The Dungarvan Valley Caves Project: First Interim Report

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Introduction

At present there is no convincing evidence for human activity in Ireland during the Palaeolithic, *i.e.* prior to the retreat of glacial ice in the northern hemisphere 10,000 BP (before the present). Whilst this may be explained by Ireland's position at the periphery of Palaeolithic Europe and the affects of intense glaciations that have regularly scoured the landscape during the course of the Pleistocene, the fact remains that Ireland shared largely the same climatic conditions that made human settlement possible in England and Wales, and Irish caves and bogs have also produced many of the same animal species exploited by these populations (Table 1; Woodman 1986; 1998; Woodman *et al.* 1997). Indeed ice sheets covered much of Wales with a similar frequency to Ireland yet the country contains Palaeolithic archaeology of considerable significance spanning a time-depth of a quarter of a million years. Perhaps an explanation for the absence of evidence for an Irish Palaeolithic lies instead in the lack of a tradition of field research in this area; the past fifty years have seen only one archaeological excavation of Pleistocene cave-deposits (at Killuragh, Co. Limerick) and there is little or no archaeological intervention, such as occurs in England, within the gravel and limestone extraction industries where such material would be expected to occur. It could be said therefore that evidence for a human presence in Palaeolithic Ireland awaits discovery.

A key geographical area in the search for an Irish Palaeolithic is the Dungarvan Valley (see below). In 2003 the Dungarvan Valley Caves Project was instituted by the authors and this paper provides a brief account of the first two years of its work, incorporating an overview of the valley's research potential and then focussing on the results of excavations that were conducted at two caves at Ballynamuck townland (Ó Drisceoil and Jennings 2004). The paper concludes with a strategy for future research.

The Dungarvan Valley

The Dungarvan Valley is a well-defined topographical unit formed by a low-lying band of Carboniferous limestone which runs east-west through south Waterford (Figures 1, 2; Plate 1). The sandstone Knockmealdown and Monavullagh mountains and the Drum Hills form the valley sides and draining it are three small rivers: the Colligan, Brickey and Finnisk, whose courses probably originated as meltwater channels at the end of the last glacial (Figure 3).

TABLE 1 **Table of Irish caves recorded as having produced faunal remains of Pleistocene age.**	
Edenvale, Co. Clare	Scharff *et al.* 1906
Castlepook, Co. Cork	Scharff *et al.* 1918
Foley Cave, Co. Cork	Gwynn *et al.* 1942
Killavullen, Co. Cork	Coleman 1947
Dunmore, Co. Kilkenny	Coleman 1965: 73-5
Killuragh Cave, Co. Limerick	O'Shaughnessy 1994
Red Cellar Cave, Co. Limerick	Leask 1938
Keshcorran, Co. Sligo	Scharff *et al.* 1903; Gwynn *et al.* 1940
Ballynameelagh 1, Co. Waterford	Adams *et al.* 1881: 180, Plate X
Ballynamintra 1, Co. Waterford	Ussher 1878-9; Ussher 1881a; Ussher 1881b; Ussher and Adams1879; Adams *et al.* 1881; Tratman et al. 1929
Kilgreany Cave, Co. Waterford	Adams *et al.* 1881, 180, Plate X; Tratman 1937, 1930; Tratman *et al* 1929; Mahr1937; Movius 1935; Movius1942; O Riordan 1931; Dowd 2002
Shandon 1, Co. Waterford	Adams et al. 1881; Brenan and Carte 1859; Adams 1876; Boulger 1876.

Caves can act as small, protected pockets for sediments within a landscape that was otherwise hugely destructive for materials of Pleistocence age. It is largely because of its caves and the materials found therein, that the Dungarvan Valley is of great significance for study of the Irish Ice Age. To date, twenty-eight caves have been identified by the authors here and of these faunal remains of late Pleistocene age have been recorded historically from four – Ballynameelagh, Ballynamintra, Kilgreany and Shandon (Adams *et al.* 1881; Woodman *et al.* 1997). The last three are major sites, which have produced the remains of Late Pleistocene animals in considerable quantities. Much of the reason for this concentration rests in the fact that the study area was situated south of the maximum advance of the last, Midlandian, ice sheet (the Last Glacial Maximum 25,000-14,000 years ago) and the caves of the valley were therefore not subjected to the scouring that occurred to the north. This has also resulted in the locale being one of only two areas in Ireland (the other is the Blackwater Valley) where caves have produced both pre-Last Glacial Maximum and Late Glacial fauna. Remarkably, given the great wealth of Pleistocene material from the valley, it is seventy years since its caves have been the subject of archaeological enquiry.

Summary Results, 2003-2005

Following a period of field survey, two caves located near Dungarvan were selected for test-excavation to determine if deposits of Pleistocene age survived within them (Ó Drisceoil and Jennings 2005). The sites were chosen chiefly due to their proximity to the famous Shandon cave and the fact they were both relatively well preserved, neither having been the subject of archaeological investigations in the past.

During April-May 2004 test cuttings were opened in Ballynamuck caves 1 and 2.[1] Funding was granted to the project by the Heritage Council and this allowed for innovative scientific techniques to be applied, many of which have been employed in an Irish context for the first time. These included (1) a full sedimentary appraisal of the excavated cave-deposits (Collcutt 2005), (2) a series of Optically Stimulated Luminescence (OSL) dates on the stratigraphic sequence (Schwenninger 2006), (3) an analysis of the sediments for pollen and phytoliths (Parker 2005), and (4) an examination of a microfaunal assemblage from the caves.[2]

Ballynamuck 1 – 'Badhbh's Hole'

At Ballynamuck 1, two cuttings were opened within a cavern that had been partially quarried in the nineteenth century (Figure 6). While today it is open to the air, the chamber was originally situated deep within a subterranean cave-system (Plate 2). A depth of 2.93m was achieved in Cutting 2 but it proved impossible to bottom it (Figure 7). The lower unit excavated was a series of laminated clays that formed underwater in what was probably a sheltered pond environment (Collcutt 2005).

1 Archaeological Excavation Licence Number 04E0573

2 A report on the microfauna had not been completed at the time of writing.

Increased plant activity outside the cave and a period of climatic amelioration and probably rapid sea-level rise led to a decrease in water-levels within it and the formation of the second unit, a clayey silt matrix with limestone roof-spalls that was subsequently subjected to bulk cementation. This produced an OSL estimate of 121,000 ± 9000 BP, i.e. probably OIS 5e, the last interglacial. A small quantity of microfauna was recovered from the unit. This in turn, was covered by a calcite floor which Cutting 1 demonstrated extended throughout most of the cavern.

Ballynamuck 2

The one cutting opened in Ballynamuck 2 was within a passage which had been truncated in the nineteenth century by quarrying (Figure 8; Plate 3). Two major sedimentary groups were noted in the 1.85m deep sondage (Figure 9; Plate 4; Collcutt 2005). The lower was a series of discrete and well-sorted clay, silt and sand laminations that rested on the limestone bedrock. These represent 'fluvio-glacial material, eventually emplaced in the cave at some point after glacial retreat' (Collcutt 2005). An abundance of grass phytoliths - durable pieces of silica that are produced in living plant cells - was found towards the base of the unit and a small quantity of microfauna was recovered (Parker 2005). The unit produced OSL estimates of 221,000 ± 16,000 BP (OIS 7 b/c) and 191,000 ± 17,000 BP (OIS 7a/ 6) (Figure 5). A diamict that had been emplaced by the mass movement of external sediments into the cave – a 'debris flow' - covered the lower unit. An OSL date of 155,000 ± 11,000 BP (OIS 6) was obtained from it, as was an assemblage of microfauna.

