Prehistoric Monumentality

in the Kilmartin Glen, Mid Argyll

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Thesis submitted in accordance with the requirements for

the degree of Master of Letters

in the Faculty of Arts of the University of Glasgow

September 2000

ABSTRACT

The main objective of this thesis was to ascertain if the Kilmartin Glen had been a landscape devoted exclusively to prehistoric burial and ceremonial monuments, as evidence relating to associated settlement appeared to be absent. Previous to this study, work that tested the pattern of prehistoric archaeological deposition in the Glen had never been conducted and the abundance of monuments had led to it being termed a 'ritual landscape'. An intensive, localised study specifically aimed at discovering archaeological evidence other than upstanding monumentality was conducted. After a desk assessment of the archaeological resource, fieldwork was conducted in the vicinity of some of the densest concentrations of prehistoric monumentality in the Glen that involved fieldwalking, geophysical surveying and trial excavations. A landscape was revealed that had been systematically reorganised, especially during a programme of 19th C agricultural improvements. Even so, it was evident from the results that ephemeral traces of ancient activity could be recognised and the upstanding remains were previously far more extensive.

A number of prehistoric sites including, lithic scatters indicative of possible settlement, a burnt mound, a decorated cist cover and rock art, were discovered during this study. This material was more indicative of Neolithic activity and material suggestive of Bronze Age settlement was not encountered, but reuse of Neolithic sites in the Bronze Age appears to be far more extensive than previously recognised. Although this evidence indicates that the Kilmartin Glen had not been a landscape devoted exclusively to prehistoric burial and ritual, a dichotomy between areas where the dead and the living resided, might have been maintained. The term ritual landscape is not helpful for interpretation of such groups of sites, neither is it useful to try and differentiate between sites associated with ritual and sites associated with other activities. More helpful is the recognition that the sites in the Kilmartin Glen relating to the period covered in this study appear to fit a particular pattern of ordering in their location and relationship with the known sites and the topography. Being aware of such localised patterns is important for future strategies of investigation, preservation and interpretation.

ACKNOWLEDGEMENTS

Without the help of a number of individuals and organisations this thesis would not have been possible. In particular, I would like to thank the following organisations for their assistance and support: Historic Scotland, West of Scotland Archaeology Service, Kilmartin Glen Project and Kilmartin House Trust. In a supervisory role I would like to thank John Barrett who got the project off the ground in the first place, and has a lot to answer for by encouraging my interest in these sites. After John moved to Sheffield, Alex Morrison took over and generously shared his knowledge of Scottish archaeology, and life in general. Although now retired, his invaluable contribution to this project is still ongoing. Ewan Campbell then took over and managed to get me to temporarily call a halt on my pursuit for a better understanding of these sites in the field and put some of my findings into this thesis. His supervision of the final text is gratefully acknowledged.

Fieldwork was extensive and is still ongoing. Too many individuals to mention were bullied bribed, blackmailed and even volunteered in this task. Some were only out for the day and some are still with me, but all are appreciated. They include Glasgow University archaeology students, members of the Natural History and Antiquarian Society of Mid Argyll, friends, relatives, and of course the hardcore who are due a special debt of thanks. Paul Johnston for his guidance and assistance in all aspects of the geophysical work and his support and encouragement throughout this project. Both him and Eland Stuart have helped me with much of the fieldwork as well as discussion and interpretation. Chris Barrowman, Rae Harry and Bruce (Pigpen) Glendinning were invaluable regulars, and Doug Scott was Doug Scott. The glamour in the team was provided by Lorraine McEwan. She also provided guidance and assistance in all aspects of the illustration as well as being responsible for most of the drawing. Figures 1, 7 and 44 were created by editing information on a digimap of Mid Arygll created by Garry Thomsett and John Arthur (GUARD). Their help in this task is much appreciated.

Outside the Department my thanks are expressed to Michael Davies (Argyll and Bute Council's Library and Museum Service) for sharing his in depth knowledge on the history of the Poltalloch estate. To Anne Kahane MBE for sharing her remarkable knowledge about the archaeology of this area. To Robbie Gordon (previously Kilmartin Glen Project now Scottish Natural Heritage), his enthusiasim, diplomatic skills and knowledge of rural matters were a major contribution to this project. Lastly, none of this work would have been possible without the indispensable co-operation of the families whose ground this work was conducted on: the Brechins, the Dixons and the Malcolms. As well as access, they provided equipment and hospitality; but best of all, stopped me from occasionally wandering off with the field fairies.

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CHAPTER 1 Introduction To Kilmartin Glen

1.1 Archaeological Background

The Kilmartin Glen is an important part of the natural and cultural heritage of Scotland. It is a highly impressive dynamic landscape resulting from the interactions between geology, climate and at least 7000 years of human activity. The Glen contains one of the most important collections of archaeological monuments in Britain. Of particular interest are the earlier prehistoric monuments: chambered cairns, round cairns, cists, standing stones and rock carvings which constitute what has been termed a prehistoric ritual landscape. From later periods, there are also present a variety of Iron Age and Early Historic sites, the most important of which is Dunadd, the ancient capital of the Dalriadic Scots. There is also an important collection of Early Christian and Medieval inscribed stones as well as castles, tower houses and deserted farmsteads. Agricultural improvements, and a diverse collection of early industrial monuments, most notably the Crinan Canal, attest to later activity. The monuments are currently preserved under various management regimes. Some of the more outstanding monuments are in the care of the Secretary of State for Scotland, and are enclosed by fencing with public access.

Although there is an abundance of upstanding monuments that bear witness to the history of human occupation in the Kilmartin area, this represents only a fraction of the archaeological evidence. The history of this area is far more complex than the *visible* monuments suggest and includes the wider landscape and its uses through time. These wider activities have left less substantial archaeological traces but are no less important than those that resulted in monument building. Despite the archaeological importance of this area the monuments and landscape are under threat from erosion caused by both natural and human forces. These processes include human impact such as forestry, quarrying, farming practices, livestock movements, visitor and vehicular erosion, and the natural erosional processes such as damage from wild animals, trees, weather and water. It is the evidence of *wider activities* that are most under threat from the erosional processes outlined above.

An intensive localised study specifically aimed at discovering archaeological evidence other than upstanding monumentality has never been conducted in this area. The intention of this thesis is to start such a programme of investigation by assessing the nature and extent of less perceptible archaeological evidence in the vicinity of some of the densest concentrations of prehistoric monumentality in the area. Once a more accurate picture of the nature of prehistoric deposition

and activity has been ascertained models to suggest reasons for their particular patterns can be suggested. This programme of investigation is ongoing, and the results included in this thesis are a sample of what was conducted between 1993 and 1995.

1.2 Geographical Location

Mid Argyll is located on the southwest edge of the Scottish Highlands (Figure 1). Part of the mainland, it is bounded by the Kintyre peninsula to the south, the Atlantic Ocean and Inner Hebrides with the Sound of Jura and Firth of Lorne to the west, and, to the east, the long narrow inlet from the sea that forms Loch Fyne. Although mainly mountainous and remote there is an abundance of long narrow glens, many occupied by deep fresh water and a long coast line due to the number of coastal peninsulas and sea lochs penetrating far inland. Such geography presents a variety of exploitable environments with ease of movement by the sea in what would normally be considered a mountainous, difficult and inaccessible landscape.

The Kilmartin Glen is located in the heart of Mid Argyll and forms the core of an extensive archaeological landscape. The Glen opens out on its southwest to a large coastal plain where the Kilmarin Burn meets the River Add flowing from the adjacent Kilmichael Glen. Low hills with passes provide access through to Loch Fyne, these now being occupied by roads and the Crinan Canal. It is the geographical location of this flat and open isthmus and its proximity to a more workable landscape with a variety of exploitable environments that has led to it being continuously occupied by people for at least 7000 years.

The isthmus that separates the sound of Jura and Loch Fyne is only seven kilometers wide between the inlets of Loch Crinan and Lochgilphead. This isthmus forms a crossroads of natural paths and waterways through generally mountainous and inaccessible countryside. These route-ways allow easy movement between Mid Argyll to Central, and Southwest Scotland via Loch Fyne and the Clyde Firth; to the Central Highlands via Loch Awe; to the Southern Highlands via Loch Fyne; and to the Hebrides, Ireland and Atlantic Europe via the west coast.

The importance and usage of these route-ways, particularly the waterways, was obviously far more essential before the advent of modern communication networks. The extensive archaeological remains in the area are testimony to the occupation and use of this landscape and its adjacent waterways, particularly by populations that were mobile or had wide ranging contact with other groups. Examples can be given from a number of periods. There are numerous archaeological

sites dating from the Mesolithic period on the coastline of Mid Argyll and the islands of the Inner Hebrides (Mellars 1987, Mercer 1980, Morrison & Bonsall 1989). The distribution of prehistoric rock art along the Atlantic fringe of Western Europe with Mid Argyll being one of the areas of its greatest concentration is well attested (Bradley 1997). The concentration of Neolithic chambered tombs around these inner waterways has also been a focus of study (Henshal 1972). Kilmartin has several examples of Clyde cairns as well as Neolithic artifacts made from Arran pitchstone and Antrim flint. The adoption of Beaker fashions during the Bronze Age suggests a combination of diffusion of ideas as well as contacts with trade networks. The evidence for production and exchange during the Iron Age and early historic periods is testified to by the finds from duns (RCAHMS 1988). The contact with and eventual occupation of Argyll by the Scots from Ulster in about A.D.500 heralds a period of far greater communication with Ireland. This greater communication may have set the scene for the voyages of St. Columba and the movement of Christianity into Argyll and its islands (Campbell 1999). The occupation and movements of the Vikings around the Atlantic seaboard and the later actions of the Lords of the Isles provide excellent evidence on the ease of movement within such an area by boat, including regular portage across isthmuses. The cattle trade and drove routes, which constituted the main economy of the Highlands, and islands until the early twentieth century had one of its main meeting points and trysts at Kilmichael (Haldane 1997). The fishing industry in the area is still important today with boats ranging from the inland lochs to all over the Atlantic seaboard.

The construction of the Crinan Canal at the turn of the nineteenth century across this isthmus is testimony to its importance in communication. The canal was designed to allow passage between the Clyde and the northwest of Scotland without rounding the treacherous Mull of Kintyre. At the time of construction this was particularly important for the Clyde fishing fleets as well as enhancing trade and greater communication between the two areas.

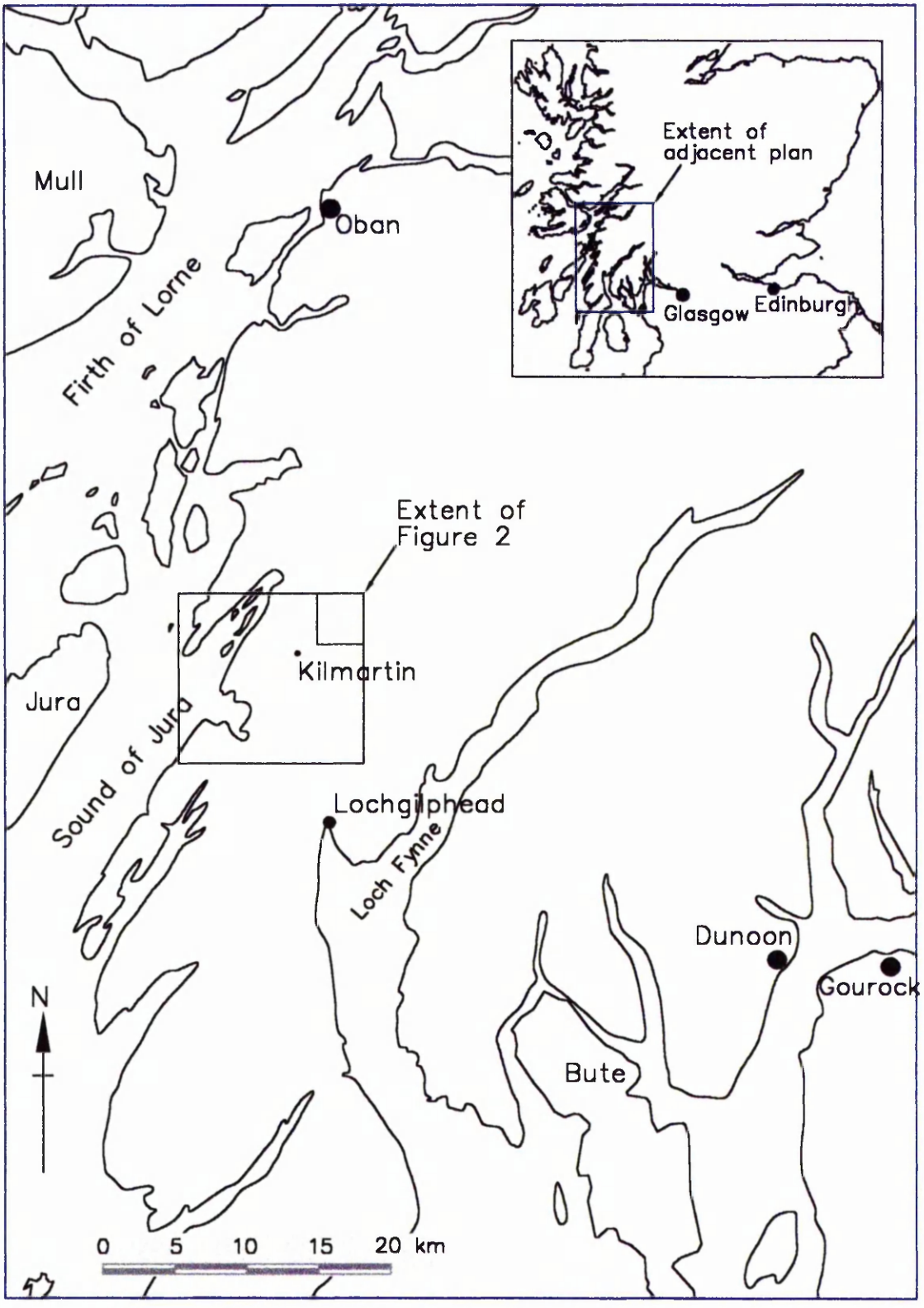


Figure 1 : Location of Mid Argyll and Kilmartin

1.3 Geology and Topography

The rocks of Mid Argyll are a variety of sandstones, shales and limestones metamorphosed into quartzites, schists, phyllites and marbles belonging to the Dalriadian Assemblage. In the Loch Awe and Knapdale areas, contemporary intrusions of basic igneous rock are prolific. Differential erosion of the sedimentary and igneous rocks, particularly accentuated by glaciation, create the characteristic scenery of the district with long narrow steep sided valleys following the northeast to southwest Caledonian trend. During the Quaternary the area was heavily glaciated with ice sheets flowing southwest from Rannoch Moor. After the retreat of glaciers the land rose relative to the sea, leaving raised beaches above the current shorelines. In the neighbouring glens of Kilmartin and Kilmichael there are extensive suites of Late Devensian fluvioglacial terraces and raised beaches (Craig & Sutherland 1971). The upper suites of fluvioglacial terraces are interpreted as being formed during the late Devensian in response to falling sea levels at between 35-36 m OD and 10-12 m OD. The lower terraces were formed by the Kilmartin Burn by later down cutting and reworking of the valley fill as sea levels fell further. This event is considered to be of Loch Lomond Stadial age, formed when ice re-advanced as far as the southern part of Loch Awe with the terraces graded to a sea level below 9-10m OD (Gray & Sutherland 1977).

The characteristic topography of the Kilmartin Glen is also very much the result of meltwater flow from the glaciers. Meltwater flowed down Kilmichael Glen from Loch Awe and left alluvial deposits where the river Add now flows. Two kilometres north of Kilmartin village, meltwater escaped through Creagantairbh Pass into the Kilmartin Glen. Debris dumped from this flow contributed to the terraces on either side of the glen and formed an alluvial plain over the former marine embayment of the Moine Mhor, which the Glen opens out onto.

The Moine Mhor is the largest sediment filled embayment of the West Highland coast. The highest point on the bog is only 13m OD and peat depths range from 0.1 m at the coast to at least five metres further inland (Haggart and Sutherland 1992). The bog is bordered by the Crinan Fault on its southwest, the Crinan estuary to the west and hills to the northeast. These reveal a complex history of relative sea level change for the area although the timing of the main postglacial transgression and the age of Lower Flandrian shore lines have not been fully determined. The altitude of the highest Flandrian marine limit should occur at about 11.0-11.5 m OD. Two lower shorelines appear to occur at 6.5m-7.5m OD and at 3-4m OD. It has been suggested that the 3-4 m OD shoreline was formed by about 3800 BP (Sutherland 1981).

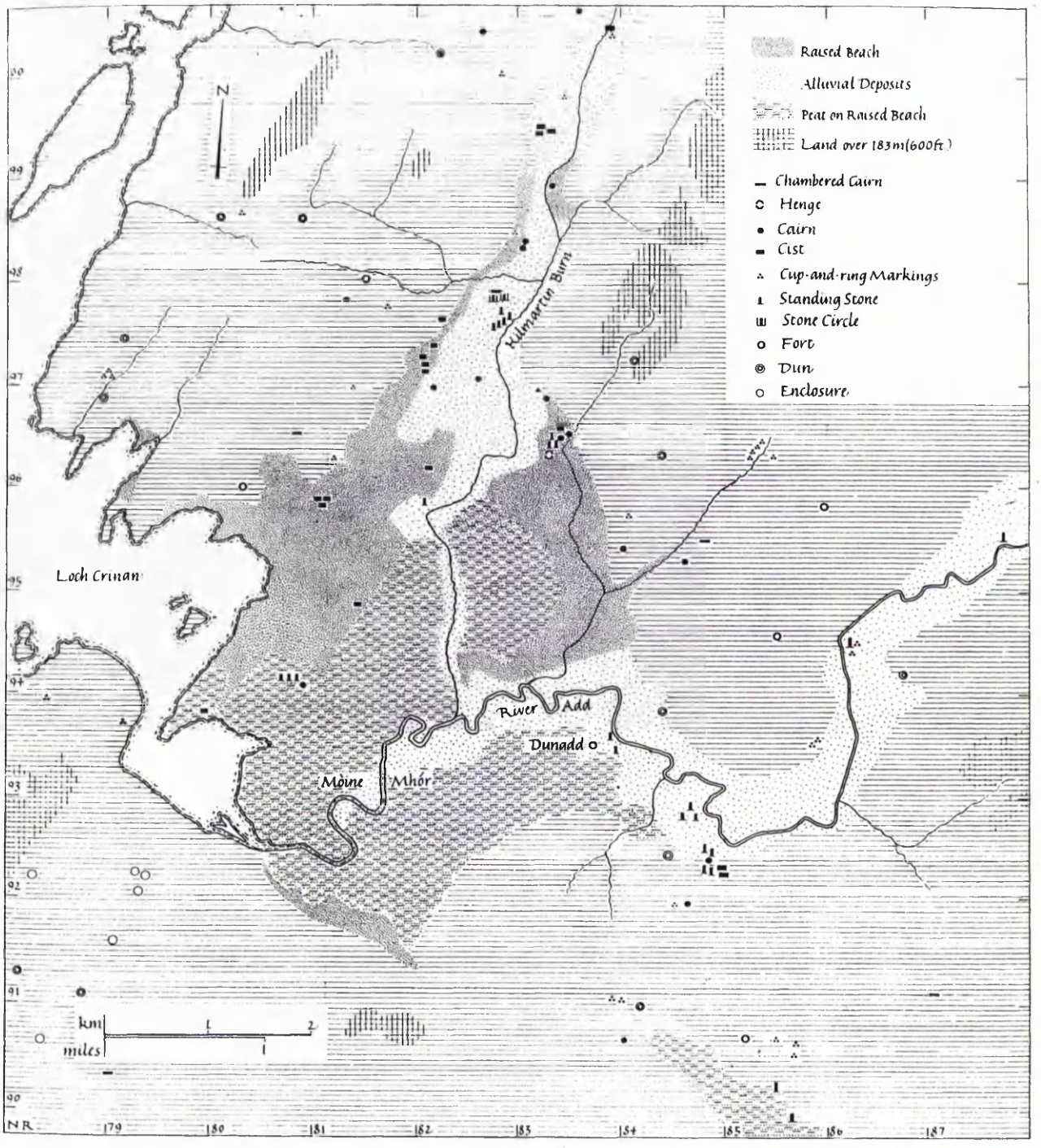


Figure 2: Kilmartin Glen Surface Geology with main monuments

The terraces appear to be flat but on closer inspection are undulating and cut by abundant fluvioglacial gullies, which can also be observed, on aerial photographs. Above the terraces and to the northeast and southwest of the glen topography is characterised by steep sided hills rising to an average of some 200 m. Within these ranges are numerous glens, lochs and waterways. Surface geology is therefore varied but the floor of the Glen and lower terraces comprise mainly marine clays, overlaid by gravels with a stony, clay top-soil rich in sands and gravels. Generally the soils are naturally acidic and some are very humic and peaty. On the hill slopes are thin clays while the bottom of the slopes are often characterised by deep deposits of fine silt from hill wash. Other than these silt deposits, topsoils through out the area are thin.

