment. These overlie medium-coarse brown silty sand, suggesting a contact with a palaeo-landsurface which has undergone subaerial weathering to produce the fine particle size products which interdigitate with the waterlain clays.

The depositional sequence would indicate an underlying weathered sandstone bedrock which becomes inundated with low energy water (estuarine) depositing fine-grained minerals. The extent of inundation is marked by the break in slope, whilst upslope from this, the weathered sandstone is overlain by reworked local superficial geological deposits (? Head).

The greatest potential recovery of archaeological material will be from within the colluvium, though finds from these deposits are likely to be derived from elsewhere (even if only a short distance) rather than *in situ*, due to the nature of accumulation. As the gradient of the slope is relatively shallow, *in situ* material may still be present at the top, preserved by the relatively gentle hillslope erosional processes.

Trial Pit 013 and environs: conclusions

The conclusions to be drawn from this work indicate that human activity over a significant period of time is registered to considerable depth within deposits which are themselves of significant palaeoenvironmental interest, and that this activity merits more detailed work in advance of the road construction work. (below, chapter 7).

Other geophysical survey work on Stoop Hill

Two other areas of 60m x 60m were examined by geophysical survey along the route of the road on the higher area of dry land to the west of the villa, but no anomalies were detected. The suitability of the technique over this geology/ soil environment was demonstrated by the results from the cropmark site. There are however activities which leave no palaeomagnetic traces. Furthermore, the evidence from trial pit 013 suggests that possibly some colluviation may mask prehistoric horizons near and beyond the base of the slope. The spatial extent of human activity cannot be predicted with any confidence at this stage.

9. The "villa" area to Caldicot Pill.

The area bounded by Summerleaze Reen, the sea wall, the slopes of the drier land on which the villa is situated, and the lowest reaches of the Nedern valley next to Caldicot Pill is of interest for the "corrugated" nature of the land surface. Although this is highly reminiscent of arable ridge and furrow, these marginal strips fringing the medieval open fields were permanent meadow and pasture (Davies 1956; Gwent CRO D501.1332). The surface treatment - perhaps early seventeenth century (Davies *ibid*; Kerridge 1967) - is probably some form of wet meadow control.

The general nature of the stratigraphy of this area may be surmised from the information presented in figure 13 and described below (p 26).

Surface survey and examination of the WS Atkins trial pit data did not suggest the presence of any areas of particular archaeological potential here beyond the vicinity of the villa site, and no trial pits were excavated. In addition to the road, there are also areas affected by construction camps. Details of some of

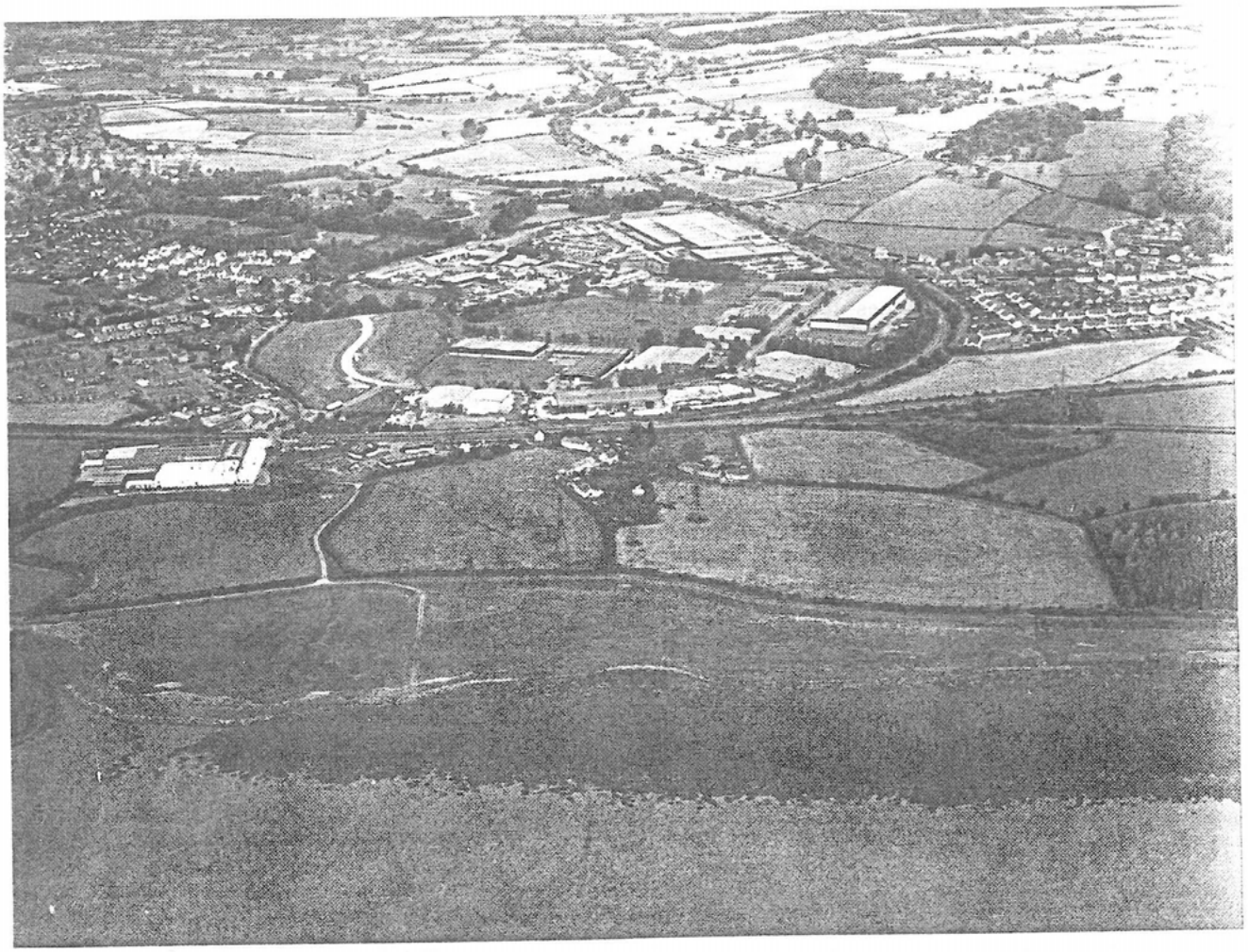


Plate 5. Area affected by construction camps, east of Caldicot Pill.

these areas were not forwarded to the Trust until after the fieldwork programme was well advanced, although it is unlikely that this affected the scope of the project to any serious extent.

10. Land east of Caldicot Pill.

The debouchure of the River Nedern into the Severn was originally much closer to Sudbrook Point. The earlier course of the Nedern (or more strictly the Troggy) is shown as late as 1777 (Gwent CRO D501.1332) in the St Peer estate plans, but it had altered to its present course by 1812 (Ordnance Survey draft 2" sheets 179) It is still visible in part on aerial photographs. Caldicot Pill itself was originally considerably wider than it is at present, and part of the land immediately east of the present Pill is a very recent reclamation.

The WS Atkins trial pit data did not extend this far east, and the stratigraphy and archaeological potential of this area was therefore something of an unknown quantity. It was considered a possibility that the area which had been occupied by the Pill when it was significantly wider than at present might produce evidence for activity connected with a dock constructed around 1785 by Henry Wise (see below, p 48). The location of construction depots on this area meant that disturbance of sub-surface deposits was likely to be more extensive here than that along most sections of the actual road. Accordingly four trial pits were excavated (trial pits 007,008,009,010).

The upper parts of these sections showed distinct laminations which indicated individual episodes of accretion within relatively recent times. It is difficult to be certain at what frequency such episodes occurred; data recently published (Bell 1990) concerning an area further downstream on the other side of the estuary shows that tides significantly higher than MHWST are registered around the equinoctial periods of the year. If it is these events which are being registered, then accretion may be rapid in the short term, although the long-term pattern would be influenced by erosive periods, perhaps on a cyclical basis (Allen & Rae 1988; SBPDR 1; section 3.2).

General stratigraphy of the estuarine deposits

The stratigraphic evidence, when taken with that derived from the deeper Trial Pits and auger holes over an area extending as far as the Nine Meads area, gives a generalised picture of the main depositional phases along the Levels away from the inland margins. This is summarised schematically in figure 13.

Five principal stratigraphic units may be distinguished:

A). The earliest phase is represented by red-brown silty sands similar to some of those encountered in auger transects A and B (such as , for instance, the lowest part of 061) perhaps suggesting the proximity of a weathered palaeo-landsurface.

B). Blue-grey estuarine silts and clays alternating with organic bands and more or less humified peats. This unit seems to represent cyclical processes of marine incursion and/or eustatic rise alternating with coastal saltmarsh development. This is to be equated with the Wentlooge Formation.

C). Blue-grey estuarine silts and clays: the organic bands of B are for the most part missing. This may possibly represent either a single, major, chiefly transgressive period, or a more complex depositional sequence similar to that suggested for unit B, from which evidence for regressive/ standstill episodes is largely missing, possibly as a consequence of erosion. Towards the western end of this transect the unit may be tentatively subdivided into C1, in which the layers are of stiffer clay, often with a greater sand fraction and containing little or no organic material, and C2 comprising mainly buttery clays in which sand is absent but organic material occasionally present. The contrast between C and D is more marked. This area was further from the land and and there is generally less organic clay, that within 010 being associated probably with *phragmites* growth on a levee on the side of Caldicot Pill. This unit is to be associated with Allen's Upper Wentlooge Formation. In several instances there is an organic or even peat "marker" band at the contact with the underlying B unit which shows that the final phase of B was particularly well-defined, but these horizons need not necessarily be synchronous.

D). Reddish brown or greyish brown clays and silts with frequent iron and manganese oxidation. There are pronounced silt laminae close to the reens. This is to be equated with Allen's Rumney Formation.

E). This unit was distinct only on the coast in the vicinity of Caldicot Pill. Broadly similar to unit D, it is characterised by its very distinct silt laminations. In the case of Trial Pit 010, where the unit is thickest, this can be associated historically with the diversion of the Nedern/ Troggy c1785 and the creation of sea defences along this stretch of coast. 010 would have been outside these defences and within Henry Wise's dock, and was consequently prone to deposition for a longer period.

11 Caldicot Pill to MHWST

The upper ranges of the intertidal zone are covered by the sea infrequently. A rich diversity of plant species is found here, from *Zostera marina* (eel grass) and *Spartina townsendii* (a twentieth century phenomenon) on those parts most subject to inundation, to *Glyceria maritima* on the main saltings. The effect of the plant growth is to enhance the capture of sediment during inundation; these parts of the intertidal zone therefore

rise upwards at a rapid rate. The raised saltings are then however more prone to attack by tidal erosion, with low mudcliffs forming along the edge. In certain places more than one of these erosive steps may be visible. In the area under consideration the principle erosion face has been protected by a revetment of stone and concrete blocks.

The rapid surface accretion on these saltings means that archaeological features are completely invisible here. Within the constraints of the project it was not considered practical to excavate machine dug trenches in this area, whilst the proximity of the intertidal zone proper with its exposures of the underlying stratigraphy suggested that the returns from such an endeavour were unlikely to be significant.

It is however highly likely that features comparable to those recorded below MHWST (see following section) may occur within this section of the crossing, perhaps at relatively shallow depth.

12. MHWST to MLWST

This part of the assessment area was examined solely by means of surface inspection. Sub-surface investigation in this area, by excavation or augering, whilst not impossible, is fraught with logistical difficulties. The main obstacle to work in this area is the unpredictable distribution of mobile surface sediments. Optimum conditions depend on the correspondence of a number of factors, including high winds and maximum lunar tidal amplitude, and the period of the survey was by no means ideal for work here. Relatively decent survey conditions did however allow one reconnaissance of the area a few weeks after the main fieldwork programme, and this section is based on observations made then.

The mobile deposits mask a complex sequence of sediments, which is described briefly above (Chapter 2). No attempt was made to survey these except insofar as they are directly related to archaeological features. However a detailed reconnaissance of these deposits would be crucial to a full understanding of the various features described here.

The following sites and features have been noted within the area between Caldicot Pill and Sudbrook Point (numbers given are the Primary Record Number of the Trust's Sites and Monuments Record ; these are followed by a detailed Grid Reference and a brief description):

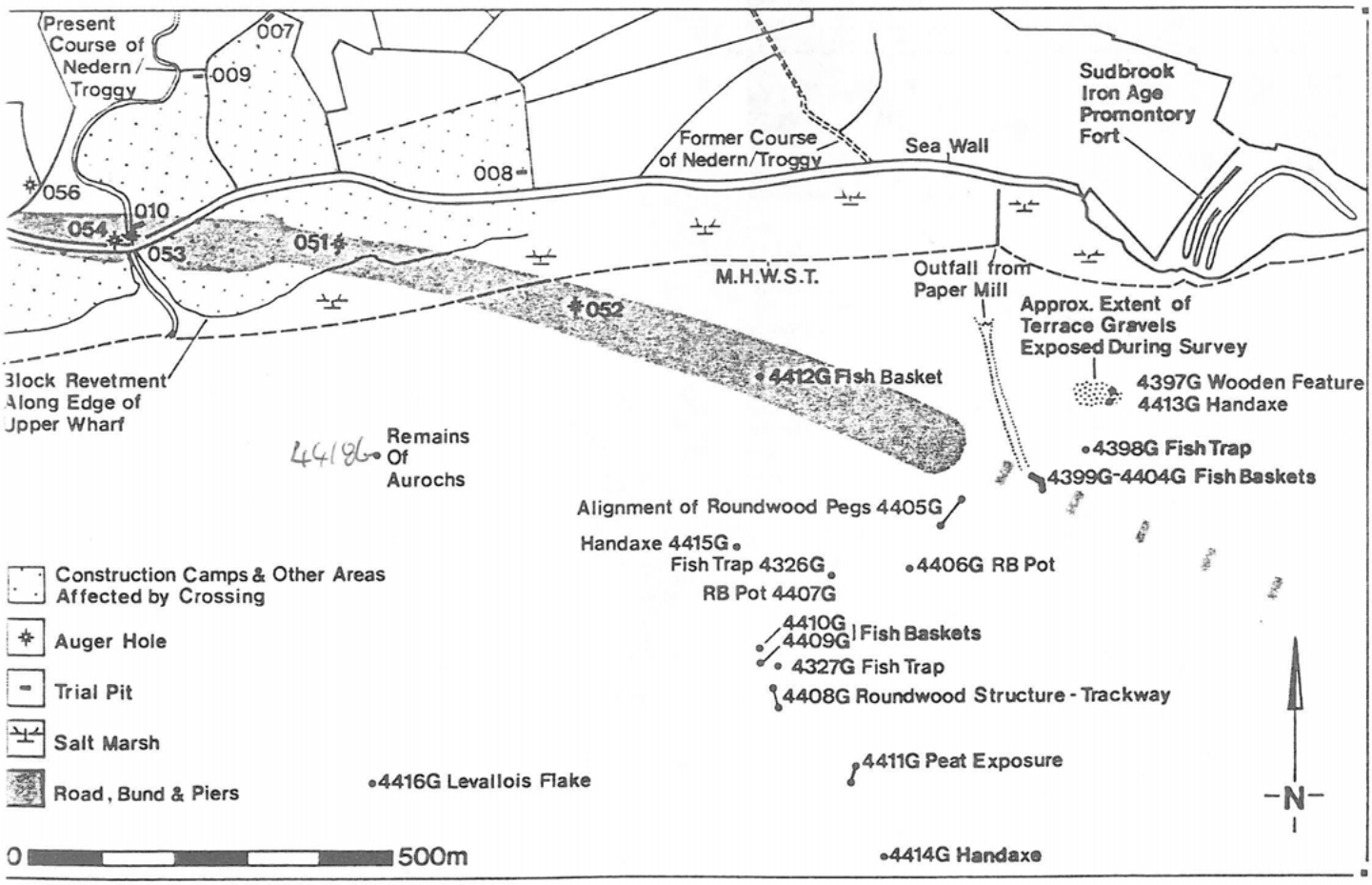


Fig 14. Archaeological features identified in the intertidal zone. Numbers refer to PRNs.

Plate 6. Handaxe (4413G), in its original location.

4397G ST 5031 8706 The main terrace gravels deposited possibly c18000 BP (Whittle 1988; site G6) are exposed offshore by Sudbrook Point. The elevation varies but is generally within a range of about 0.4m below to 0.7m above OD. The gravels have been affected by frost heave and are set in a matrix of coarse yellowish red sand. An interesting feature occurs at the location given above: a line of essentially contiguous upright pieces of (apparently roundwood) timber (species unknown) protrude by some 0.15m from a curvilinear fissure. It is difficult to determine whether the wood has been deliberately inserted or whether it is growing *in situ*. A probable handaxe (PRN 4413G) has recently been recovered from a point immediately adjacent to this feature, and unlike the palaeolithic material recovered from the lower gravel bar situated further offshore, this item did not appear to be rolled (D Upton, *pers comm*).

4398G ST 5028 8701 (2.65m below OD). Remains of V-shaped fishtrap, consisting of horizontal and vertical roundwood elements up to c20mm diameter, set into grey estuarine clay. An isolated roundwood stake and further pieces of woven roundwood near the open "mouth" of the trap are presumably to be associated with the main structure.

4399G ST 5021 9 86948 (3.08m below OD). Fish basket.

4400G ST 5021 5 86950 (2.92m below OD). Remains of fish basket, considerably damaged. One of the major roundwood elements of this particular basket was identified in the field as being *Betula* (birch).

4401G ST 5021 3 86957 (2.72m below OD). Fish basket.

4402G ST 5021 0 86958 (2.61m below OD). Fish basket, constructed of very small withies up to 5mm in diameter.

4403G ST 50206 86959 (2.38m below OD). Fish basket, similar to 4402G but in a better state of preservation.

4404G ST 50199 86962 (2.12m below OD). Fish basket.

There were significant quantities of roundwood within the general area of sites 4399 to 4404G which did not exhibit any coherent structure; these may be associated with the fish baskets or possibly part of some larger structure or structures. The entire area will repay further work. Several items of disarticulated animal bone were noted in this region but no samples were taken.

4405G ST 50107 86934 to ST 50082 86917 (1.29m to 0.61m below OD). Line of ten roundwood pegs of uncertain date and function, protruding a few centimetres above soft and poorly consolidated grey estuarine clays into which they have been driven. The lowest pegs are in the middle of the row and this may possibly suggest that the pegs were originally situated across a shallow channel.

4406G ST 50038 86840 (1.76m below OD) Approximate findspot location of substantial part of Romano-British ceramic vessel, now in Newport Museum (*pers comm D Upton, R Trett*)

4407G ST 49943 86819 (0.10m above OD) Approximate findspot location of rim of Romano-British Oxfordshire colour-coated ware vessel (third/fourth century AD)

The findspots of Romano-British material are probably within the former outfall of the River Nedern/ Troggy prior to its repositioning in the late eighteenth or early nineteenth century to debouch at Caldicot Pill. The location of the outfall may broadly be placed in the area between the last mentioned findspot (4407G) and the southwestern edge of the terrace gravels (in the vicinity of ST 5025 8706); certainly there is a spread of material including animal bones, wooden items and post-medieval pottery across the whole of this area which would be consistent with the debris to be found in such a channel. There is a channel, generally sharply defined and clearly incised which flows towards MLWST from

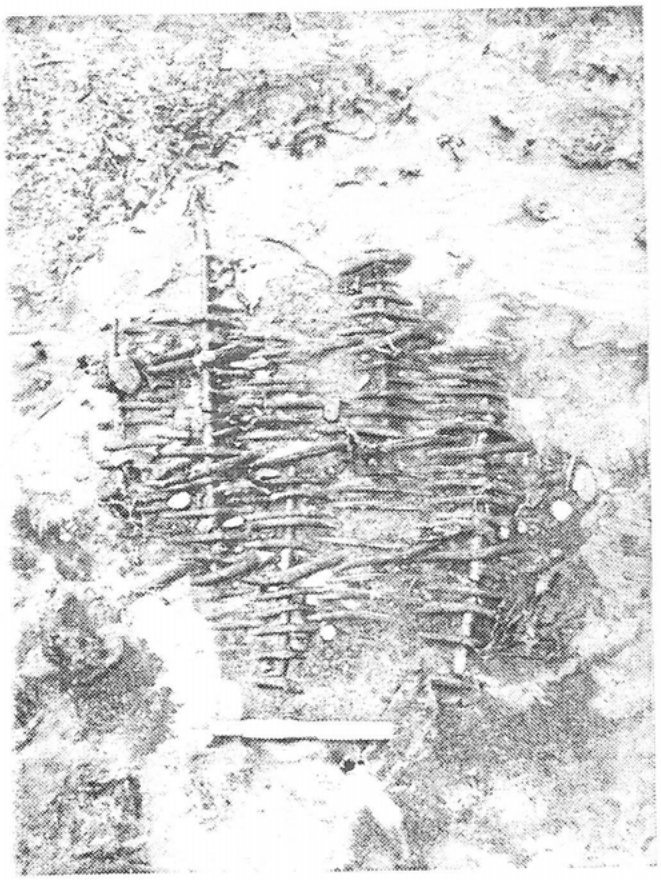


Plate 7. Fish basket (4409G) (25cm scale).

Plate 8. Fish trap (4398G).

around ST 5014 8718, but this is to be associated with a modern pipe which carries waste from the pulp mill at Sudbrook. The pollution from this waste makes investigation in this part of the intertidal zone unpleasant and possibly hazardous.