Discussion

Excavations and subsequent analyses at Ballynamuck 1 and 2 have demonstrated both caves would have made for wet and inhospitable places not suitable for human occupation during the time periods in question. This might explain why archaeological materials of Palaeolithic age were lacking. Nevertheless, the results to date are encouraging: the oldest dates from any caves in the Dungarvan Valley have been produced and the survival in both sites of sediments with associated palaeontological material encapsulating a sequence through the temperate climate of OIS 7, the penultimate glaciation (OIS 6 - the 'Munsterian') and the last inter-glacial (OIS 5e), is a fortuitous discovery in an Irish context with important implications.

The detection of stratigraphy that predates the Munsterian glaciation (OIS 6) from Ballynamuck 2 provides evidence that, contrary to what is commonly held, cave-sediments of this age can survive the effects of glacial scouring brought about by an ice-sheet covering the cave (Mitchell and Ryan 2001: 79). By implication this increases the prospects for the recovery of Palaeolithic archaeology for it has been the potential for an Upper Palaeolithic (40,000-10,000 BP) that has dominated discussions thus far on the topic.

It is also of note that the lower unit at Ballynamuck 2 corresponds closely in age (221,000 ± 16,000 BP) with the Early Neanderthal archaeology (250,000-225,000 BP) found at Pontnewydd cave, North Wales (Green 1984). This, the most north-westerly Lower Palaeolithic site in the world situated far beyond the previously recognised distribution of such sites in Britain has since its discovery buttressed to a certain extent, the contention that a Lower Palaeolithic could survive in Ireland (Woodman 1986; 1998). The difficulty was however, that unequivocal evidence for OIS 7 deposits had not been identified in Ireland (Coxon and Waldren 1995). The sediments of this age from Ballynamuck 2 can be said therefore to further sustain the argument that this remains a genuine possibility though it should be borne in mind that during the interglacial of OIS 7 human populations in Britain were quite sparse (Wymer 1999: i, 190).

The palaeontological material recovered from the caves is also important. The microfauna from sediments of OIS 5e (last interglacial) and OIS 7 age from Ballynamuck caves 1 and 2 respectively, represent the first such discoveries in Ireland though because they were within deposits 'emplaced by rapid transport systems, any palaeontological finds may be mixed and must be secondary to (older and perhaps very significantly older than) the actual emplacement episodes' (Stuart and Van Wijngaarden-Bakker 1985; Collcutt 2005). Whatever the actual date of the fauna, the caves are only the fifth and sixth sites in Ireland to have produced bones of pre Last Glacial Maximum date. Likewise, the recovery of phytoliths from the OIS 7 deposits in Ballynamuck 2 provide important palaeoenvironmental evidence.

Future Prospects

The primary aim of the first two years of the Dungarvan Valley Caves Project was to identify new caves in the valley with integral deposits of Pleistocene age. While this has been achieved at both Ballynamuck 1 and 2, there is a limit to what can be gained archaeologically, from expanding the existing cuttings given the waterlaid nature of their sedimentation. It is nevertheless intended that additional analyses of the Ballynamuck excavations will be carried out to refine the chronology and nature of the materials recorded thus far. The geochronological evidence provided by the cave deposits can be utilised to establish a link with the glacial stratigraphy of the surrounding area, whose history is not well understood at present (Quinn and Warren 1989).

More field studies of cave sediments in the Dungarvan Valley are needed to assist with predicting the likely locations and nature of Pleistocene deposits within the valley. In particular primary deposits closer to original cave entrances and speleothems which help keep older sequences in place, will be sought out for their higher archaeological potential. To this end, a number of previously unexamined caves will be assessed and investigations are proposed too at Ballynamintra cave where significant Pleistocene faunal remains were recovered in the late nineteenth and early twentieth centuries (Adams *et al.* 1881; Ussher 1881a; Ussher 1881b; Tratman *et al.* 1929). Ballynamintra was thought to have been emptied of

sediments during the course of these excavations but the site does in fact still contain a substantial volume of sediment, the interpretation of which could benefit greatly from the application of modern scientific techniques of the kinds applied in Ballynamuck 1 and 2. Ballynamintra is also situated higher above sea-level (*c.*20m) than the Ballynamuck caves (*c.*7m) and within a relatively isolated ridge of limestone, 'probably long divorced from any wider subterranean drainage system; without sufficient catchment, flushing could not occur' (Collcutt 2005).

Conclusion

The purpose of this paper was to provide a synopsis of the first two years work of the Dungarvan Valley Caves Project. Results to date have been promising and indicate the potential that exists in the valley for future discoveries that can contribute much to questions around the absence of an Irish Palaeolithic. Further interim reports in this journal will report on new developments and full publication will follow in due course.

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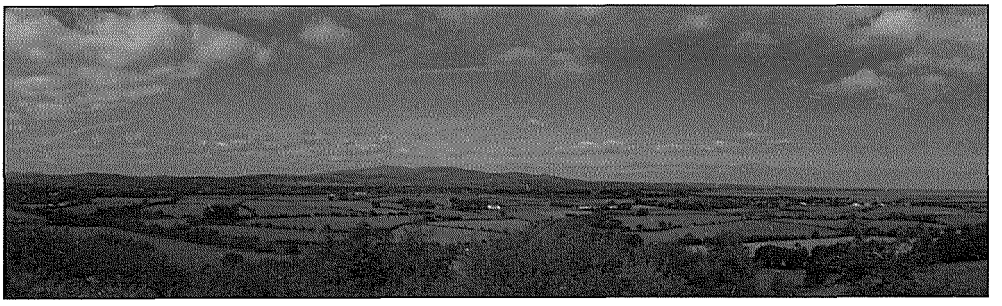

Plate1: Panorama of the Dungarvan Valley taken from the Drum Hills (south) showing the valley with the Monavullagh Mountains in the background.