1.4 Climate and Vegetation

The West Coast of Scotland has a mild windy oceanic climate, with frequent gales and rainfall, particularly in autumn and winter. Exposure to wind and rain is prevalent on the western seaboard, although the Gulf Stream Drift contributes to a lower incidence of frost and milder temperatures than further inland. Average annual rainfall in Argyll varies from 1800 mm on the coast to 2400 mm in mountainous areas, which is generally a little wetter than much of the rest of the country (Soil Survey of Scotland 1982). Average temperatures are also related to altitude and latitude and decrease with both. Present day temperatures were reached at around 9600-9800 BP (Peacock et al. 1989; Peacock and Harkness 1990), although it is generally accepted that it was a couple of degrees warmer until an increase in precipitation and storminess around 4000 BP. This change coupled with human impact encouraged the reduction of forest cover and the formation of blanket peat.

Different agencies acted on the expansion of forests until they reached their greatest extent in Argyll during the fourth millennium BC. The dominant species in Mid Argyll at this time were oak and hazel (Bennet 1989). Current forest cover is mainly the result of human management and consists mostly of coniferous plantations that vary from small narrow shelterbelts to large-scale industrial operations covering thousands of acres. The extensive variety in some of the deciduous plantations is the result of eighteenth and nineteenth century planting (Hall 1986, 7) and more recent planting on the fringes of conifer plantations. Remnants of natural woodlands survive in unmanaged areas such as steep valley sides and coastal fringes. The natural dominant species tend to be oak and birch. It should be noted though that many of these areas were managed during the kelp and charcoal industries of the nineteenth century.

Until the middle of the nineteenth century, much of the glen was still covered by a thick blanket of peat. It was extracted and drained mainly as part of the scheme of agricultural improvement. In 1844 the Moine Mhor covered over 5000 acres (NSA 1844, p552), it now encompasses approximately 17.5 square kilometres (2000 acres) lying below the 15 m contour. It is evident that woodlands covered some of this low lying area before the formation of peat but unfortunately dates for this are as yet unavailable. During the draining of the Moine Mhor it was noted:

> "Large roots of trees, principally oak, alder, birch and hazel, are not infrequently found several feet beneath the surface. Below this mass of vegetable matter is found a bed of unusually fine gravel" (NSA 1844, 552).

Scott (1989, 55) suggests that the cairns forming the linear cemetery from the Glebe to Crinan Moss, a distance of 3 km, were intervisible, therefore there could have been no thick woodland on the floor of the glen during the 2nd millennium BC to restrict the view. In very general terms vegetation in other unmanaged areas tends to be wet or rough grasslands with areas of dense bracken and plants typical of bogs and thin-soiled hilltops. It should be noted that within this landscape there are many mini environments that represent a diverse range of flora.

The expanse of peatland is one of the most important raised mire sites in Britain today as few survive intact. The northern section is one of the largest examples in Britain that still retains its original domed surface. It is now a National Nature Reserve and currently under the management of Scottish Natural Heritage. One of the main points of interest is the southern section that contains an intact transition of plant communities from the central acid raised mire to the salt marsh by the coast. This is the only intact example of this transition in Britain and is now designated as a Site of Special Scientific Interest and a European Special Area of Conservation.

1.5 Past and Present Land Use

As well as being an area of outstanding natural beauty, with careful management and protection of the more important and fragile, natural and built heritage, Kilmartin Glen is also a modern working rural landscape. The main economies of the glen are farming, forestry and tourism. Most of the ground in the glen is under pasture with sheep or cattle. Arable farming is limited, as is the range of crops but cereals, grasses and root crops are usually represented, with silage the most abundant.

The surrounding hills provide rough grazing, steeper slopes overlooking the glen, and other uneconomical ground near roads is suitable for forestry.

The appearance of the layout and ground cover of the glen is very much the result of its reorganisation during the agricultural revolution in the eighteenth and nineteenth centuries when extensive 'improvements' were carried out to increase not only the amount of arable land but its productivity as well. The infield/outfield system of small tenant farmers was abolished in favour of new estate controlled systems where fewer tenants controlled larger areas of farmland. This resulted in huge changes in land use practice and systematically depopulated the glen as well. From 1831 the rural population fell consistently (TSA 1961, 234).

The improvements have probably had the greatest affect on the condition of the archaeological record in the glen. There are numerous references to the extent of the monuments prior to the improvements, for example:

> "The valley is studded with cairns, megaliths, inscribed stones, forts and other monuments of antiquity. The number of these is but a tithe of what existed two centuries ago: old men alive at the beginning of the last century spoke of more than a score of cairns and many standing stones being removed to make way for the plough" (Gillies 1909,147).

Throughout the improvements many monuments were removed, either because they were a convenient source of construction material, or they were simply in the way. Many monuments, particularly cists, were discovered during the ground disturbance of the improvements or by later ploughing of improved ground. Usually this disturbance led to their destruction as well as, presumably, much of the other buried archaeology throughout the glen. However there are a number of cases of the discovery of cists, where out of reverence for the dead, remains were left *in situ*.

In some parts of Scotland the improvements are well documented, such as in Assynt and Loch Tayside (Morrison, 1985) where pre- and post-improvement surveys of the estates were conducted. In the Kilmartin area the Malcolms of Poltalloch mainly instigated improvements as they bought out neighbouring estates (Dingwell & McGowan 1996, 5; Macinnes 1998). Despite the existence of the Poltalloch Papers and numerous literary references to improvements in the Kilmartin Glen, information on the pre-improvement landscape is fragmentary. Between 1798 and 1802 surveys of buildings on recently acquired lands were conducted (Council Archives) and it is well documented that of some of the Poltalloch Papers were lost in various fires, the most famous one being at Duntrune Castle 1929. Also worth noting though is Alfred Gawthorne-Hardy's comment that the

records of expenditure on the improvements were later burnt when it was discovered that an equivalent acreage of best Linconshire land could have been purchased for the money spent on the improvements (Michael Davies, pers comm).

Evidence for the elucidation of the organisation and development of the Scottish rural landscape before 1700 is very fragmentary, with the main sources of information being 'Roy's Map', the Military Survey of Scotland, (1747-1754) and the Old (OSA 1791-9) and New Statistical Accounts of Scotland (NSA 1845). Roy's Map illustrates that agriculture was concentrated in the northern and western areas of the Kilmartin Glen and outwith the Moine Mhor (Figure 3). The series of Enclosure Acts of 1661, 1685, 1695 and the Division of Commodities Act of 1695 suggest that this agricultural pattern is enclosed rig and furrow rather than runrig. Further evidence to this pattern of agriculture is suggested by in the County Agricultural Report (1798). The author mentions the instigation of improvements in Kilmartin but when referring to Kintraw, 5 km north of Kilmartin Glen the author states, "I was informed that runrig is still in use, and that no leases are granted except to some graziers" (Smith 1798, 25). Geophysical survey in Kilmartin Glen has encountered agricultural patterns and field systems from before the 'improvements' (Abernethy 1992; 1993; 1994; 1998). In some parts of the Glen these patterns are also visible from adjacent higher ground or on aerial photographs. This pattern of cultivation would have been practised alongside pastoral activities. The common form of improving the soil in the glen was "lime and the dung the cattle makes in winter" (OSA 1794, 259).

By the 1790s drainage and reclamation of the Moine Mhor for agriculture was under way with the setting up of small holdings in the area (OSA 1794, 234) and well established by the 1830s (NSA 1845, 567). George Langlands Map of 1802 illustrates, in somewhat symbolic form, Experiment Farm (now Barsloisnoch) and a grid representing the area of bog under improvement (Figure 4). Traces of this land reclamation can still be seen today. As well as drainage and peat removal in and around the glen other improvements included the canalisation of burns, the construction of roads, the reorganisation of ground enclosure, the planting of woodlands, new housing and the setting up of a number of small industries. The drainage programmes across large tracts of the floor of the glen resulted in an estate brick works being established in order to produce enough drainage tiles for this to be effective. Slockavullin became an industrial centre for the estate and also contained a smithy, coaching house and mill. A gas works was also constructed in the village to supply the New Poltalloch House that was completed in 1849. To the immediate west of Slockavullin a reservoir was established on the Raslie Burn to control the flow of water for industrial purposes. A canal to contain the burn was also constructed through the village and across the floor of the glen. The Kilmartin Burn was also canalled for much of its course through the glen in order to reclaim the ground where it had previously meandered.

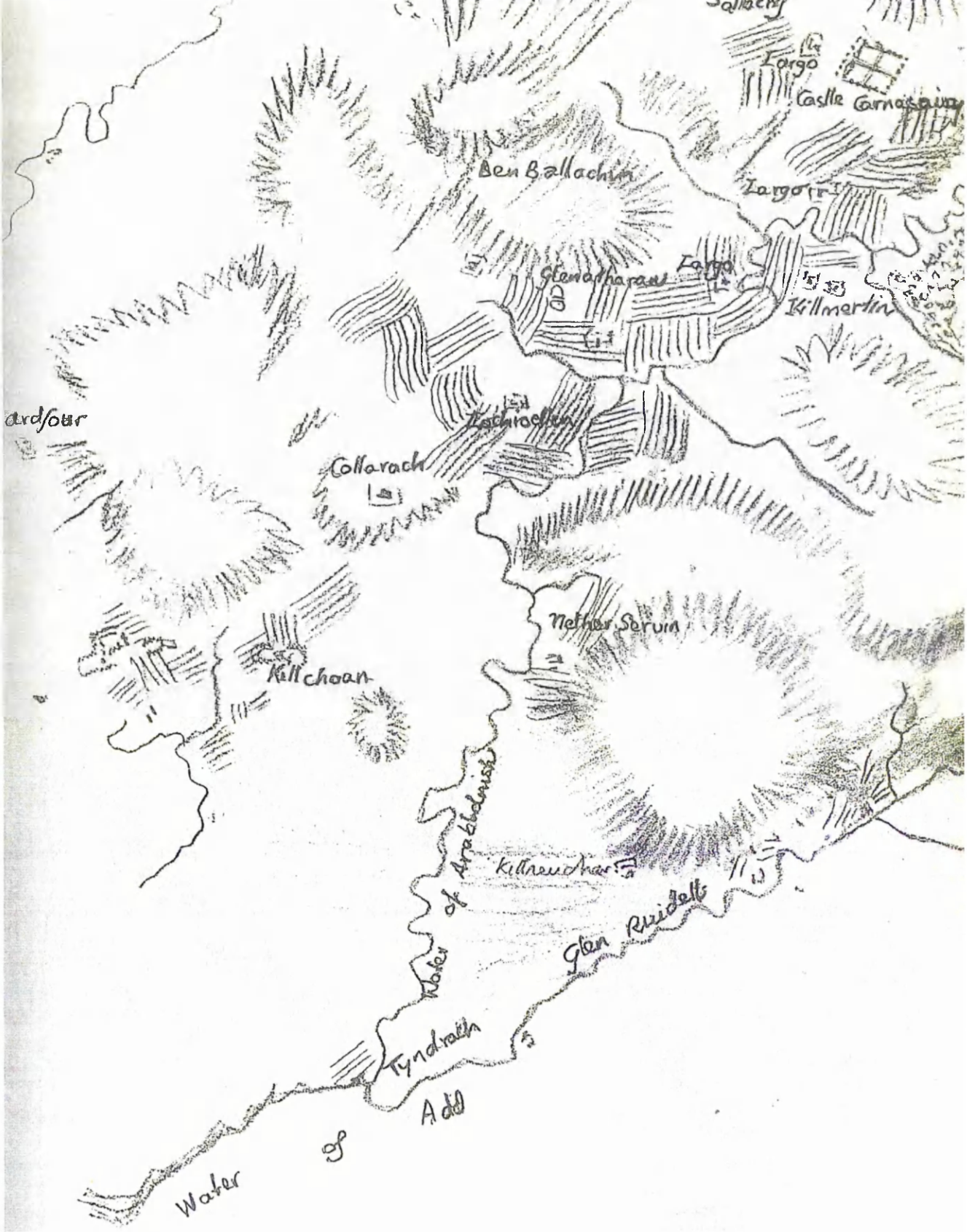


Figure 3: Roy, W. Military Survey of Scotland 1747-55 Showing Kilmartin Glen
(From and Re-drawn for Clarity Dingwall and McGowan 1996, Figure 2b)

Figure 4: Langland's Map 1802, Showing Kilmartin Glen and Experiment Farm with improvement grid

During the eighteenth and nineteenth centuries large-scale woodland management and planting schemes were conducted. An estimate at the time states that '25 years previously 100,000 trees had been planted' (OSA 1874, 258). A letter written by Neil Malcolm in 1798 refers to 14 bushels of acorns being sent to Poltalloch from Kent and mentions that as well as planting them in a nursery employees were asked to carry acorns in their pockets when about their business on the estate for planting on areas of ground away from cattle (Davies forthcoming; Dingwall and McGowan 1996). As well as oak: larch, firs, beech, elm and ash were added to the estate woodlands.

The improvements resulted in a massive increase in the amount of lime being used and the building of kilns for its processing. Macaskin Island in Loch Craignish was exploited as a source of lime, which the tenants were obliged to deliver annually to Duntrune. Burnt flint from liming is frequently found in the plough soil in many of the fields in Kilmartin and should not be confused with the prehistoric deposition of flint (Abernethy 1994). Apart from the increase in conifer plantations, the upgrading of public roads and construction of numerous buildings, the layout and appearance of the managed landscape has changed little since the 1880s. If anything there is a general dilapidation of the estate and some of the improved ground has reverted to rough grazing and wetlands.

1.5 Early Archaeological Work

The earliest archaeological investigations to be conducted in the glen and published were carried out by Dean Mapleton and Cannon Greenwell during two separate campaigns of excavation in 1864. Although friends it appears that they did not excavate together, even though both of them investigated several of the same sites. The main target of their campaigns were cairns, their method of excavation being to observe labourers removing the cairn material until a cist was encountered. For the nineteenth century when the most important stimulus was the collection of artefacts, their level of recording was quite good. The dimensions of cairns, alignment and detailed descriptions of cist construction as well as the interiors and contents were all recorded. Artefacts were also drawn and described.

In the papers that are published (Greenwell 1886; Mapleton 1870a; 1870b; 1880; 1886), they investigated a number of cairns including Glebe, Dunchraigaig, Ballymeanoch Henge, Rhudle and Ri Cruin. The most famous and best-documented investigations that they carried out were Greenwell's excavation of Nether Largie South chambered cairn and Mapleton's excavation of Kilchoan chambered cairn and, which were published together (PSAS 1866, 336-355). At this time the chambers still contained prehistoric burials, artefacts and features. Mapleton (1870a) also

published an account of the various types of monuments existing in the Kilmartin area. The extent and variety of the prehistoric rock art in the kilmartin area was not fully recognised until Sir J. Y. Simpson published an account of the prehistoric rock carvings of Scotland (1868). In this paper he also talks quite extensively on the monuments of Kilmartin.

The work of Greenwell and Mapleton in the Kilmartin area is of particular interest and usefulness as it reflects the changing landscape and how the improvements affected the destruction of the monuments. In the introduction to one of Mapleton's papers (1870a), he is referred to as being the best authority on the monuments of Kilmartin. Mapleton was the Episcopalian minister of St. Columba's Chapel on the Poltalloch estate and later became Dean of Argyll and the Isles. Throughout this period he lived as a tenant of Duntrune Castle until his death in 1892, and his remains are buried in the graveyard surrounding St. Columba's Chapel.

The next campaign of survey and excavations to be conducted in the Kilmartin area was by Christison (1904; 1905) on behalf of the Society of Antiquaries of Scotland, and was concentrated on the duns and forts. It is still important today for assessing the changes in the condition of the monuments since the beginning of this century (Ritchie 1997, 7). Not until the late 1920s and early 1930s with the campaigns of J. H.Craw (1930), again on behalf of the Society of Antiquaries of Scotland, were excavations aimed at making the monuments more understandable. Although the majority of sites Craw looked at received minimal investigation, some of them such as Dunadd, Nether Largie Mid and North and the cists at Brouch an Drumein, Poltalloch received quite detailed attention with follow up research on findings and artefacts.

From the 1930s the exceptional character of the archaeology of the Kilmartin Glen was well recognised and regularly referred to and discussed in numerous archaeological publications. Although undiscovered sites were still being encountered, and some destroyed without recording, the main upstanding monuments of the glen were left relatively undisturbed. The earlier archaeological work in the glen culminates with the publication of Campbell and Sandeman's 'Mid Argyll: a Field Survey of the Historic and Prehistoric Monuments' (1962); which became the inspiration for many interested groups to become more active in researching the archaeology of Argyll and the surrounding counties (Ritchie 1997, 8). After the publication of several Royal Commission Inventories taking in the counties around Argyll the prehistoric monuments of Mid Argyll eventually received coverage in Argyll Volume 6 (RCAHMS 1988). An extract from this volume including only the monuments of the Kilmartin area in a more accessible and cheaper format has recently been published (RCAHMS 1999). In 1992 the RCAHMS published Argyll Volume 7, Mid-Argyll and Cowal: Medieval and Later Historic Monuments (RCAHMS 1992).

A number of modern archaeological investigations and excavations, both as programmes of research and as developer funded projects have been carried out in the last forty years. Detailed description and discussion of all such work, the variety of prehistoric sites, their condition, the artefacts, the reports of the antiquarians and sites that have been known to be destroyed are reserved for Chapter 3 where an assessment of the known prehistoric archaeology of the glen is undertaken. Before this an explanation of the research design and methodology is presented in Chapter 2.

CHAPTER 2 Research Design And Methodology

2.1 Introduction

The main objective of this study was to ascertain if the Kilmartin Glen had been a landscape devoted exclusively to prehistoric burial and ceremonial monuments, as evidence relating to settlement appeared to be absent. To achieve this goal a new programme of archaeological investigation was planned in order to assess the less perceptible archaeological remains between the visible upstanding monuments, such as buried deposits and unusual patterns and relationships amongst sites. Such methodology can usually involve documentary research, aerial photographic survey, field walking, site visits, geophysical survey, excavation and palaeobotanical analysis. An undertaking of this nature over such a large tract of landscape was simply not feasible at the time. Work had to be limited to samples of the landscape recognised as archaeologically wealthy. Methods utilised had to be economical to apply with the maximum potential for return of information. Therefore three areas in the Glen with upstanding prehistoric monumentality were selected for more detailed investigation that concentrated on field walking and geophysical surveying with excavation being kept to a minimum. For more details on the fieldwork aims see Chapter 3.5. The main body of this chapter describes in greater detail the methodology and equipment utilised for this study.

2.2 Methods of Investigation

There are numerous methods of investigation that could be applied in order to provide more information and test current known patterns of prehistoric archaeological deposition in the Kilmartin area. For ease of discussion these can be divided into three main categories: non-invasive, invasive and scientific analysis. The methods used depend on the specific problems that are being approached, the type and condition of archaeology that is under investigation, what stages the investigation is at and the resources available.