4408G ST 4985 8668 (1.05 to 0.75m below OD) Woven hurdle-like roundwood structure, much damaged, extending over a distance of approximately 30m. and set in gravels and soft blue-grey estuarine clays. This may be the remains of a trackway, or perhaps of a more complex structure, but the full extent, and the state of those parts not presently exposed at the surface, is uncertain. A sample of this structure was dated by radiocarbon in 1986 as follows: CAR-1068 900± 60 ad (uncalibrated); 900-1021 AD (calibrated). (R Trett *pers comm*).

4409G ST 49832 86715 (0.43m below OD) Fish basket.

4410G ST 49832 86733 (0.14m below OD) Fish basket.

4411G ST 49955 86550 to ST 49961 86565 (2.70 to 2.80m below OD) Exposure of thin band of woody peat, situated near the southern edge of the main gravel bar, and overlying blue-grey Wentlooge Formation clays. Human activity is indicated by occasional small charcoal flecks on the clay surface immediately below the peat, near to the southwestern end of the exposure. This area of the gravel bar is covered with pegs and stakes, often occurring in curvilinear alignments, which were not surveyed in detail. The finds of rolled palaeolithic implements (4414G, 4415G, 4416G) have been made in the general vicinity of the gravel bar, one (4414) coming from very close to the peat exposure. Obviously although the peat whilst of unknown date was clearly formed significantly later (ie within the Holocene) than the artefacts were manufactured. Green (1989) gives grid references for the palaeolithic finds as ST 5000 8645 (4414G), ST 4980 8687 (4415G) (both handaxes) and ST 4930 8655 (4416G) (Levallois flake)

ST 4930 8699 (2.24m above OD) vertebrae, pelvis and other bones of an aurochs (*Bos primigenius*) have been found scattered over an area several yards across (D Upton *pers comm*); some of these are still *in situ*. Although this species survived in Poland until AD 1627, it became extinct in Britain during the Middle Bronze Age, the latest dated example being from a cave at Charterhouse Warren, Mendip, Somerset (Everton 1975) dated to 1295 ±37bc

L4416

Plate 9. Hurdle-like structure, possibly a trackway (4408G). (25cm scale)

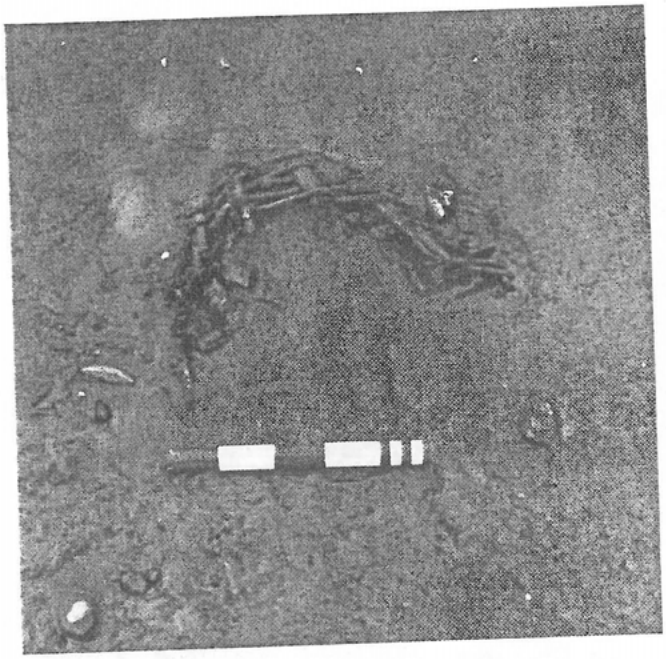


Plate 10. Fish basket (4409G). (25cm scale).

(BM-731) (Burleigh and Clutton-Brock 1977). Whilst the aurochs does not in itself provide direct evidence for human activity (and thus has no PRN), the existence of this and other skeletons of *Bos primigenius* in the estuary (such as those from Rumney and Uskmouth; Green 1989) illustrates very clearly an important aspect of the faunal evidence available in the estuary to provide a palaeoenvironmental context for such activity.

4412G ST 4983 8710 (c2.56m above OD) Approximate location of fish basket (D Upton *pers comm*), not visible on occasion of survey owing to masking by modern sediments.

The Sites and Monuments Record contains data concerning two additional sites recorded previously which were not examined at the time of this survey:

4326G ST 4993 8682 (0.72m above OD) Roundwood stakes between 40 and 70mm diameter,together with some larger timber stakes, clustered in subrectangular groups and lines. These are driven into the blue-grey clay and stratified within it.

4327G ST 4986 8671 (0.62m below OD) Similar assemblage of wood to 4326G, described above, and in similar context.

Both spreads of material are provisionally identified as fish trap components. 4327G is situated close to fish baskets 4409G and 4410G and the "hurdle" structure (4408G), and may be of similar (ie 10th century AD) date.

Dating of the many wooden features described here is difficult. Most are associated with blue grey clays, the dating of which is discussed by Allen (1986) who suggests that the initially grey sediments have become pink within a century or so of deposition but then change to greenish grey with the onset of iron reduction some two hundred years after deposition, a process largely complete after some 1000 years. It is thus extremely unlikely that the structures are all modern, and probable that most or even all date to the early medieval period (ie prior to the Norman conquest) or earlier, and this supposition is reinforced by the single radiocarbon date for 4408G.

The finds of Romano-British pottery - and there have been other finds than the two noted here, including coins (eg HN Savory in BBCS 14.1, 1950: PRN 484G) - are best considered as stray finds, though they emphasise the importance of the Nedern/ Troggy which was an important thoroughfare not only in Roman times when it gave access to Caerwent and a number of other Romano-British sites, but also earlier during the Bronze Age, a point clearly emphasised by the recent discovery of a complex waterlogged site in the base of the Nedern Valley next to Caldicot Castle which has produced *inter alia* evidence for deliberate deposition of metalwork and other high-status items as well as fragments from at least one boat. A charter in *Liber Landavensis* records a grant made by Brochwael son of Meurig of the landing rights and fishweirs *in ostio Taroci* (ie at the mouth of the Troggy); this would have been during the tenth century AD.

There can be little doubt that the structures and artefacts noted here are a relatively small fraction of the material which this part of the estuary contains. That such a small proportion of the archaeology has been noted is due to problems concerning difficulty of access and visibility which have already been noted. Further work is necessary in order to utilise the information available here to its full potential.

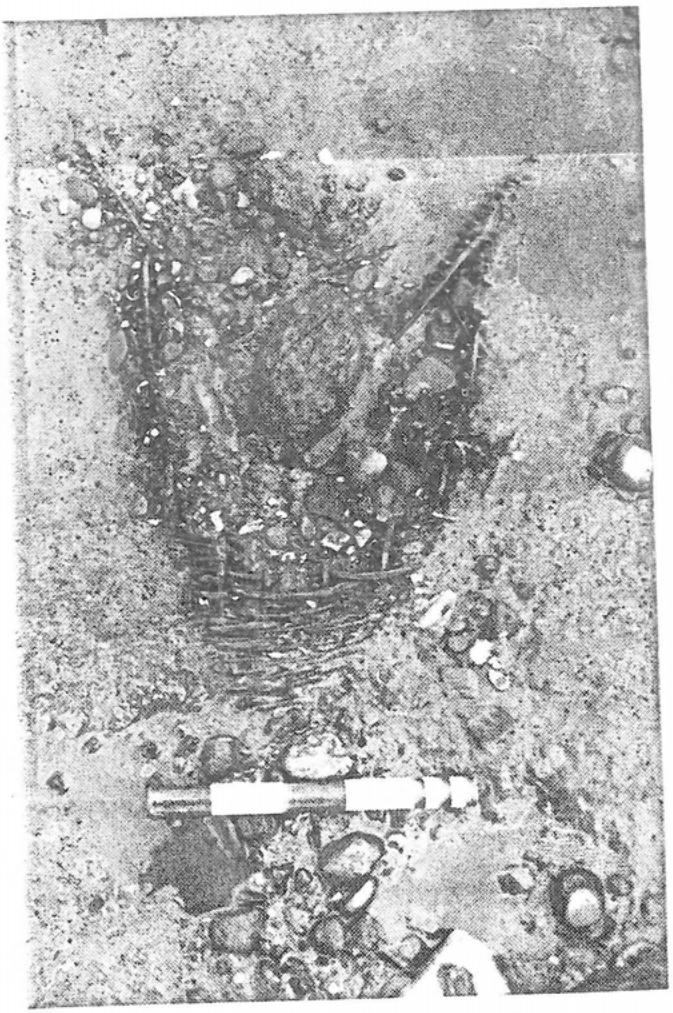


Plate 11. Fish basket (4410G). (25cm scale).

5

RESULTS OF ASSESSMENT: PALAEOENVIRONMENTAL STUDIES

Introduction

by M Bell

Aims

These were:-

1) To establish the palaeoenvironmental potential of archaeological sites to be affected by the Second Severn Crossing and its associated works.

2) To define what work should be undertaken prior to construction of the Crossing.

Field Investigation

Fieldwork was concentrated on the three areas where the proposed road cuts the interface between the estuarine flats and the adjoining slopes. These ecotones were considered likely contexts for past human activity exploiting the estuary and offered potential for correlating that activity with the estuary wide sedimentary sequence recently outlined by Allen (1987), Allen and Rae (1987) and Allen and Fulford (1987). A transect of auger holes was put across at each interface to establish the basic sedimentary sequence. The equipment used was an Eijkelkamp Riverside auger for the stony colluvial sediments and an Eijkelkamp gouge auger for the estuarine silts and clays. The auger holes acted as a guide to the location of test pits which were put down across two of the interfaces, one just south of Caldicot (Trial Pit 013), the others just south of where the new road crosses the Cardiff-London railway line (Trial pits 015 and 016). A third interface c120m southeast of Caldicot Sewage works was augered but no trial pit could be excavated. In addition a number of the trial pits on the flats were observed; they presented a basically similar sedimentary sequence and one (012) was selected for limited analytical work. Trial pits 012, 015 and 016 had relatively simple sedimentary sequences which are described in the report below on the sediments as well as in the previous chapter. Trial pit 013 presented a more complex sequence which is also described in chapter 4.

Laboratory Report on Sediments

by J Crowther

Introduction

Samples from five of the pits were analysed with a view to characterising the principal sedimentary contents identified in the field and to investigating possible colluvial sequences in pits 013 and 016. Details of the samples analysed are given in Appendix I. Attention focused upon five properties:

(i) Particle size The texture of sediments closely reflects the environment of deposition, with coarser sediments generally being indicative of high energy situations.

(ii) LOI Loss-on-ignition (@ 375°C for 16 hr; Ball, 1964) provides a measure of the organic matter concentration. Estuarine deposits accumulating below sea level generally contain very little organic matter, but concentrations increase appreciably following exposure as the ground surface becomes vegetated.

(iii) pH (1:2.5, water) In an estuarine environment pH is strongly influenced by the salinity of the sediments. Where pH value exceeds c 8.3 the sediments are almost certainly either of marine/estuarine origin or have been inundated by brackish water following deposition. Lower values do not, however, preclude a marine origin, since salts may have been leached at some stage following deposition.

(iv) χ Low frequency magnetic susceptibility (χ) largely reflects the concentration of magnetic forms of iron oxide (eg, maghaemite), this being dependent upon the presence of iron and of alternating reduction-oxidation conditions that favour the formation of magnetic minerals. Enhanced χ is generally associated with microbial activity in topsoils or, more locally, with burning (Tite and Mullins, 1971; Allen, 1988). Thus, whereas marine/eastuarine sediments would normally be expected to have very low χ values, enhancement may be expected following exposure (eg, during marine regression) and, in particular, where colluvium from adjacent slopes has been incorporated within the accumulating deposits. As with pH, however, caution must be exercised in interpreting the data since enhancement produced by these mechanisms may be reduced by subsequent gleying (eg, as a result of later marine inundation).

(v) Phosphate-Pt Total phosphate (phosphate-Pt) was determined by alkaline oxidation with NaOBr using the method described by Dick and Tabatabai (1977). Phosphates, which are present in all organic matter (including plant material, excreta and urine), are relatively insoluable and tend to become "fixed" in soils and sediments. In this preliminary assessment, phosphate analysis was confined to the samples from the possible colluvial sequences.

Results and discussion

Descriptions of the sediments are presented in Table 1 and full analytical data are given in Appendix 3.

Pit 012 (Estuarine deposits)

The basal sediments in this sequence comprise grey silty clays. These are very saline (pH, 9.45) and heavily

Table 1. Details of soils/sediments sampled for laboratory analysis.

Pit 012 (Estuarine deposits)

Sample	[ctxt]	
1104	[228]	A horizon of modern soil, 0 - 18 cm. Brown to dark brown (7.5 YR 4/2). Stoneless.
1105	[228]	B horizon of modern soil, 18 - 30 cm. Brown to dark brown (7.5 YR 5/4 - 4/4). Stoneless.
1106	[229]	Estuarine deposit @ 60 cm. Greyish brown (10 YR 5/2). Stoneless.
1107	[229]	Estuarine deposit @ 90 cm. Brown (7.5 YR 5/2) with 20% grey (N 5/0) mottling, stoneless silty clay.
1108	[230]	Estuarine deposit @ 175 cm. Brown (10 YR 5/3) with 30% grey (N 5/0) mottling, stoneless silty clay loam.
1109	[235]	Basal estuarine deposit @ 310 cm (next to mollusc sample 1101). Grey (N 5/0) stoneless silty clay.

Pit 013
Column 1 (Estuarine and palaeochannel deposits)

Sample	[ctxt]	
1110	[261]	A horizon of modern soil, 0 - 15 cm. Dark greyish brown (10 YR 4/2) stoneless silty clay loam.
1111	[262]	B horizon of modern soil, 15 - 28 cm. Dark brown (7.5 YR 4/2) with 5% grey (N 5/0) mottling. Stoneless silty clay.
1112	[264]	Estuarine deposit @ 50 cm. Brown (7.5 YR 5/2) with 10% grey (N 5/0) mottling. Stoneless.
1113	[274]	Estuarine deposit @ 100 cm. Dark greyish brown (10 YR 4/2) with 10% dark grey (5 Y 4/1) mottling. Stoneless silty clay.
1114	[274]	Estuarine deposit @ 200 cm. Dark greyish brown (10 YR 4/2). Stoneless.
1115	[271]	Top of gully fill (sampled for pollen). Grey (10 YR 5/1) silty clay loam. Few small rounded stones.
1116	[272]	Gully fill (sampled for pollen). Grey (10 YR 5/1). Many small rounded stones.
1117	[272]	Gully fill below [272] (sampled for pollen). Dark grey (10 YR 4/1) silty clay. Few small rounded stones.
1118	[272]	Basal gully fill (sampled for pollen). Grey (10 YR 5/1) with 10% brown (7.5 YR 5/2) mottling. Stoneless.
1119	[275]	Sediment in which gully is cut. Reddish brown (5 YR 5/3) stoneless silty clay loam.
1120	[273]	Sediments at base of exposed section. Reddish brown (5 YR 4/4) silty clay loam.

Column 2 ('Coloured bands' at base of estuarine deposits)

Sample	[ctxt]	
1121	[274]	Typical estuarine deposit. Dark greyish brown (10 YR 4/2) stoneless silty clay loam.
1122	[279]	'Green' in smeared section. Grey (5 Y 5/1) with 10% brown (7.5 YR 5/2) mottling. Stoneless.
1123	[279]	'Blue' in smeared section. Grey (5 Y 5/1) with occasional iron staining, stoneless silty clay.
1124	[278]	'Very green' in smeared section. Grey (5 YR 5/1) with 5% strong brown (7.5 YR 5/6) mottling, stoneless silty clay loam. Traces of sandier greenish grey (5 GY 5/1) material in isolated pockets (product of weathering sandstone gravels?)
1125	[277]	Reddish brown (5 YR 5/3) with 5% strong brown (7.5 YR 5/6) mottling, stoneless silty clay loam.
1126	[277]	Grey (5 YR 5/1) with 20% reddish brown (5 YR 5/3) and 5% strong brown (7.5 YR 5/6 mottling. Stoneless.
1127	[276]	'Green' in smeared section. Like sample 1124 but with fewer sandier pockets. Stoneless silty clay.
1128	[273]	Sediment underlying estuarine deposits. Reddish brown (5 YR 5/3) with 10% strong brown (7.5 YR 5/6) mottling, stoneless clay loam.

Column 3 (Estuarine deposits overlying sands and gravels)

Sample	[ctxt]	
1150	[274]	Estuarine deposits. Brown (7.5 YR 5/2) with 5% grey (N 5/0) mottling, stoneless silty clay.
1151	[268]	Sediment underlying estuarine deposits. Reddish brown (5 YR 5/3) with 5% strong brown (7.5 YR 5/6) mottling, stoneless silt loam (same as sample 1128?)
1152	[268]	Transiitional between samples 1151 and 1157. Reddish brown (5 YR 5/3) with traces of stong brown (7.5 YR 5/6) mottling. Stoneless.
1153	[268]	Transitional between samples 1151 and 1157. Reddish brown (5 YR 5/3) with 10% yellowish red (5 YR 5/6) mottling. Stoneless.
1154	[268]	Transitional between samples 1151 and 1157. Reddish brown (5 YR 5/3) with 5% yellowish red (5 YR 5/6) mottling. Stoneless.
1155	[268]	Transitional between samples 1151 and 1157. Reddish brown (5 YR 5/3) with 5% yellowish red (5 YR 5/6) mottling. Stoneless.
1156	[268]	Transitional between samples 1151 and 1157. Reddish brown (5 YR 5/3) with 5% yellowish red (5 YR 5/6) mottling. Stoneless.

1157	[269]	Reddish brown (5 YR 5/3) sandy loam. Stoneless.
1158	[268]	Transitional between [269] and [270]. Reddish brown (5 YR 5/3) with traces of yellowish red (5 YR 5/6) mottling.
1159	[270]	Reddish brown (5 YR 4/4) sandy loam with 35% small to medium rounded stones.
1160	[270]	Reddish brown (5 YR 4/4) sandy loam with 35% small to medium rounded stones.

Column 4 (Colluvial sequence)

Sample	[ctxt]	Depth (cm)	
1125c	[261]	10	Dark grey (5 YR 4/1) with traces of strong brown (7.5 YR 5/6) mottling, silty clay loam. Few small stones.
1126c	[261]	15	
1127c	[261]	20	
1128c	[262]	25	
1129	[262]	30	Brown to dark brown (7.5 YR 4/2) silty clay loam. Few small stones.
1130	[262]	35	
1131	[262]	40	
1132	[263]	45	10% small rounded stones.
1133	[263]	50	Brown to dark brown (7.5 YR 5/2 - 4/2) clay loam, with 25% small rounded stones.
1134	[263]	55	25% small rounded stones.
1135	[263]	60	10% small rounded stones.
1136	[264]	65	
1137	[264]	70	Dark grey (10 YR 4/1) with 10% brown to dark brown (10 YR 4/3) mottling, stoneless silty clay.
1138	[264]	75	
1139	[264]	80	
1140	[265]	100	
1141	[265]	105	Brown to dark brown (7.5 YR 4/2) stoneless clay loam.
1142	[265]	110	
1143	[266]	115	Brown to dark brown (7.5 YR 4/2) with 10% strong brown mottles, clay loam. Few small stones.
1144	[266]	120	
1145	[266]	125	Intermittent line of medium to large stones. Brown to dark brown (7.5 YR 4/2) with 10% strong brown mottles, clay loam.
1146	[266]	130	
1147	[266]	135	
1148	[266]	140	
1149	[266]	145	Brown to dark brown (7.5 YR 4/2) with5% strong brown mottles, clay loam. Few small stones.
1150	[266]	150	
1162	[266]	155	
1163	[266]	160	
1164	[267]	165	
1165	[267]	170	
1166	[268]	175	
1167	[268]	180	Reddish brown (5 YR 5/3) with 5% yellow red (5 YR 5/6) mottling, stoneless silt loam.

Pit 015

Sample [ctxt]

1231	[322]	Basal sediments @ 220 cm. Greyish brown (10 YR 5/2) sandy silt loam.

Pit 016

Column 1: Modern soil and peats (sampled for pollen analysis, 40 - 86 cm)

Sample	[ctxt]	Depth (cm)	
1201	[301]	10	Very dark greyish brown (10 YR 3/2) humose clay. Few medium stones.
1202	[301]	20	Peaty. Few medium stones.
1203	[302]	30	Very dark grey (10 YR 3/1), peaty. Few medium stones.
1204	[309]	40	Mineralogenic band.
1205	[309]	43	Mineralogenic band. Dark greyish brown (10 YR 4/2) humose clay.
1206	[303]	50	Peat with some coarse sand particles and silty clay lenses. Very dark grey (5 YR 3/1), rubbed colour dark reddish brown (5 YR 3/2). Stoneless.
1207	[303]	60	Peat.
1208	[303]	70	Peat.
1209	[306]	80	Mixture of very dark grey (5 YR 3/1) peat and brown to very dark brown (7.5 YR 4/2) silty clay loam. Few medium stones.
1210	[312]	90	Brown (7.5 YR 5/4) silty clay loam. Few medium stones.