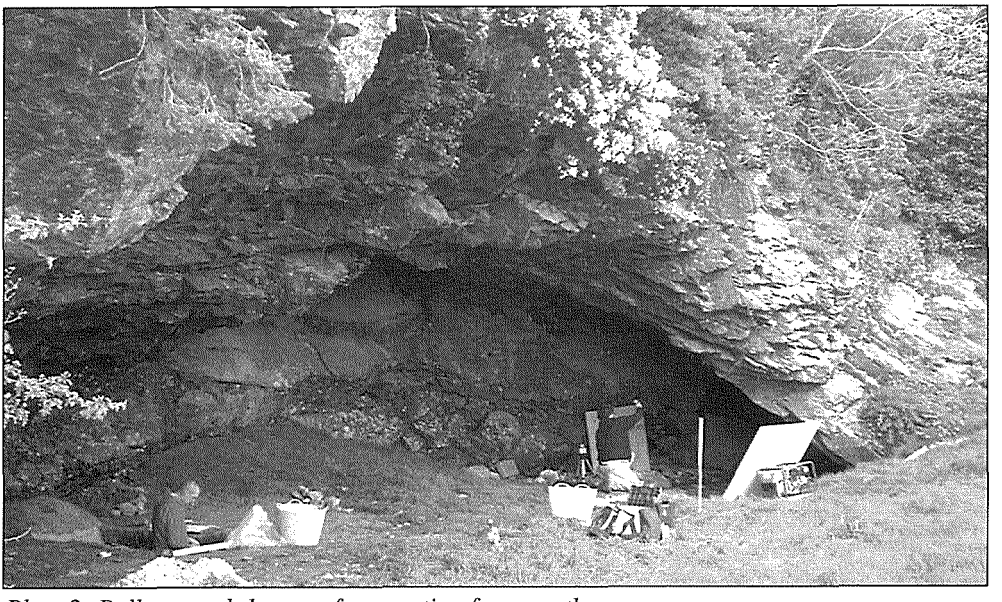

Plate 2: Ballynamuck 1 area of excavation from north.

Plate 3: Entrance to Ballynamuck 2, from north.

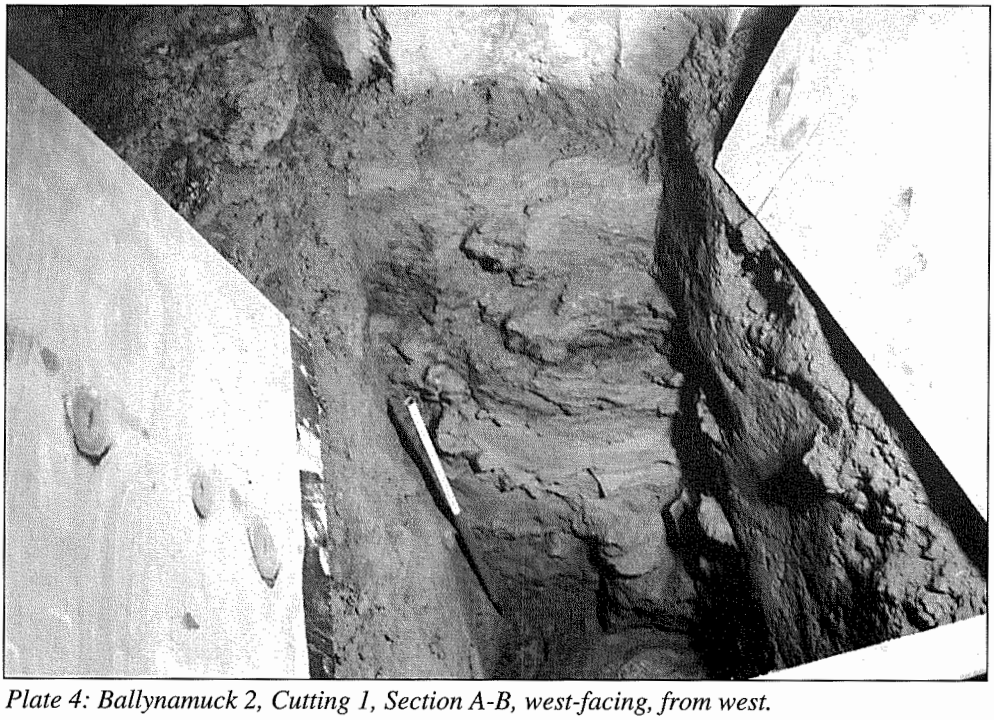

Plate 4: Ballynamuck 2, Cutting 1, Section A-B, west-facing, from west.

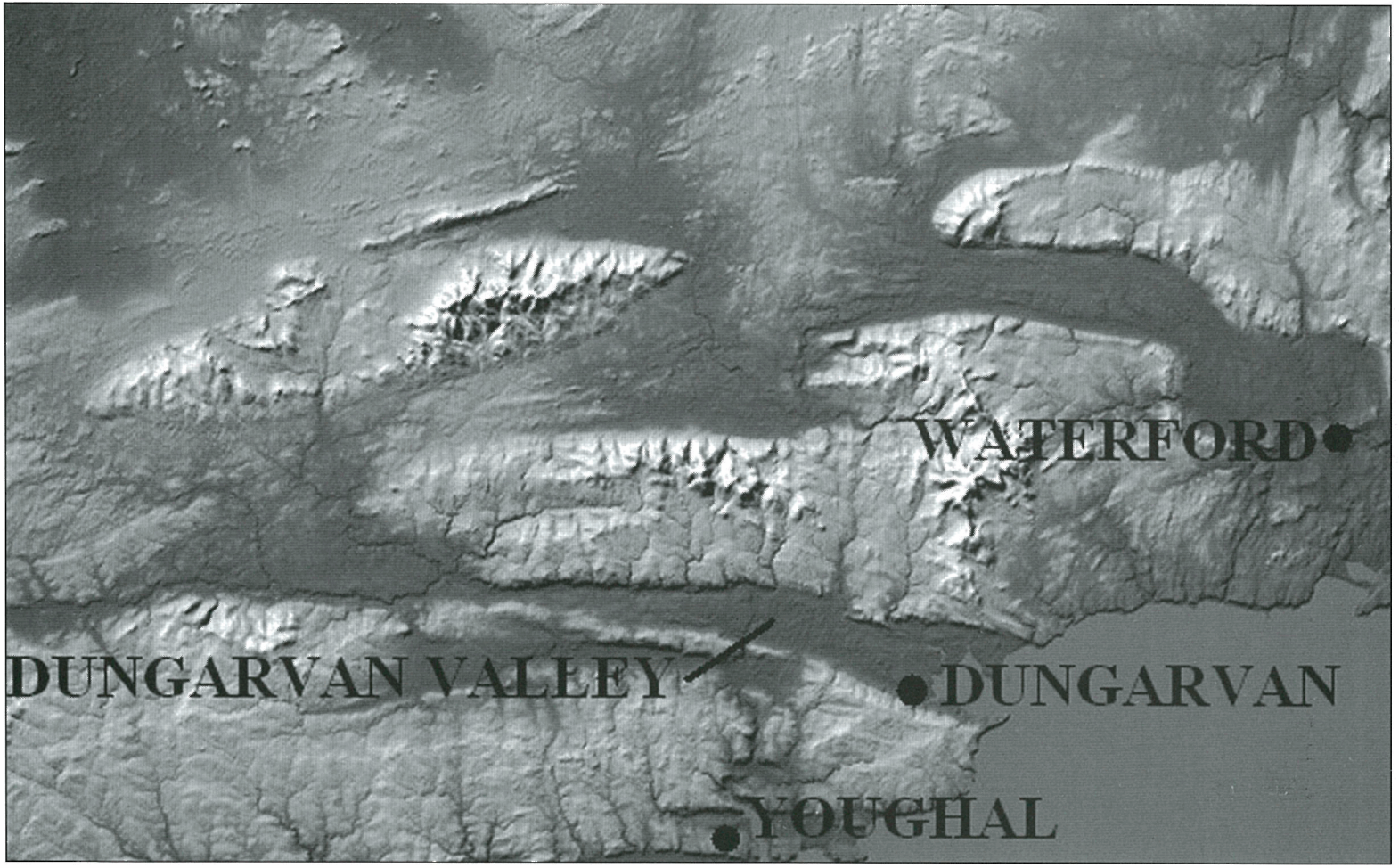

Figure1: Location of the Dungarvan Valley marked on Topographical Map of South-East Ireland.