Essentially, *non-invasive methods* do not involve any disturbance of archaeological remains, particularly if they are still *in situ*. As well as upstanding sites, such remains include buried archaeological deposits and any potential sites. These methods include *desk-based research* where an assessment of all historical, cartographic, photographic and printed references to the archaeology of the area can be conducted and is usually the starting point for any archaeological project. *Walk over surveys* of the landscape under study and the examination of ploughed fields for

surface artefacts and the plotting of their distribution are usually conducted after the desk-based survey. It should be noted that this type of work should only be conducted with the approval of landowners, farmers and other people who work in the area under scrutiny. Discussion with such people often proves extremely valuable as they invariably have unrecorded information relevant to the study.

Any new sites encountered might require a level of recording other than just their location. This may involve the *survey* of upstanding remains by planning, photography, plane table surveying or electronic surveying such as with a total station. Electronic surveying is particularly useful for mapping larger sites and their surrounding landscapes or detailed mapping of lithic scatters. Surface lithic scatters should also have all finds carefully located within a site grid. *Geophysical survey* can be used to detect possible buried archaeological features without their disturbance and is particularly useful for locating areas of greater potential interest before excavation. There are a variety of instruments and methods depending on the nature of the archaeology that is being examined and the background conditions of the survey area. The two most utilised methods in archaeology are resistivity surveying and magnetic surveying. Excavation of *test pits* to the depth of the subsoil in order to assess the presence of topsoil artefacts and subsoil archaeological features detected by geophysical means can also be conducted without disturbing buried archaeological deposits.

Invasive methods involve deliberate disturbance of archaeological sites, structures and features. This can vary from partial to full excavation, from a trial trench to the removal of a sample of material for laboratory analysis, to controlled demolition of a site and then its reconstruction. Essentially any of these methods are destructive towards the site so a detailed record of all excavation work is necessary as well as the eventual publication of full report on the work. Excavation is a very lengthy, expensive and increasingly bureaucratic process that should not be carried out unless the means are available to complete such work to specific standards. These methods are also only conducted after some form of non-invasive assessment has been conducted.

Scientific analysis can be both invasive and non-invasive. It usually involves the collection of samples of various materials from specific contexts and utilising a variety of collection techniques. It can vary from the analysis of artefacts obtained during an archaeological excavation to samples obtained from natural phenomena such as lake sediments, peat bogs and ancient glacial deposits. These samples can then be subjected to various tests or analysis in the controlled environment of the laboratory. For example, the analysis of a metal artefact can not only inform on the manufacturing technique, but also source the raw materials. Similarly, stone and the raw materials from pottery can be matched to a geological origin by the microscopic examination of thin

spectrometric identification of elements. One of the most crucial of scientific techniques is that of providing an absolute date, independent of typological observations or human prejudices. This is an enormous area of research being constantly refined, and there are various techniques depending on the type of material under investigation. Radiocarbon dating is the most commonly used in the field of archaeology. Dates from this can also be cross referenced with other methods such as dendrochronology. Samples from a site excavated during this study produced correlating radiocarbon and luminescence dates (see Chapter 5).

There are numerous methods of analysis that can be conducted on pottery, bone, wood, metal, soil, pollen and other materials, where the results can be used to tell how old something is, where it is originally from and what past flora, fauna and climate were like. The study of the history of human impact on the environment, both locally and globally is increasingly becoming a more important area of research. Although scientific analysis is crucial for answering specific questions and providing facts when normally we are dealing with inference, the various methods are highly specialised areas of study in their own right and some are extremely expensive to carry out.

2.3 Factors Affecting Research Design and Methodology

There are a variety of constraints affecting the methods discussed that can influence their profitability of use. For example, the applicability of a particular method to what is being investigated, time and finances or the political situation that may surround the archaeology that is to be investigated. For this present study, care also had to be taken in order to maximise the return of information against effort and expense employed. Time to conduct desk and field investigation was not the main problem but the severe lack of funding limited the methods available as well as the extent of field work conducted. Important factors to consider when planning a programme of archaeological investigation are the actual problem that is being approached what the guiding principles for the project are and what achievements are set for it.

A major influence on the strategy of fieldwork conducted was the political situation surrounding the Kilmartin area. The landscape in the study area and its current management and use has already been described in Chapter One. The management of the environmental and archaeological resource has also been mentioned but shall now be discussed in more detail as it is an important part of the natural and cultural heritage of Scotland and several public bodies have an effect on this issue. In 1994 the Kilmartin Glen Project was formally established. This project brought together a number of organisations, notably Argyll and Bute Council (formerly Argyll and Bute District Council and Strathclyde Regional Council), Argyll and the Islands Enterprise, Historic Scotland,

Scottish Natural Heritage, The Scottish Tourist Board, and local people to formulate an integrated approach to the management and interpretation of the area's heritage (KGP 1994; Macinnes, 1995).

In the past, organisations involved in the study, management and conservation of the natural and built resources of the Kilmartin area worked separately and without an understanding of the views and needs of the local inhabitants. Unfortunately this situation led to different organisations working against each other and a mistrust of the conservation community by local inhabitants. Included in the aims of the Kilmartin Glen Project was to manage the resources in such a way that such problems were addressed. The conservation of the area for present and future generations and the encouragement of both visitors and local community to understand and relish its beauty and richness led to the production of a mission statement by the Kilmartin Glen Project steering group:

> "To work with local communities to enhance public awareness, understanding and enjoyment of the Kilmartin Glen and surrounding area through a co-ordinated approach to country side and visitor management" (KGP, 1994).

It was crucial that the strategy of my research fully appreciated the philosophy of Kilmartin Glen Project and was understanding of local feelings as well as fitting in with the management of a working rural landscape. Any fieldwork carried out was to be done with as much co-operation as possible with relevant bodies as well as local landowners and any interested locals. All attempts would be made to inform the local population, schools, historical societies, of any work carried out, the results obtained and the role of the Kilmartin Glen Project.

The sensitive and fragile nature of the environment had to be carefully considered. A series of nationally important environmental resources are located in the Kilmartin Glen area. These include an extensive series of fluvioglacial terraces and raised beaches, the raised mire of the Moine Mhor, upland bogs and the silted meanders of the older channels of the River Add. The importance of the monuments, their various levels of protection and the policy of Strathclyde Joint Archaeology Service (West of Scotland Archaeology Service) that archaeology is best left preserved *in situ* were extremely important considerations. As well as being sensitive to the political situation and the importance of the natural resources of the area one of the most influential factors on research methods is the history of landscape use. Any attempt to understand the pattern of archaeological deposition in the area must also take into account the extensive landscape management projects carried out in the eighteenth and nineteenth centuries. As already alluded to in Chapter One the modern layout of the area and the majority of archaeological disturbance is mainly the result of activity carried out during these improvements.

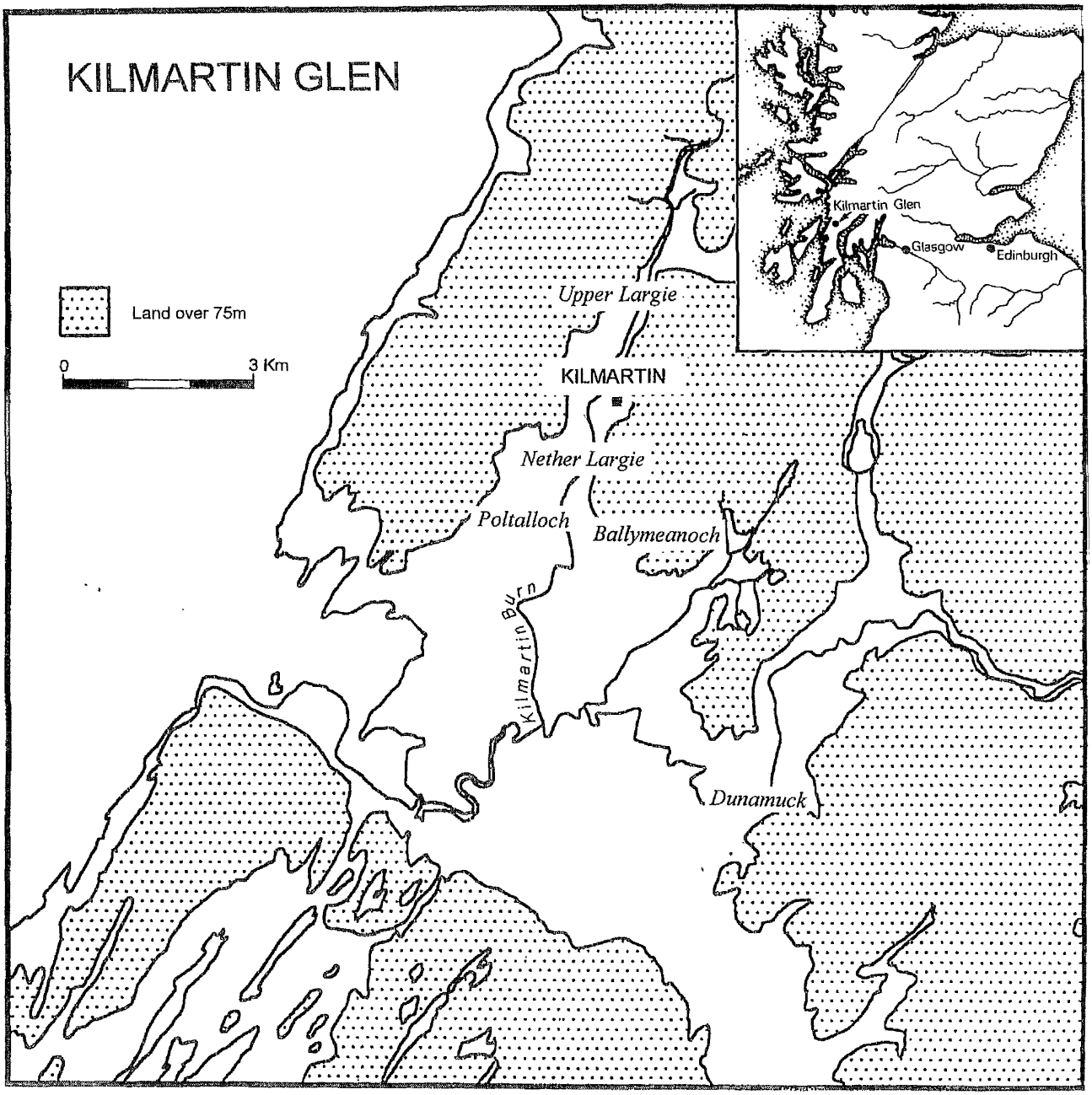


Figure 5: Location of Kilmartin Glen and Extent of area of Interest

2.4 Designing a suitable programme of research.

Due to consideration of all of the above factors it was decided that the work would as much as possible be a non-invasive programme of investigation. The main factors guiding this methodology and the collection of information can now be summarised as follows.

It should conform to the recommendations of heritage management for the study area.

It should consider current and past patterns of land use.

It should not be intrusive on the lives of the local inhabitants but be something they can easily take part in if they so wish.

A large area has to be investigated as economically as possible.

The Kilmartin Glen has the densest concentration of prehistoric ritual and funerary monuments on the west mainland of Scotland. The Glen itself appears to form the core of a wider prehistoric ritual landscape. For the purposes of this study it was desirable to include this wider landscape, but it was necessary to limit the extent of the study area and methods of investigation employed due to the actual workload created and what was actually possible to include within a single thesis.

The first exercise was to define the geographical boundaries of the study area (Figure 5). At the very least it was desirable to include the entrances/exits for route-ways to and from this natural crossroads in the landscape and include enough ground to demonstrate the relationships that the monuments bear to each other and the wider landscape. A number of factors such as proximity to the Glen, decrease of monument density and natural geographical boundaries would also influence the limit of the study area and where greater a greater level of attention was exercised.

In 1992 Historic Scotland commissioned a desk-based study of the archaeological and palaeoenvironmental resource in the Kilmartin area. This included the production of a catalogue of archaeological monuments within the most archaeologically sensitive area around Kilmartin and recommendations for a future programme of fieldwork (Abernethy et al. 1992). This particular study was the precursor for the programme of investigation carried out for this thesis with some of the fieldwork being funded by Historic Scotland. The increasing demand, from both the general public and educational bodies, for better and more comprehensive information concerning the nature of Kilmartin's heritage, particularly the archaeology, led to the creation of the Kilmartin House Trust. In May 1997 they opened a museum/visitor and education centre in the village of

Kilmartin. In addition, The Royal Commission for Ancient and Historical Monuments Scotland has collaborated with Kilmartin House Trust in order to produce an extract from Mid Argyll and Cowal: Prehistoric and Early Historic Monuments, Argyll Volume 6, published by the RCAHMS in 1988. Essentially, this extract includes a list of the Prehistoric and Early Historic monuments within the Kilmartin area that are of greater interest and importance, presented in a more affordable and accessible format. The Early Christian, Medieval and later monuments were not included in this publication. For the geographical area included in the extract the same boundaries that had been used in the earlier study commissioned by Historic Scotland were maintained. For practical reasons it was decided to continue with the use of these boundaries for this study as they contained the main areas of landscape and monuments around Kilmartin Glen that would be under discussion.

The landscape within this study extends over 175 square kilometres and includes the Kilmartin and Kilmichael Glens, The Moine Mhor, the southwest end of Loch Awe, and the immediate uplands to these areas. All of the monuments and any references to archaeology within these boundaries would be included in a database. As this is such a massive area, fieldwork was mainly concentrated in and around Kilmartin Glen with a number of core areas being selected for more detailed studies.

The first step was to undertake an up to date desk-based survey of all known sources of documentary information for the study area. As well as assisting in the overall assessment of information and processing of new results the desk-based survey should assist in the choice of fieldwork locations and other future work. At this stage it was also important to gather any unrecorded information from people who work the landscape in and around the study area. From local knowledge and documentary sources an assessment of landscape use and industrial activities, particularly since the industrial and agricultural revolutions, would be gained.

A major emphasis of the fieldwork would be on walk over survey. Any fields within the study area that get ploughed would be walked at measured intervals with precise locations of any significant surface finds recorded. As arable farming forms only a small part of how the landscape in the study area is managed, it was envisaged that only a small percentage of the ground would be walked in this way. As well as including core areas of upstanding evidence of archaeological activity, the field walking exercise would also look at other areas of landscape. Thus the majority of field walking took place in unbroken ground in a variety of topographical situations. As well visiting known sites and looking for unrecorded ones, an assessment of condition, erosional processes operating and any information on past land use could be conducted. Careful consideration would be given to the site location and associations with other sites, topographical features, view-sheds, resources, astronomical observations and natural route-ways or boundaries.

Access and types of fieldwork shall depend on the current land use patterns and agricultural and livestock cycles. It was the intention that none of the fieldwork would clash with any of the normal activities of a modern rural landscape.

It was also thought important to undertake a programme of geophysical survey in order to assess the presence or absence of possible buried archaeological features in the study area. Although the walk-over survey looked at as many different aspects of this landscape as possible the programme of geophysical survey had to be restricted to only a small part of it. Firstly, there are numerous factors that can limit the use and effectiveness of this type of investigation such as geology, terrain, ground cover and previous ground disturbance. Secondly, if examining large areas it can be a time consuming and labour intensive form of investigation. Thus geophysical surveying was to be initially concentrated in the vicinity of monument complexes in order to give a fuller picture of the extent and variety of buried possible archaeological anomalies existing in their vicinity. Information from the desk-based survey and field walking exercise would also influence where geophysical surveying was conducted. It was intended to survey any prehistoric lithic scatters that were encountered and investigate any crop marks that might be indicative of buried archaeological sites.

2.5 Fieldwalking Procedures

Many archaeological sites survive beneath the present-day ground surface as sub-soil features. Sometimes they can be revealed in aerial photography by the differential growth in crops and grasses or as soil-marks. This though, depends very much on the agricultural state of the land and moisture content of soil. Some buried sites may never be revealed, others may only reveal different parts at different times of the year and only under certain conditions. Sometimes the only indication that buried archaeological remains survive is the presence of artifacts in the ploughsoil and lying on the ground surface. To confirm the presence or absence of a buried archaeological site without its disturbance field walking and geophysical surveying can be applied. These two methods are used in conjunction as the results often compliment each other. Where concentrations of surface artefact scatters are encountered further investigation can be conducted through geophysical surveying.

Ideally when conducting a search for surface artefacts in a ploughed field, it should be allowed a period to weather first. Natural eroding of earth clods by rain, wind and drying reveal the stone and artefact content of the ground surface and give a better indication to the presence and extent of any artefacts that the ground may contain. Unfortunately it is not always possible conduct field

walking in ideal conditions as ploughed fields are often immediately seeded. This only allows a short period to investigate before seedlings sprout. There are numerous other variables that can affect the discovery of surface artefacts such as light, weather and experience of walkers. With so many difficult variables to assess, agreement on detailed guidelines for standardised methods in field walking are yet to be achieved (Barker 1982, p35).

Although the condition for each of the ploughed fields walked during this investigation was not always the same, the same methodology was adhered to when they were being examined. All surfaces of ploughed fields were walked in lines 10 m apart with the ground on about 1.0 m either side of the line being scrutinised for the presence of surface artefacts. Any significant finds were placed in a finds bag and left *in situ* with a pin-flag to mark their location. Where significant finds were encountered the full extent of the ground between the walking lines were closely examined for additional artefacts. Where groups of significant surface finds were encountered a site grid was then located over the area and all of the positions of the finds recorded.

2.6 Geophysical Surveying Techniques

An excellent method of detecting buried features on known archaeological sites without having to excavate is by geophysical surveying. Geophysical surveying techniques see through the soil and buried archaeological features such as walls, roads, pits, ditches and hearths can be detected. Although there are numerous geophysical techniques and instruments that can be employed to gather information only two methods, but utilising a number of different machines and different sampling strategies, were conducted during this study: electrical resistance surveying and gradiometer surveying. Descriptions of machinery, how they detect anomalies, how to conduct a survey and general fieldwork procedures are described in numerous publications, some of which were used for this study (Bettes 1992; Clark 1990; Greene 1987; Tite 1972).

If the resistance to an electric current being passed through buried archaeological features or the magnetic properties measured then readings that depart from the normal background readings can be observed. The measurement of electrical resistance is performed by passing an electric current through the soil and. Depending on the capacity of the soil for holding moisture (often affected by buried archaeological features), a resistance to the current can be observed therefore anomalies from the normal background readings can be detected (Figure 5). The remains of a buried wall or road should consist of a greater amount of stone and compacted material than the background soil conditions so holds less moisture than the surrounding subsoil. When an electrical current is passed through this medium there is a higher resistance to this current than there is when it is

passed through the surrounding subsoil. The remains of a buried ditch normally contain a fill that is less compacted with a greater capacity for retaining moisture than the background subsoil. When an electrical current is passed though the fill of a buried ditch the resistance to the current is less than for the current passed through the surrounding subsoil.