Table 1 continues overleaf

Column 2: Sequence of mineralogenic deposits

Sample	[ctxt]	
1241	[311]	Brown (7.5 YR 5/4) silty clay loam. Few medium stones.
1242	[312]	Brown (7.5 YR 5/4). Patches with abundant small to medium rounded stones.
1243	[313]	Reddish brown (5 YR 4/4) clay loam. Small to medium rounded stones near top of context.
1244	[314]	Reddish brown (5 YR 4/4) clay loam. Small to medium rounded stones.
1245	[315]	Reddish brown (5 YR 4/4).
1246	[316]	Pale yellow (5 Y 7/3) silty clay loam. Stoneless.

Column 3: Sediments in palaeochannel

Sample	[ctxt]	
1247	[308]	Very dark grey (10 YR 3/1) humified peat.
1248	[309]	Very dark greyish brown (10 YR 3/2).
1249	[310]	Very dark grey (10 YR 3/1).
1250	[317]	Dark brown (7.5 YR 3/2).
1251	[318]	Brown (10 YR 5/3).

Column 4: Possible colluvial sequence

Sample	Depth (cm)	
1211	10	Dark reddish brown (5 YR 3/2) humose clay.
1212	20	
1213	22	
1214	24	
1215	26	
1216	28	
1217	30	Dark reddish brown (5 YR 3/2) humose clay.
1218	32	
1219	34	
1220	36	
1221	38	
1222	40	
1223	42	
1224	44	
1225	46	
1226	48	
1227	50	
1228	52	
1229	60	Mixture of black (5 YR 2.5/1) peat and peat stained clay.
1230	72	Basal sediments. Dark greyish brown (10 YR 4/2) silty clay loam.

Table 1 continued.

gleyed, and include a thin peaty band (c 1 cm), representing a period of exposure during their accretion. The overlying deposits contain higher proportions of silt, and become progressively less gleyed and less saline up the section.

Pit 013 - Column 1 (Estuarine and palaeochannel deposits)

The basal sediments in the exposed section are reddish brown silty clay loams (>20% sand). Their relatively coarse texture is indicative of a higher energy environment than that which prevailed further up the sequence (see below), possibly reflecting a phase of marine transgression. A small gully is cut into these sediments. The gully fill, which comprises layers of grey silty clays/ silty clay loams with varying stone contents, is noteworthy in three respects. First, the most stony layer [context 272] has the lowest LOI value, the greater mineralogenic component possibly reflecting a phase of more rapid sediment accretion, thereby reducing the opportunity for plant growth/ accumulation of organic residues along the line of the gully. Secondly, the sediments from the base of the channel immediately below context 272 display the highest χ value (0.290 $\mu m^3\ kg^{-1}$) of all of the samples analysed, higher in fact than the modern topsoils. This may well be indicative of burning in the vicinity of the gully. Thirdly, the sediments from the upper half of the fill have an appreciably lower pH than those below. This suggests a progressive change to less brackish conditions, a finding borne out by the pollen evidence. The sediments overlying the gully fill are stoneless silty clays, similar in character to the upper estarine deposits reported from pit 012.

Pit 013 - Column 2 ("Coloured bands" at base of estarine deposits)

In this section the basal silty clay loams [273] are overlain by a sequence of silty clays which appears as distinct coloured bands in the cleaned (ie smeared) section. This change in texture would seem to reflect a change to a lower energy environment, though higher energy conditions returned briefly (sample 1126) as accretion occurred. Interestingly, the basal sediments have a lower pH than the banded layers, which may indicate less brackish conditions at the time of deposition. The relatively high LOI and χ recorded in uppermost green band suggest that these sediments may have been exposed. Indeed, this band seems to correspond with the palaeosurface into which the gully is cut.

Pit 013 - Column 3 (Estuarine deposits overlying sands and gravels)

The basal sediments [270] in this section comprise gravelly sandy loams. These are overlain by a stoneless sandy loam [269], in which discrete lenses of sand are evident, which gives way to a thicker sequence of silt loams [268]. One noteworthy feature of these contexts is their relatively low pH (range, 7.85 - 8.18), com-

pared with the overlying estarine deposits [274, 8.47].

Pit 013 - Column 4 (Colluvial sequence)

The colluvial sequence investigated is located at the foot of the slope in the northwestern face of the pit. The section extends from the ground surface to a depth of 180 cm. Variations in LOI, phosphate-Pt and χ down the section are shown in Fig 28. The basal sediments [268] comprise reddish brown, stoneless silt loams. The very low sand content and absence of stones in this and the overlying context [267] are suggestive of a low energy estuarine depositional environment, with no significant colluvial component. However, the pH is relatively low (7.92). The overlying context [266] is distinguished by the occurrence of iron and manganese nodules and staining, which give it a purplish colouration in cleaned section, by its coarser texture (c 22% sand), and by the presence of stones. In fact, there is an intermittent line of medium to large stones at c 125 cm. The general character of these sediments, combined with their high phosphate-Pt concentration, is indicative of colluviation, which is presumed to be attributable to a phase of human activity on the adjacent slope. Indeed, finds from this layer include a pottery sherd, tentatively dated as late Neolithic or Bronze Age, and a sheep's rib. What is also significant is that the pH rises up through these deposits, perhaps indicating that a marine transgression occurred during this phase of occupation.

Contexts 265 and 264 probably reflect an increased marine influence and apparent cessation of activity on the slope. Context 264, in particular, has a very low sand content (<10%). The low pH of this context (7.52) is, however, somewhat puzzling, but could simply reflect post-depositional leaching. These estuarine sediments are succeeded by a second stony colluvial layer [263] which, like context 266, displays clear signs of phosphate enrichment (also, in this case, χ enhancement) and contains artefacts (tile fragments of probable Romano-British age). The modern soil [262 and 261] is notably finer textured and much less stony than the underlying colluvial layer, and may well contain a significant estuarine component.

Pit 015

Only the basal mineralogenic deposits [322] were sampled. These were sandy silt loams, with a relatively low pH (7.64).

Pit 016 - Column 1 (Modern soil and peats)

The basal sediments in this section [311] comprise brown silty clay loams, containing more than 20% sands and including a few medium stones. These are overlain by peats [303]. Thin lenses of mineralogenic sediments occur throughout the peats, and are probably indicative of individual flooding episodes. There is also a more substantial band of clay from 38 - 47 cm. Peats occur again above 38 cm [302 and 301] but they become progressively more oxidised and have a greater mineral (clay) component.

Pit 016 - Column 2 (Sequence of mineralogenic deposits)

Context 316, at the bottom of the section, is a pale yellow (gleyed) silty clay loam. It has a high pH (9.67) and very low LOI (0.35%), and is probably of estuarine origin. The sand content of c 20% is indicative of a relatively high energy environment. pH decreases progressively through the overlying sediments, suggesting a change towards less brackish conditions. Contexts 315, 314 and 313 are distinguished by their reddish brown colour, their coarser texture (c 33% sand) and the occurrence of rounded stones (pebbles).

Pit 016 - Column 3 (Sediments in palaeochannel)

These sediments were not investigated in the same detail as the palaeochannel fill in pit 013. However, two features are noteworthy. First, the pH decreases appreciably up the sequence (cf pit 013 - column 2). Secondly, there is no χ enhancement within the sediments. In this case, therefore, there is no palaeoenvironmental evidence to suggest human activity in the palaeochannel.

Pit 016 - Column 4 (Possible colluvial sequence)

In contrast to pit 013, the northwestern face of pit 016 (at the base of the adjacent slope) displayed no visible evidence of colluviation, and laboratory analysis tends to confirm this (Fig 29). The peaks in both χ and phosphate-Pt at 24 cm may be indicative of an hiatus in sediment build-up, and this is worthy of further investigation.

Assessment of significance and potential

The following points emerge from the preliminary work undertaken:

1 The locations of greatest interest from a palaeoenvironmental (and archaeological) viewpoint are located in the interface zone between the estuary and the adjacent slopes, and future work should be concentrated here rather than on the Levels.

2 Post-glacial (Flandrian) alluviation in the Severn Estuary is thought to have begun c 6 - 8000 years bp (Allen and Fulford, 1986), but comparatively little is known about the sequence of sedimentation prior to the Romano-British period. The deeper sediments examined in pits 013 and 016 clearly demonstrate the potential of this interface zone in investigating fluctuations in sea-level and depositional environments in early prehistoric times. Further work, using micromorphological and SEM techniques, would allow the sediments to be characterised in more detail, and interpreted with greater certainty. The surface morphology of sand grains might, for example, provide some basis for distinguishing their mode of transport (water or wind) prior to deposition. Such investigations would be vital not only in enhancing current knowledge of natural environmental change in the Severn Estuary, but also in elucidating palaeoenvironmental conditions during early phases of human occupation, as is well illustrated by the channel fill and possible palaeosurface identified in pit 013.

3 The interface zone remained a sensitive "barometer" of environmental change through until Roman times, and preliminary work on the colluvial sequence in pit 013 has demonstrated the potential the sediments provide for elucidating both sea-level change and activity on adjacent slopes during late prehistoric and

Romano-British times. As such, the area provides a unique opportunity to test recent hypotheses concerning Romano-British shoreline oscillations (Allen and Fulford, 1986).

Pollen Analytical Data

by MJC Walker

Introduction

Samples for pollen analysis were taken from open sections at three sites within the study area where fen peats and organic silts/clays were exposed: Pit 13 (context 271), Pit 15 (context 320), and Pit 16 (contexts 303 and 310). Samples were prepared for pollen analysis using conventional techniques (Moore and Webb, 1978), and a sum of 100 land pollen was achieved for each level. The pollen counts are shown in Table 2.

Pit 13 (context 271)

Although only traces of pollen were recovered from the lowermost sample of this channel infill, the three remaining levels yielded abundant, well-preserved pollen. The spectra are dominated by Gramineae, with Chenopodiaceae and Compositae (Liguliflorae type) well represented in the lower polleniferous horizon. Arboreal and shrub pollen (*Quercus*, *Alnus* and *Corylus*), along with *Plantago lanceolata*, are the major components of the pollen counts from the upper levels. Numerous spores of *Pteridium* are also present in these horizons. The record appears to represent a transition from a salt-marsh environment (indicated by the Chenopodiaceae-Gramineae) assemblage to a fen or alder carr surrounded by stands of mixed woodland (oak, hazel, birch, lime, elm), bracken-covered slopes and open fields.

Pit 15 (context 320)

Although pollen is present throughout these fen peats, some levels contained very low numbers and the degree of pollen preservation varied throughout the profile. Many grains showed signs of exine damage (typically corrosion) usually associated with oxidation processes which would have occurred either during rapid peat accumulation or as a consequence of the periodic drying out of the mire surface. The principal elements of the spectra are *Alnus* and *Quercus* in the lower levels, with Gramineae, Cyperaceae and *Alnus* dominating counts from the upper parts of the profile. Filicales spores are abundant throughout while *Pteridium* frequencies increase in the upper horizons. The evidence suggests that alder carr and mixed woodland (oak, lime and hazel) gradually gave way to a landscape of open grassland interspersed with wooden stands and areas of bracken.

Pit 16 (context 303)

This section, located some 30 m to the west of Pit 15, records a similar pollen-stratigraphic sequence, with the alder carr episode represented by the counts from 60 - 80 cm and the grassland phase from 40 - 60 cm. The development of farming activity is more clearly displayed in this profile, however, as indicated by the presence of such "agricultural weeds" as *Plantago lanceolata*, *Plantago media/major*, *Urtica dioica* and

TABLE 2: POLLEN ANALYTIC DATA
(1) Pit 13 (context 013)

Level (cm):	1115	1116	1117	1118
Betula	6	1		
Pinus	2	1		
Ulmus	1	1		
Quercus	13	7	1	
Alnus	8	10	4	
Tilia	2	1	1	T
				R
Corylus	7	5	2	A
Salix		1		C
Ilex		1		E
Ericaceae		1		P
				O
Gramineae	29	30	28	L
Cyperaceae	6	5	10	L
				E
Chenopodiaceae	3	17	33	N
Compositae: Liguliflorae type	1	1	11	
Compositae: Tubuliflorae type	1			O
Cruciferae	2			N
Leguminosae	1	3	1	L
Plantago undifferentiated	2		2	Y
Plantago lanceolata	6	8	2	
Plantago maritima	2	2	1	
Plantago media/major type	2	2		
Rumex			1	
Ranunculus		1		
Filipendula	3			
Potamogeton	1	3	2	
Filicales	9	3	3	
Polypodium	7	4		
Pteridium	10	23	4	
Ophioglossum			1	
Sphagnum	1	2		
Indeterminate	3	2	3	

(2) Pit 15 (context 320)

Upper

Level (cm below surface):	40	50	60	70	80
Betula			1	1	1
Pinus	1		1		1
Ulmus			1		1
Quercus	4	11	12	17	17
Alnus	13	14	27	41	19
Tilia				1	1
Corylus	4	7	5	9	22
Salix	2	3	2	4	1
Sorbus type		1			
Gramineae	26	30	16	6	11
Cyperaceae	35	27	25	15	22
Chenopodiaceae	3		2		
Compositae: Liguliflorae type	5	2	2	1	
Compositae: Tubuliflorae type			1	1	
Galium			2		
Hypericum	1				
Liliaceae	1				
Plantago lanceolata	1	1			
Plantago maritima					1
Plantago media/major type	1		1		
Ranunculus	1				2
Urtica		1			
Sparganium			1	1	
Filicales	110	221	163	135	73
Polypodium	2			3	1
Thelypteris					15
Pteridium	31	21	13	11	4
Sphagnum			1		
Indeterminate	1	3	2	3	1

(3) Pit 15 (context 320)

Lower

Level (cm below datum):	0	15	30	45	60	75
Betula	2	3		4		
Pinus			1		2	
Ulmus		1				
Quercus	8	14	13	5	14	T
Alnus	46	47	40	50	32	R
Tilia	10	14		5	14	A
						C
Corylus	13	22	9	9	6	E
Salix	1	2			1	
Hedera			1		1	P
						O
Gramineae	4	3	10	10	6	L
Cyperaceae	8	2	13	7	9	L
						E
Chenopodiaceae			1			N
Compositae: Liguliflorae type			2			
Compositae: Tubuliflorae type			1	1	1	O
Artemisia			1			N
Cruciferae	1				1	L
Ranunculus			3		1	Y
Rosaceae			1	1		
Filipendula			1			
Filicales	92	88	36	188	64	
Polypodium	1			10	1	
Thelypteris			4		1	
Pteridium	1	2	1	5	4	
Sphagnum		1				
Indeterminate	7	2	3	8	12	

(4) Pit 16 (context 303)

Level (cm below surface):	40	50	60	70	80	86	
Betula		1		3			
Pinus					1		
Ulmus	1				1		
Quercus	4	9	7	20	14		
Alnus	1	4	31	50	44		
Tilia			1	3	11		
Corylus		3	7	5	16		T
Salix			2	3			R
							A
Gramineae	24	27	14	6	6		C
Cyperaceae	46	37	13	5	5		E
Caryophyllaceae		2					P
Chenopodiceae	1		6				O
Compositae: Liguliflorae type	11	5	6	1	1		L
Compositae: Tubuliflorae type					1		L
Artemisia			1				E
Cruciferae	3						N
Galium				1			
Hypericum		2		1			O
Plantago lanceolata	2	5	2	1			N
Plantago media/major type	2	1					L
Ranunculus	1	1	2	1	1		Y
Thalictrum		1					
Rosaceae			1				
Filipendula		1	2				
Succisa			1				
Urtica	1	1	2				
Sparganium	1						
Filicales	9	36	36	38	16		
Polypodium			3	2			
Pteridium	16	12	18	13	5		
Sphagnum	1	1	1	1	1		
Indeterminate	3		2				

(5) Pit 16 (context 310)

Level (cm below datum):	10	20
Betula	1	1
Pinus		1
Quercus	7	5
Alnus	15	13
Tilia	2	
Corylus	3	1
Salix	5	1
Ericaceae	1	
Gramineae	11	18
Cyperaceae	32	31
Caryophyllaceae	1	
Chenopodiaceae		4
Compositae: Liguliflorae type	12	11
Compositae: Tubuliflorae type	1	
Liliaceae	2	3
Plantago lanceolata	2	2
Polygonum	1	
Rumex	1	
Ranunculus	1	
Filipendula	1	
Urtica		2
Equisetum	1	
Filicales	3	
Polypodium	2	
Pteridium	2	
Sphagnum	2	
Indeterminate	1	7

perhaps also species of Cruciferae and Compositae (Linguliflorae type).

Pit 16 (context 310)

This channel infill at the base of the profile yielded two pollen spectra dominated by Cyperaceae, Gramineae and *Alnus* and is clearly related to the phase of alder carr development referred to above.

Assessment

The oldest deposits on lithostratigraphic grounds must be those of the channel infill in Pit 13 which show evidence for marine regression or, at least, the transition from salt-marsh to fen and alder carr communities. In each of the othe profiles, there are indications of an initial alder carr with mixed woodland which gives way to a more open grassland landscape, with some residual woodland stands interspersed with bracken. The presence of pollen from agricultural weeds suggests former farming activity and hence the sequence may be interpreted, at least in part, in terms of woodland clearance. Recent data from the Gwent levels (Smith and Morgan, 1989) show evidence of woodland clearance and farming activity during the Early and Middle Bronze Age (3700 - 3500 BP). A valuable record of prehistoric farming activity may therefore be preserved in these organic sediments, in addition to evidence for natural environmental changes.

There is no direct evidence for the age of the deposits, although the very low counts for *Ulmus* suggest a post "elm-decline" date ie. post 5000 BP. However, if the marked fall in *Tilia* pollen between levels 70 and 80 cm in Pit 16 and between the upper and lower profiles in Pit 15 is a reflection of the regional *Tilia* decline, the date of 3670 +_ 70 BP on a similar horizon at the nearby Goldcliff site (Smith and Morgan, 1989) may be applicable to these levels. If this biostratigraphical correlation is correct, the lower fen peats in Pit 15 and the basal 15 cm of organic sediment in Pit 16 date from the late fourth and fifth millennium BP, while the upper parts of those two profiles accumulated during the Bronze Age and more recent periods.

Macrofossils

by M Bell

Three samples were analysed in the laboratory in order to examine the potential for macrofossil analysis and obtain some preliminary information about the environments in which certain sedimentary contexts were laid down. The samples were as follows:-

Sample 1101; trial pit 012; from basal grey silty clay (context 235)0.20m below thin peat band.

Sample 1198; Trial Pit 013; Context 272. basal gravel in palaeochannel.

Sample 1197; Trial pit 013; Context 271, grey silty clay loam, palaeochannel fill overlying context 272.

The samples were floated in the laboratory and flots extracted. In each case it was necessary to add a small quantity of hydrogen peroxide to break up resistant clods. The sediment was then washed on to a nest of sieves down to 250um (sample 1101) or 125 um (samples 1197-8); at this stage the samples have only been sorted down to 0.5mm. The results are presented in table 3.

Mollusca

Sample 1101 was taken from a point in Trial Pit 012

Table 3 : Zoological evidence from Trial Pits 012 and 013

Trial Pit	012	013	013	012
Context		271	272	hand-
		clay	gravel	picked
Sample	1101	1197	1198	shells
sample weight	2774g	3039g	2490g	
Land mollusca				
Vertigo pygmaea (Drapernaud)			1	
Pupilla muscorum (L)		3	1	1
Arionidae		+		
Cepea hortensis				1
Brackish and marine species				
Hydrobia ulvae (Pennant)	2	25	8	
Hydrobia ventrosa (Montagu)	13	4	1	
Ovatella myosotis (Drapernaud)	5			
Leucophytia bidentata (Montagu)	83	8	1	1
Littorina sp		+	+	
Littorina obtusata				6
Mollusc apices:	**Total**	103	40	12
Other biota				
Echinodermata, Echinoidea (sea urchin test fragments)		+		
Crustacea, Decapoda (crab claw fragments)		+	+	
Insect fragments	+	+	+	
Bone fragments		+	+	
Ostracods (valves)	3			

where several shells were visible in the section. The sample was overwhelmingly dominated by *Leucophytia bidentata*, a species of estuaries and mudflats; this is also the habitat of the other species present here *Hydrobia ventrosa*, *Ovatella myosotis*, and *Hydrobia ulvae*.

Elsewhere in the Trial Pit 012 section a number of individual shells were noted in the silty clay sequence. Six of these have been identified as the marine species *Littorina obtusata*, which lives on seaweed covered rocky surfaces. There were also individual examples of *Leucophytia bidentata*, *Pupilla muscorum* and *Cepea hortensis*. The land and marine species are likely to have been washed in rather than to have lived *in situ*.

Sample 1198, from the basal palaeochannel fill, contained only 12 shells. The estuarine species *Hydrobia ulvae* was the most numerous and with it were individual shells of the other brackish water species *Hydrobia ventrosa* and *Leucophytia bidentata*. Marine influence is also indicated by a fragment of *Littorina* sp. Individual shells of two land molluscs were also present, *Vertigo pygmaea* and *Pupilla muscorum*; both have open country ecological preferences but their shape means that they would have floated easily and no significance can be attached to individual shells.

Sample 1197 from the overlying context contained forty shells but the assemblage was similar with *Hydrobia ulvae* predominating, followed by *Leucophytia bidentata* and *Hydrobia ventrosa*. Again a fragment of the marine *Littorina* species was present and three examples of the land species *Pupilla muscorum*.

Other faunal evidence

The marine influence indicated by the Mollusca is confirmed by the presence in sample 1197 of sea urchin test fragments and by crab claws in samples 1197 and 1198. Ostracods were noted in sample 1101 and insects in all three samples. Neither the ostracods nor the insects have been subject to specialist examination though their presence identifies classes of information which could be profitable explored in the future.