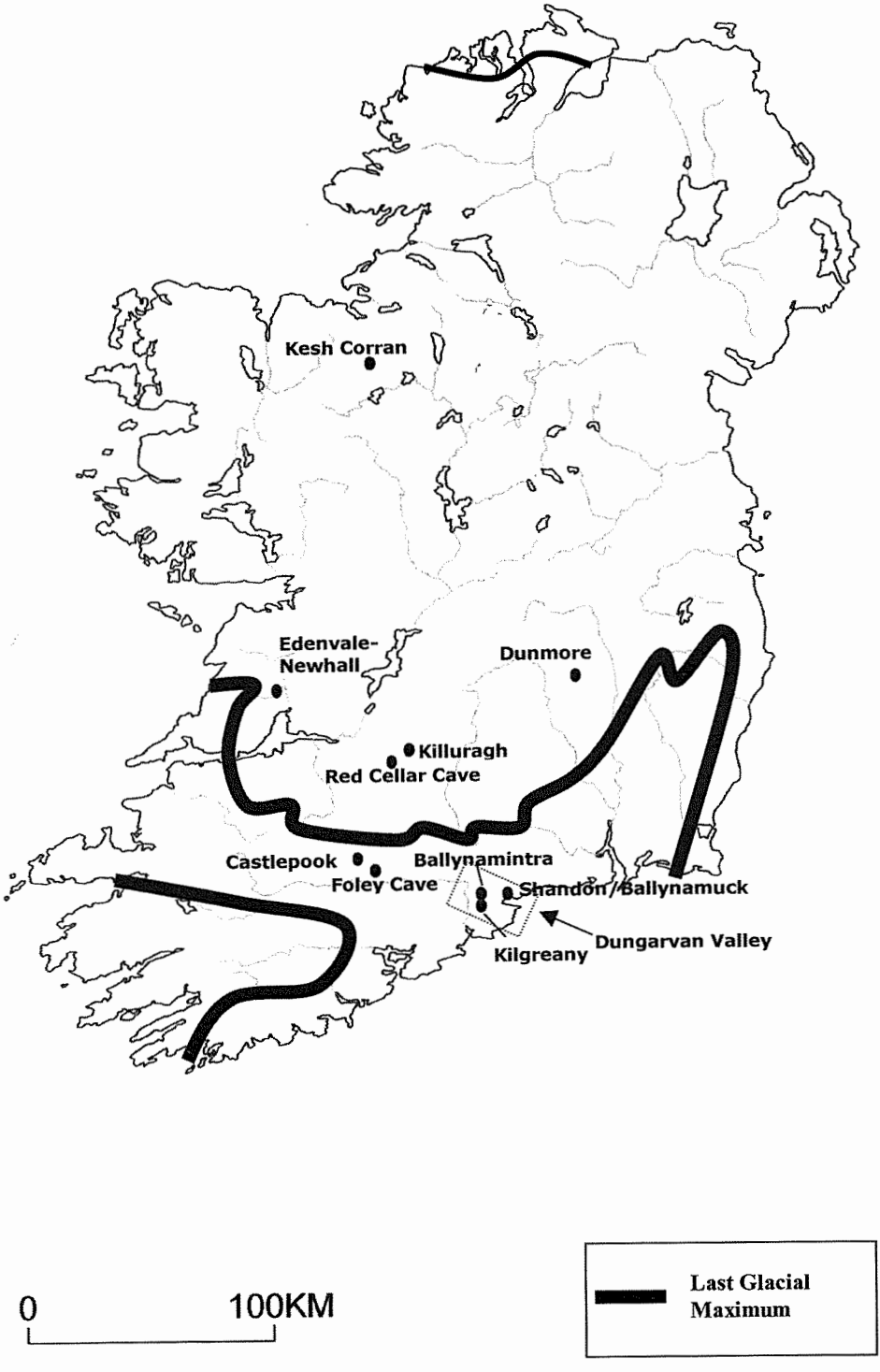

Figure 2: Map of Ireland showing late Pleistocene cave-sites and the suggested limits of ice-cover at the Last Glacial Maximum (25,000-14,000 BP) (after Bowen et al. 2002; Woodman et al. 1997).