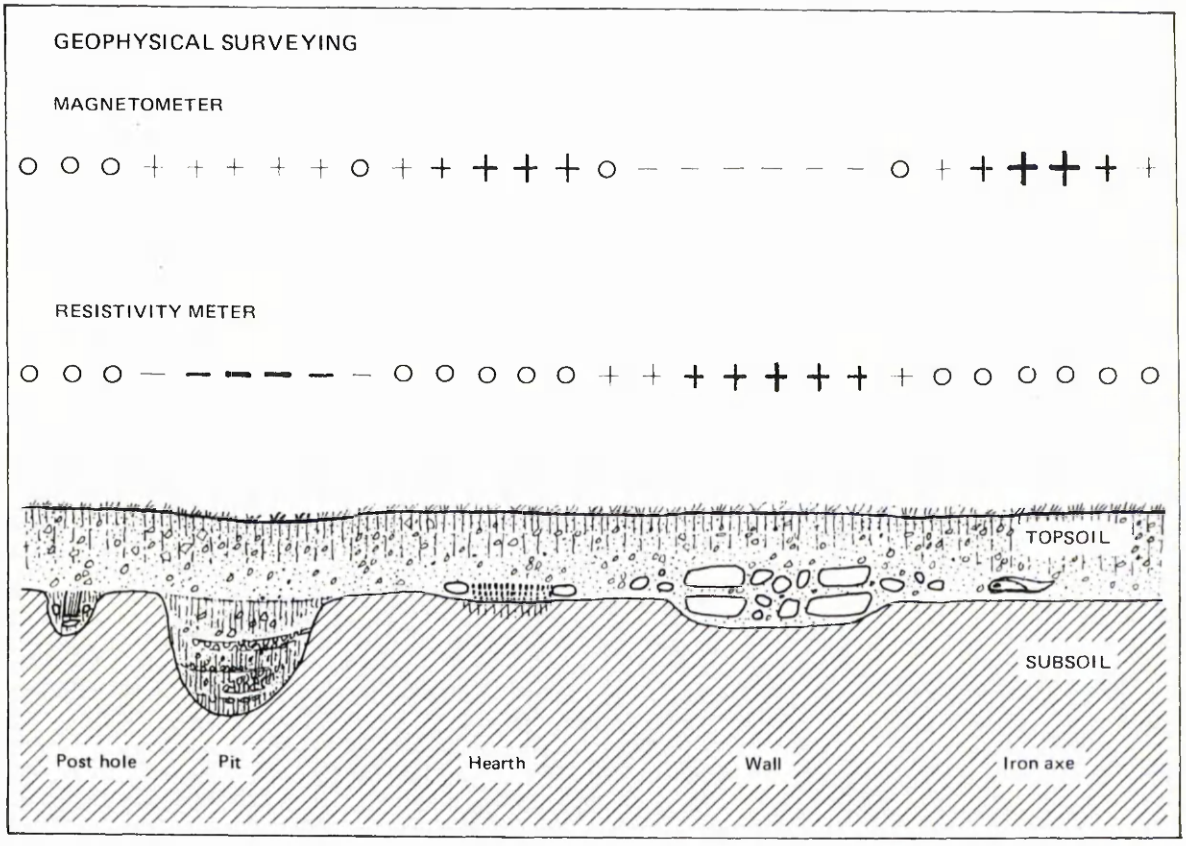
Like resistivity, magnetic surveying relies on the detection of variations from the general background of the soil, in this case indicated by differences in its magnetic field. The different magnetic susceptibilities of buried structures and features can be measured with a magnetometer. The simplest form of this instrument is a proton magnetometer, which measures changes in the total magnetic field intensity. Magnetic particles occur naturally in most soils and clays, and the normally random alignment of magnetic particles within the ground is affected by the digging and refilling of pits and ditches and therefore should provide higher readings than those for the surrounding subsoil (Figure 6). Solid features such as walls and roads contain less magnetic minerals and therefore provide *lower* readings than their surroundings. Other magnetic anomalies occur due to heating. When heated to 700 °C or above magnetic particles align themselves along with the prevailing magnetic field of the earth and retain the alignment on cooling; this thermoremnant magnetisation occurs with hearths and kilns.

The instruments mostly utilised for the surveys conducted in this study were an electrical resistivity meter and a fluxgate gradiometer, both manufactured by Geoscan Research. If time and conditions allow it is beneficial to conduct geophysical prospecting using both resistivity and gradiometer techniques as this provides a comparison between two different instruments suited to detecting a variety of anomalies in a variety of geological conditions. The same methodology is usually applied for both these machines. Grid size and sampling interval can be varied for particular surveys. In this case most grids comprised 20 m by 20 m with a sampling interval of 1.0 m or 0.5 m. This is a convenient grid size as it is quick and easy to locate and an easy scale to work with both in the field and when producing illustrations. Recording readings within 20 m by 20 m grids is also less laborious than larger or smaller grids and provides a happy medium of return of information for effort expended. The larger the grid the more likely a mistake can be made both in grid accuracy and in collecting data. The data collected in smaller grids often requires a greater amount of processing when viewing an entire survey.

Collecting data simply involves walking up and down measured lines within the grid logging readings at the desired intervals. Although logging at half metre intervals is preferable as a more accurate representation of buried anomalies should be gained, logistically this is not always possible and readings are often logged at one metre intervals. The survey instruments only collect and store raw data and have limited memory space. The data collected in the field has to be

and store raw data and have limited memory space. The data collected in the field has to be regularly downloaded and under go further processing using commercially available graphics packages.

Due to length of time involved in this project and the revolution in computer technology the software used to process and plot geophysics data became increasingly more sophisticated. Three programmes were in use for the processing of data presented in this study. Initially all data was downloaded using Geoscan's *Geoplot* Version 1 which can display the statistics of each grid and also a reading distribution histogram. Suitable plotting parameters to best represent the maximum and minimum values of readings can be chosen to disguise any excessively high or low readings that may be due to factors not concerned with archaeological deposits. Dot density graphics or plots of the area surveyed can then be created. It is important to note though that the raw data is not altered or modified in any way. Further processing can then conducted on the initial plots using *'Datasurv'* a data manipulation package written by J. Huggett with results displayed using a surface modelling software package written by R. Spicer and M. Fletcher. This programme allows the independent illumination and observation of a surface model constructed of the geophysical survey data from any position within a hemisphere above it. The possibilities for the presentation of the survey information are, therefore, vast and those graphics included in this study only represent a few of the possibilities examined. Despite this ability, the data processing facilities offered by Datasurv are few, and are concerned primarily with the removal or correction of intergrid imbalance resulting from instrument drift or other field work variables. Data processing itself had to be undertaken manually, in DOS. When Geoplot Version 2 became available this situation changed dramatically. This programme is equipped with a suite of automatic procedures that not only correct the same variables dealt with by Datasurv, but also address processing previously undertaken in DOS. In addition, various filters and other data processing procedures are included in the package, which allowed a much greater level of image processing to be undertaken. However, all of the above programmes ran in a DOS environment and there were limits to the size of the data file that could be dealt with. Surveys often have to be divided into bite sized lumps, which are then processed individually and the resultant images printed and manually pasted together (Tabor and Johnson 2000, 321). For this study this was only necessary with the Poltalloch data. The relatively recent introduction of Windows based graphics packages such as GeoQuest's InSite and Geoscan's Geoplot Version 3 have addressed this problem but were unable to be utilised for this study.



A hypothetical example of the ability of the two main methods of geophysical prospecting used in this study to detecting buried archaeological features. 0 indicates an average background reading, + a positive reading and – a negative response compared with the site average. Lighter or darker symbols give a rough impression of the relative strength of these likely results. (Greene 1983, 49)

Figure 6 : Types of Geophysical Readings Obtained from Different Buried Archaeological Features

The electrical resistance meter utilised for this study comprised two pairs of probes, one being fixed and the other mobile with both at either end of a fifty-metre cable. This system effectively divides the functions of current passage and potential measurement between two matched pairs of electrodes. The fixed probes are set into the ground between one and two metres apart depending upon the nature of the soil in the area to be surveyed. Attached to the other end of the fifty-metre cable and fixed onto a frame are the mobile probes. They are set half a metre apart and cannot be varied. The depth to which the instrument is most sensitive is also half a metre. The entire frame is then moved up and down the grid being surveyed along the traverse lines. The mobile probes are inserted into the ground at the desired recording intervals. At each point where the probes are inserted into the ground a current is passed and the resistance to it logged by the machine. This can be a slow and laborious method of collecting data. As there is a cable attached to the mobile frame it can be very awkward particularly if there is crop stubble, long grass, tall weeds, under-growth or trees within the survey area. Depending on the size of the survey area the fixed probes may also have to be re-sited on numerous occasions so increase the potential for balancing problems between grids.

Another method of surveying with a resistivity meter that was employed during this study is the measurement of electrical profiles. This method of investigation enables the examination of a section through buried deposits. It is not a true section though; the third dimension only being inferred from the apparent resistivity of the deposits under examination as the current supplied is biased to greater and greater depths. If multiple readings are taken over the same sampling point with a progressively expanding electrode array then measurements can be made at this point that are effectively a product of the depth to which the current is biased. This can give an indication as to the possible depth and compaction of buried archaeological features such as walls and ditches. This method of investigation is extremely laborious and generally only used on known areas of archaeological deposits. Readings also have to be recorded manually and results are usually presented as line graphs. Electrical profiling, although infinitely more time consuming and tedious to perform, is a useful mechanism for providing information of a specific nature. As such, it can be exploited to indicate the depth of the deposit under examination and postulate the degree of survival of features of interest as a function of their depth so where excavation is not an option it is useful as another method of testing geophysical results already obtained.

Whereas a proton magnetometer measures variation in the earth's total magnetic field caused by archaeological or other phenomena, a gradiometer measures the differences in the vertical component of the magnetic field between *two* points of known relationship to one another. In the case of the fluxgate gradiometer these two points are two fluxgates situated vertically above one another at either end of an aluminum tube and aligned with each other. The difference in the

earth's magnetic field between these points rather than the total field is measured. The Fluxgate gradiometer can simply be walked up and down measured survey lines with the user pressing a data logger every time the desired logging interval is crossed. Although there is no awkward cable the machine must always be held vertical while in use to keep the fluxgates in alignment.

Unfortunately gradiometers and magnetometers are extremely sensitive to anything in their vicinity that is magnetic and readings can be contaminated from discarded metal in the topsoil. Other natural deviations in the background magnetic field can be caused by geological anomalies such as outcrops of magnetically susceptible igneous rock. There are also certain more modern factors that can interfere with magnetic surveying. Disturbances can be expected around wire fences, railways or in the vicinity of pylons or overhead cables. Also when using magnetically susceptible instruments nothing magnetic can be worn or carried by the operator. All of the above have an effect upon the background magnetic susceptibility of the area in question which affects the nature of the earth's magnetic field to some extent and so is detectable by magnetometers/gradicmeters.

Each type of geophysical surveying instrument also has advantages and disadvantages and is more successful at discovering different types of features under various background conditions. In archaeological terms those features that are best detected by a gradiometer are those that have had their magnetic susceptibility enhanced by the application of heat or by the accumulation within a feature of a deposit of a more magnetically susceptible nature than its surroundings. These features could include the buried archaeological remains of hearths, kilns, ovens or the fill of ditches and pits. Electrical resistance surveying produces the best results in well-drained subsoil with archaeological features buried at an even depth. Electric currents do not pass easily through dry and compact soil and natural anomalies can easily be confused with archaeological features if the features are not all at an even depth. Although it can be quite a laborious technique it is better adapted for finding linear features such as walls and roads. Magnetic surveying has the advantage of being quick and convenient to use as there are no probes that have to be inserted into the ground every time a reading is recorded, but there are more extenuating circumstances to consider that electrical resistivity surveying is not so susceptible to. In summary there are numerous advantages and disadvantages in the use of geophysical surveying that are worth noting.

Advantages

It is non-invasive so the site does not undergo any damage.

It records as well as discovers.

It locates precisely where buried features are.

It is especially useful for mapping out large sites.

It saves time and money on trial excavation and trenching.

It can be used within a site to reveal the most profitable areas for excavation, which is especially useful on rescue excavations.

Disadvantages

The inability to distinguish between natural and anthropogenic causes when anomalies are amorphous.

The inability to distinguish if patterns of buried archaeological features are contemporary or unrelated.

In practice the collecting of data is uncomplicated whereas the interpretation of results requires knowledge of various scientific techniques and geology.

Good results cannot be expected when using geophysical survey on a blind test therefore it is best used in the vicinity of known archaeological sites and in conjunction with field-walking and aerial photography.

There are certain archaeological features that geophysical prospecting is not particularly successful at detecting such as post-holes.

In interpreting geophysical data an attempt is made to infer the potential archaeology from the measurement of a physical effect. The possible interpretations given below are only assumptions made by reference to the surrounding archaeology and the type of anomalies certain buried structures might possibly create. There is no uniform pattern for the identification of buried archaeological anomalies as the methods of construction of monuments, materials used, their method of removal and level of disturbance, soil conditions and geology all effect the quality of anomalies detected. The only positive method to verify their identification is by excavation.

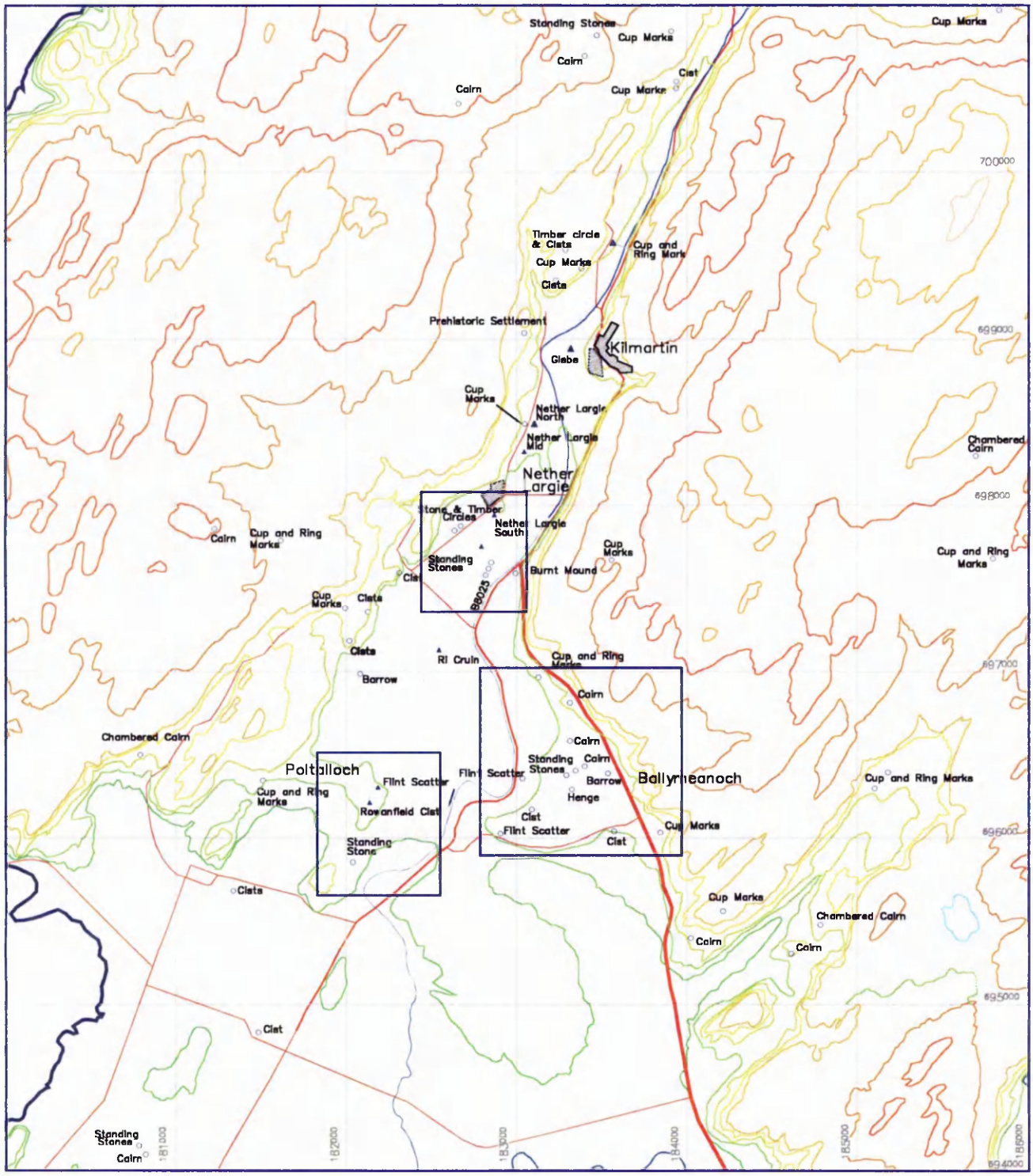


Figure 7 : Kilmartin Glen showing prehistoric sites and areas of detailed study

SCALE 1:25,000

KEY

Coastline
Roads
River
Linear Cemetery
Archaeological Feature

Contours

10	150
20	200
30	250
40	300
50	350
100	400

(meters above Newlyn Datum)

2.7 Detailed Study Areas

Within the study area there are three areas each with greater concentrations of upstanding prehistoric monumentality than the surrounding landscape. These are in the vicinity of Dunamuck, Ballymeanoch, and Nether Largie (Figure 5). The *Dunamuck* complex is located mainly around the entrance to the Kilmichael Glen whereas the *Ballymeanoch* and *Nether Largie* complexes are located around the entrance to the Kilmartin Glen some 5 km to the northeast. For this study, work was concentrated in the vicinity of the two Kilmartin complexes (Figure 7). It was hoped this would result in a more detailed understanding of a very localised complex of prehistoric monuments whose extent appeared to be limited by natural topographical boundaries in the landscape. The boundaries to these areas represented on illustrations is arbitrary but mainly limited by fields that could be walked after ploughing. As well as Ballymeanoch and Nether Largie, fieldwork was also conducted to the east of Poltalloch to include ground around the east side of the entrance to the Glen. This area contained far less upstanding monuments so would also provide an interesting contrast to Ballymeanoch and Nether Largie. It is the intention that a similar programme of work will be conducted for Dunamuck at a later date.

One of the main reasons to concentrate on Ballymeanoch and Nether Largie was because these areas were of major concern to the Kilmartin Glen Project and also contained several prehistoric monuments designated to be of outstanding importance (RCAHMS 1988). The monuments of these two complexes are currently preserved under various management regimes. In the vicinity of *Ballymeanoch*, Dunchraigaig cairn and Baluachraig rock carvings are in the care of the Secretary of State for Scotland and are fenced off with public access and supplied with notice boards. Ballymeanoch henge, standing stones and kerb cairn are scheduled and in an area of ground that until 1994 was regularly ploughed. In 1994 Historic Scotland negotiated a landscape management agreement with the landowner and an area of ground containing these monuments was taken out of cultivation and enclosed by a fence with gates for public access. These sites also now have interpretational notice boards. The other sites at Ballymeanoch have minimum protection. In the vicinity of *Nether Largie*, Temple Wood stone Circle, Nether Largie South chambered cairn, and the other cairns in the linear cemetery extending into the landscape northeast and southwest of the Nether Largie monument complex are in the care of the secretary of state for Scotland and are enclosed by fences with public access and notice boards. Although a Scheduled Ancient Monument of national importance the ground around and between the Nether Largie standing stones was regularly ploughed until 1997 when Historic Scotland established a similar land management agreement as at Ballymeanoch.

In Chapter 4 each area investigated shall be presented in more detail along with the methodology, survey design and instrumentation utilised at each of their locations and the results obtained. Before this, the subject of the next chapter shall be a review and summary of the known prehistoric archaeology in the study area and the more recent work conducted concerning its interpretation.

CHAPTER 3 The Prehistoric Archaeology of the Kilmartin Glen

3.1 Introduction

The Kilmartin Glen contains the densest concentration of archaeological monuments on the mainland of Scotland. This wealth of monumentality has attracted much attention and has been written about for the last 200 years, yet even today little is known of the people that created the prehistoric monuments, their society, ideology and how and where they lived. It is the intention of this study to start a rectification of this situation by conducting a programme of fieldwork that tests the current recognised patterns of prehistoric archaeological deposition. Before this can happen it is useful to summarise and review the extent of the known prehistoric archaeology and what is currently understood about its interpretation. Figures 8 and 9 illustrating parts of the Kilmartin Landscape are fully discussed in Chapter 6.

3.2 Monument Inventory

A database of the prehistoric archaeology of the study area was compiled using information from the NMRS and includes all of the authenticated prehistoric sites, artefacts, human remains and their previous investigation. It was compiled in order to summarise a large amount of information in such a way that relationships can easily be recognised and comparisons and patterns within this archaeological record can then be demonstrated, thus enabling theories to be formed and tested. Below is a summary of the prehistoric archaeology within the study area. It utilises all information available on the archaeology of the area before the programme of research was conducted. It illustrates the variety and complexity of, as well as the lack of interpretation for, such a density of prehistoric monuments. Very few radiocarbon dates are available for this area but the main period of interest for this study is from about 3500 BC to 1500 BC and includes the Neolithic and Early Bronze Ages.