Faunal interpretation.

Analysis suggests that all three samples were laid down under conditions of reduced salinity. There was some input of fully marine biota, no doubt washed in by high tides, and a limited presence of land molluscs washed in by flooding. The three samples accord with present views of the mode of deposition of the Wentlooge Formation to which the sediments apparently belong. The palaeochannel (context 280) in Trial pit 013 contained no freshwater species and seems likely to be a channel cut by retreating tides rather than runoff from dry land. In view of the presence of artefacts it could be an anthropogenic feature but its gentle profile does not really support that interpretation. The mollusc evidence from the palaeochannel confirms the pollen evidence for saltmarsh at its base but molluscs were not analysed from sufficiently far up in the palaeochannel fill to pick up the transition to fen carr conditions which the pollen shows.

Plant Macrofossil Analysis

by AE Caseldine

A preliminary analysis of seeds extracted from the two samples (1189 and 1198) from the palaeochannel (context 280) in Trial Pit 013 was made. The results are given in table 4. The two samples contained a similar assemblage though 1197 was richer. The occurence of taxa such as *Suaeda martima*, *Chenopodium/ Atriplex* spp., *Triglochin maritima* and *Spergularia* cf *maritima* is indicative of a salt-marsh environment though the *Chenopodium/ Atriplex* species could also represent cultivated or waste ground habitats. *Carex* spp. and *Stellaria palustris* suggest marsh or fen environments whils aquatic conditions are indicated by the presence of *Ranunculus* species which are common in and by slow streams. Further evidence for cultivation or disturbed ground is provided by the presence of *Aphanes arvensis*, *Polygonium convolvulus*, *Plantago major* and *Sonchus asper*. Woodland or scrub is indicated by *Sambucus nigra*, *Rubus fruticosus* and *Betula*.

Interpretation

It is evident from the composition of the plant macrofossil assemblages that the remains were derived from a number of different environments, probably from both in the immediate area of the palaeochannel and from further afield. The evidence supports the pollen and mollusc evidence for saltmarsh, as well as the pollen evidence for open conditions and some agricultural activity.

Conclusions

by M Bell

1. Trial pit 016 produced flint flakes, apparently stratified in the main peat deposit and the fill of gully 307. In trial pit 013, one flint artefact and some charcoal were found in the laminated estuarine sequence, and further flint artefacts, charcoal and bone in the palaeochannel. A high magnetic susceptibility value from the basal channel fill may also suggest anthropogenic activity.

2. The pollen evidence indicates that human activity in the palaeochannel took place during a saltmarsh phase prior to a transition to fen or alder carr. The neighbouring slopes still carried some mixed woodland but in view of the low elm values and the presence of indicators of open conditions a Neolithic or Bronze Age date seems likely.

3. Flints in the channel and upper part of the peat sequence in Trial Pit 016 relate to a period after the local; lime decline and a time when woodland had been largely replaced by open grassland. A Bronze Age date may be tentatively suggested for this phase of human activity.

4. Since the channel (307) in Trial Pit 016 contained a flint flake the possibility should be considered that it is an anthropogenic feature cut for drainage at the base of the slope. It was, however, only found in one face of the pit.

5. In both pits the number of artefacts is small but it must be remembered that the pits were machine-dug and only very tiny areas have been excavated by hand, so in both cases the extent of the archaeology remains unclear.

6. What makes the finds in both pits important is the fact that they are stratified within a sedimentary sequence which has the potential to preserve discrete activity episodes. They are also associated with a range of well-preserved biological evidence and have the potential to preserve organic artefacts.

7. Episodes of colluviation at the west end of trial Pit 013 were tentatively associated with activity on the slope in the Bronze Age and Romano-British periods. These are separated by a phase of marine deposition.

8. There are several distinct artefact horizons within the sedimentary sequence which can be potentially correlated with transgression, regression and slope erosion processes which have been tentatively identified on the basis of the pollen and sediment studies.

9. The marine silty clays in soil pit 013 are tentatively correlated with the Wentlooge formation of Allen (Allen 1987; Allen and Rae 1987). The site should ultimately help to establish whether there is any evidence in prehistory for cyclical transgressive/ regressive episodes which seem to have affected the more intensively studied post-Medieval part of the Severn Estuary sequence and for which there is some tentative prehistoric evidence in the form of aeolean and stabilisation phases within the Bronze Age sand dune sequence on the opposite side of the estuary at Brean Down (Bell 1990).

Table 4. Preliminary plant macrofossil identifications from Trial Pit 013.

	1198	1197
Ranunculus scleratus L. (celery-leaved crowfoot)	1	-
Ranunculus subgenus *Batrachium* (DC) A Gray (crowfoot)	-	2
Ranunculus sp. (buttercup)	1	-
Cardamine sp. (bitter-cress)	-	1
Cruciferae gen. et sp. indet	-	1
Cerastium sp. (chickweed)	-	1
Stellaria palustris Retz. (marsh stichwort)	1	-
Moehringia trinervia (L.) Clairv. (three-nerved sandwort)	-	1
Spergularia cf *maritima*(L.) Griseb. (sand-spurrey)	22	37
Atriplex/ Chenopodium spp. (goosefoot/ orache)	1	18
Suaeda maritima (L.) Dum. (herbaceous seablite)	2	2
Rubus fruticosus agg. (blackberry)	5	17
Potentilla anserina L. (silverweed)	-	5
Aphanes arvensis agg. (parsley piert)	2	-
Umbelliferae gen. et sp. indet.	-	2
Polygonum convolvulus L. (black bindweed)	-	1
Rumex acetosella agg. (sheep's sorrel)	1	2
Urtica urens L. (small nettle)	-	2
Urtica dioica L. (stinging nettle)	1	2
Betula sp. (birch)	-	2
Plantago major L. (great plantain)	1	-
Sambucus nigra L. (elder)	4	7
Cirsium sp. (thistle)	-	1
Leontodon sp. (hawkbit)	-	1
Sonchus asper (L.) Hill (spiny milk- or sow-thistle)	-	2
Triglochin maritima L. (sea arrow-grass)	-	1
Luzula sp. (woodrush)	-	1
Carex spp. (sedge)	1	4
Gramineae gen. et sp. indet.	-	1

Table 5. Wood identifications

Sample	Trial Pit	Context		Species
1260	016	305		*Quercus*
1200	016	305		*Quercus*
1240	016	311	(part of large tree)	*Quercus*
1252	015	320		*Alnus*
1190	013	272		*Prunus spinosa*
1270	015	320		cf. *Alnus*
1271	015	320		*Quercus* cf. *Alnus*
1272	015	320		cf. *Alnus*

6

RESULTS OF ASSESSMENT: DOCUMENTARY AND CARTOGRAPHIC RESEARCH

The recent landscapes

Much of the assessment programme is necessarily concerned with the 'hidden' landscapes that are buried beneath the modern land surface. This present landscape is itself, however, of considerable interest, as it has evolved over several hundred years and contains features that illustrate changing agrarian practice on the Levels since the Middle Ages. It is important that these features should be recorded and understood, though no specific archaeological sites from this early modern period have been recognised along the crossing route.

Scope of this enquiry

For the purposes of the present assessment the documentary and cartographic research has necessarily been limited to sources most likely to reveal specific archaeological sites or aspects of landscape formation. These have included :

(a) The County Sites and Monuments Record held by the Glamorgan-Gwent Archaeological Trust.

(b) Manuscript/ printed maps and plans at Gwent CRO and the NLW.

(c) Manorial and estate surveys and the records of the Court of Sewers in the same collections.

(d) Printed sources, journals and periodicals with specific reference to the Levels.

(e) Aerial photographs in the collections of the Welsh Office Air Photographs Unit.

It was not possible, because of time constraints, to examine the extensive records for the Duchy of Lancaster lordship of Caldicot at the Public Records Office, nor could the manorial and estate records in (c) be examined in very much detail. For present purposes, however, there is sufficient information to identify potential areas of archaeological interest from the historic period along the Crossing route.

Open fields and common interests

This is a landscape where many of the aspects of Medieval land management survived in a recognisable form into the nineteenth century. Dorothy Sylvester and Margaret Davies have described the partial survival of the commons and open field systems among these coastal parishes (Sylvester 1958; Davies 1956 & 1973). It has, indeed, been suggested that "the strong communal organisation that was necessary for the regulation of the common meadows and pastures may have acted as a bulwark for the open fields" (Griffiths in Huw Owen 1989 243, referring to Courtney 1983, 280 *et seq*). The extent of medieval intercommoning between the adjacent parishes, however, (which may also have been a strong deterrent to early enclosure) reveals underlying ties that may have derived from the existence of earlier, and larger, estate units.

The pre-conquest evidence

Figure 17 shows the manors as they might have appeared in the later middle ages, but in many cases these are clearly subdivisions of what were probably once larger units. Thus the parish of Caldicot was divided into four lordships (Caldicot Eastend, Caldicot Westend, The Priory and Dewstowe) by the sixteenth century. Similarly, the lordship and parish of Llanvihangel Rogiet appears physically to be a portion of the surrounding lordship of Rogiet. This fragmentation is masked, however, by the joint holding of adjacent lordships by the same family (thus the lordships of Llanvihangel and Rogiet were held jointly from the thirteenth century) and it is uncertain how far this, too, may have affected subsequent intercommoning.

Something of the possible earlier structure of land partition may be seen in charters included in the 12th cent *Liber Landavensis*: ostensibly recording land grants made to the diocese of Llandaff in the late 9th/early 10th cents (Davies 1979a). The two adjoining estate units shown in figure 16 include most of the land covered by the proposed road link: these estates were part of a much larger stretch of royal coastal possessions. It is significant that their boundaries seem to accord with those of the mediaeval manors, and although their precise courses cannot be reconstructed completely, it appears that the major reen channels were already established as functional land boundaries before the Conquest.

These two adjoining estates lie on either side of the major channel known later as Twymple Pill, which seems also to have formed the boundary between the Commotes, or larger territorial units. Of the two estates, Tref Peren, in the Commote of Llebenydd,

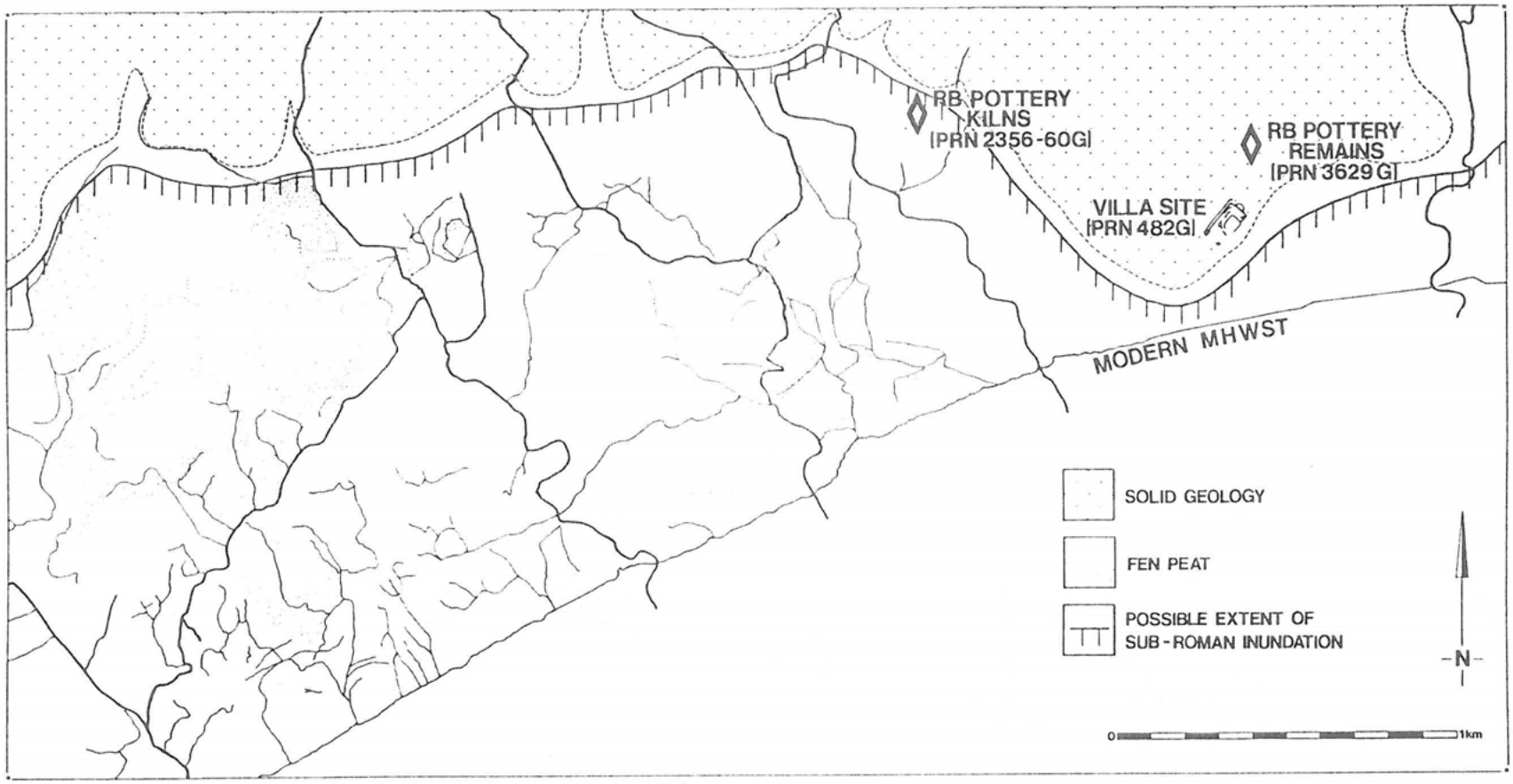


Fig 15. Conjectural reconstruction of the landscape during the Romano-British period. The known Romano-British sites are shown superimposed onto a plan of the pre-enclosure drainage and relief. The relict drainage features, derived from aerial photographs, are in part superficial; it is likely that considerable Post-Roman accretion of sediments on the floodplain has modified any earlier drainage pattern. Nonetheless, the major reens, as the trial pit sections show, are old channels that were probably in existence during the Romano-British period. Similarly, the peat fen "trough" along the northern side of the floodplain is a recurrent feature.

Sources:- Aerial photographs: 1946-7; CPE/UK/1828 (4059,4060); CPE/UK/1871 (3210); CPE/UK/2081 (4456, 4457) (Welsh Office Air Photographs Unit). 1953 CH051 (JK St Joseph, University of Cambridge Committee for Aerial Photography). Published sources: Barnett 1965; Anon in *Archaeol Wales* **19** (1979), 32.

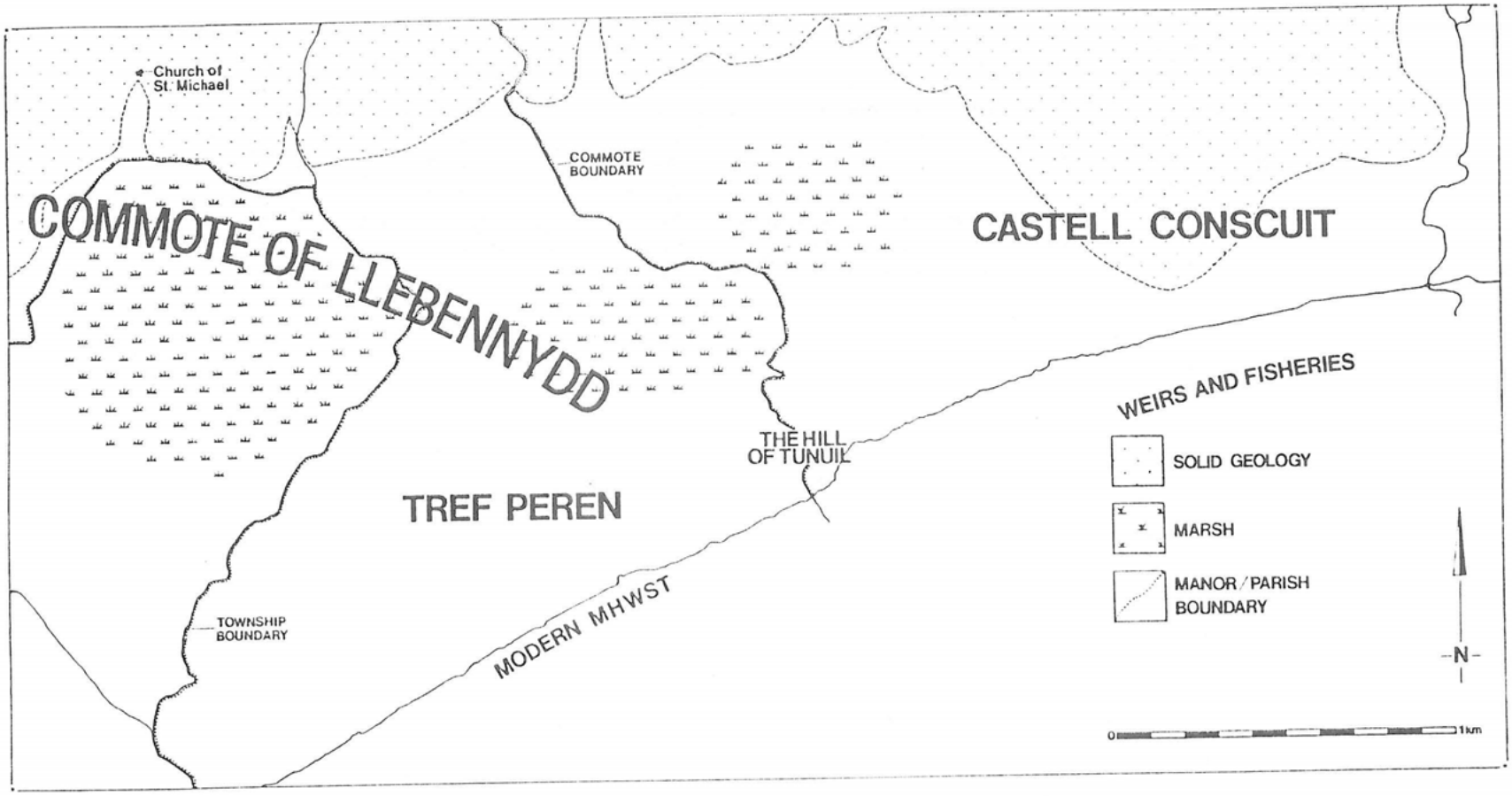


Fig 16. Conjectural reconstruction of the landscape during the tenth century AD. Records of coastal land grants made to the diocese of Llandaff in the late ninth/ early tenth century show that the Norman "manorialised" landscape has its origins in a still more ancient settlement pattern. The boundaries suggested in the pre-conquest descriptions are broadly those of the later medieval manors; these tend to be defined by reens on the Levels and rivers or roads on the higher ground. Early accounts also reveal other aspects of a landscape that was well-established by the tenth century - roads, churches, extensive arable and meadow land and rights in weirs and fisheries.

Sources:- Evans and Rhys 1893; Richards 1969.

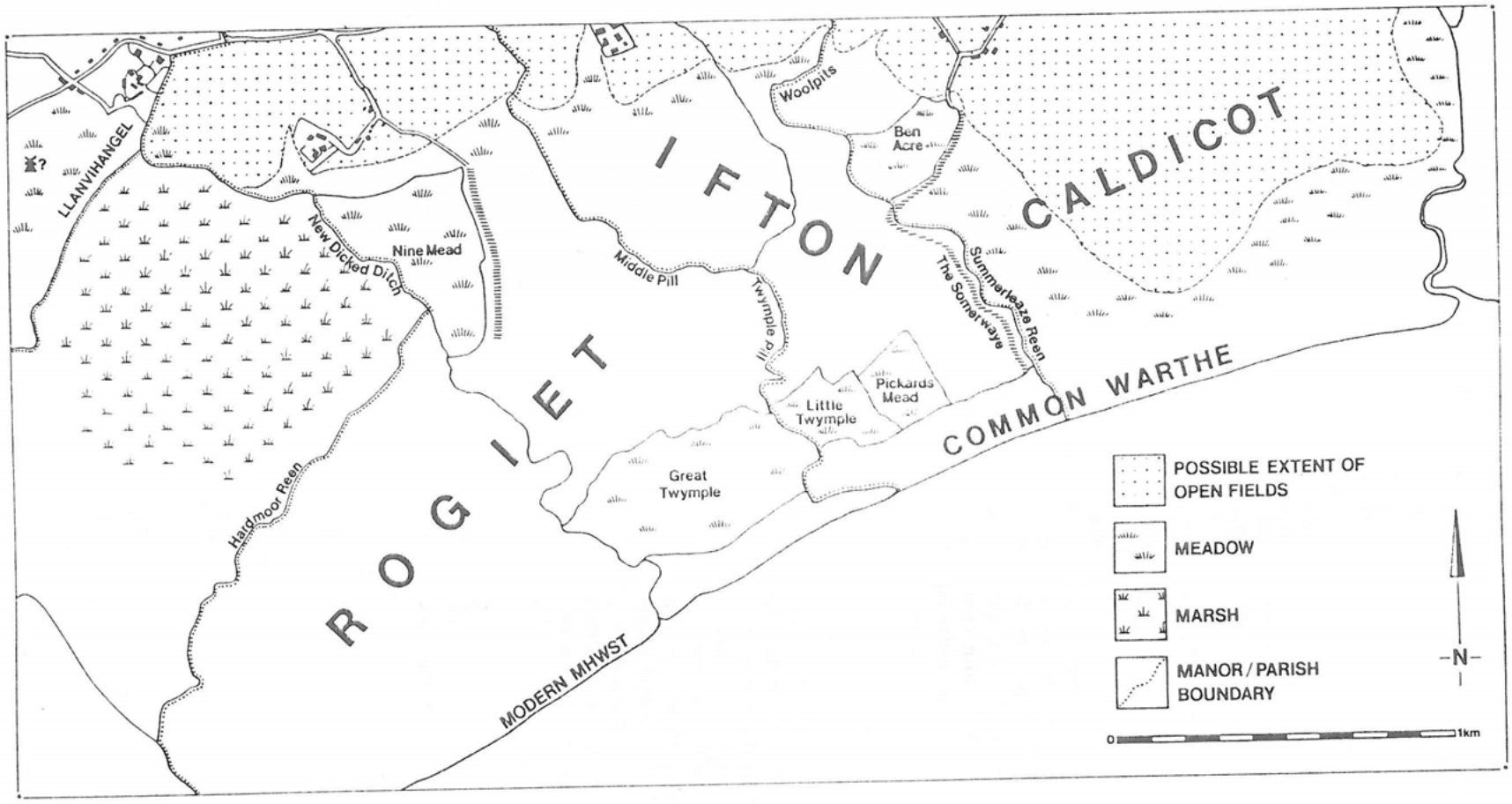


Fig 17. Conjectural reconstruction of the landscape during the later Middle Ages. By the thirteenth century the manorial units shown had evolved as long strips extending from the uplands to the coast, each with its range of complementary resources. Much of the floodplain, however, was held in common by the six adjoining parishes and provided extensive summer grazing on moorland and saltmarsh. In the later Middle Ages, in which this figure is based, areas of coastal meadow were held by each manor, with additional meadows further inland between the peat moors and the open arable fields. The villages were also clustered along the edge of the solid geology. Human and livestock populations were probably quite high and the Levels were an essential, carefully maintained resource.