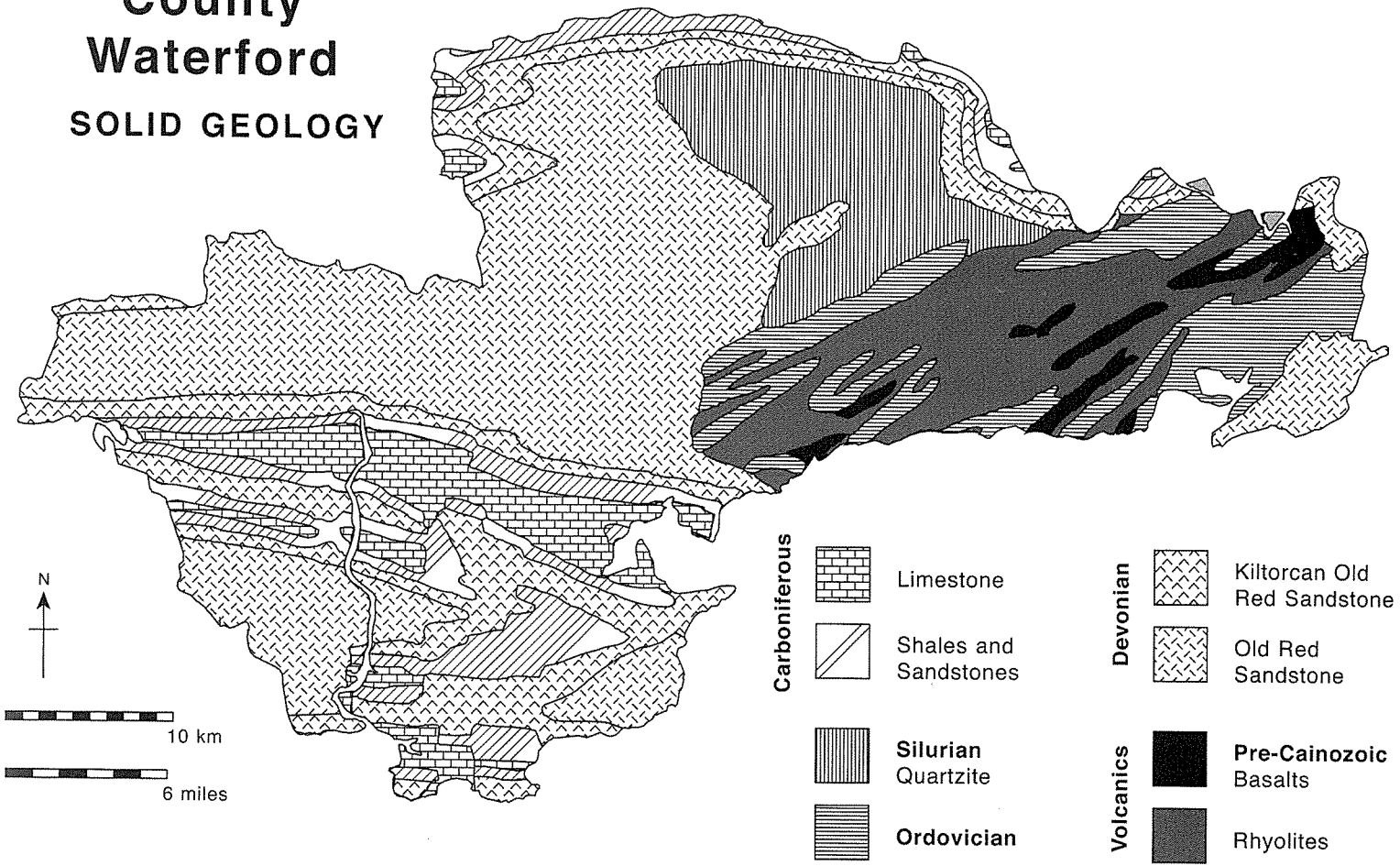

Figure 3: County Waterford Bedrock Geology (Moore 1999: 291).

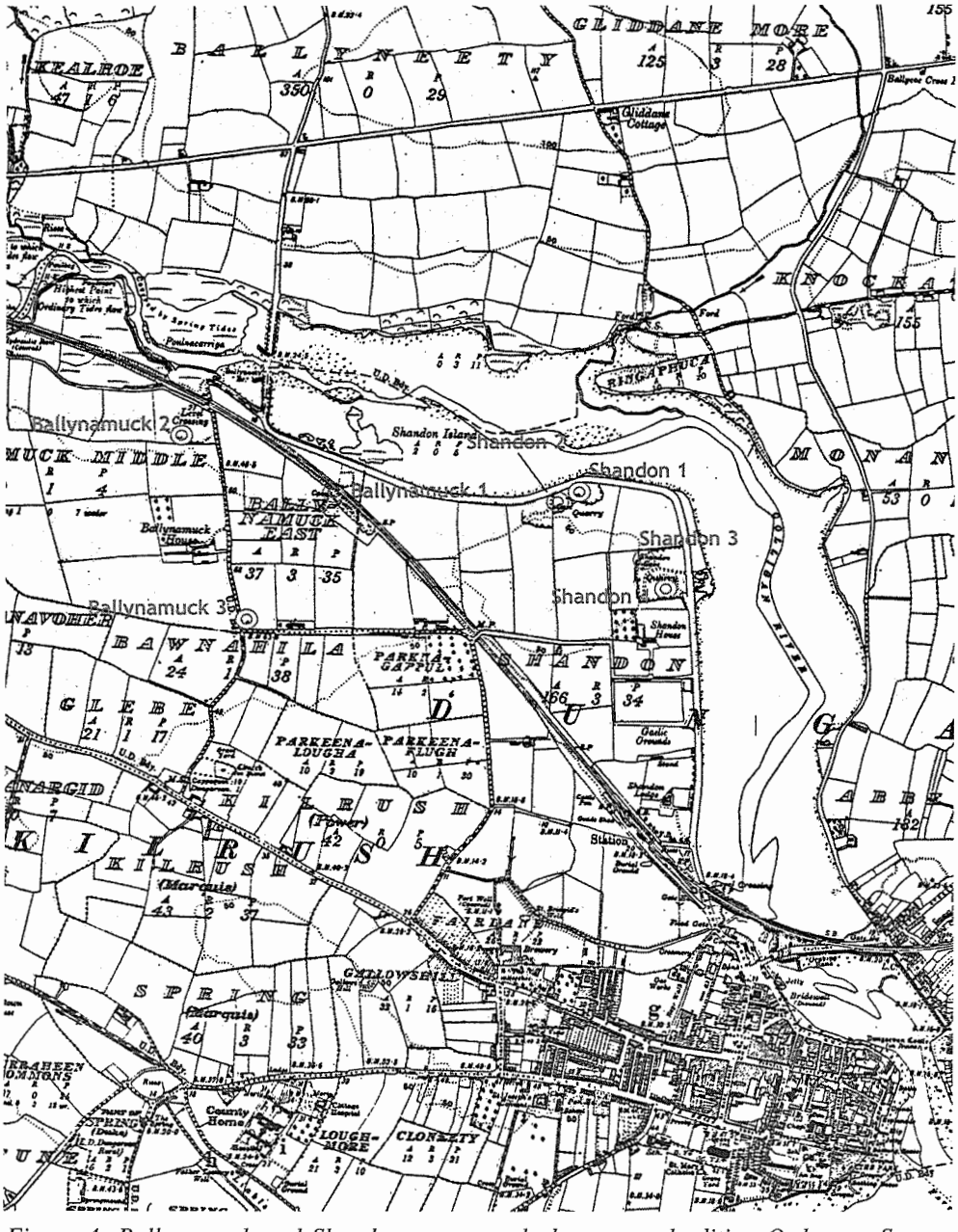

Figure 4: Ballynamuck and Shandon caves marked on second edition Ordnance Survey map.