The RCAHMS lists 92 different sites relevant to the period of prehistory under investigation that are in this area and with the heaviest concentration being in and around the Kilmartin Glen (RCAHMS 1988). These include six chambered cairns, one henge, two stone circles and twenty-two other cairn sites. Some of these other cairn sites consist of two or three cairns in proximity while others have been completely removed. Also included amongst the cairn sites are two barrows and two possible additional chambered cairns sites. Most of the cairns contain the remains of cists and some also have the remains of kerbs. Cists were not always covered by cairns and

conducted on the prehistoric rock art of Argyll (Simpson 1868; Christison 1904a; Campbell and Sandeman 1962; Morris 1977; Bradley 1991), and a number of motifs present in Irish passage grave art have been recognised, though not associated with any tombs. Rock art is extremely difficult to date and the evidence in Kilmartin suggests a long history of use, with the passage grave motifs early, and the axe head carvings in cists late in the tradition. Bradley (1991) has noted that the rock art in Kilmartin is concentrated on the fringes of the agricultural land and that the most complex motifs are situated in prominent places in the landscape commanding the access routes. He has suggested that this form of rock art was initially in use by mobile populations.

A number of standing stones in the area are heavily decorated with this form of carving, while many have none or only a couple of cup marks. Very few standing stone sites have been excavated, but when a stump was removed from Ballymeanoch, deposits of cremated bone were found (Barber 1977). Other standing stone sites in the area have been associated with the discovery of human remains, for example the fallen stone at Achnabreck (ONB). Realistic interpretations for standing stones vary and include markers for routes through the landscape or for territories. Certainly most of the standing stones are in prominent locations with all round visibility. The most popular and controversial interpretation for the use of the standing stones in the Kilmartin area is that they are aligned with solar and lunar events. This topic has been one of the most discussed aspects of the prehistoric monumentality of the Kilmartin area and has been investigated by both supporters and critics (Burl 1993; Moir 1981; Patrick 1979; Ruggles 1984, Thom & Thom 1979). The idea that they were erected in order to observe movements of the sun and moon is highly unlikely, as knowledge of these movements would have already been necessary in order to erect the monuments in such locations in the first place. Nor were such monuments erected in order to keep track of the solar or lunar cycles as this can be done quite simply without going to such efforts.

The sun and the moon would have been important and familiar aspects in the everyday lives of such people, as were monuments, the world that contained them and the fragility of life within it. The skyscape may simply have been incorporated into the architecture of the monuments as was the landscape, and doubtless other media as people made sense of their world and their place in it. These sites are probably part of a complex array of the rituals of life, death and rebirth that would have been crucial for social reproduction and categorisation. Although the study of standing stones is a vast and controversial subject, argument can often revolve around the accuracy of some of these alignments. This is extremely difficult to measure as we are now not only dealing with the ruins of these sites, but a different sky from when they were erected. Most professional archaeological researchers today are not so much concerned with degrees of accuracy concerning

such alignments, but are in agreement that some monuments appear to be associated with some of the main events in solar and lunar cycles.

Within the Kilmartin area, Bronze Age cists are decorated with various carvings, such as cup marks, lozenges, axe heads and rebating grooves. These carvings have been assigned to a different tradition known as Single Grave Art (Simpson and Thawley 1972). The assigning of such motifs to different phases of prehistoric activity and the re-use of stones carved in the Neolithic period in Bronze Age cists and cairns in Kilmartin have also been discussed (Bradley 1993). Kilmartin contains one of the greatest concentrations of axe head carvings in Britain. They have not been found anywhere else in Argyll and are found exclusively in Bronze Age cists. Four sites are currently known, three of them in different cairns in the linear cemetery, Ri Cruin, Nether Largie Mid, Nether Largie North and a fourth discovered during quarrying at Kilbride. Also concentrated in the Kilmartin area are grooved and rebated cists. Other examples throughout the British Isles are extremely rare while Kilmartin contains twelve examples (Campbell, Scott and Piggott 1961). Evidence for reuse of stones containing earlier carvings can be found incorporated into a number of monuments in Kilmartin but most common context for this practice is within cist burials. The best known examples are the Badden cist slab and the cover slab from the central cist in Nether Largie North cairn.

The most famous aspect of the Kilmartin prehistoric monuments is the linear cemetery, which comprises a number of round cairns forming a line along the bottom of the Glen. Scott (1966) suggested that the cairns in the linear cemetery were intervisable. Certainly if the ground had been cleared of trees this would have been the case. Although there are many other cairns in the area they have not stimulated nearly as much interest. Topographical locations for the cairns vary from low-lying, flat open ground to the summits of hills (Carnasserie, Barr a Churin). Cists that are not marked by cairns are well attested and often found dug into the gravel terraces. All of the cairns in the linear cemetery have been excavated to some degree (as have many of the other cairns). In the linear cemetery only Nether Largie North has been fully excavated. Although conducted in 1930, a reasonable account for the time was published which revealed a complex of unusual features beneath the cairn material representing a range of possible activities (Craw 1930). Unfortunately none of the ground around any of the cairns has been investigated. Bradley (1991), one of the more recent writers to discuss the linear cemetery, has suggested that Nether Largie North and Glebe cairns are built on top of earlier sites that may have been stone circles. Many of these cairns contain a central burial cist and often two or three satellite cists. Although ruinous and mostly cleared it is evident that a number of them were enclosed by boulder kerbs, for example, Dunchraigaig, Nether Largie Mid and Ri Cruin. As well as the larger cairns enclosed by kerbs of boulders there are several small kerb cairns, such as at Kintraw and Ballyneanoch.

Figure 8: Aerial Photograph of Ballymeanoch Looking South (David Lyons)

Figure 9: Aerial Photograph of Nether Largie Looking Northwest (David Lyons)

Cist burials, whether covered by cairns or not are a common form of prehistoric deposition to be encountered in the area. At present there is no clear differentiation between the grave assemblages from either. Cists often occur in clusters that form cemeteries but are also found as individual sites. Records also show that many cists have been found and destroyed over the years particularly during the agricultural improvements of the nineteenth century. There are several recorded cases though of cists being encountered and through reverence for the dead remains were left *in situ* (Mapleton 1870a; 151; Cambell and Sandeman 1961, 20). Undoubtedly the recorded cists in Kilmartin represent only a fraction of the original total and more await discovery. Quarrying from gravel terraces in the Glen has resulted in the discovery and rescue excavation of a number of cists. The more recent of these resulted in some post excavation analysis (Cregeen 1981, Mercer et al. 1987). Most of the radiocarbon dates in the study area are from the excavations of Temple Wood and the cist cemetery at Upper Largie. The dates from these two sites also demonstrate a degree of contemporanity during the early second millennium BC.

Of the different styles of burial monument constructed during the prehistoric period it appears that inhumation and cremation continued to be practised side by side. Crouched inhumations are only encountered in the various forms of cist burials, and although there are reports of human bones from chambered cairns in the area nothing is known of how they were deposited. It is probably the case that they were regularly disturbed and possibly even the chambers cleared out in prehistory. The survival of skeletal remains in any of the burial monuments from Kilmartin is rare as the soil is very acidic. There are numerous references to the discovery of human bones in the past and some more recent discoveries, but all have been in an extremely poor state of preservation. Teeth have the best chance of survival and in some cists, for example one from Temple Wood (Scott 1988; 65) and another from Ballymeanoch henge (Greenwell 1866, 349), are the only part of the skeleton to survive. Cremations also have a much better chance of surviving in acidic soils. Partial human remains representing crouched inhumations have been recovered from cists at Poltalloch (Cregeen and Harrington 1981). Phosphate tests from the base of cist B from Temple wood were indicative that the cist had contained a crouched inhumation (Scott 1988, 81). Analysis of both cremated and unburnt human remains from burials associated with the above represent children as well as adults.

3.3 Artefacts

The majority of the prehistoric artefact assemblage encountered in the Kilmartin area was recovered from burial sites such as cairns and cists. Despite the number of cists many were found to be empty. This is probably due to two main factors: previous disturbance and soil conditions. Before excavation or recording many cists had been previously disturbed or destroyed, particularly

during the improvements of the nineteenth century. The soils in the Kilmartin area are acidic which is a poor medium for the survival of any grave contents, particularly body remains and any other organic deposits, hence the full extent of grave goods can only be guessed at. Some artefacts, particularly those recovered during agricultural improvements, are either lost or their provenance is unknown. There are occasional single surface finds, such as a polished stone axe from Upper Largie (Campbell and Sandeman, 1961), a polished stone adze from Drimvore (*ibid*) and a flint scraper from Dunchraigaig (Hall, 1980, 31). Two Neolithic carved stone balls have also been found in the study area, one a surface find at Ballymeanoch (OS 1973) and the other during excavations at Dunadd Fort (Christison 1905, 311). Carved stone balls are exotic and rare in this area, their main concentration being in the Northeast of Scotland. There are accounts of lithic material found at Craiglass (Simpson 1868, 30), and Cairnbaan (Mapleton 1870a, 154). Despite the abundance of other prehistoric activity, grave goods and occasional finds, prehistoric lithic scatters or artefactual evidence suggesting settlement and occupation of the landscape around the prehistoric monuments is as yet unknown.

As well as Neolithic polished stone tools there has been Neolithic pottery encountered in the glen. A complete Achnacree bowl belonging to the Lyles Hill-Grimston tradition was recovered from Nether Largie South Chambered Cairn. As well as artefacts representing the Neolithic activity, both Nether Largie South and Kilchoan chambered Cairns contained Bronze Age Food Vessel sherds. Nether Largie South also contained beakers and barbed-and-tanged arrowheads. The majority the prehistoric pottery from Kilmartin dates from the Early Bronze Age and has been recovered from cist burials both in and out of cairns. Some of the cists contain typical Beaker-related assemblages. The beaker assemblages from Kilmartin Glen vary quite considerably and include finds of jet necklaces, barbed and tanged arrow heads, flint tools and Food Vessels. There appears to be no differentiation between grave goods from the unmarked cists and those cists covered by cairns, but more Food Vessels, which are a later style than Beakers, have been found in the area. Both types of pottery have been recovered from adjacent cists such as at Poltalloch (Cregeen and Harrington 1981), and from different cists within the same cairn as at Nether Largie South. Some of the finest known examples of Food Vessels have been recovered in Kilmartin. Comparisons have been made between the Bronze Age pottery from Kilmartin to Irish and Yorkshire styles (Clarke 1970). Middle to Late Bronze Age pottery is represented by sherds recovered during the excavation of the cist cemetery at Upper Largie (Mercer *et al,* 1987). The excavation of three different features associated with this cist cemetery revealed the remains of a Cinerary Urn and a small number of other sherds in poor condition that represented two other pots of a simple bucket shape.

Despite the richness of some of these Beaker-type grave goods, finds of metalwork from any context are rare. Only two cists have been found to contain metalwork, but the objects, a dagger and a fragment of bronze, are lost. Three bronze objects, a halberd, a socketed axe and a spearhead, are included in the Poltalloch collection as well as some of the pottery found on the estate. Only one bronze hoard has been found in the study area (Strachan 1884; Campbell and Coles 1963). It comprises two spearheads, three socketed axe heads, a gouge, two rings and a knife and dates to the Late Bronze Age. The spearheads and gouge were discovered by accident near Torran at the south west end of Loch Awe in 1881 and the rest of the objects were found at the same site in 1962. It is interesting to note that the lack of metal work, particularly early bronze age, contrasts with the carvings of what appear to be Early Bronze Age flat metal axe heads. This will be discussed in more detail later.

The Poltalloch Collection comprises artefacts that were mostly recovered on the Poltalloch estate during the nineteenth century, which at that time encompassed the entire study area. Unfortunately, items including the Bronze Age metalwork and some of the pottery from this collection that came from the estate remain unprovenanced. The Poltalloch halberd is traditionally thought to have been found at Dunadd, but there is no documentary support for this. There are several references to artefacts being recovered from cairns and cists in Kilmartin Glen, including a spearhead, but sitenames are not given (NSA 1845, ACC 1915, ONB). It should be noted though that during the nineteenth century the Poltalloch estate extended from Loch Awe to Loch Sween and from Loch Craignish to Knockalva so it is possible that some of the unprovenanced objects were not even found in the vicinity of Kilmartin Glen. The Poltalloch collection was gifted to the nation and is now with the Royal Museum of Scotland. Another nineteenth century collection of archaeological artefacts from the Kilmartin area was assembled by Cannon Greenwell who investigated a number of cairns in the area. It now resides in the British Museum, London.

3.4 Main Patterns of Evidence and Possible Models of Interpretation

The pattern that emerges from the above summary of the known prehistoric archaeology of the Kilmartin area is a lack of recorded settlement and artefactual evidence, which contrasts with the abundance of ritual and burial remains. The recorded prehistoric sites also include a peculiar concentration of rock carvings that decorate both monuments and natural surfaces, yet the concentrations of decorated natural surfaces do not coincide with the concentrations of monumentality. This form of embellishment continued for at least two millennia and included representational forms such as the carvings of axe heads inside of cists. Again there is a peculiar concentration of axe head carvings in the Kilmartin area. Even more peculiar is the presence of

grooved cist slabs, which are almost unique to the Kilmartin area. The Neolithic material continued to act as foci of attention during the Bronze Age. Neolithic monuments, although restructured, seem to be at the core of complexes of ceremonial monuments that expanded into the wider landscape while stones containing Neolithic carvings were incorporated into Bronze Age monuments. As well as only a particular range of activity being represented in the archaeological record, there is also only a particular range of artefacts. Although a number of exotic items are represented that suggest widespread contact, metalwork is extremely rare. The context in which various artefacts have been discovered is also limited. This pattern of prehistoric archaeological deposition has important implications for issues related to past social and economic behaviour. The abundance and location of rock art, the lack of settlement evidence, lithic scatters and limited exotic artefacts might suggest mobile rather than sedentary populations. This forces us to reconsider how a landscape is used, how it is redefined in later prehistory, how the monuments are used, and why they are located where they are.

Although a considerable amount of work has been conducted over the last 150 years, there has been little in the way of modern archaeological excavation and investigation conducted within the Kilmartin area. Due to the lack of fieldwork carried out interpretation of the prehistory is very much dependent on work from sites outside the area. Excavations in Cowal have revealed three settlement sites, two at Ardnadam (Rennie 1984) and one at Auchategan (Marshall 1978), with radiocarbon dates in the third millennium BC. Although badly truncated and damaged by episodic flooding, arrangements of postholes, hearths and spreads of stone suggestive of a succession of small roundhouses, and other structures were discovered at Ardnadam (Rennie 1984). The complex of features represents activity from the Neolithic to the Medieval periods. A similar sequence of remains was encountered at Auchategan, though not as badly damaged. The recovered artefacts from these sites complement those that have been found associated with chambered cairns in the Kilmartin area and can also be sourced to various parts of the British Isles. The Cowal Neolithic houses and nearby chambered cairns have been interpreted as being used by localised farming groups that were in contact with a much wider area (RCAHMS 1988, 7; Ritchie 1997 45-6). The excavators at both sites have suggested that some of the Neolithic occupation is thought to represent seasonal occupation, possibly by herdsmen. The overall evidence does seem to suggest that the users of these sites were used to a degree of mobility.

By the early third millennium BC trade networks had become more widespread and important. The density of monuments and occurrence of certain exotic artefacts has been attributed by some authors to a powerful local group controlling the porterage across the Crinan isthmus (Scott 1951, 31) and access to economic resources via this natural crossroads in the landscape (Ritchie 1997, 57). The absence of settlement for this period is a wider problem that has never been fully

addressed. Some authors have raised the possibility that the Glen may have been only used for burial and ritual (RCAHMS 1988; Bradley 1993; Ritchie 1997) and that the population lived elsewhere. Elizabeth Rennie has been investigating charcoal-burning platforms in Cowal and Argyll for at least twenty years and has found evidence that some of them are on top of possible prehistoric structures (Rennie 1997). These platforms are almost exclusively on hillsides and the Kilmartin cairns and standing stones do tend to occupy the most suitable ground for farming. Ritchie emphasises the fact that the known evidence for prehistoric settlement in Argyll and Cowal is extremely fragmentary, therefore "...the dearth of settlement sites around Kilmartin is thus no surprise" (Ritchie 1997, 57). This is not sufficient reason to dismiss the question of where did the people who built the Kilmartin monuments live? The term 'Ritual Landscape' is also as equally unhelpful as it implies a spatial division between ritual and everyday use of a landscape (Thomas 1999, 26). Investigations by John Barber in Arran and other areas have resulted in his view that

> "The absence for evidence for Neolithic settlement in these landscapes is certainly not evidence for their absence" (Barber 1997, 149).

Excavation of two stone circles on Machrie Moor, revealed evidence of both economic and ritual activity. This includes two earlier timber circles with a deposit of Grooved Ware in one of their postholes and evidence of cultivation including ard marks (Haggarty 1991). The Arran sites have undergone a greater level of investigation and interpretation and, although the information gleaned from them is invaluable, there are major differences in natural resources and patterns of prehistoric archaeology with Kilmartin. Investigations of prehistoric landscapes on Arran have concluded that Neolithic settlement was more widely and densely distributed than previously thought, which is the opposite of the traditional view of a small Neolithic population diffusely spread across the landscape (Barber 1997, 149). General models for prehistoric activity do not take into account the localised variations in the prehistoric archaeological record or the particular localised conditions that have affected the survival of prehistoric archaeology.

The lack of models to explain patterns of prehistoric archaeology in the Kilmartin Glen is very much representative of the state of Neolithic studies in Scotland at the time of writing and highlighted by Sheridan and Sharples:

> "...we feel that the traditional compartmentalisation of Scottish Neolithic research into artefact- or site-orientated studies, and the strong emphasis on description rather than interpretation, misses many opportunities for advancing our understanding" (Sheridan and Sharples 1992, 5).

Such compartments of study may provide suitable terms of convenience or categories that ease storage of information but are inadequate for describing a collective archaeological resource. They represent restricted locations in the landscape around which a range of prehistoric activities would have taken place and limit the range of questions we consider.

Perhaps the most enlightening contemporary works to include discussion of the Kilmartin archaeology are by Richard Bradley. His study of the rock art, where complexity and location of carvings contains important information, has already been mentioned above (Bradley, 1991). In a number of publications he has used examples from Kilmartin to illustrate aspects of some of his arguments: how the prehistoric archaeology reflects the changing perceptions of the landscape during this period; how we perceive the prehistoric landscape as unaltered in the prehistoric world; how locations in the landscape become important, shape human experiences and are incorporated into the monumentality; how a landscape can be changed to one that is understood as a series of routeways to one of a series of destinations; how monuments relate not only to each other but also to places, paths, the unaltered topography and how they are reused, rebuilt and redefined (Bradley 1991, 1992, 1993, 1995).

These arguments are specifically aimed at an explanation for the rise of monumentality and the altering of the landscape in prehistory. When applied to Kilmartin these arguments should be far better defined and understood as this area contains such a variety of monumentality, in a variety of topography, all within a small area. If these arguments suggest that the location of monuments is meaningful and significant, then surely this should be the case with settlement sites, particularly in an area with a lack of easily domesticatible land. Unfortunately without this settlement evidence we can only examine what appears to eventually become a purpose built and managed prehistoric landscape that reflects a limited use, occupation and repertoire of human experience.

Other than Bradley, work concerning the prehistoric archaeology in the Kilmartin Glen has mainly been limited to the descriptive. In recent decades this is in part due to the fact that most of this work has been the result of site rescue and the obligation of archaeologists to publish excavation results. Investigative fieldwork to test the current known patterns of prehistoric archaeology in the Kilmartin Glen has never been conducted. The history of landscape use or the effect that this has had on the current patterns of known sites and their survival has never been fully assessed either. The recovery of material for paleobotanical and microfaunal studies in order to reconstruct the prehistoric environment and land use has never been conducted. Despite all of the excavations that have been conducted and catalogues that have been produced concerning archaeology from the study area, little has been done to synthesise and interpret all of the information for the locale.