Sources: Bradney 1929; Davies 1973; Stopgate 1986.

occupied what is now the parishes of Rogiet and Llanfihangel. Most of the 'tref' or township extended northwards from the moorland fringes - and it is likely that the pre- conquest settlement and arable sharelands were based here, in the area of the mediaeval open fields. A separate portion, however, described as occupying the coastland, can perhaps be identified with the coastal strip of modern Rogiet Parish, whose ancient inland boundary was the now-defunct Hardmoor Reen running across the Moor.

Several of the reens that will be liable to disturbance, therefore (Hardmoor Reen, Ifton Reen and, possibly, Nine Meads Reen) have been in use as boundary ditches since at least before the Conquest. Evidence of their past management may be of particular relevance to our knowledge of the state of the Levels in the early Middle Ages.

It is also worth examining the potential sub-Roman interest of early territorial units in the vicinity of Caerwent. The 'villa' site, described above, at ST 483-873, lies about 1 km from the late Roman 'grey ware' pottery manufactory at ST 474-877; both complexes are located on the margins of the preferred arable lands. A further possible RB site has been identified some 3.5 km further west at ST 438-875 (see page 7 above), also lying on the edge of the solid geology.

Much of the known coastal settlement appears to have been abandoned by the later 4th cent, when the Caldicot kiln site ceased operation and the settlement north of Caldicot at ST 473-873 was last occupied (Vyner & Allen 1988). Caerwent itself, however, continued to be occupied into the late 4th or 5th cent. Quantities of Roman coinage of all dates accumulating in the vicinity of an apparent slipway at Black Rock off Sudbrooke suggest the maintenance of coastal trading into the late 4th cent; a late Roman hoard from Ifton with coins of Honorius may belong to the same period (Hudson 1978; Nash-Williams 1928, 264).

The pre-Conquest estate units defined in figure 16 are comparatively late (ninth/ tenth century as opposed to sixth/ seventh century) but have some of the traits noted by Davies for earlier grants: their relative size, location on good soils in the vicinity of former Roman settlement and their status as royal possessions (Davies 1979b 156).

The medieval Levels

The middle ages saw the development of the pre-conquest landscape, suggested in figure 16, into a markedly anglicised manorial system (see Davies 1958; Courtney 1983). There are, however, no specifically medieval remains that are likely to be affected by the Crossing route. The possible layout of the Levels in the later middle ages is shown in figure 17.

Post-medieval enclosure

By the late 16th century the Levels landscape had already begun the transition into its eventual post-medieval form. Certain areas of moorland had been enclosed, including Pickarde's Mead and the Great and Little Twymple lands on the coast (possibly associated with the pre-conquest topographical feature called 'Tunuil Hill') and the meadow island of Nine Meads, south of Rogiet, which was being held as a tenancy-at-will at the rent of four shillings in 1599 (Gwent CRO: D.668.19). These were naturally well-drained elevated points on the Levels that had probably been valuable meadow lands long before the process of enclosure.

East of the moors, however, in the lordships of Ifton and Caldicot, the pattern of early enclosure was being stamped upon lands that had previously lain open as common meadow and pasture. By 1613 much of the drier headland underlain by solid geology around Stoop Hill (including the scheduled "villa" site) was enclosed, though extensive common field strips remained open here until the mid-19th century (Davies 1956, 11).

This drier headland was fringed by a broad swathe of lower-lying common meadow which extends around the coast to the Caldicot Bisditch on the east, and continues inland on either side of Summerleaze Reen to west "...we go unto a lane called the Summer Way where we fetch into the parish or manor of Yfton all the meads and pastures belonging to the said parish..." (Manorial Court of Ifton 1677) (Bradney 1929, 124). A distinctive feature of this coastal meadow is its 'ridge-and-furrow'-like pattern of surface drainage gulleys, tied in to a complex sub-reen system. Vestiges, too, of a similar pattern can be seen on the west side of Caldicot Moor, again on the margins between the drier uplands and the peat moor. It seems likely that this phase of reclamation and surface treatment is early post-mediaeval (Davies notes one such meadow described as "Le Ridges" in a survey of 1613 (Davies 1956 11). This seems to be a form of catchwork water meadow, probably an enhancement of the natural winter flooding of the low-lying meadow alongside the reens (Thirsk 1967, 180). In this connexion it is interesting to note that the silt laminations in the upper sediments alongside the reens were clearly visible in the trial pits.

Figure 18 shows the extent of this "ridge-and-furrow", taken from aerial photographs. There are two forms of the ridging:

(a) Curved, very close-set ploughed strips similar to classic arable rig-and-furrow. This occurs in the closes alongside Summerleaze Reen (eg at ST 477 872)

(b) Broader-spaced furrows, some 3m apart, separated by flat strips. These are more regular in layout and are tied in to a grid-iron arrangement of cross-gullies. This form is more extensive than (a) and appears on the

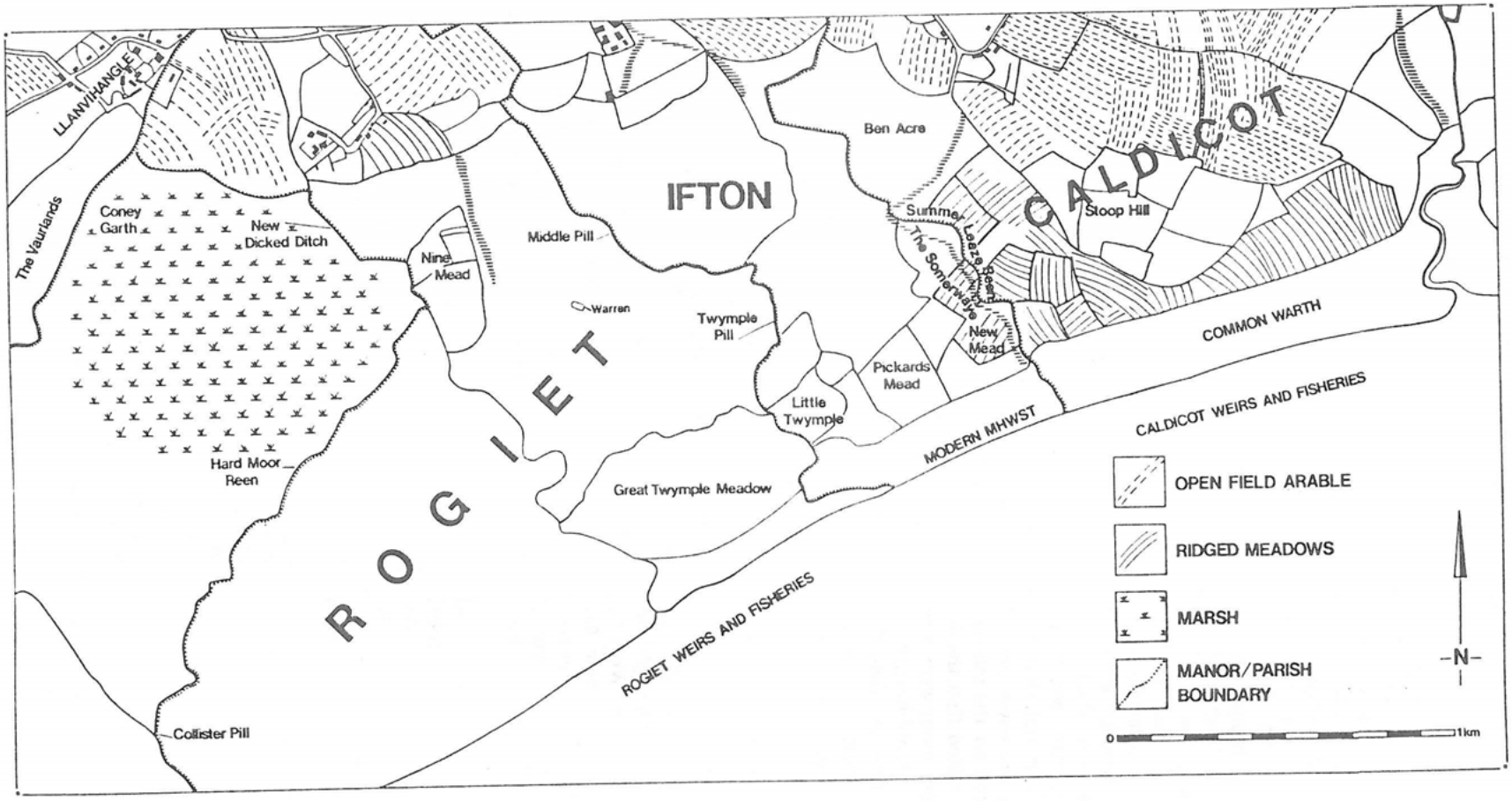


Fig 18. Reconstruction of the landscape near the beginning of the seventeenth century. The considerable increase of surviving records from the early seventeenth century onwards offers the first detailed impression of how the Levels were used. Much of the landscape appears to have continued in a form largely unchanged from the Middle Ages - and this survival was to become a marked characteristic of the Caldicot levels. Changes, however, were already appearing. Parts of the common arable were being enclosed and there were probably many more closes than are suggested here. The ploughed-up ridging of the wet meadows possibly also originated during this period, though the practice may have continued into the eighteenth and nineteenth centuries. Most of the moorland and salt wharves, however, continued as unstinted common pasture and the floodplain was still unprotected by sea walls.

Sources:- Maps: NLW Tred Dep 1016/961/934; Gwent CRO D.1670.69/ D.501/1332. Documents: NLW Tred Mss 169; Gwent CRO Misc Mss 1453/ D.668.19. Aerial Photographs: as figure 15. Published sources: Stopgate 1986; Bradney 1929; Kerridge 1967; Davies 1956.

outer fringes of Summerleaze reen, in the old coastal meadows of Great Twymple etc and also along the northern edge of the open moorlands, where the meadows are cut by the railway.

It is likely that this represents a two-phase sequence of wet meadows, probably associated with the gradual enclosure of former common meadow/ pasture. The apparent earlier phase (a) may well be early seventeenth century (as the "Le Ridges" name suggests) but a variant of the (b) form can be seen over those pastures enclosed after the act of 1850, though the latter is perhaps more likely to be a drainage feature. The advantages of controlled winter flooding of meadows before the widespread use of fodder crops were considerable: this method increased hay yields by between three and four times, and enabled flocks and herds to be grazed between crops (Kerridge 1967, 256 *et seq*). The operation of wet meadows on the Levels in the seventeenth and eighteenth century would have been continually at risk from tidal inundation, on a coastal flood plain unprotected by sea walls until the 1780's and later. Indeed, a court roll for the manor of Caldicot and Newton also in 1613 noted that the four major reens crossing Caldicot/Rogiet moor were being maintained by the inhabitants of Llanfihangel and Ifton "...for their own good (otherwise all their land between Caldicott common and their houses also would be overflown with high springes of the sea)" (Bradney 1929, 111).

The Sea Walls

Of particular relevance to the evolution of the field systems on the Levels is the comparatively late phasing of the sea defences between Sudbrook and West Pill (those between West Pill and Collister Pill were first erected in the mid nineteenth century). As late as 1697 the jurors of Rogiet could assert that their coastal meadows of Great Twymple were not protected by a sea wall (NLW Tred Mss/169) and it seems likely that the entire stretch of coastal mead and pasture had developed long before such a wall existed, separated from the wharf frontage only by a ditch or fence. The first wall, which seems to postdate the existing eighteenth century estate plans, but is shown on the Ordnance Survey 2" draft sheet 176 of c1812, was probably erected in the late eighteenth century (NLW Tred Deposit 1016; Gwent CRO D.501.1332). It appears to have been an earthen bank; Hassall, writing in around 1812, noted that it had a near vertical seaward side, unlike the traditional fenland sea walls, and had recently been faced in stone on both sides (Hassall 1812, 78-9). The wharfage even at this late stage seems appears to have extended some 150m to 200m further out to sea; periodic inundation up to this time was presumably an acceptable hazard (Maps: Gwent CRO D 1670.69 (1759); Gwent CRO D501.1332.Fo.11 (1777); NLW OS 2" First Draft, sheet 176 (1812)).

Much of this late eighteenth century development of the wharf frontage was associated with the operation of a shipyard at the mouth of Caldicot Pill, on what is now dry meadow land. A number of small ocean-going merchant brigs were built here between 1785 and about 1814, largely the enterprise of a local farmer called Henry Wise (Birbeck 1978, 13). To create his dock he built a sea-wall around the outfall of the pill, enclosing some eight acres of the adjoining meadowland. It is likely that the earlier line of the Nedern/ Troggy brook was diverted to its present course in order to flood the dock. The extension of the dock wall westwards to Twyn Pill, thus creating the first sea wall at this point, was perhaps also an essential part of the development.

The dock was still in existence in 1829, though probably disused (Gwent CRO D.2282.3) but by 1842 a new sea wall had been erected in front of the pill and the land reclaimed (NLW Tithe Survey Map of Caldicot). The eighteenth century earthen dock wall adjoining the pill remains, however, and is the only extant survival of an early sea wall on this part of the Levels.

Enclosure of the remaining commons happened in two stages:

(a) The Ifton Enclosure Act of 1776

The open moorland lying inland from the coastal meadows in Ifton Parish (between Ifton Reen and the closes abutting Summerleaze Reen) was enclosed after an act of 1776, along with the remaining 560 acres of common fields of the parish (NLW Tred Mss/34/61).

(b) The Caldicot Moor and Commons Enclosure Act of 1850

Engrossment and enclosure of the common fields in Caldicot Parish continued piecemeal until what little remained was enclosed in the 1850's (Gwent CRO Inc. AW. 5,6,7.). The parliamentary act of 1850 also enabled the reclamation and partition of Caldicot and Rogiet Moors. This was an action that had been vigorously encouraged by Hassall in 1812 but which was long delayed by the diversity of interests involved (contemptuously dismissed by that writer as "...promiscuously depasturing the motley herds of six parishes." (Hassall 1812, 69) Several stretches of reen were relocated as a part of this process - modern West Pill Reen in particular was almost entirely recut in about 1861. Both its ancient predecessor (the "New Dicked Ditch") and Hardmoor Reen (which ran diagonally across the grid layout of the new fields and could not be incorporated into the revised reen system) were backfilled. In addition to these major channels, however, a vast, sprawling drainage complex made up of several tens of smaller irregular ditches and palaeochannels was abandoned.

In harmony with this reclamation process the Commissioners of Sewers were adding to the existing sea defences virtually throughout the mid 19th century. Much of the late 18th/early 19th century wall descri-

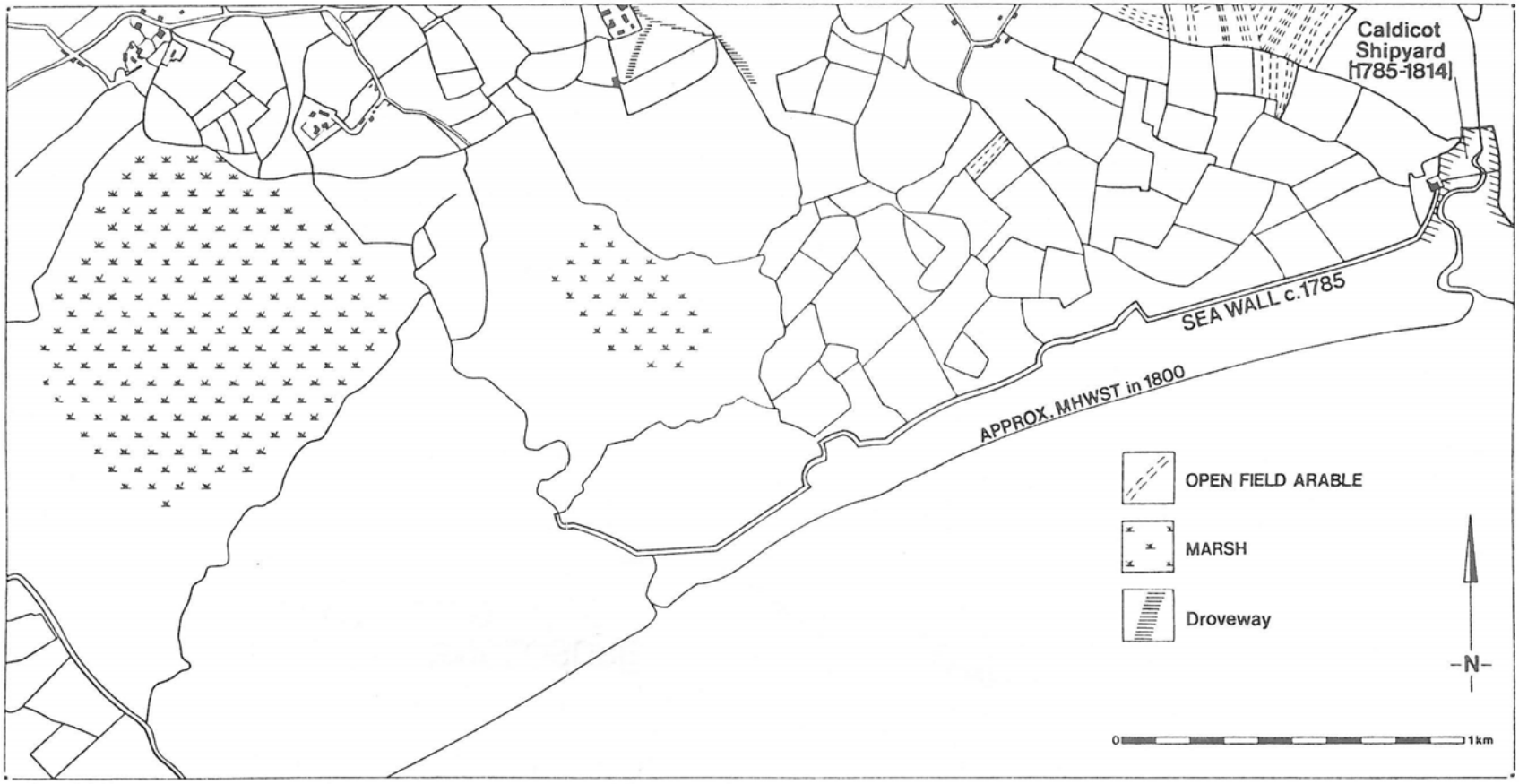


Fig 19. Reconstruction of the landscape c1800. The process of enclosure continued during the eighteenth and early nineteenth century, though there were still common arable and meadow strips left unenclosed in the parish of Caldicot until 1850. The commons in Ifton Manor were enclosed after an act of 1776 but the bulk of the moorland still remained open pasture. With the steady loss of their commons, the coastal villages were now subject to depopulation: the number of occupied houses in Llanwihangel fell from twenty-eight in 1651 to eighteen in 1711 and just six by 1766. At Ifton the parish church was demolished around 1755 and never replaced. Other aspects of the older landscape were changing: a private shipyard now occupied the former wharf at the mouth of Caldicot Pill, requiring the diversion of the Nedern/ Troggy, and a sea wall had been constructed as far west as Twyn Pill.

Sources:- Maps: NLW Tred Dep 1016/961/934; NLW OS 2" Draft Sheet 176. Documents: Tred Ms 34/61. Published sources: Stopgate 1986; Bradney 1929; Davies 1956.