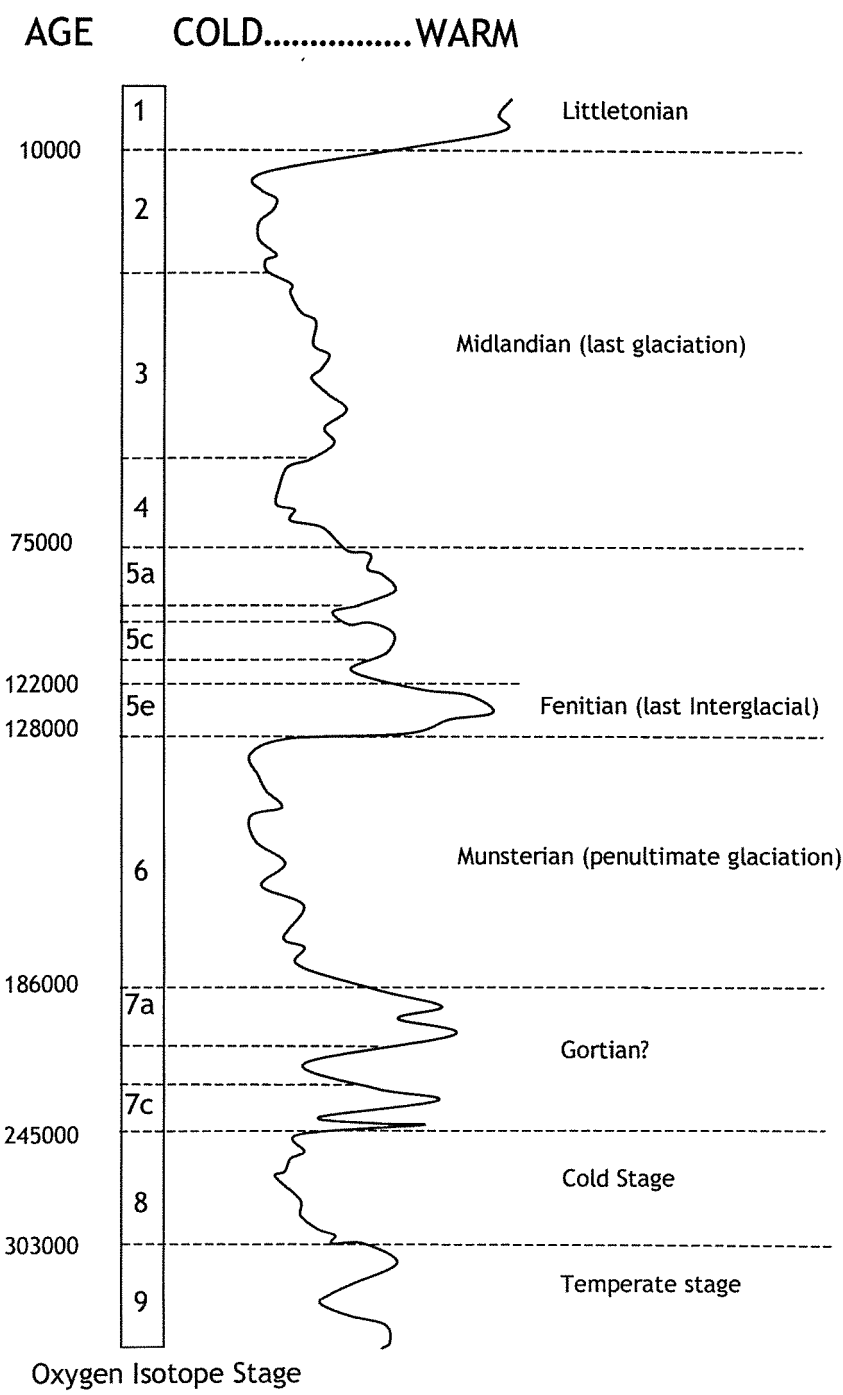

Figure 5: Chart showing the history of a changing climate (Ninkovich and Shackelton 1975). Deep deposits of planktonic fossils have accumulated on the seabed over hundreds of thousands of years. The ratio of two oxygen isotopes at the time of the formation of their shells can be measured. This ratio is an indicator of past volumes of world ice and therefore, of warm and cold events. These are called Oxygen Isotope Stages.

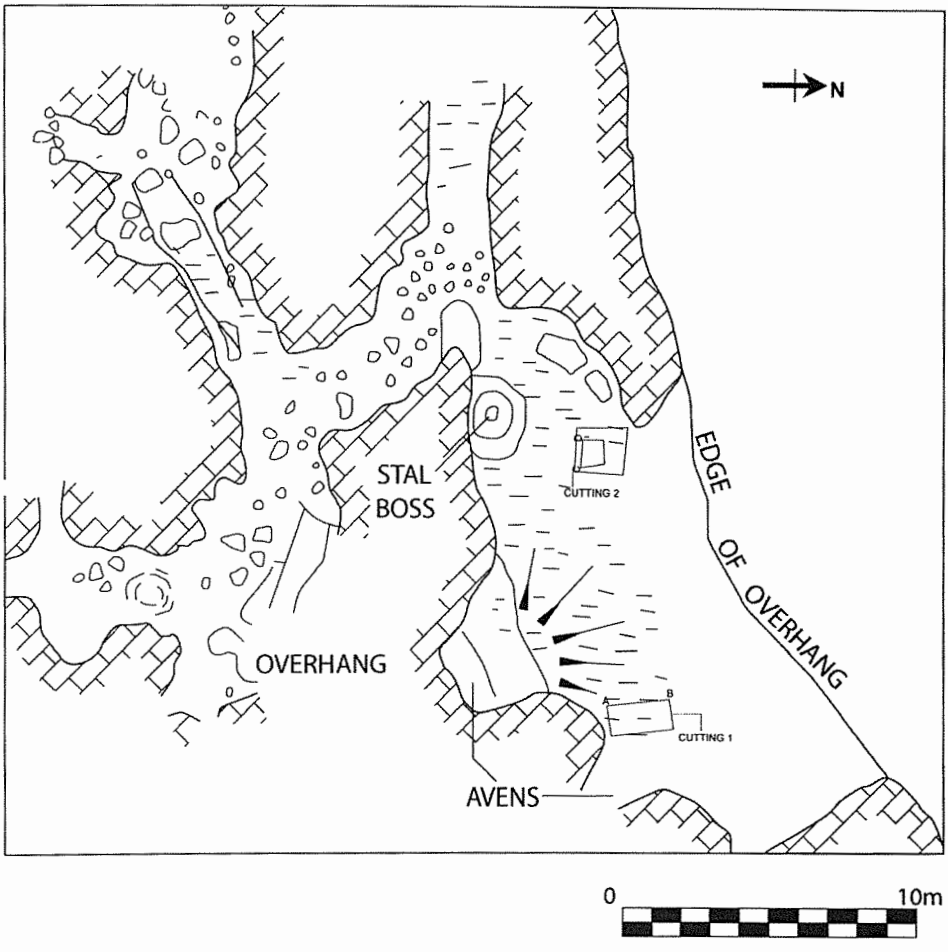

Figure 6: Ground plan of Ballynamuck 1 showing position of Cuttings 1 and 2 (after Ryder 1989).