3.5 Fieldwork Aims

A programme of geophysical prospecting and fieldwalking was formed as part of the research design. The aims of this exercise were to assist in analysing the extent of possible buried archaeological features within the Kilmartin landscape, particularly in the vicinity of the upstanding prehistoric monumentality at Nether Largie and Ballymeanoch. By concentrating on these areas it is intended to ascertain if the types of upstanding monuments are an accurate representation of the archaeological remains for this period or do they also contain evidence of settlement. It was also intended to determine whether these unique alignments of standing stones had once formed part of larger linear complexes and to discover if traces of prehistoric activity can exist underneath a modern agricultural landscape. Intensive field walking was also conducted in the vicinity of these monuments, both in ploughed and unploughed fields. Not only would this locate any prehistoric surface lithic scatters, and possible additional areas to conduct geophysical prospecting but also note relationships amongst the monuments and their locations. This led to the detailed investigation of a third area (Poltalloch), which is close to Ballymeanoch and Nether Largie and has similar topography. It was expected to encounter evidence representative of other activities both prehistoric and more recent. An assessment of the landscape and the geological background to the areas had been conducted earlier, and, although the area does not house the best conditions for the development and survival of geophysical anomalies, if existing, these conditions should allow their detection.

Selective test pitting and trial trenching was conducted to help assess the quality of results obtained from geophysical surveying and field walking, as well as attempting to assess impact of erosional processes that might be operating. Highly desirable, but only possible for this study under certain circumstances, was a far greater degree of invasive archaeological excavation. This would be necessary in order to provide evidence by which some of the non-invasive work could be judged. It was also important to have a better means of understanding the erosional processes operating on the landscape and the archaeology contained within it, as well as identifying areas with a greater potential for the survival of buried archaeological remains. Thus a small amount of invasive archaeological excavation was envisaged, but this would be limited to planned developer-funded projects monitored by West of Scotland Archaeology Service and conducted in the field by the author.

A more detailed examination of the archaeological background to the survey areas and the results of the geophysical surveying and field walking are presented in the next chapter. It is necessary to provide a far wider picture of the prehistoric archaeological record of the Kilmartin Glen before a better understanding of it can be gained by adapting Bradley's model for the rise of monumentality.

CHAPTER 4: Detailed Study Areas: Field Walking and Geophysical Survey

4.1 Introduction

A number of different methods of investigation were applied to gather information in the field over a number of years. Where possible these methods were used in conjunction, but at the various locations investigated different combinations of methods or sometimes only one method could be utilised. As well as the expense, the methods used and locations investigated were very much affected by the management of the rural landscape. Ground condition, time of year and what particular fields and areas of landscape were being used for very much limited where and what fieldwork could be conducted. As well as at Ballymeanoch and Nether Largie a more detailed programme of investigation was conducted to the east of Poltalloch. For the purposes of this chapter the programmes of *non invasive* field investigation that were conducted are presented under each of the study areas rather than by the methods that were utilised. Each of the three areas is introduced by a description of the location and archaeological background.

4.2(i) Nether Largie (Figure 10)

Nether Largie is located towards the west of the floor of the Kilmartin Glen. The prehistoric monuments of this group lie at the entrance to the Glen and to the west of the Kilmartin Burn and northeast of the plain that the Glen opens out onto. The floor of the Glen at Nether Largie is not completely flat, but comprises a series of wide, low terraces between 16 m OD and 20 m OD that are cut by the shallow remains of fluvioglacial gullies. The monuments are often referred to as being on the valley floor but are in fact all above the flood plain and on the lower terraces. More fluvioglacial terraces rising steeply on the northwest to 30 m OD overlook the Nether Largie monuments. Slightly over 1 km to the southeast is situated the Dunchraigaig/Ballymeanoch prehistoric monument complex.

The main sites of this complex of Late Neolithic and Early Bronze Age monuments comprise Temple Wood Stone Circle, Nether Largie South chambered cairn, Nether Largie Standing Stones and the Bronze Age round cairns of Ri Cruin, Nether Largie Mid, Nether Largie North and Glebe. These Bronze Age cairns extend out into the landscape to form a linear cemetery. Rock art can be found on most of these monuments and there is a natural rock sheet adjacent to Nether Largie North that contains cup markings. Between Nether Largie South and Nether Largie Mid cairns is the site of a cairn that was removed in the nineteenth century. For the purpose of this exercise

surveying was restricted to the area containing the standing stones, the stone circle and the chambered cairn.

The earliest element in this group is Nether Largie South chambered Cairn. It is one of the best-preserved examples of this type of monument and is listed by the RCAHMS as a monument of outstanding importance (RCAHMS 1988, xx). The cairn material measures 34 m by 27 m and contains an intact central chamber measuring some 6.5 m by 1.5 m and divided into four compartments. Investigation by Greenwell in 1864 revealed that the chamber had been blocked and three bronze age cists had been added to the monument, one of which was inside the chamber and had already been disturbed. Finds from inside the chamber include sherds of beaker pottery, a round-based Neolithic pot, sherds of a dark-coloured urn, barbed and tanged arrow heads, and other flint implements. As well as cremated bones there were unburnt human and bovine bones. Two hundred and fifty metres southeast of Nether Largie South is Temple Wood stone circle. Like Nether Largie South, Temple Wood has a long history of restructuring, some details of which have already been alluded to in the section on the monument inventory in Chapter Three (3.2).

The Nether Largie group of standing stones lies 350 metres south of Nether Largie Chambered Cairn and 250 metres southeast of Temple Wood. They are placed in a linear arrangement running 75 metres in a NE/SW orientation. The stones are of the local metamorphic rock with the largest ones rising to nearly 3 metres in height. One of them is extensively decorated with rock art and some of the others have occasional cup marks. Past investigation concerning this group of stones has centred on the argument of whether the stones are aligned to lunar movements (Thom 1971, Patrick 1979). The alignment also appears to be composed of five distinct elements:

1) A northernmost pair of stones with their long axes aligned NW/SE (Stones K and L);

2) 35 metres SW of this pair is a single menhir (stone F) with extensive cup-and-ring markings decorating its SW face. Around its base are four small stones each about 0.5 metres in height that delineate the area of packing stones;

3) 5 metres to the SW of this group are another similar group of four stones. Three of these are about 0.5 metres in height, (Stones C, D and E), the other one is a stump. They are more widely spaced than element 2 and have no central stone.

4) 30 metres SW of this third grouping are a pair of taller menhirs (Stones A and B). These are similar to Stones K and L.

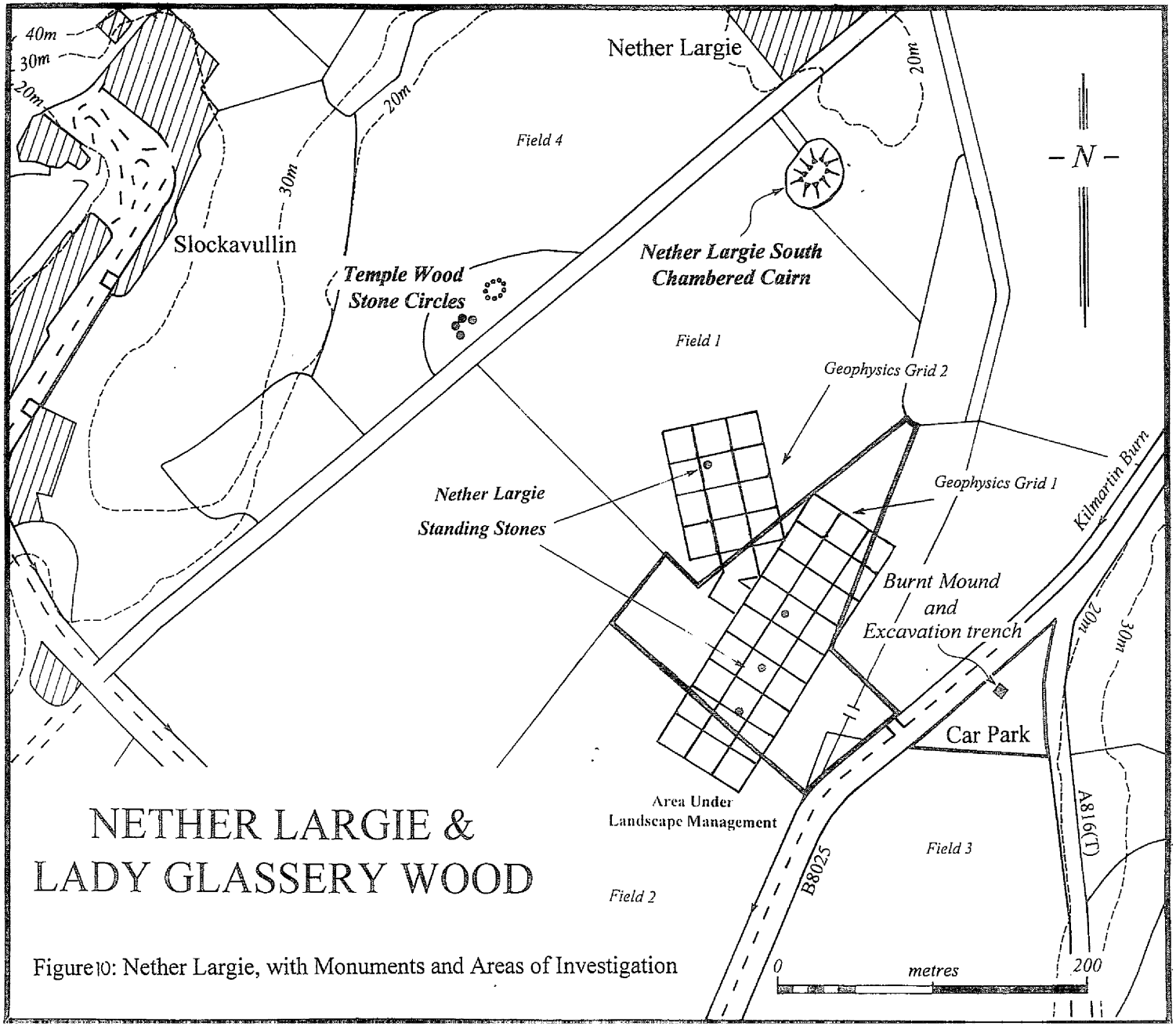


Figure 10: Nether Largie, with Monuments and Areas of Investigation

5) There is an additional single standing stone situated 100m to the NW of the northernmost pair (Stone M) and in 1973 excavation revealed the stump of another one situated 300m west of the southernmost pair (Stones A and B).

4.2(ii) Nether Largie Fieldwalking (Figure 10)

As is evident by the W Daniel print of 1818 (RCAHMS 1988, 138) much of the ground in the vicinity of the Nether Largie standing stones was under a thick blanket of peat previous to agricultural improvement. After drainage and removal of the peat it became suitable for agriculture and the present field layout was established. The fields in the vicinity of Nether Largie were regularly ploughed from this point onwards. Under the current management regime arable farming plays far less of a role than it once did with only a small percentage of fields allocated this activity and on a cyclical basis. Occasionally within the Glen pasture fields are ploughed and reseeded.

Throughout the phase of fieldwork that is included in this study only four of the fields at Nether Largie therefore were ploughed to allow walking following the methodology explained (Figure 10). Extensive weathering was allowed for Field 1 before examination while it was necessary to examine Field 3 within one week of ploughing. Fields 2 and 4 were examined after moderate weathering. Fields 1 and 2 contained the same very stony plough soil with abundant sand and gravel. Surface finds were very sparse in these two fields and mainly consisted of early modern debris. Only one significant small surface find was encountered. Five metres southeast of the standing stone in the middle of Field 1 a flint tool was recovered which has since been identified as a section of sickle blade, possibly Neolithic, by Caroline Wickham-Jones. In Field 2 a fairly large flat slab of local schist was found in the plough soil 12 m northwest of Stone F. It measured 0.4 m by 0.3 m by 0.06 m thick. One large significant surface find was encountered during the geophysical surveying exercise. While surveying in between the four post arrangement of Stones C, D and E and a stump, the probes of the RM 4 came into contact with a large stone immediately below the surface. The corner of this protruded above the surface. A thin layer of turf was easily peeled back to reveal a large, flat stone measuring 0.82 m by 0.23 m lying in a NE/SW orientation and closest to the stump. It is likely that this is the fallen upper body of the stump. After recording the turf was rolled back to its original position. The plough soil in Fields 3 and 4 contained a high proportion of peat. Only early modern debris was encountered on the surface including evidence of nineteenth century liming.

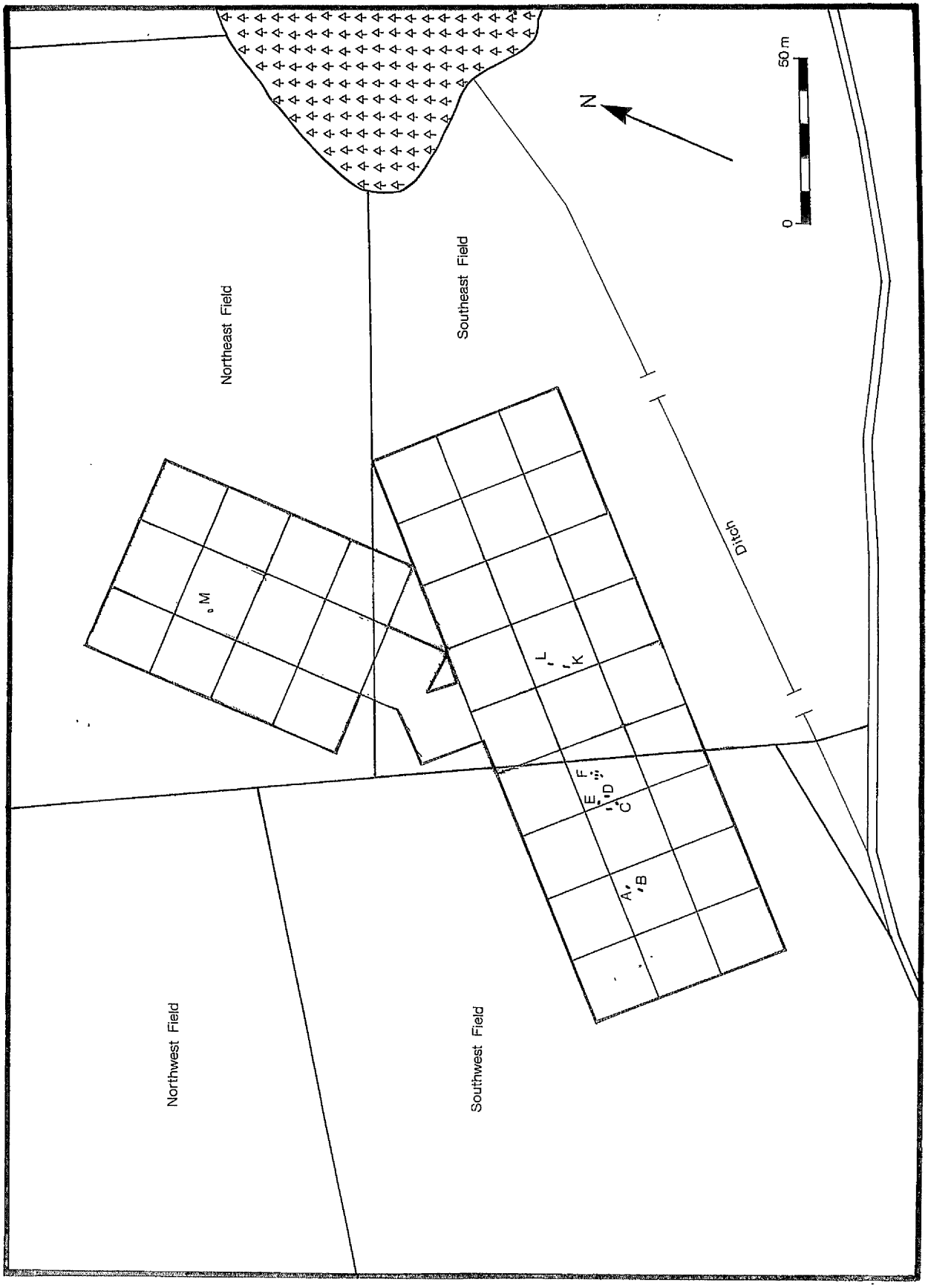


Figure11: Nether Largie Standing Stones and Geophysics Grids

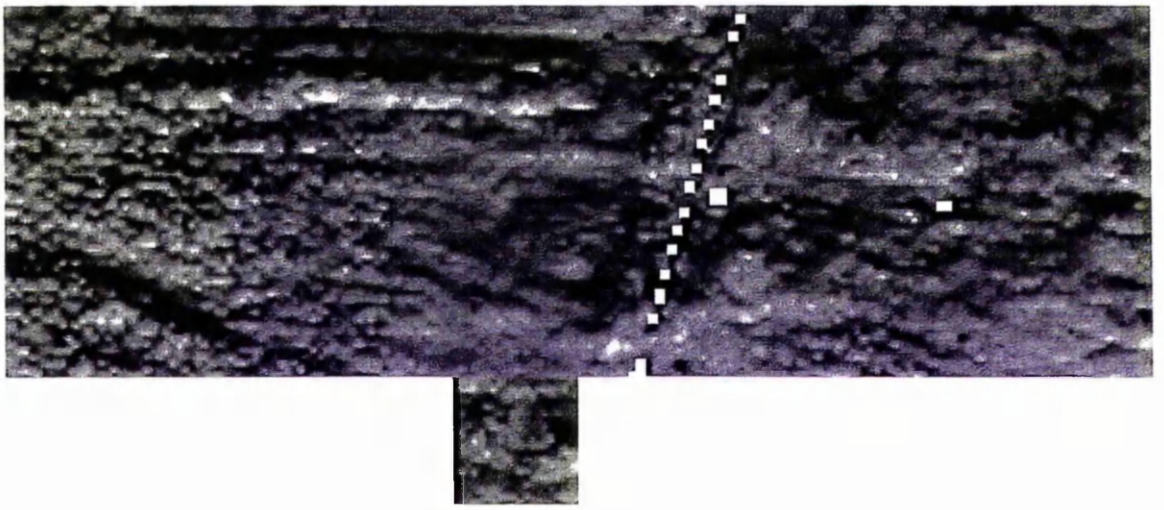
4.2(iii) Nether Largie Geophysical Survey (Figure 11)

Over a number of years a considerable amount of geophysical surveying utilising different machinery and different sampling strategies has been conducted in the vicinity of this monument complex. The instruments employed for the surveying conducted in this area included an RM 4 electrical resistivity meter with a twin electrode probe configuration employing a unit probe separation of 0.5 m and a FM 36 fluxgate gradiometer. Whereas with an RM 15 electrical resistance meter readings are logged automatically and then downloaded to a computer with the RM 4 readings have to be copied down every time the probes are inserted into the ground and then manually entered into a computer. Consequently the RM 4 is a much slower and laborious machine to use.