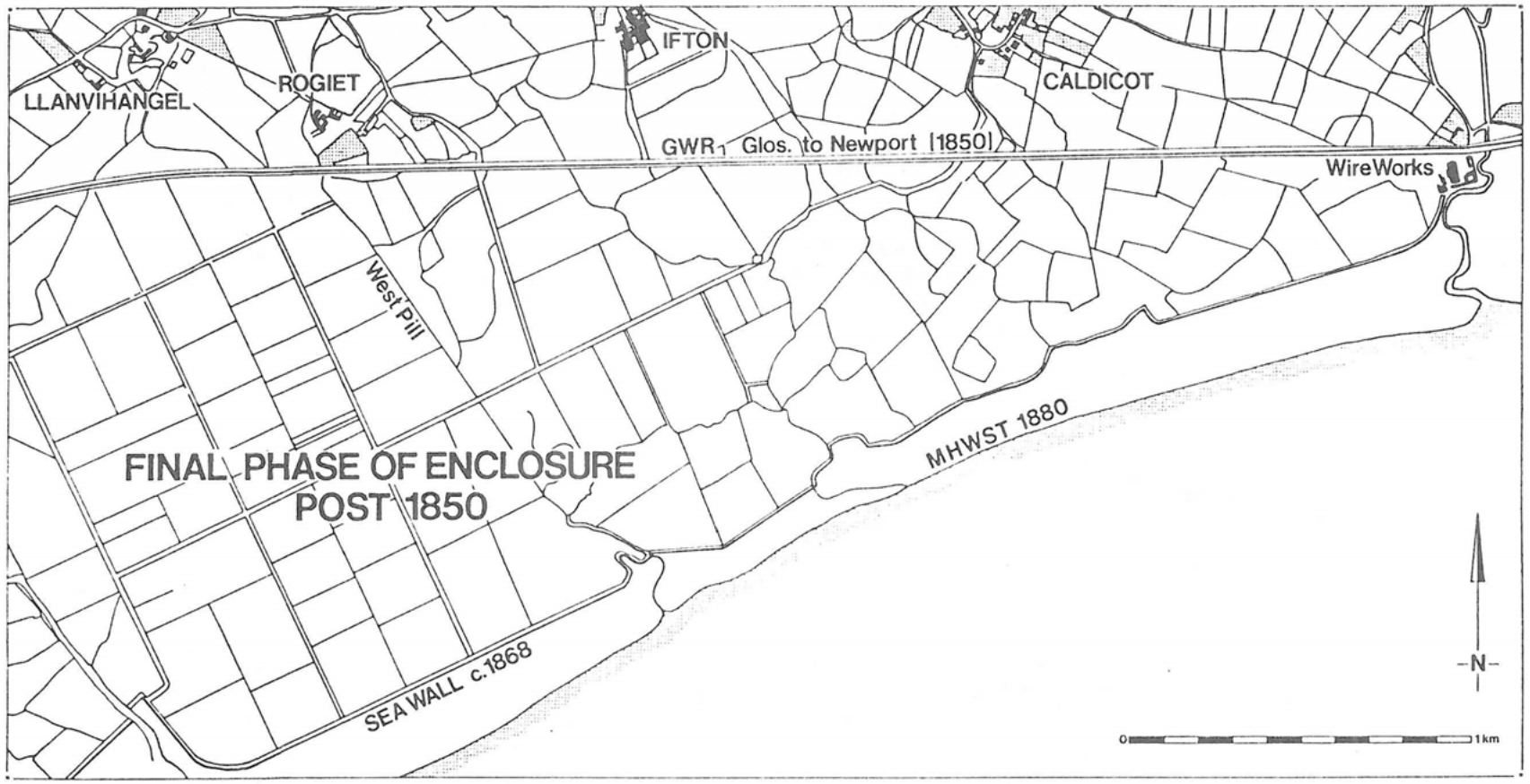


Fig 20. The landscape c1880. With the final phase of enclosure after the general act of 1850, the Levels landscape had assumed virtually its modern form. In that year also the new GWR line to Newport was completed, helping to sever the former contact between the ancient villages and the Levels themselves. The final stretch of sea wall from Twyn Pill to Collister Pill was erected c1868. Enclosure of the moors required extensive alteration to the older drainage pattern during the 1860s, though most of the major reens survived. Further drainage problems were encountered with the pumping operations for the new Severn Tunnel on which work commenced in 1873, and modifications to the reens, pills and sluice gates continued into the twentieth century.

Sources:- Maps: OS 6" sheets Mon XXX, XXXV. Documents: Gwent CRO Inc Aw 5,6,7; Gwent CRO D.2282.3,4.

bed above seems to have been modified, particularly at the mouths of the Pills, and it is likely that most of that earlier wall was eventually encased in a Victorian or later cladding. The stretch from the outfall of Summerleaze Reen to West Pill, subject to severe early twentieth century erosion, has been entirely rebuilt (MMI 1954, 43).

The wharfage and intertidal zone

While there is no specific documentation for particular features beyond the sea walls, there is reference to types of activity.

The ninth century grant of the estate of Caldicot in the *Liber Llandavensis* describes the rights of the lord in the shore '*cum coretibus suis*' (with its weirs) (Evans and Rhys 1893) and these fishing rights are amplified in the post-medieval surveys. The lord of Rogiet had "..the Morning Tyde of every friday, from Good Friday to All Saints' Day, of all the Wears and Netts between Twympill and Collitie Pill" (NLW Tred Mss/169) while rights for the same period (called 'the lord's tide') along the shore of the Duchy of Lancaster manor of Caldicot Eastend belonged to the King (Bradney 1929, 113). The parson of Rogiet, moreover, was also shown in seventeenth century surveys to have "the tithe of the fish" along the same stretch of Rogiet coastline "in the Right of the Rector of Rogiate" (Gwent CRO Misc Mss 1453 (1622-4); Bradney 1932, 267 (1677))

Common grazing rights existed at all times of the year on the mediaeval wharfage of each manor, though even this category of common was somehow subject to engrossment. By 1777 the salt wharfs east of Caldicot Pill (which were almost twice their modern extent) had been parcelled into private grazing lands, held by the richer proprietors and divided, as today, by small reens and gullies (Gwent CRO D.501.1332). The remaining common wharfage appears to have been included in the final phase of mid Victorian enclosure as a part of the annual enclosure act of 1850 (Enc Aw 5.6.7).

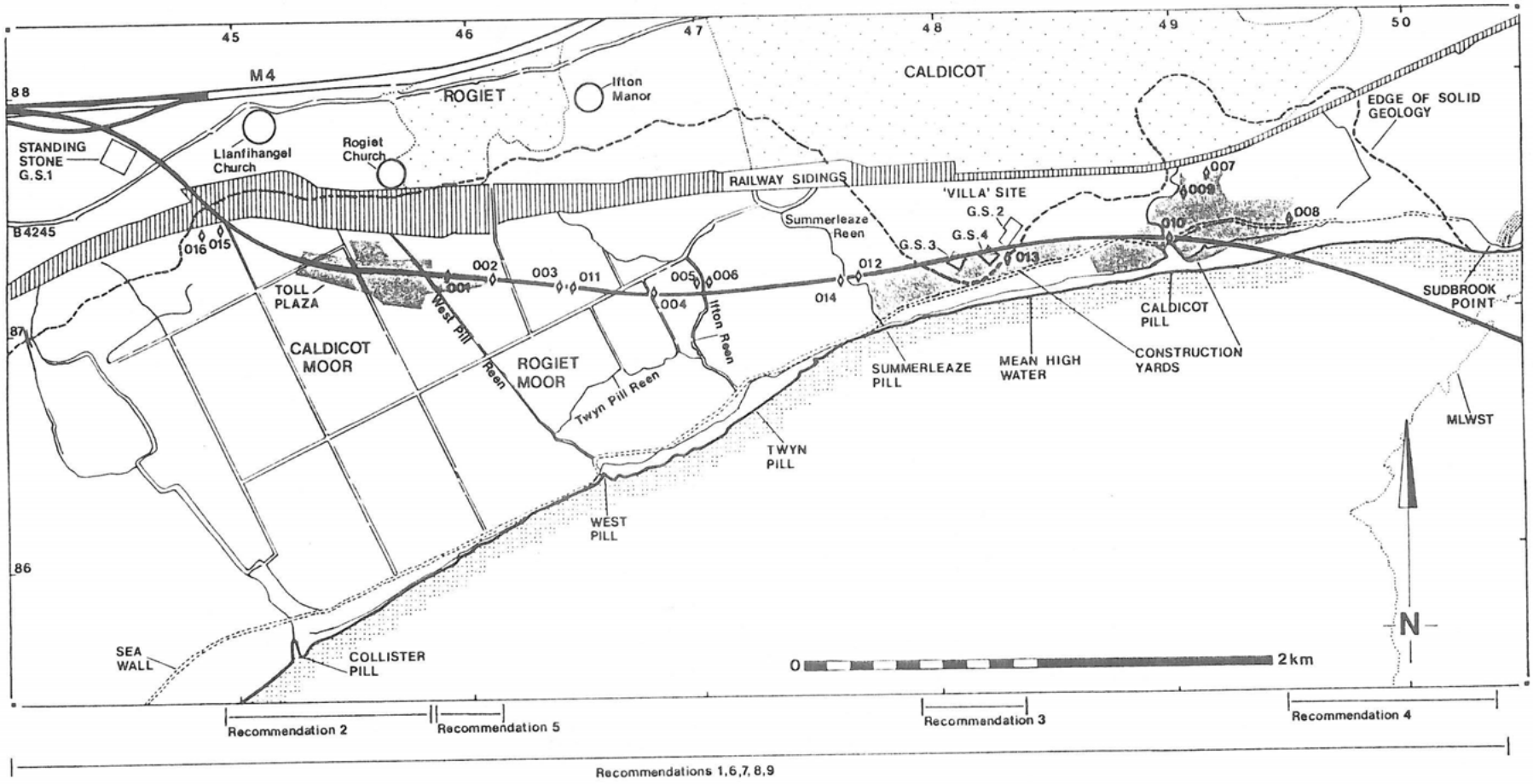


Fig 21. Location plan, showing areas relevant to specific recommendations.

7

RECOMMENDATIONS FOR FUTURE ACTION

This chapter amplifies the series of recommendations included in the preliminary report submitted during August 1990, and sets out the proposed mitigatory course of action in greater detail.

The numbering of the proposals in the preliminary report has been retained here.

Our baseline in both documents has been Statutory Instrument 1988, no 1199: Town and Country Planning (Assessment of Environmental Effects) Regulations 1988, and specifically the reference in Schedule 3 to measures taken.."in order to avoid, reduce or remedy....significant adverse affects".

1) Reduction of archaeological damage: Timing of future work.

(a) Whilst it is frequently assumed that mitigatory measures, insofar as archaeology is concerned, consist of further fieldwork, the possibility of protective measures being taken should not, even at this stage of the design process, be lost sight of. It is archaeologically preferable that where the option to preserve in actuality rather than merely preserve by record exists, that option should be taken. In the present case however, given the nature of the archaeological features on or near the route of the road, together with the advanced state of planning for the construction of the Crossing, our recommendations are mainly concerned with the option of preservation by record. Those areas which might have been most susceptible to flexibility in terms of reducing ground disturbance to sensitive locations, the construction camps, were in fact amongst the least productive in terms of direct evidence for human activity.

(b) Our recommendations presented here consist therefore of measures which should be implemented *prior* to construction work taking place, and measures which should be implemented *during* the construction process. Most of these recommendations are in the first category. It is highly desirable for a variety of reasons (including safety considerations, ease of access to sites, disturbance to excavated areas and inconvenience to the construction process) that further investigation should be undertaken prior to the commencement of construction work.

Recommendation 1: Future field investigations indicated in the following recommendations, apart from watching briefs undertaken during the construction process, should be initiated in advance of construction work taking place.

2) Field investigations in the Vurlong Reen area

An area of high potential for the recovery of palaeoenvironmental information with evidence for prehistoric human activity is identified in the area of Vurlong Reen, south of the main railway line (above, p 8, 39 40). Ground stability here, given the thickness of the peat deposits, may be poor and the measures taken to counter this may involve considerable ground disturbance. The following strategy is therefore proposed:-

(a) The extent of any additional disturbance occasioned by the instability of the ground in this area needs to be determined in consultation with the relevant contractor and an appropriate strategy for further sampling of the deposits devised. The high desirability of recovering a complete pollen diagram from the deepest part of the peat is noted below (recommendation 7). It is also highly probable that the preservation of wood here will be of sufficient quality to permit dendrochronological studies to be undertaken. There is an urgent need for further dendrochronological work to be carried out in the environs of the Severn Estuary, in order to extend existing dated tree-ring sequences.

(b) Further work should be undertaken in any case in the area of Trial pit 016: specifically a trial pit c30m long and 2m wide should be excavated entirely by hand across the interface in order to establish whether other flint artefacts are present. This should be excavated to just below the base of the peat.

(c) In the event of any structural evidence being recovered, more detailed site-specific investigations should be undertaken.

Recommendation 2: Limited field investigations should be undertaken in the immediate vicinity of the site identified at ST 4503 8741, together with more detailed palaeoenvironmental examination of the peat deposits between ST 4496 8746 and ST 4580 8722.

3) Field investigations in the area of the "villa" complex

Fieldwork undertaken in the vicinity of the Scheduled "villa" site at ST 4837 8740 indicates that the route of the crossing, here shown as being in a shallow cutting, clips the edge of the complex of features detected by aerial survey and geophysical prospection. Trial trenching indicated (a) the likelihood of further features of the complex being buried under colluvium, and (b) the presence of earlier prehistoric activity (above, pp 16-24). Additional fieldwork should be undertaken here in order to examine more fully those parts of the villa complex affected by the road construction, and to explore further the nature and extent of prehistoric activity on the important margin between wetland and dryland.

The following programme of work is recommended:-

(a) The most urgent requirement is for a trial pit at the interface around ST 4809 8717 near to Transect A, which has not been adequately assessed. This would be c10m x 5m x 2.5m deep initially, with the possibility of stripping an adjacent area if significant quantities of flints or other artefacts are discovered.

(b) Trial pit 013 should be partially re-opened and another smaller trial pit dug on the opposite (north-western) side of the present hedge. Where the colluvial deposits are at their most well-developed, a strip c2m wide and 5m long should be excavated by hand in order to recover additional artefacts, so that these deposits can be dated and their stratigraphic relationship to the estuarine deposits established. It will be particularly interesting to discover whether there is any buried surface which can be related to the nearby Villa. At the southeastern end of the trial pit, where the palaeochannel and banded marine deposits are located, an area c10m long by 5m wide should be cleared by machine to c0.3m above the base of context 274. This should be excavated by hand to examine the horizons which are known to contain flint artefacts and charcoal.

(c) The trial pit northwest of the hedge proposed in (b) will test the hypothesis that the archaeological features in the lower part of the area scheduled under the 1979 Ancient Monuments and Archaeological Areas Act (monument Mm 169) are preserved below colluvium (above p 24). If that is indeed the case, a sondage c 5m x 10m should be excavated by hand. The sondage should be located so as to locate the presumed continuation of the parallel linear features near to the southern corner of the complex.

(d) In the event of discrete prehistoric sites being discovered as a result of (a) or (b), or of a greater complexity of what are presently presumed to be Romano-British features being revealed by (c), there is a possibility that a further stage of limited investigation would be required.

Recommendation 3: Further field investigations should be undertaken on that part of the Scheduled "villa" complex and its immediate environs affected by the road construction in order to define the extent of prehistoric activity in the area more clearly, to relate both prehistoric and Romano-British activity to depositional processes and to examine parts of the complex believed to be buried by colluvium.

4) Field investigations in the intertidal zone

The intertidal zone is a highly complex but archaeologically rewarding area. Assessment has been difficult owing to factors entirely beyond our control; these same factors of weather, tidal inundation and the present distribution of modern mobile sediments will also affect any future programme of work. In particular, there needs to be flexibility in the matter of the timing of such work in order that optimum conditions can be utilised whenever they occur. Future work must involve the investigation of features on the line of the bridge abutments and caissons and in such parts of the vicinity where ground disturbance is likely to occur as a result of the crossing construction. The extent of such disturbance is a matter to be discussed with the contractor. At this stage we anticipate further evaluation of the area, taking advantage of appropriate conditions for such survey, followed by investigations of features shown to be vulnerable. Such features should be examined in the context of the landforms and sedimentary units with which they are associated.

The following work is thus required:-

(a) Further detailed survey of the hurdle and fish-trap structures identified above (p28) particularly in relation to landforms within the immediate environs of the route.

(b) Surface survey and plotting of any other features visible on the line of the crossing and within 50m either side of it.

(c) Excavation of those structures noted in (a) and (b) which are on the line of the Crossing, or sufficiently near the environs of the Crossing to be affected by related construction works, or by changes in erosion of the surface of the intertidal deposits which may be occasioned by the presence of the crossing. This work should be accompanied by dating of the features and the sediments with which they are related. Advice and assistance (particularly that of the local museum service, Monmouth Borough Council) in respect of storage and conservation should be sought.

Recommendation 4: A programme of more detailed survey of the features in the intertidal zone should be accompanied by investigation and excavation of those features in the path of the Crossing, or otherwise to be disturbed by its construction.

5) Field Investigations in the Toll Plaza area, Rogiet Moor.

In the vicinity of the toll plaza relict drainage channels were recorded and partially examined which had formerly functioned as the boundary of the estate and possibly also the manorial demesne of Rogiet. This area was known as Nine Meads. It appears therefore that during the medieval period there was perhaps a narrow spit of land extending into the unreclaimed levels, or even an isolated "island" of dryer ground. Further work is needed to establish whether this "peninsula/ island" was developed upon the top of any earlier feature, either natural or anthropogenic. The available contractors' trial pit data together with the stratigraphy recorded in trial pit 001 (ST 4593 8721) indicate that the edge of the fen-edge peat is possibly not far from this point, and the relatively rapid change in the landscape here is also worth further investigation. Of the seven major natural drainage channels which will be disturbed by the route of the Crossing, those marking the boundary of Nine Meads are the only ones which do not carry large quantities of water, and are thus the only ones which it is practical to examine. Differential sediment accretion over a considerable period of time (probably at least nine centuries) will be registered in the stratigraphy either side of the reens which acted as a boundary feature. It is proposed therefore to complete examination of this

area by means of two machine-dug test pits, similar in size to those excavated during the assessment, spanning the full width of Nine Meads Reen and West Pill Reen, together with an auger transect across the "island" and its immediate environs.

Recommendation 5: Limited excavation work should be undertaken on the edge of the area of early land reclamation, Nine Meads, on Rogiet Moor.

6) Watching brief during construction.

Recommendations 2-5 indicate the level of response believed to be necessary for those areas of archaeological sensitivity identified during the course of assessment. The indications from the investigation of the remainder of the route suggest that a lower level of response is required. Over much of the length of the crossing the level of the carriageway will be above that of the existing ground surface, suggesting that the impact upon any archaeological features will be far smaller than were the case otherwise. The palaeoenvironmental significance of the peat deposits along the former fen-edge is likely to be considerable; reference is made elsewhere (recommendations 2a and 7a) to the necessity of further work here.

Our investigations of areas likely to be disturbed by construction depots do not indicate any concentrations of prehistoric or later activity, although this is not the case in the vicinity of the toll plaza, where we identify further (albeit limited) work as being necessary (recommendation 5).

Excavation by the contractors of carriageway drainage ditches will expose the upper part of the stratigraphy over the entire route of the crossing. The present assessment indicates that the archaeological interest of the upper parts of the estuarine Levels deposits is likely to be minimal. However, depending on the depth of disturbance involved in these drainage works, a low-level watching brief would possibly be desirable during this stage of work in order to record any stratigraphic variability or previously undetected features. This opportunity should also be taken to examine the palaeochannels in the area of the present MoD firng range between Ifton and Summerleaze Reens. Similarly, there may also be traces of evidence for the shipbuilding activities of Henry Wise which took place near to Caldicot Pill during the late eighteenth centuries. The nature of the relict eighteenth century earthen sea wall which is part of Wise's dock should be recorded.

The area between the M4 and the railway line should also be the subject of a watching brief during the initial topsoil strip. Although geophysical survey did not reveal any anomalies of archaeological significance this does not preclude the existence of features which are not susceptible to detection by this means. The existence of the Scheduled standing stone at the extreme edge of the area affected by the carriageway, and the probable former presence of a further standing stone close to the B4245, as well as the existence of prehistoric activity on the southern side of the railway line, means that the whole of this area of "dryland" should be closely monitored during the early stages of construction.

[Whilst our sampling strategy and investigations to date prompt us to predict with some confidence that the possibility of coming across unexpected features during the course of construction outside those areas already identified as being of particular interest is low, it is not possible to offer a categorical statement that there is no archaeology along the route of the crossing other than that noted here. We would recommend therefore that contingency funds be set aside against the possibility of unexpected archaeological discoveries, and that provision be made for a limited time to investigate such discoveries. The parameters of such contingency arrangements would be a matter for discussion between the Crossing contractor, the archaeological contractor/consultant, and WO Highways Directorate.]

Recommendation 6: A Watching Brief should be conducted during the early stages of the construction process, with the specific objectives of recording any previously undetected archaeological features in the area of the standing stone, and monitoring the exposure of the stratigraphic variability and any related archaeology by the insertion of drainage features. [Contingency arrangements should be made against the possibility of previously undetected features requiring more detailed investigation than that which could be accommodated within the terms of the Watching Brief].

7) Palaeoenvironmental studies.