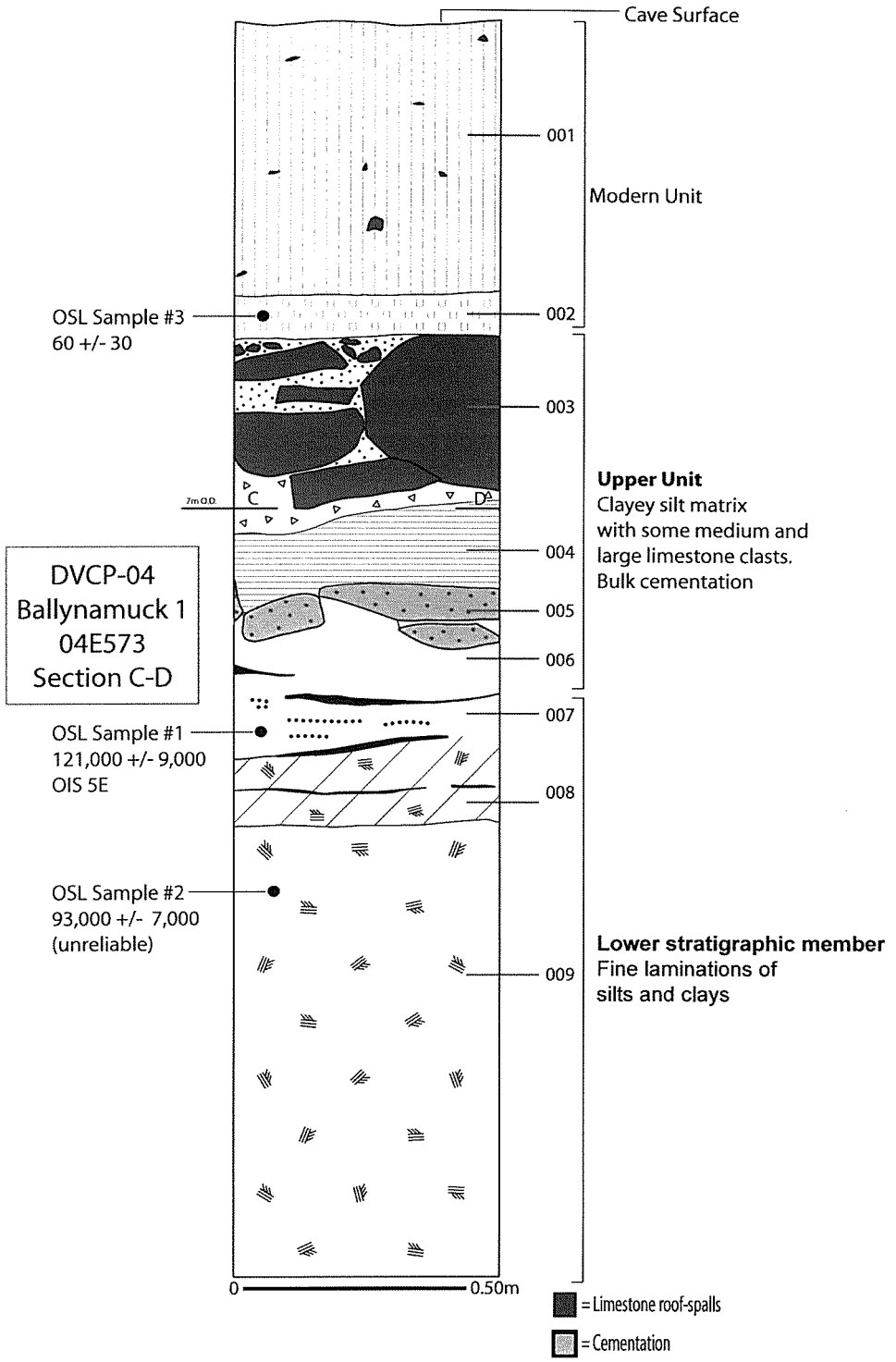

Figure 7: Ballynamuck 1, Section C-D, north-facing.

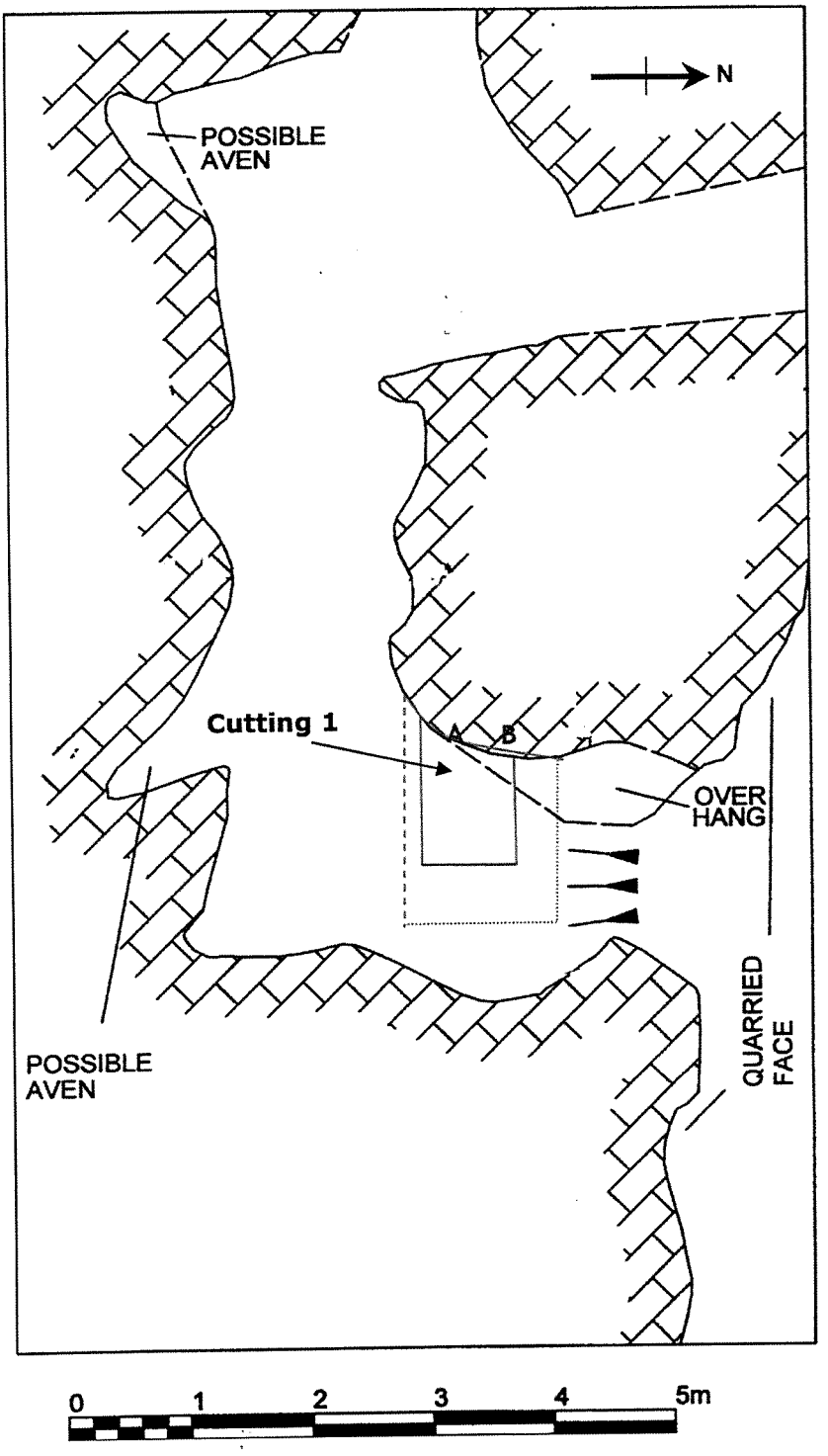

Figure 8: Ground plan of Ballynamuck 2 showing position of Cutting 1.