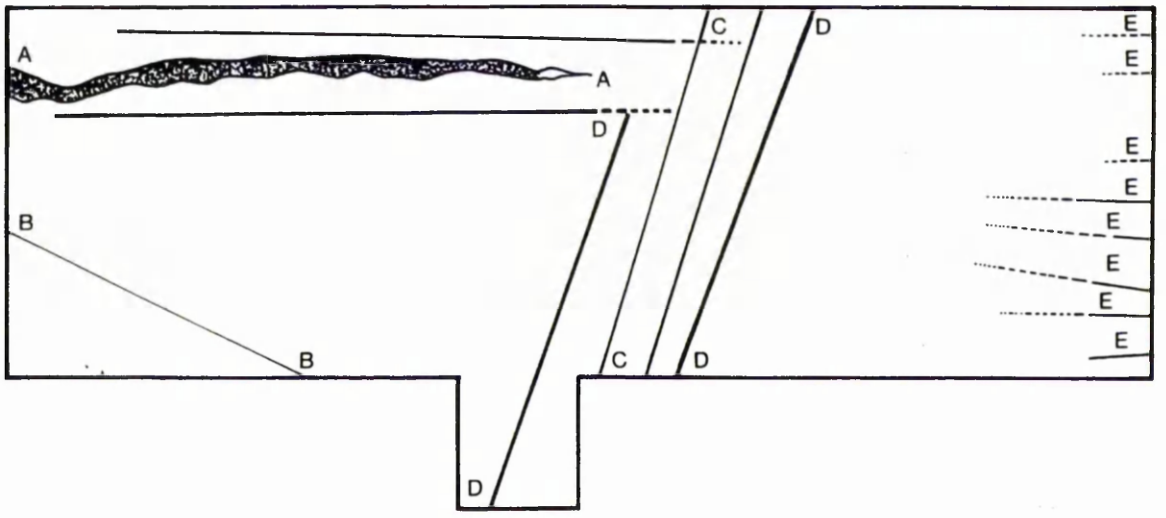
After an initial on-site appraisal with these two instruments the survey of the grids presented here was continued using the RM 4 only since the nature of the data collected with the gradiometer was considered to be of lesser quality. The abundance of wire fencing and the presence of overhead power lines in the vicinity of the survey area also limited the use of magnetic means of prospecting. Therefore only two small test surveys comprising of six and four 20 m by 20 m grids were conducted with the gradiometer. Before each survey was conducted a series of 20 m by 20 m grids were established across the areas to be surveyed. The grids surveyed with the RM 4 and the FM 36 had readings taken at 1m intervals. For the purposes of this study only a percentage of the surveying undertaken at Nether Largie is included, the rest being reserved for forthcoming work as the project is still on going. Two different resistivity survey grids are presented as well as some initial trials with gradiometer surveying that were conducted within some of the same areas.

Grid 1 RM 4 Survey (Figures 12 and 13)

This area comprised 28 grids covering an area measuring 180 m by 60 m and contained the main alignment of the Nether Largie standing stones and an area to their northeast. Geoplot was used to initially process the data with further data processing carried out using 'Datasurv'. The fence between the SE Field and SW Field is represented by a line of white squares running across the graphic where dummy readings were to be recorded because at regular intervals along the line of traverses the fence would obstruct readings from being taken. Dummy readings also had to be recorded at stones G, H and A. For ease of interpretation the results are presented as two sets. The first includes the anomalies that are clearly explainable in terms of more recent land use, and the second includes the anomalies that may be of greater potential archaeological interest. Oblique views of the data are also shown (Figure 13)



Land use



possible antiquities

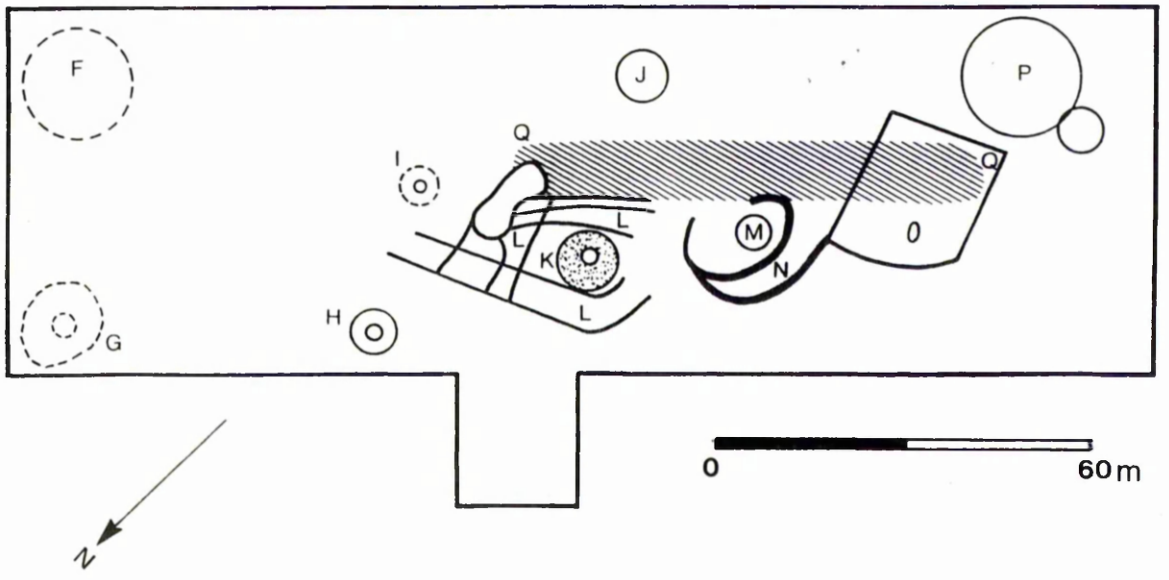
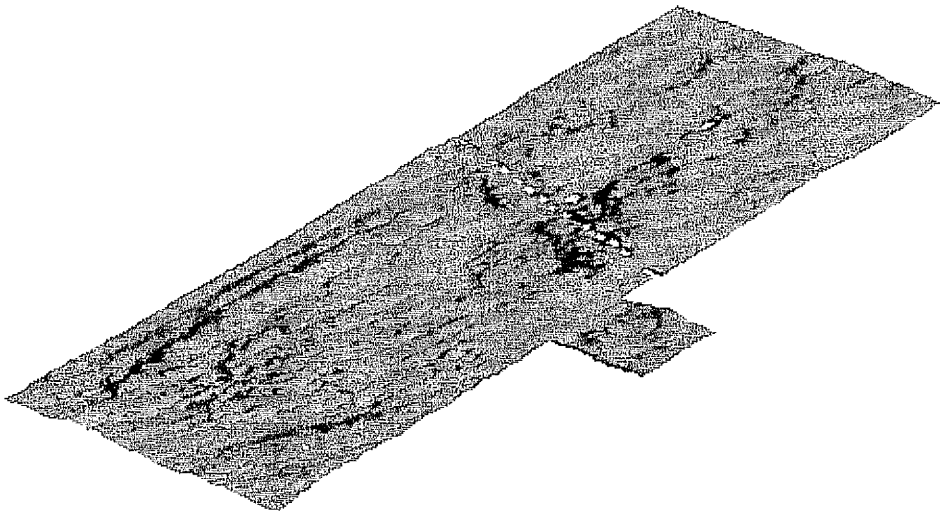
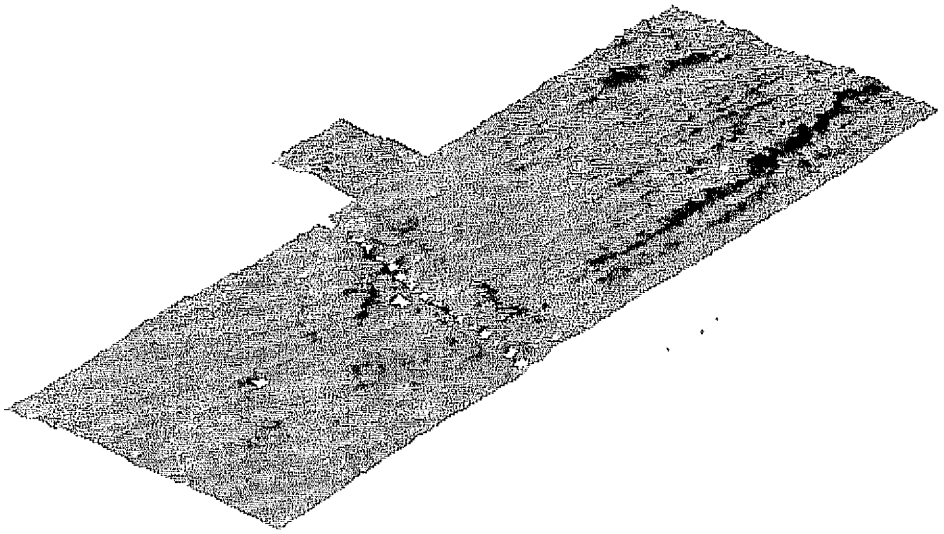


Figure 12 : Nether Largie Grid 1 Resistivity Survey – Overhead View and Interpretation



Oblique View Looking South



Oblique View Looking North

Figure 13 : Nether Largie Grid 1 Resistivity - Oblique Views

Anomaly A

This is the strongest anomaly encountered in the survey and comprises three parallel lines of high resistance running NNE/SSW across the SE Field with the central line being represented by a larger spread of high readings. The sort of buried feature that might produce such an anomaly could have been a wall with a ditch on either side. Other possible explanations might include a large ditch with upcast on either side or the limits of agricultural land use. In archaeological terms anomalies of this nature are fairly recent and provide evidence for landscape alteration as well as demonstrating the effectiveness of the investigative machinery.

Anomaly B

This comprises a line of high resistance running almost E/W across the corner of the survey area in the SE Field. This probably represents old field boundary as it runs parallel and fairly close (about 20m) to the present boundary between the NE Field and SE Field.

Anomaly C and D

Running parallel with the fence between the SE and SW Fields runs a strip of high resistance readings. This is possibly an earlier stone boundary since cleared. It is similar to Anomaly A, though not as clear and there are lines running parallel on either side (Anomaly D). Therefore Anomalies C and D could be interpreted as being similar to Anomaly A, but with lower readings possibly due to the stone content of the soil.

Anomaly E

Anomaly E comprises a column of short, roughly parallel lines, of lower than average background resistance on the edge of the survey area in the SW Field. In the middle of the area they appear to continue as far as the southernmost pair of stones. On the ground surface are two corresponding gouges leading up to the stones.

Anomaly F

Although not very clear there appears to be a faint circular line of higher than average background resistance almost 20m in diameter in the eastern corner of the survey area in the SE Field with Anomaly A cutting through the middle of it. Unfortunately the data collected in this area is very 'noisy' with large variations in neighbouring readings masking normal reading trends. This effect in the readings is probably due to a combination of greater ground disturbance, higher stone content in the soil and survey technique in this area compared to the rest of the surveyed area. This anomaly is worth noting as there is a similar, but much more discernible anomaly (Anomaly P) also contained within this survey area.

Anomaly G, H and I

Anomaly G is situated on the northern side of the line formed by Anomaly B and is a small oval shape surrounded by a line of higher than average background resistance with a smaller circular patch of even higher readings at its centre. Anomaly H is situated about 50m SW of anomaly G but on the southern side of anomaly B and has a circular enclosing line of higher than average background resistance with a smaller circular patch at its centre. It also appears to be in alignment with stones K and L and the outlying stone in the NE Field. Anomaly I is situated about 20m south of anomaly H and, although faint, a pattern similar to anomaly H can be discerned. These three anomalies are quite similar in appearance but their cause cannot be postulated without further information or excavation. The fact that Anomaly H appears to be in alignment with the existing stones raises the possibility that this is the socket of a removed stone.

Anomaly J

Anomaly A appears to terminate before it reaches the fence. In this space and abutting anomaly C a circular band of higher than average background readings is discernible, particularly on the south and east obliques. It could be the case though that the outer parallel lines of Anomaly A actually continue all the way to intersect Anomaly C and give the illusion of there being a circular anomaly.

Anomaly K

Anomaly K is small, but very discernible doughnut shaped area of high resistance with the centre being of very low resistance. It is situated 15 m north of Stone F and it is suggested that this is a strong candidate for being representative of prehistoric activity and could be the remains of an area of stone with a pit in the middle. There are other anomalies around its perimeter but they have been given a separate label.

Anomaly L

Surrounding anomaly K on three sides are three enclosing pairs of roughly parallel lines. The absence of them on the SW may be due to the construction of the field boundary. This anomaly could the result of some form of architectural elaboration around the perimeter of Anomaly k but the rectilinear form of them and the fact that they continue past anomaly K suggests they are the result of plough damage.

Anomaly M

In the SW Field and opposite anomalies K and L are anomalies M and N. Anomaly M is an obvious five metre diameter circular area of high resistance graded in numerical value with the highest readings in the centre. This could be another strong candidate for representing prehistoric activity. Anomalies giving readings of this nature are likely to consist of very hard packed material

such as stone . For example, in the adjacent four post arrangement (element 3, stones C, D and E) the only high reading obtained in an area of fairly low resistance was recorded immediately on top of the large turf covered stone. A large stone was also found on the surface near to this anomaly (see above).

Anomaly N

Curving around the Southwest of Anomaly N are two lines of lower than average background resistance. The inner one appears to curve sharply back around on itself as it runs into Anomaly Q and has Anomaly M in its centre, while the outer line joins Anomaly O at its northern corner. These anomalies are less likely to be the result of plough damage than Anomaly L as they are far less regimented so could be associated with Anomaly M. Low resistance readings of this nature are sometimes indicative of ditches or the edges of a banked area.. Possibly even a bank and ditch.

Anomaly O

Enclosing the southern most pair of stones and a large area of mostly low resistance is a rectilinear, almost D shaped, line of high resistance some 20m across with the pair of stones located nearer the southwest side. There is no indication of such an anomaly around the northern pair of stones, but at Ballymeanoch the survey revealed a similar anomaly enclosing the row of four stones (A-D). Whether these enclosures are part of the monuments' design, a later elaboration while the monuments were still in use or even a later addition after they have gone out of use it is not possible to verify without the sort of information gleaned from excavation.

Anomaly P

In the Southeast Field immediately southeast of Anomaly O is a 20m diameter circular line of higher than average background readings with another small discernible circle some 5m in diameter on its southwest perimeter. Both enclose areas of fairly average background resistance. Such an anomaly could be the result of many different types of structures, but its pattern is one that that suggests an antiquity.

Anomaly Q

Running adjacent and overlapping the ground containing the main stone alignment is an area of very low resistance some 75 m by 5 m and is discernible as a large trough on the graphics particularly the south and east oblique views. If this anomaly corresponded exactly with the monument with a pair of stones delineating each end of it, then the probability of it being constructed with deliberate intent and having an architectural relationship with the stone alignment would be very high. Alternatively it could be a natural anomaly perhaps caused by geological conditions. The fact though that Anomaly Q is so close in location and extent to the stone

alignment cannot be ignored and highlights the possibility that it represents some earlier activity with the standing stones erected in reference to it.

Grid 1 FM 36 Survey (Figure 16)

This area comprised of 6 grids covering an area measuring 60 m by 40 m and was located around Stones K and L in the southeast field in order to avoid the wire fences. The data collected in the field was processed using Geoplot, but no further processing was conducted due to the quality of the data. The small area of white squares in the western corner of the graphic represent where dummy readings had to be recorded due to the proximity of the fence running through the main alignment of the standing stones. It can also be observed that the readings in the vicinity of where the survey grid came closest to the fence were also affected and are represented by the darker area on the graphic around the dummy readings.

Although the RM 4 survey proved successful in detecting a number of anomalies and distinct reading trends, the results of the FM 36 survey within this area proved inconclusive. The results of the RM 4 survey do reveal that the ground in this area has undergone considerable disturbance, particularly due to early modern landscape management activity. As it is ground disturbance that gradiometer surveying is best at locating, the extent of it in this area has probably rendered this method ineffectual.

Grid 2 RM 4 Survey (Figure 14 and 15)

This area comprised twelve 20 m by 20 m grids covering an area measuring 60 m by 80 m. It was located in the Northeast field and covered the area between stones K and L and the outlying Stone M and detected a number of anomalies of potential archaeological interest. The data collected in the field was also initially processed using Geoplot with further data processing carried out using 'Datasurv'.

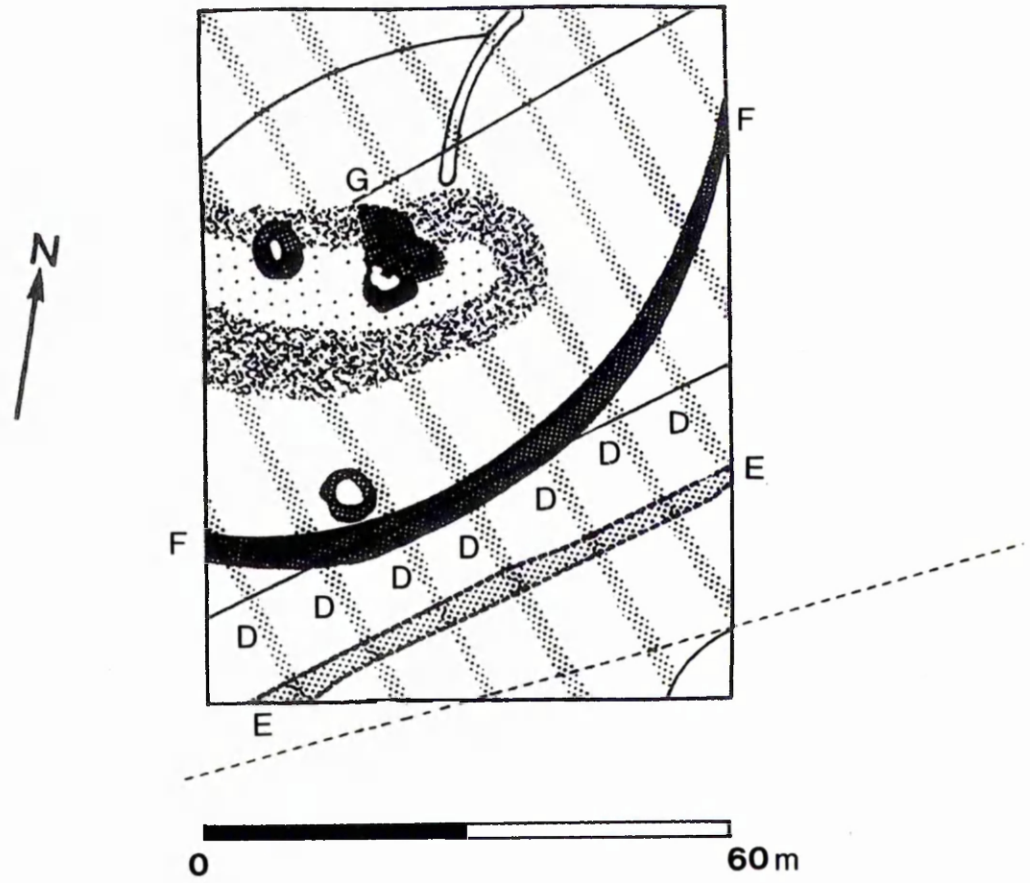
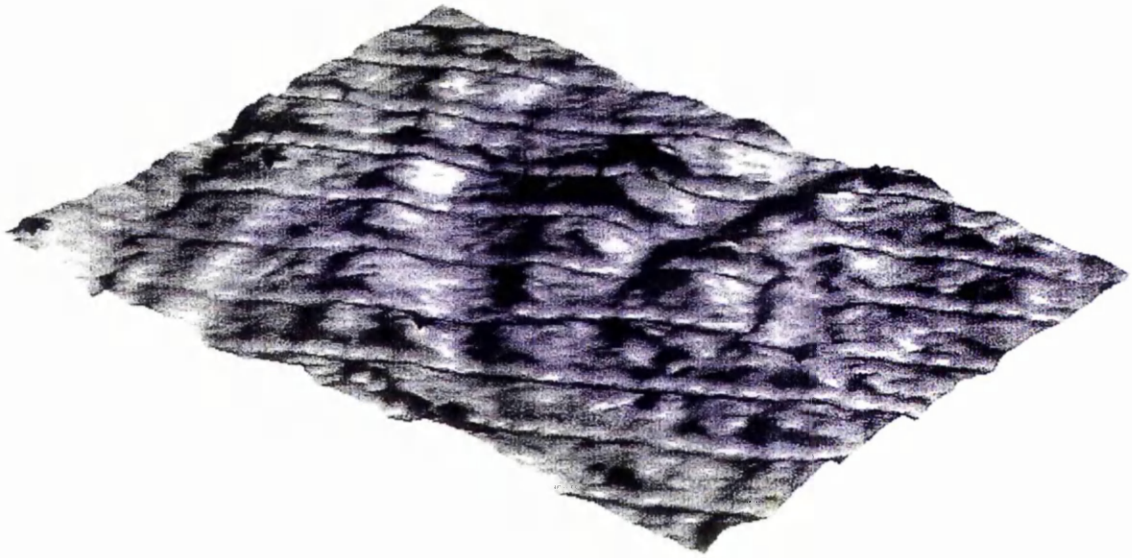
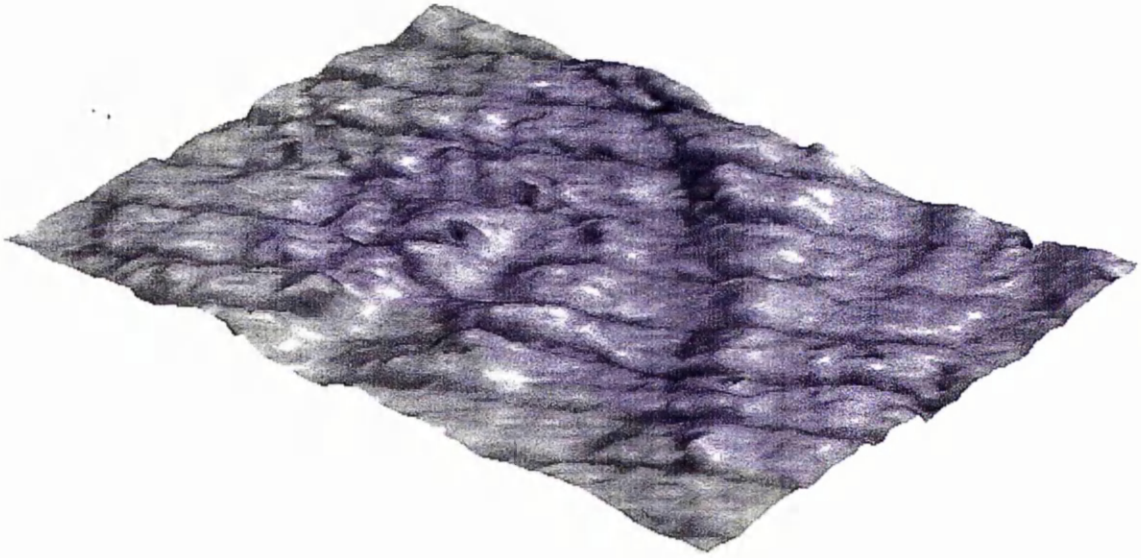


Figure 14 : Nether Largie Grid 2 Resistivity Survey – Overhead View and Interpretation



oblique view looking south



oblique view looking north

Figure 15 : Nether Largie Grid 2 Resistivity Survey – Oblique Views

Anomaly D

The most obvious features depicted in the surface model are the parallel lines running through the entire survey area from east to west. These are almost certainly the remains of 19th and early 20th century rig and furrow. It is interesting to note that they cut across the top of every other anomaly which, suggests that in archaeological terms, they are later features. Assertions of this nature can only be made by viewing the data in three dimensions and, at least on this site, still require to be tested by excavation. Similar geophysical features on other sites have been tested in this manner and this lends some credibility to the inferred relative chronology and interpretation of rig and furrow at Nether Largie.