The proposed work should be accompanied by palaeoenvironmental studies which will need to be extensive if significant *in situ* archaeology is found. This assessment shows that there is considerable scope for comparative palaeoenvironmental studies using several sources of evidence. In particular the following aspects are important:-

(a) A full pollen diagram in the deepest part of the peat sequence in the vicinity of Trial Pit 015 and other sequences from sections with archaeology. This is likely to be the most potentially important technique.

(b) Analytical work on the basal sediments 270-267 in Trial Pit 013 to clarify their mode of deposition. Scanning Electron Microscopy of sand grains from Context 269 in the same Trial Pit would be particularly helpful.

(c) Further work on sediment characterisation and chemical analysis, particularly the colluvial part of Trial Pit 013 and any colluvial deposits upslope of Trial Pit 016.

(d) If there proves to be significant archaeology in Trial Pit 013 as a result of the investigations proposed above in recommendation 3(b), specifically context 267 and the banded deposits 275-278, micromorphological analysis will help to clarify whether 267 is a palaeosol and would lead to a better understanding of the banded sequence.

(e) Mollusc columns should be examined from both

interface sites, particularly the palaeochannel deposits.

(f) Ostrocods, diatoms and forams may help to clarify the environment of deposition of some layers.

(g) Beetles and seeds should be examined, particularly in association with any *in situ* archaeological horizons.

(h) Future work should involve a sedimentologist, preferably Professor John Allen of Reading University, so that the sequences can be integrated with the wider Severn Estuary sequence.

(i) Chronological calibration of sediments and the archaeological and palaeoenvironmental data contained within them should be undertaken. This would primarily involve archaeomagnetic work on the silts and clays around Trial Pit 013 and radiocarbon dating on the peats around trial pits 015 and 016 and the wooden structures in the intertidal zone. Additionally, as we have indicated previously (Recommendation 2), there may also be considerable scope for dendrochronological studies on wood samples from within the peat deposits south of the railway line on Rogiet Moor.

Recommendation 7: Future work should incorporate an integrated programme of palaeoenvironmental and related studies, including archaeological dating.

8) Documentary and cartographic work

Documentary and cartographic work undertaken as part of the assessment has emphasised the value of such studies, particularly for elucidating the more recent (medieval and later) episodes of landscape development. The datasearch undertaken to date has not however been exhausted (documents in the Public Record Office, for example, have not been consulted), and there is clearly scope for limited further work of this nature to be undertaken with a view to providing a historical context for more recent events registered archaeologically. This however is not envisaged as constituting a major component of any future programme of work.

Recommendation 8: Future work should incorporate an extension of the documentary and cartographic datasearch and synthesis already undertaken.

9) Forward planning: basis for future collaboration.

Successful execution of the proposals put forward here will depend upon the close co-operation of the archaeological organisation(s) undertaking the work, the development contractors and the Welsh Office Highways Directorate. Most of the recommendations made here can be accomplished with no delay to the construction programme on-site, provided that the necessity of forward planning is recognised. Some of the problems encountered in the formulation of the present assessment programme could have been resolved earlier had the implications of the August 1988 report *A Question of Time* been considered at an earlier stage.

It is recommended therefore that forward planning for the next stage of archaeological work be inititiated at the earliest opportunity. Recruitment of specialist services, given the busy schedules of most palaeoenvironmentalists and other specialists, will also need to be considered.

The British Archaeologists Developers and Liaison Group *Code of Practice* should form the basis of collaboration with the contractors, whilst the existing arrangements for funding of archaeological works arising from Welsh Office road schemes should be the basis of further work funded by the Welsh Office.

Recommendation 9: There should be close collaboration with the developers in the formulation of the further programme of archaeological work outlined here. The BADLG Code of Practice, together with existing arrangements for the funding of archaeological work arising from Welsh Office road schemes should form the basis for future co-operation. Forward planning for future work should commence at the earliest opportunity.

A suggested timetable for future work is presented below:-

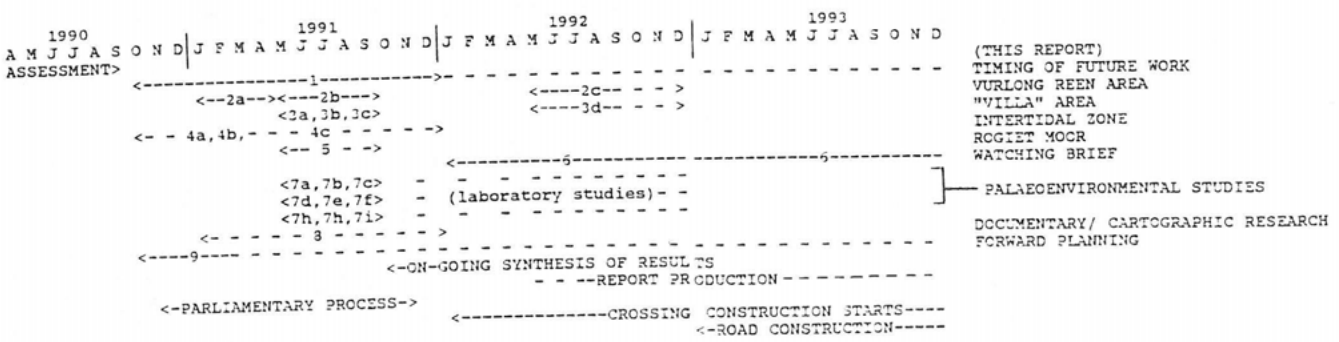


Fig 22. Suggested timetable for implementation of recommendations.

Appendix I

The Finds

a) Prehistoric

The following items were evidently of prehistoric origin:-

Context no/ Description (*provenance: trial pit / auger hole; layer*)

1500 Flint fragment (*077;-*)

1501 Flint; ?core fragment reused as side scraper (*013; 271*)

1504 Flint piece, patinated.

1506 Flint fragment: waste (*013; 271*)

1507 Very small flint fragment: waste (*013; 274*)

1508 Small piece of reduced pottery, grey core with brown surface, heavily shell-gritted (*trial pit 013; layer 266*)

1536 Flint fragment: waste (*016; 303*)

1538 Flint fragment, probably part of damaged and abraded scraper (*013;271*)

1539 Flint piece, patinated (*013;272*)

1540 Flint fragment, possibly modified core remnant (*013; 271*)

1545 Flint piece, patinated (*016; 318*)

1546 Flint fragment; ?waste (*016; 318*)

1547 Flint fragment; waste (*016; 303*)

1548 Very small flint fragment; ?micro waste (*013; 272*)

1549 Flint piece, patinated (*013; 272*)

1550 Flint fragment; ?waste (*013; 271*)

1551 Flint fragment; ?waste (*013; 271*)

1552 Flint fragment; ?waste (*013; 271*)

1553 Flint fragment; ?waste (*013; 271*)

1554 Flint fragment; ?waste (*013; 271*)

(nos 1548-1554 were recovered by wet-sieving of samples.)

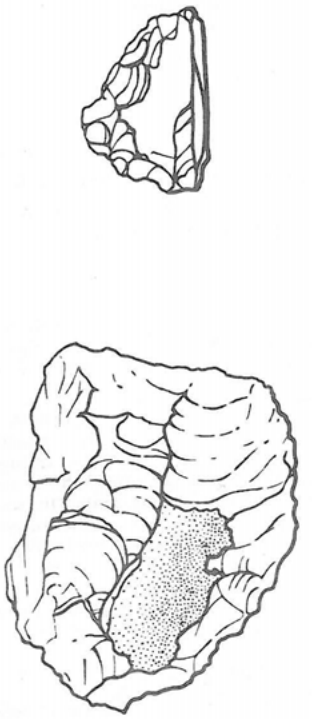


Fig 23. Flint artefacts 1501 (top), 1538 (bottom). (scale x2)

Dr HN Savory writes:-

"The material...is from more than one period. The flints are mainly waste from chipping floors which are presumably located nearby, and more than one source for the flint seems to be indicated, since in addition to the dark grey flint there are a few brownish pieces (1500, 1545, 1549) which seem to have come from a gravel deposit, while others (1504, 1539, 1533) are patinated. They do not have much character apart from the two damaged scrapers (1501, 1538) which are so small that they could be mesolithic (cf the tiny pieces 1507, 1548).

The sherd (1508), again, could be interpreted in more than one way. It seems... to be a rim fragment, with only a small part of the actual flat top of the rim preserved. But the fragment is so small that it is difficult to judge how to tilt it ...[it could be] part of a wide bowl with a rounded base...[or]..a flat-based jar with a gently rounded shoulder. Although the latter interpretation seems to me more likely and would suit a later Bronze Age date, or even one in what used to be called "Iron Age A", and the coarse shell-gritted ware would be consistent, one cannot exclude the possibility that the vessel belonged to the late Neolithic "grooved ware" group.One should perhaps be cautious in assigning a precise date to this material."

b) Romano-British

The following items were recognised as being of Romano-British date:-

Context no/ Description (*provenance: trial pit; layer*)

1518 Small body sherd, undiagnostic redware (*013;262*)

1519 Tile fragment (*013;263*)

1530 Tile fragment (*013;263*)

1532 Tile fragments (two) (*013;262*)

1533 Tile fragment (*013;265*)

1534 Tile fragment (*013;264*)

Dr EM Evans writes:-

"Six fragments of brick and tile were retrieved. All weighed less than 50g, and fragments of this size are usually impossible either to identify as to type or to make any useful assessment of the fabric by visual inspection. Five fragments (1519, 1530, 1532x2, 1534) were heavily abraded and no comment is possible. The sixth fragment (1533) may be part of the flange of a tegula or half-box tile. The condition of all the fragments makes it unlikely that they are in their primary place of deposition".

Appendix 2

Report on Geophysical Survey *by J Gater and C Gaffney*.

Introduction

The fieldwork was carried out by four operators using two magnetometers. The 20m survey grids were tied in to base-lines which had been established by GGAT personnel. Four areas were investigated and their location is shown on Figures 1,2 and 8.

Results

Area 1 (Figures 24 and 25)

The magnetic results from the area surrounding the standing stone proved to be relatively quiet. Apart from the obvious modern magnetic disturbances, there are few anomalies of interest.

The major anomaly crossing the area is associated with a small ferrous pipeline which feeds a water trough at position (A) on the survey plots. Other anomalies (B) are also thought to be the result of modern disturbance on the site. Whilst an archaeological interpretation is possible - small scale "industrial" activity could be responsible - given the context of the anomalies (close to the trough) a recent origin is more probable. Other minor anomalies - the peaks visible on the x-y traces - are associated with buried ferrous objects, presumably modern in origin. Those at (C) might benefit from further archaeological investigation, but there are no anomalies of obvious archaeological interest associated with the standing stone.

Area 2 The "villa" cropmark (Figures 7, 26)

To the south of Caldicot the proposed route passes close to an enclosure - tentatively interpreted as a villa - visible on aerial photographs. Unfortunately, the clarity of the photograph is such that it is difficult to see whether the features extend to the south and west. The aim of this survey, therefore, was to examine the known remains so that the results would act as a control for interpreting areas 3 and 4 (see below) which lie directly on the course of the road.

Although the general level of magnetic noise is low (see X-Y traces) there are clear linear anomalies (see dot density plots) which are associated with ditch lengths. These would appear to form a small sub-rectangular enclosure with dimensions of approximately 40m x 45m. The anomalies are rather weak and broken in the western half, but whether this is a true reflection of the archaeological picture or merely localised variations in the magnetic enhancement is difficult to say.

Associated with the enclosure are a series of anomalies which appear to be pits or other features of archaeological interest (these are best viewed when the broad responses on the X-Y traces are compared with the high concentrations of dots on the density plots). The anomalies at (D), in particular the twin positive peaks are often characteristic of kiln or similar remains. However, in this instance there is a large negative response also present and this could indicate the presence of modern iron objects.

Minor magnetic disturbances in the corner of the survey grid (E) are due to a fence in the hedgeline, and the increase in noise at (F) is due to a pylon.

Areas 3 and 4, west of the "villa" complex (Figure 27)

Modern features are apparently responsible for the majority of magnetic anomalies in these two areas. The anomalies at (G), (H), and (I) correspond respectively with a gate, a water trough and a (presumed) pipeline, though in the case of the latter it is difficult to be specific close to the edge of the survey area. There are also a number of iron spikes scattered through both survey areas.

Rather curious anomalies are visible at (J), though they appear to be associated with the postulated pipeline. Possible pits are highlighted, but the magnetic evidence is not very convincing. There is a lack of magnetic responses similar to those associated with the known enclosure in Area 2.

Conclusions

The magnetometer survey failed to identify any anomalies of archaeological potential associated with the standing stone.

Anomalies of archaeological interest were recorded in the field containing the known enclosure, but no geophysical evidence was found for remains extending onto the line of the proposed road.

Given the general low levels of magnetic enhancement along the Severn Estuary, and the possible great depths of deposits overlying archaeological remains, the geophysical techniques may have "missed" features which are more ephemeral in nature than those associated with the enclosure in Area 2.

[Fieldwork: J Gater, C Gaffney, D Shiel and S Gaffney
Report: J Gater, C Gaffney]

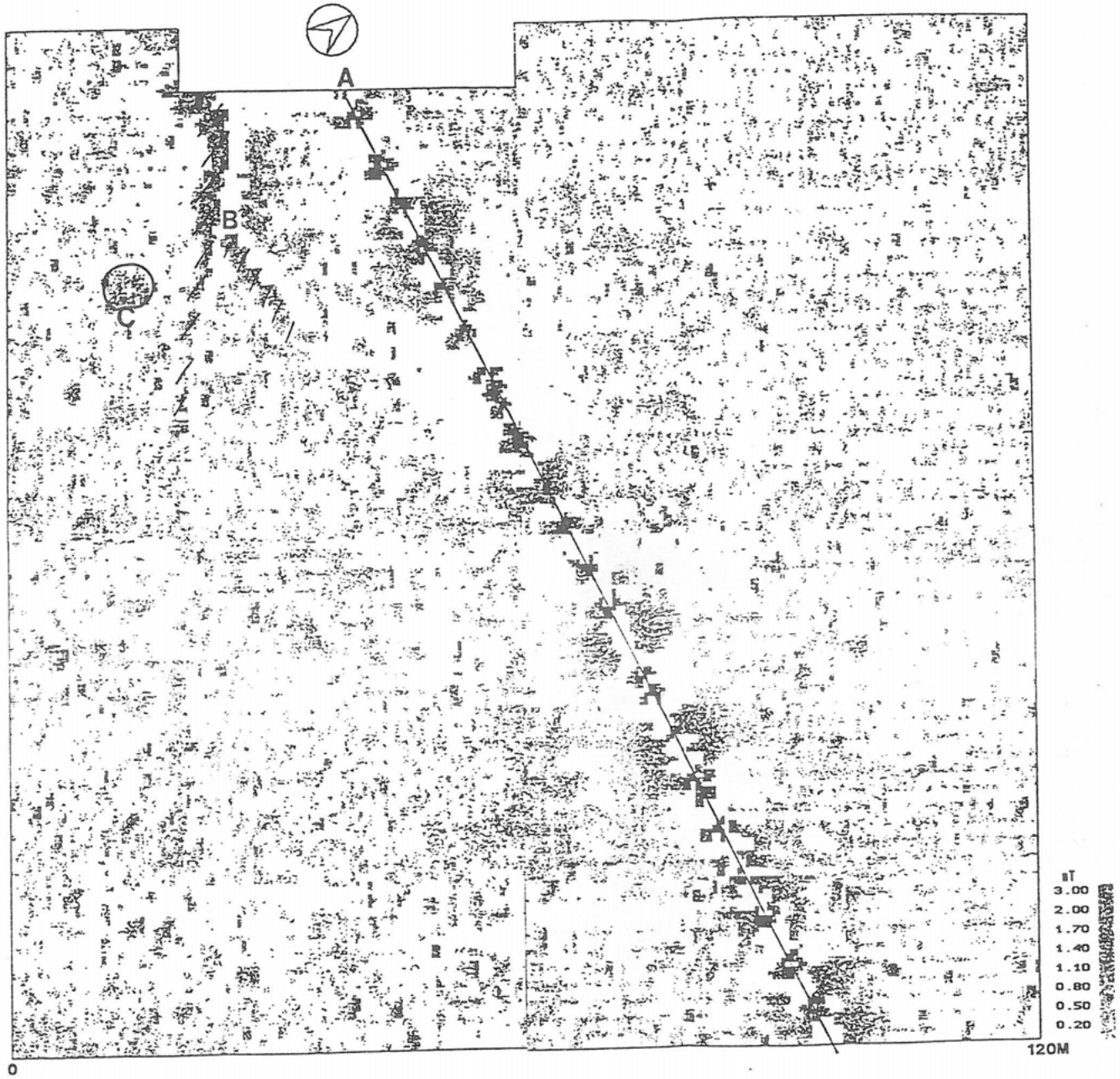


Fig 24. Dot-density plot of magnetic data, geophysical survey area 1.

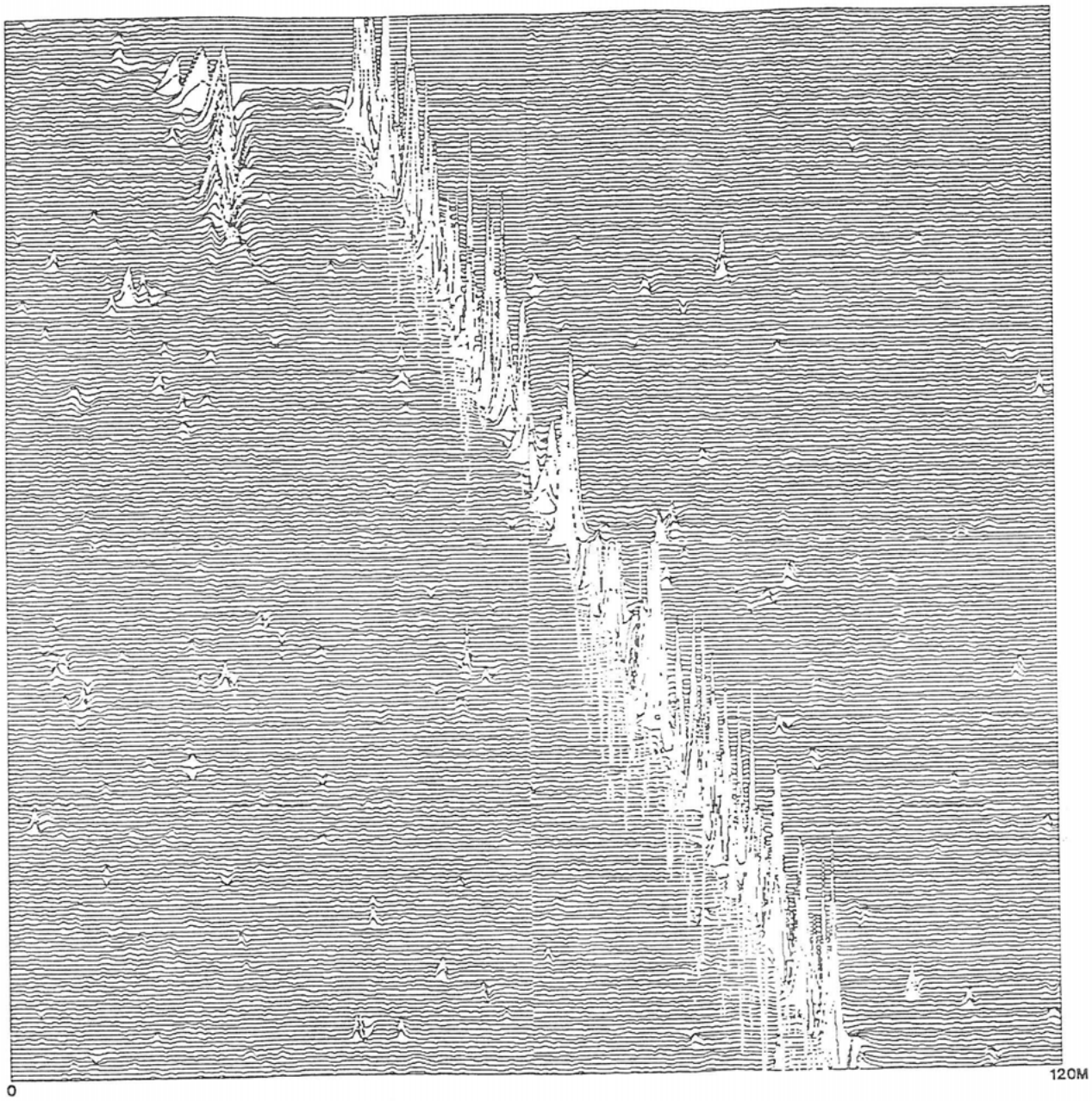


Fig 25. Contour plot of magnetic data, geophysical survey area 1.