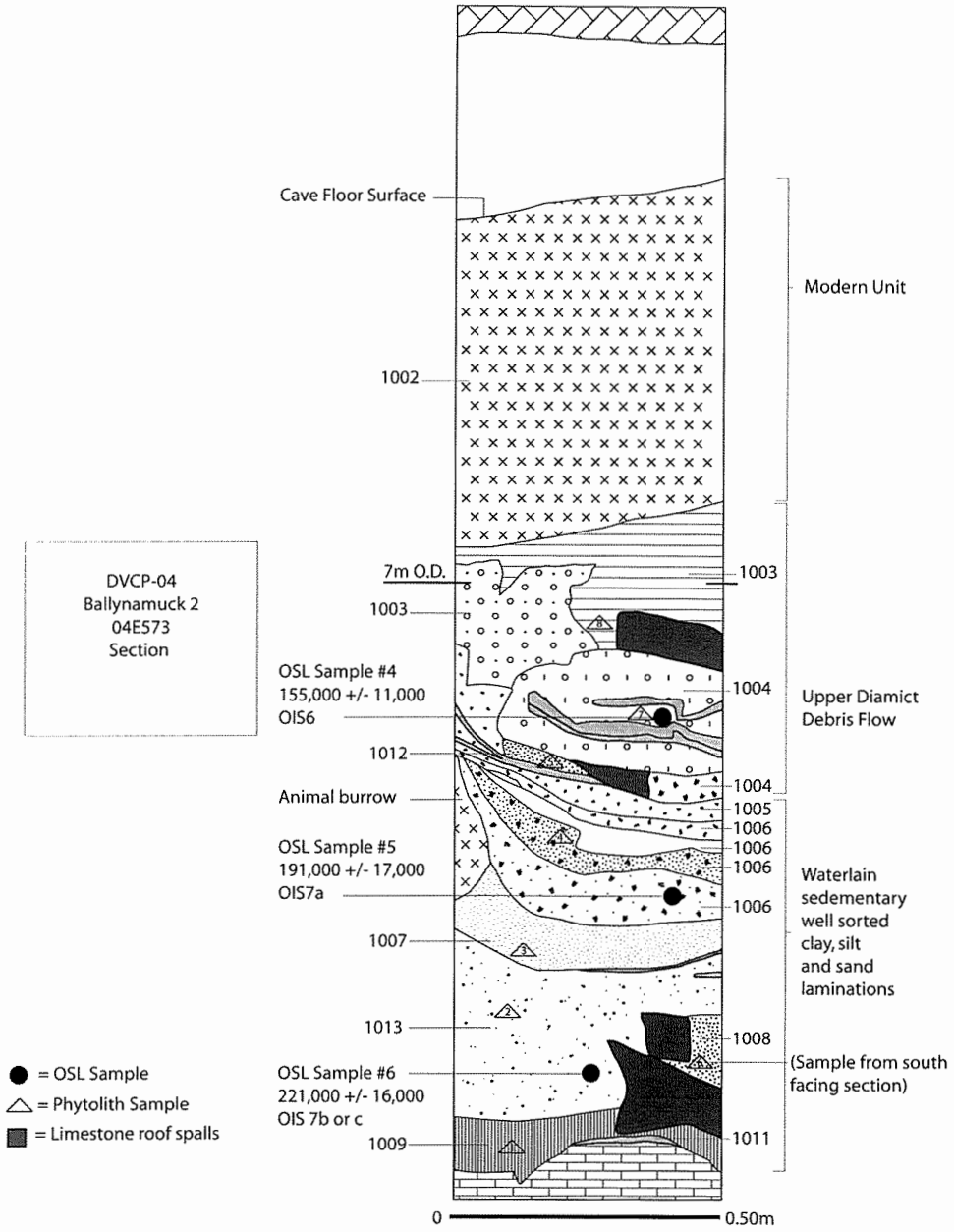

Figure 9: Ballynamuck 2, Section A-B, west-facing.

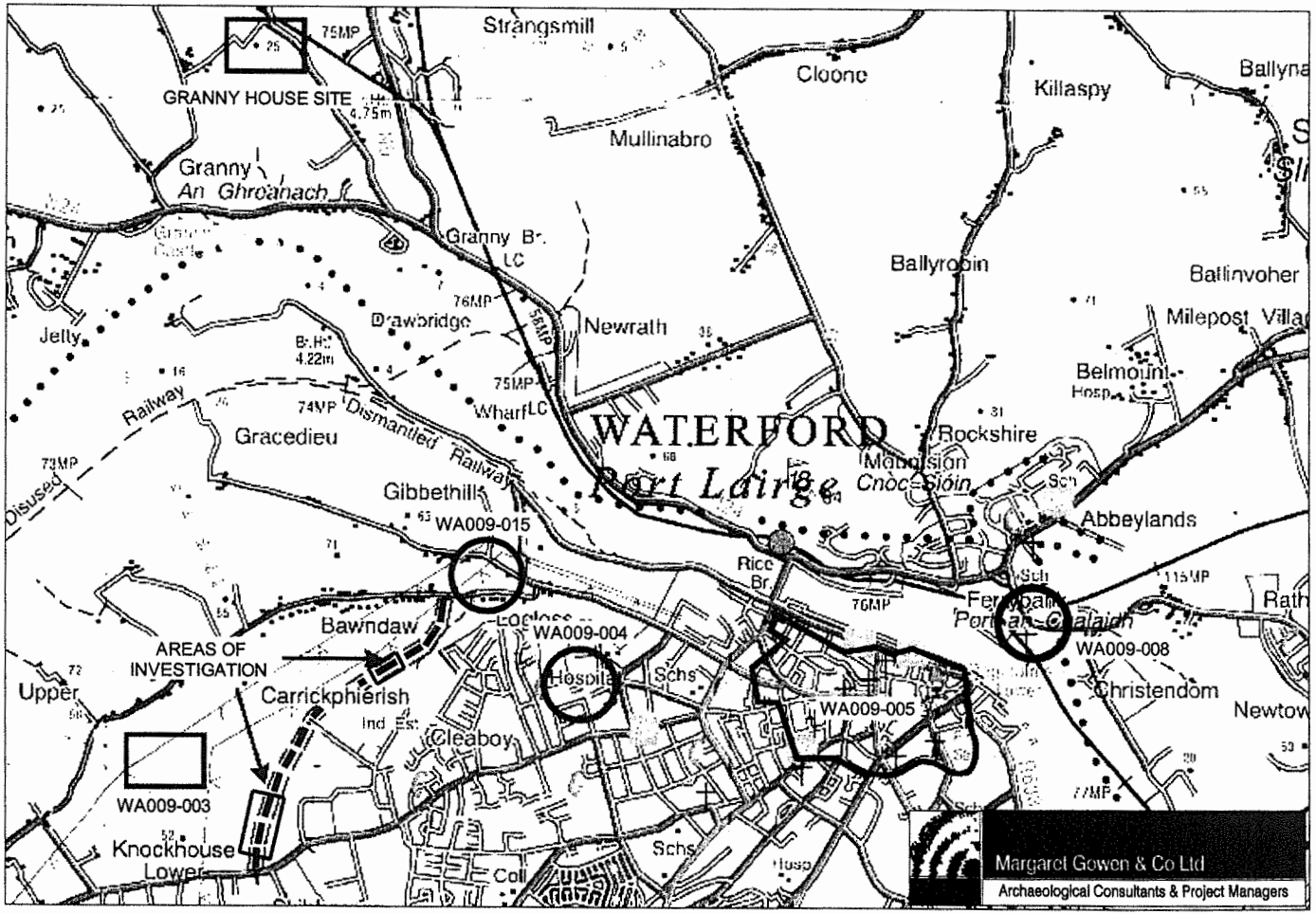

Figure 1: Location of proposed road showing areas of archaeological investigation.