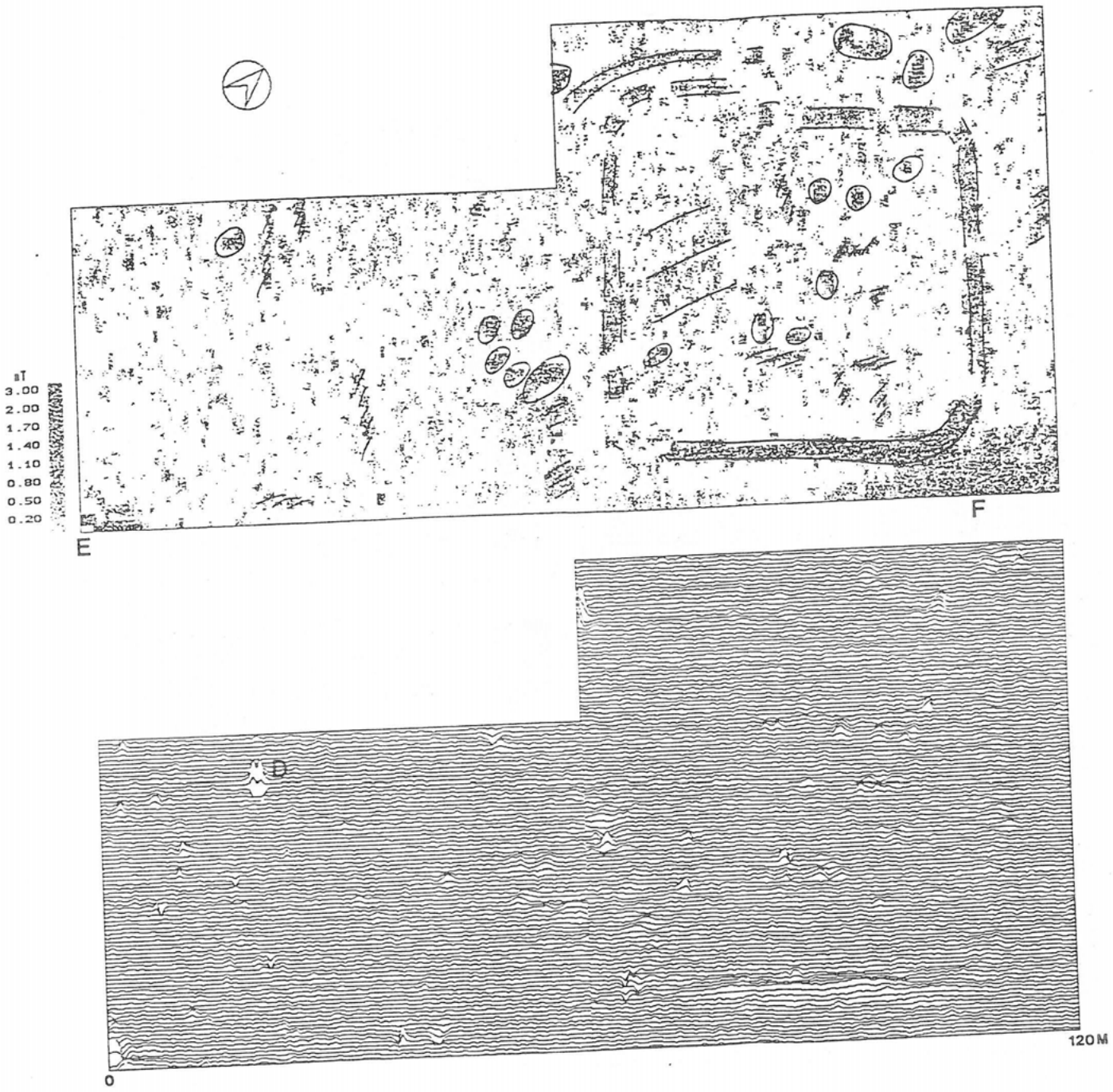


Fig 26. Dot-density (upper) and contour (lower) plots of geomagnetic data, villa site.

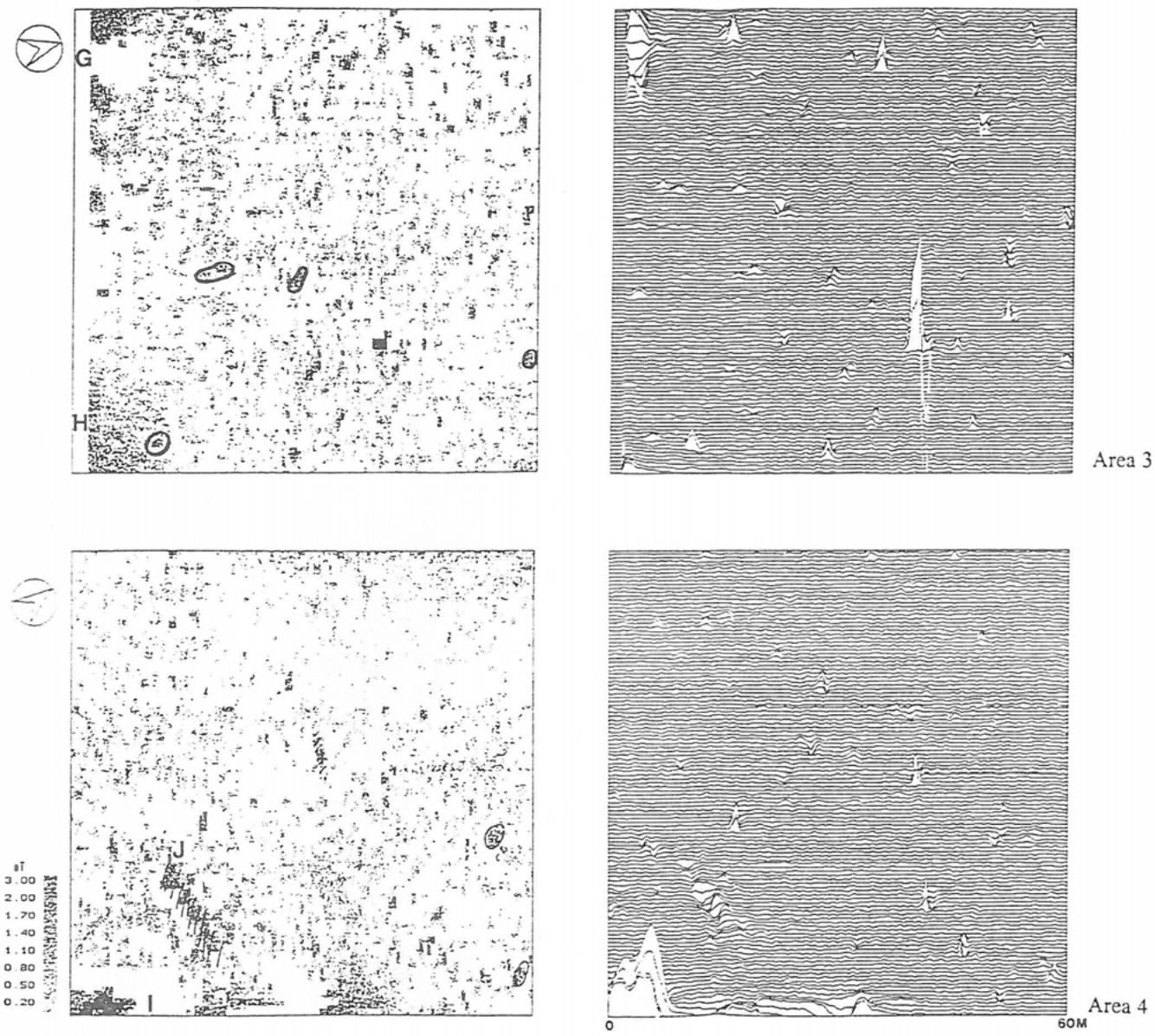


Fig 27. Dot density (left) and contour (right) plots of geomagnetic data, areas 3 and 4 (west of villa site).

Appendix 3

Analytical data *by J Crowther*

(see chapter 5 above)

Sample	LOI (%)	Phosphate -Pt (mg g-1)	χ (μm3kg-1)	pH (1:2.5, water)	Coarse sand (%)	Medium sand (%)	Fine sand (%)	Silt (%)	Clay (%)
PIT 012									
1104			0.217	6.36					
1105			0.099	7.26					
1106	1.93		0.088	8.63					
1107	1.56		0.079	8.75	0.2	0.9	1.1	62.5	35.3
1108	1.24		0.090	8.93	0.1	0.1	0.6	67.3	31.9
1109	1.81		0.062	9.45	0.1	0.4	0.5	56.2	42.8
PIT 013 - Column 1									
1110	5.80		0.151	6.65	0.5	2.4	3.8	50.9	42.4
1111	3.20		0.106	7.14	0.8	2.4	2.3	51.4	43.1
1112			0.093	8.76					
1113	2.00		0.103	8.82	1.4	1.6	1.2	51.5	44.3
1114	2.14		0.111	8.66	0.1	0.2	0.4	55.7	43.6
1115	2.40		0.138	8.28	2.0	8.2	3.8	60.0	26.0
1116	1.57		0.118	8.18					
1117	2.25		0.290	8.58	0.4	2.9	1.0	53.3	42.4
1118	2.00		0.072	8.81					
1119	1.05		0.065	8.66	0.2	4.8	6.9	67.4	20.4
1120	2.21		0.086	8.66	0.3	9.4	11.8	54.4	24.0
PIT 013 - Column 2									
1121	1.52		0.091	8.90	0.1	1.9	1.9	65.6	30.5
1122	2.15		0.097	8.59					
1123	1.96		0.058	8.57	0.3	3.4	3.8	55.2	37.3
1124	1.37		0.035	8.56	0.4	4.8	5.1	59.4	30.3
1125	1.11		0.054	8.62	1.6	4.9	6.3	60.1	27.1
1126	1.72		0.066	8.47					
1127	1.23		0.078	8.48	0.3	4.8	6.0	50.4	38.5
1128	1.43		0.080	8.37	0.4	9.8	13.2	55.3	21.3
PIT 013 - Column 3									
1150	2.06		0.101	8.47	1.4	2.8	2.8	57.6	35.4
1151	0.99		0.077	7.93	0.8	6.8	9.3	70.9	12.5
1152			0.061						
1153			0.080						
1154	1.58		0.083	8.04					
1155			0.066						
1156			0.058						
1157			0.040	7.88	0.7	28.3	32.0	33.0	6.0
1158			0.046	7.85					
1159			0.045	8.14	4.8	30.5	27.9	26.3	10.5
1160			0.049	8.18					
PIT 013 - Column 4									
1125c	6.94	0.807	0.222	6.06	1.4	9.3	7.8	52.4	29.1
1126c	5.53	0.690	0.175						
1127c	4.53	0.578	0.111						
1128c	3.51	0.460	0.062						
1129	2.83	0.364	0.083	6.92	1.0	6.7	5.2	52.7	34.4
1130	2.10	0.493	0.074						
1131	2.15	0.450	0.051						
1132	2.18	0.487	0.079						
1133	1.91	0.823	0.125	6.70	9.7	14.2	10.4	41.0	24.7
1134	1.60	0.742	0.185						
1135	1.84	0.574	0.085						
1136	2.25	0.704	0.115						

(continued)

Sample	LOI (%)	Phosphate -Pt (mg g^{-1})	χ (μm^{3}kg^{-1})	pH (1:2.5, water)	Coarse sand (%)	Medium sand (%)	Fine sand (%)	Silt (%)	Clay (%)
PIT 013 - Column 4 (continued)									
1137	2.61	0.627	0.083	7.52	2.1	3.4	4.0	47.2	43.3
1138	2.19	0.638	0.088						
1139	2.29	0.663	0.082						
1140	1.50	0.772	0.107						
1141	1.29	0.621	0.081	8.35	4.9	11.0	8.8	47.3	28.0
1142	1.37	0.758	0.075						
1143	1.24	1.36	0.073						
1144	1.14	0.986	0.087						
1145	1.14	0.702	0.086	8.39	4.4	10.6	9.4	50.6	25.0
1146	1.43	0.572	0.073						
1147	1.34	0.747	0.116						
1148	1.39	0.833	0.120						
1149	1.50	0.611	0.103	7.95	4.0	9.3	9.4	52.0	25.3
1150	1.54	0.684	0.107						
1062	1.29	0.775	0.117						
1163	1.43	0.635	0.130						
1164	1.35	0.436	0.123						
1165	1.40	0.379	0.093						
1166	1.30	0.336	0.125						
1167	1.35	0.343	0.110	7.92	0.4	2.6	4.3	76.2	16.5
PIT 015									
1231	0.66		0.049	7.64	0.5	8.5	13.2	62.5	15.3
PIT 016 - Column 1									
1201	16.3		0.123	7.06	1.4	2.8	4.3	38.3	53.2
1202	39.8		0.081						
1203	40.3		0.089	6.73					
1204	19.2		0.096						
1205	13.0		0.087	6.80	1.4	1.4	2.8	25.0	69.4
1206	67.8		0.024						
1207	65.7		0.040	6.64					
1208	59.5		0.068						
1209	10.6		0.032	6.91	0.3	6.2	9.4	51.4	32.7
1210	0.99		0.046	7.66	0.5	7.7	11.2	60.2	20.4
PIT 016 - Column 2									
1241	1.18		0.026	7.45	0.2	7.2	10.8	62.4	19.4
1242	1.14		0.067	7.77					
1243	1.79		0.063	7.74	0.3	7.2	25.2	37.7	29.6
1244	0.89		0.095	7.92	0.1	7.3	25.7	41.2	25.7
1245	0.99		0.041	8.45					
1246	0.35		0.032	8.67	0.3	8.9	10.2	50.5	30.1
PIT 016 - Column 3									
1247			0.048	7.48					
1248			0.035	7.14					
1249			0.032	7.15					
1250			0.031	7.73					
1251			0.025	7.82					
PIT 016 - Column 4									
1211	27.9	1.05	0.281	5.29	1.2	2.3	3.5	31.8	6.12
1212	30.6	0.634	0.103						
1213	27.6	0.597	0.149						
1214	23.7	0.716	0.193						
1215	25.4	0.677	0.179						
1216	26.5	0.638	0.091						
1217	23.6	0.612	0.115	5.75	0.1	1.4	2.7	35.6	60.2
1218	23.5	0.581	0.119						
1219	22.6	0.536	0.123						
1220	23.1	0.493	0.113						
1221	24.3	0.532	0.120						
1223	25.3	0.508	0.088						
1224	26.0	0.500	0.106						
1225	25.6	0.551	0.128						
1226	28.1	0.555	0.129						
1227	28.0	0.571	0.153						
1228	34.5	0.591	0.207						
1229	66.3	0.475	0.275	6.02	0.4	3.8	3.8	15.4	76.7
1230	11.4	0.268	0.032	6.47	0.2	7.2	10.5	58.5	23.3

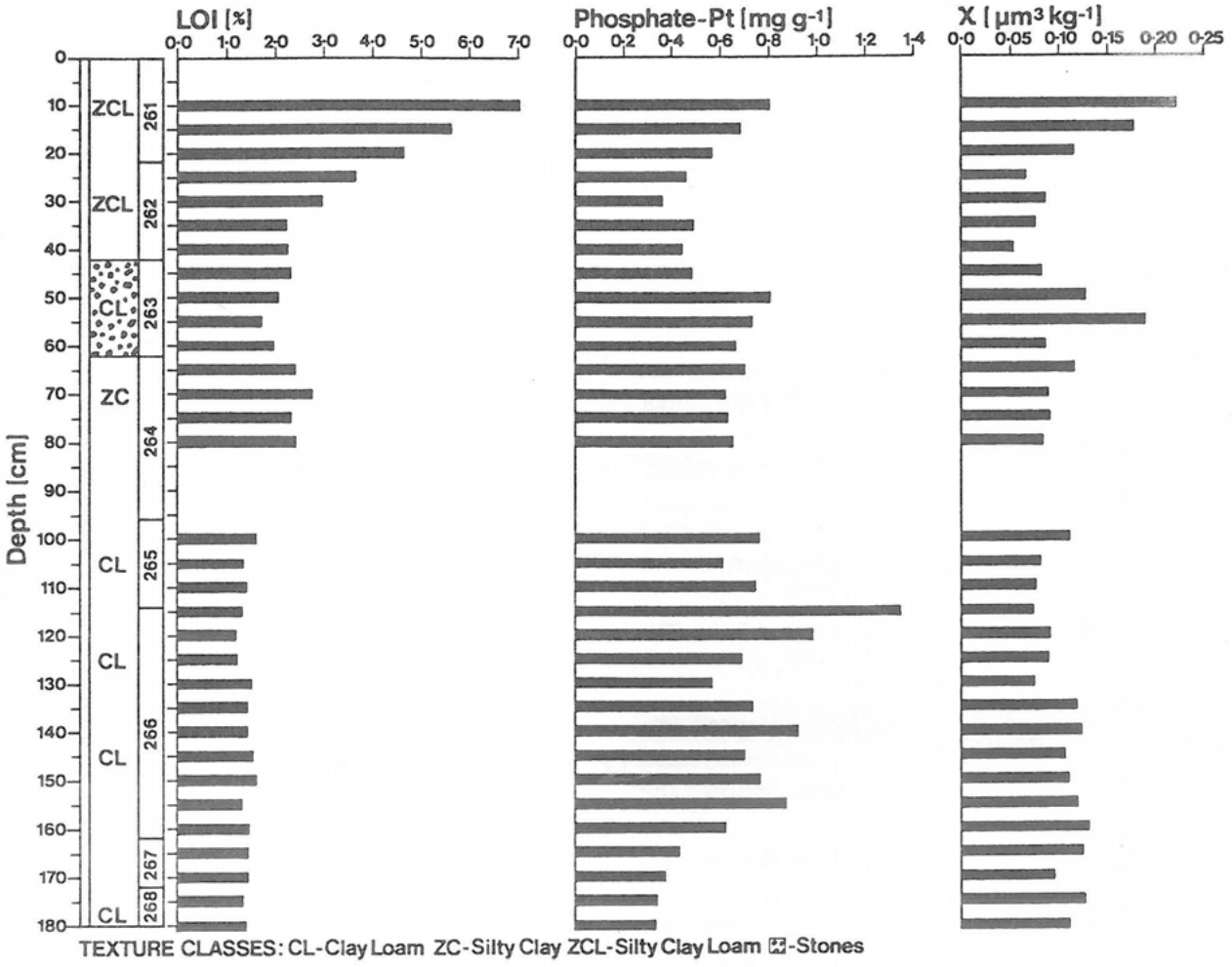


Fig 28. Variations in LOI, Phosphate-Pt and χ down the colluvial sequence (column 4) in Trial Pit 013.

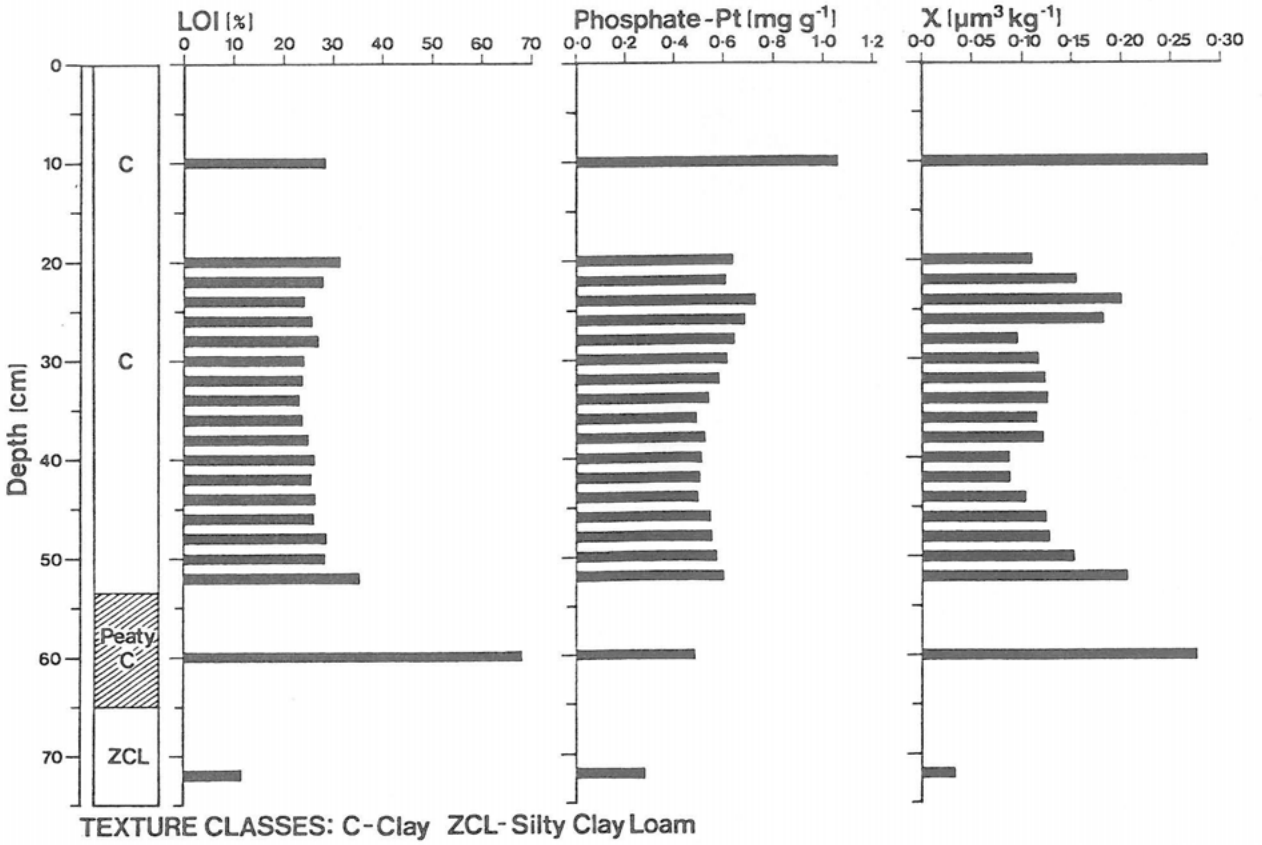


Fig 29. Variations in LOI, Phosphate-Pt and χ down the possible colluvial sequence (column 4) in Trial Pit 016.

Appendix 4.

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