Anomaly E

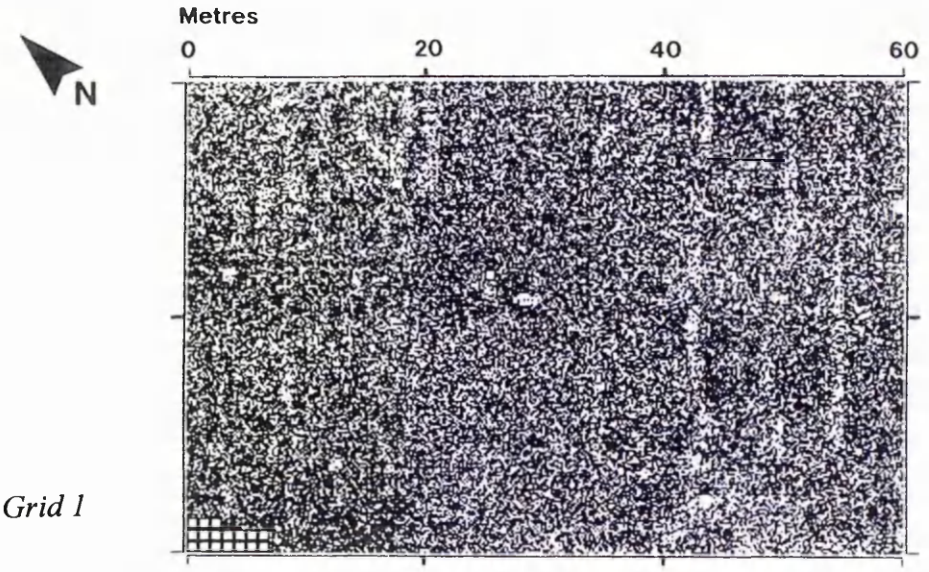
This anomaly is situated to the west of, and running almost parallel with an extant fence and is composed of a straight line of readings that appears to be slightly lower than the readings for the rig and furrow and higher than average background readings. This is most likely an old field boundary or perhaps representative of other agricultural practices employed around the time the rig and furrow was in use.

Anomaly F

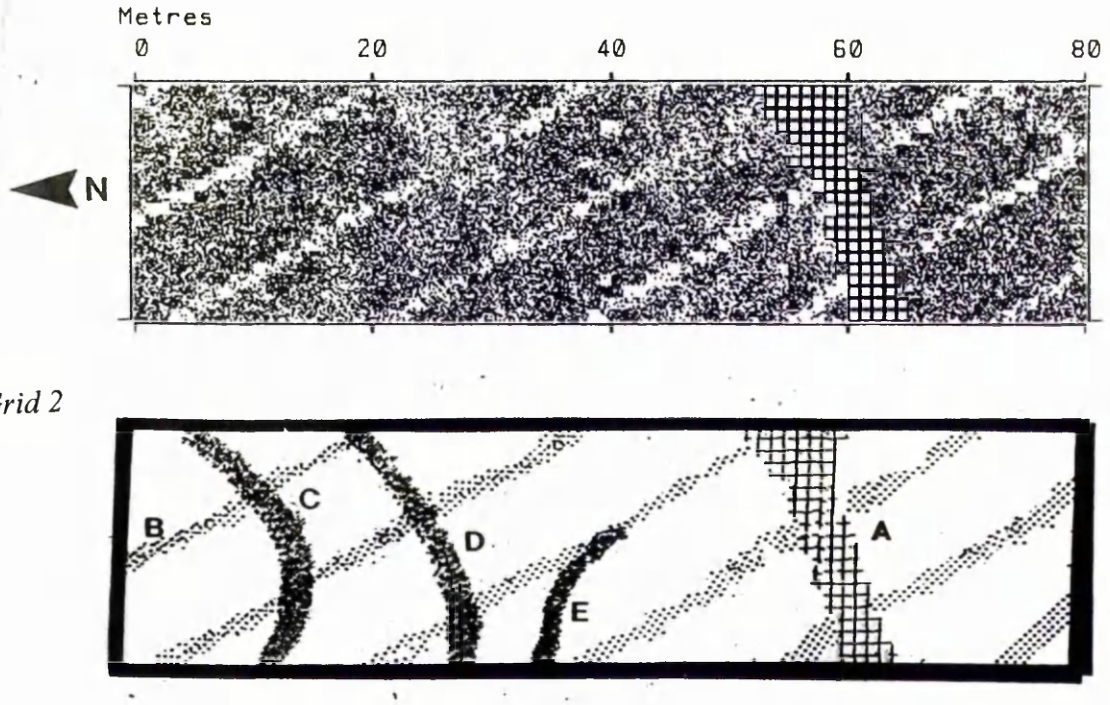
This curvilinear anomaly runs southeast/northwest across the survey area and comprises a broad band composed of high resistance with a parallel and probably associated band of lower resistance readings. A possible archaeological explanation for geophysical anomalies of this nature could be the remains of a bank and ditch complex. Only an expansion of the survey area might elucidate the course of this feature and/or indicate the degree of its survival.

Anomaly G

In the area corresponding to the location of stone Z, there is a small but nevertheless obvious patch of high resistance readings surrounding an inner patch of low readings. This is also situated in the middle of a long narrow stretch of low readings banded by an area of higher readings roughly corresponding to a slight extant mound in upon which stone Z is located. An anomaly of similar character and dimensions can be seen about 13m northwest of stone Z. Due to the similarities of the geophysical nature of the feature surrounding stone Z, it raises the possibility that this feature may represent the stump or site of an additional stone.



Grid 1



Grid 2

Figure 16 : Nether Largie Grids 1 and 2 Gradiometer Survey –

Overhead Views and Interpretation

Grid 2 FM 36 survey (Figure 16)

This area comprised four 20 m by 20 m grids covering an area measuring 80 m by 20 m. It was located to examine the corridor between stones K and L and the outlying Stone M. Geoplot was used to process the data collected during this survey but as the initial graphics produced were of good quality and it was a small survey no further data processing was carried out. Despite a wire fence running through the grid the results of this survey proved far more successful than that conducted in the southeast field and a number of anomalies of interest were detected that corresponded with those detected by the RM 4 survey. The series of white squares represent the location of the fence where dummy readings had to be recorded. It should be noted that readings were not recorded as close to the fence as in the gradiometer survey of grid 1.

Anomaly B

Corresponding with and like Anomaly D in the resistivity survey this was the strongest anomaly encountered in the grid and comprises a series of parallel lines of distinctly low magnetic probably representing the remains of earlier rig and furrow agriculture. These readings are somewhat peculiar as the resistivity readings for this anomaly suggest the presence of cut features and the gradiometer readings suggest that they are composed of built features. The possibility that these features represent drainage should now be considered.

Anomaly C, D and E

These anomalies are similar in character and comprise narrow curvilinear bands of magnetically higher than average background susceptibility. The concave side of Anomalies C and D face north while with Anomaly E it faces the opposite direction. Readings of this nature are suggestive of cut features such as a series of ditches. These anomalies all have corresponding, but slightly offset resistivity anomalies that are suggestive of banking. Anomaly C in the gradiometer survey appears to follow the edge of the slight mound that the standing stone sits on.

4.2(iv) Summary of Nether Largie Field Walking and Geophysical Surveying

Resistivity surveying proved the most profitable method in the grids surveyed at Nether Largie that are presented here. The results of the gradiometer surveying varied between the areas where it was tested. A large number of geophysical anomalies were encountered, some of which were of potential archaeological interest, but the most striking ones can all be associated with post-improvement enclosure and agricultural practices. The field boundaries themselves caused the most distinctive geophysical anomalies. Interpretation is further complicated by surface geology resulting from glacial drift and the ground having undergone severe disturbance in the past during

the process of peat removal, improvement and ploughing. The results of the field walking in this area also demonstrate a greater level of peat removal between Temple Wood and the Kilmartin Burn than the other areas that were walked and a distinct lack of surface finds any earlier than the post medieval period in almost all areas examined.

The possibility that the standing stones were part of a longer row now seems unlikely, but the possibility that another stone once stood between stones K and L, and the outlier in the Northeast Field, has been raised due to the location of Anomaly H (Grid 1 RM 4). In this particular setting there could be a possibility that anomalies such as K and M may be representative of additional sockets or cairn material. The possibility that several small enclosures associated with the monument once existed has also been raised with Anomaly N's association with Anomaly M and Anomaly O's association with stones A and B. Other anomalies of particular interest are Q and P. Q may be geological in origin but if not then there is a possibility it could represent some earlier activity with the stones being erected in reference to it. Anomaly P is perhaps the most intriguing of the anomalies with virtually dozens of possible interpretations for such a context. As it is on ground that was mostly under peat until the beginning of the 19th C, it is assumed to be an antiquity. It also appears to represents an enclosure which survives underground as a ring of hard packed material such as the remains of a stone kerb or wall, stone packing material of a palisade or an embankment. In the Northeast Field both instruments detect the same anomalies but readings suggest they are composed of different materials. As the anomalies are slightly offset the instruments could be reading different aspects of the same anomalies. If so, there is a possibility of the mound containing the standing stone being surrounded by a bank with another possible ditch and bank arrangement associated with it. It must be noted that anomalies responsible for the ditch and bank arrangement may be geological in origin and represent the remains of a ploughed out fluvioglacial channel.

4.3(i) Ballymeanoch (Figure 17)

One kilometre to the southeast of the Nether Largie complex of prehistoric monuments is situated the Ballymeanoch complex of prehistoric monuments. This group is mainly located on a fluvioglacial outwash terrace on the south-east side of the entrance to the Kilmartin Glen. The terrace is 20m OD in height and some 0.5 km in area with a roughly triangular shape. The topography of the terrace appears wide and flat, but on closer inspection it is more rolling and cut by a series of shallow gullies. The edges of the terrace form steep bluffs, particularly on the northwest and south. This higher ground provides extensive views across the valley floor to the north-west, and the Moine Mhor to the south. Most notable in this important group of Late

Neolithic and Early Bronze Age monuments are Baluachraig rock carvings, Dunchraigaig cairn, Ballymeanoch henge, Ballymeanoch barrow, Ballymeanoch kerb cairn and the Ballymeanoch standing stones. All lie within 500m of each other. Within the plantation area on the northwest of the terrace, which was felled in 1996, are two other known monuments, a cist and a possible cairn. Within the plantation on the southern edge of the terrace is another probable cist (Kahane 1978, 23). In 1973 a Neolithic carved stone ball was found lying on the surface some 200 m southeast of the henge (OS 1973).

The Baluachraig rock carvings comprise of a number of cup-and-ring markings and plain cup-markings on an outcrop of natural rock sheet commanding a view looking west across the entrance of the Glen. They are located 230 m northwest of Dunchraigaig cairn and just above the 20m contour line on sloping ground outwith the terrace. Dunchraigaig cairn is a Bronze Age burial cairn with remains measuring 30m in diameter and 2.5m in height. On the northern side of the perimeter are three earthfast boulders that are probably the remains of a kerb. During the 1860s Greenwell investigated Dunchraigaig cairn and revealed three cists containing a number of inhumations and cremations. Finds included two food vessels, flint chippings, a whetstone, a flint knife, a greenstone axe and some fragments of pottery (Greenwell 1866, 347-8).

The henge at Ballymeanoch is 500 m south of Dunchraigaig cairn. It measures 40m in diameter and comprises a denuded outer bank with an internal ditch that are broken by two entrance causeways on the northeast and southwest. The interior of the henge contains a much robbed round cairn with one central and a satellite cist. In 1864 Greenwell found the central cist to be empty while the satellite contained the remains of three inhumations and a fragmentary Beaker (Greenwell 1866, 348-9). The Barrow is 200 m northeast of the henge and comprises a turf covered mound measuring 30 m in diameter and 1.4 m in height. A trench excavated by Craw in 1928 revealed that the mound consisted chiefly of earth and boulders. At a depth of about 1.0 m a layer of charcoal covered the old ground surface but no finds were encountered (Craw 1929, 189), so there is still some doubt as to the authenticity of this barrow. One hundred and thirty-five metres WNW of the barrow lies Ballymeanoch kerb cairn. It measures 6.9m in diameter and 0.7m in height and is surrounded by a kerb of upright boulders of which eleven still survive. Some of these boulders appear to have been displaced. There is no record of this cairn ever being excavated.

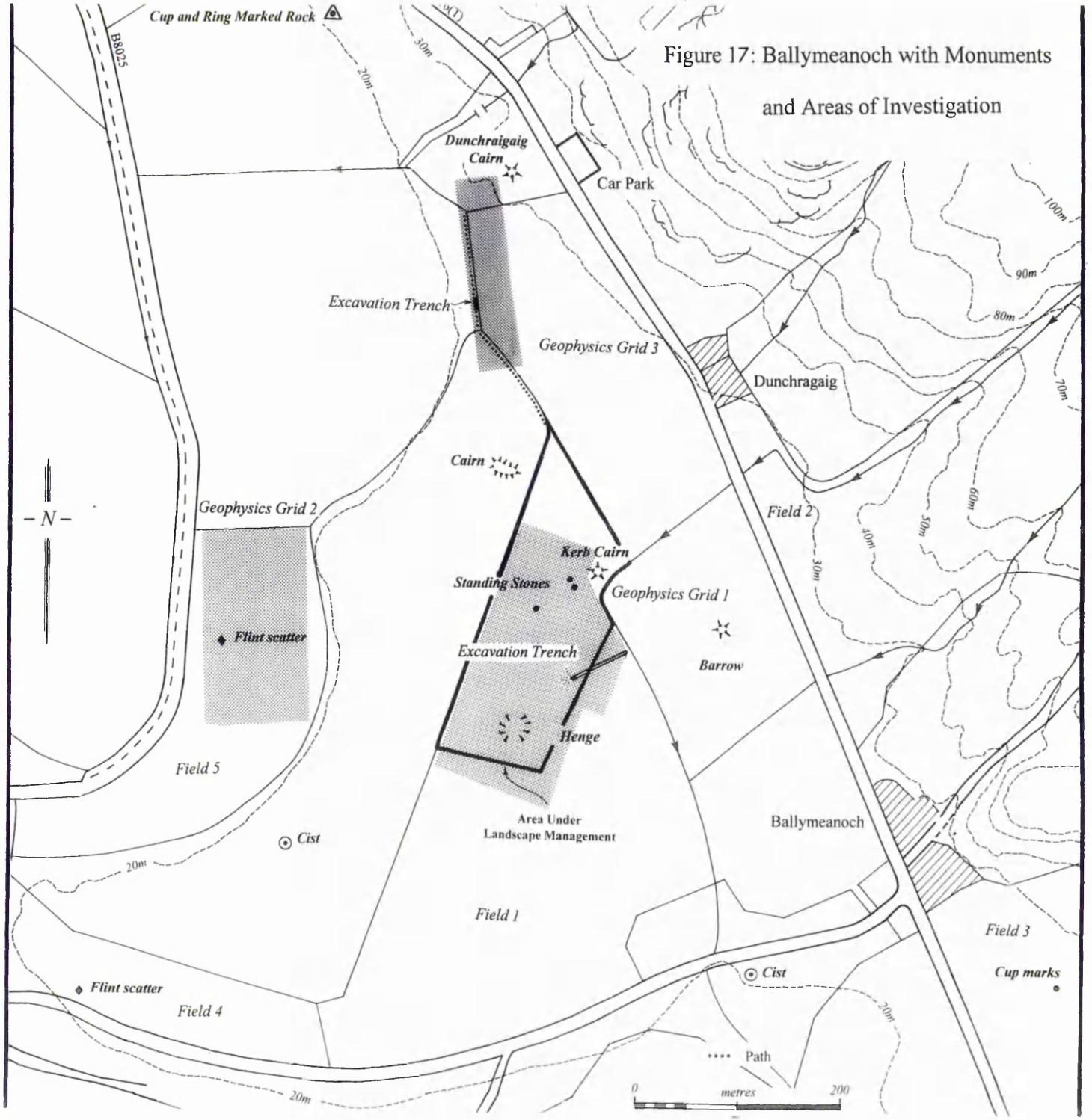


Figure 17: Ballymeanoch with Monuments and Areas of Investigation

The cairn in the plantation is about 100 m northwest of the standing stones and was investigated by Craw in 1929 when he recorded it as being 55 feet by 35 feet. Nothing to suggest that it is an antiquity was encountered during his excavation (Craw 1930, 135). The cist is some 90 m southwest of the henge and it location was only accurately plotted in 1996 during a survey of the ground after felling of the plantation (Carter 1996). Previous to this the cist had last been reported by Marion Campbell (DES 1965, 8-9). Eight hundred metres SE of the henge on then southern edge of the terrace is a slight mound with a flat stone on the top which probably is the remains of another cist (Kahane, 1978). There have been several other references to cists being located within the woods in the area of Ballymeanoch but the sites have since been lost.

Thirty metres SW of the kerb cairn are a unique group of standing stones all of the local metamorphic rock and averaging about 3m in height. Two of the stones are extensively decorated with cup-markings and a seventh stone fell sometime at the end of the 19th century. The stump of this stone was removed in 1977 and the socket excavated. The only significant find was of three small patches of burnt bone at the bottom of the socket, which may have represented a foundation deposit (Barber 1978, 104-12). The remains of this stone, which is also heavily decorated, now lie in the culvert next to the kerb cairn.

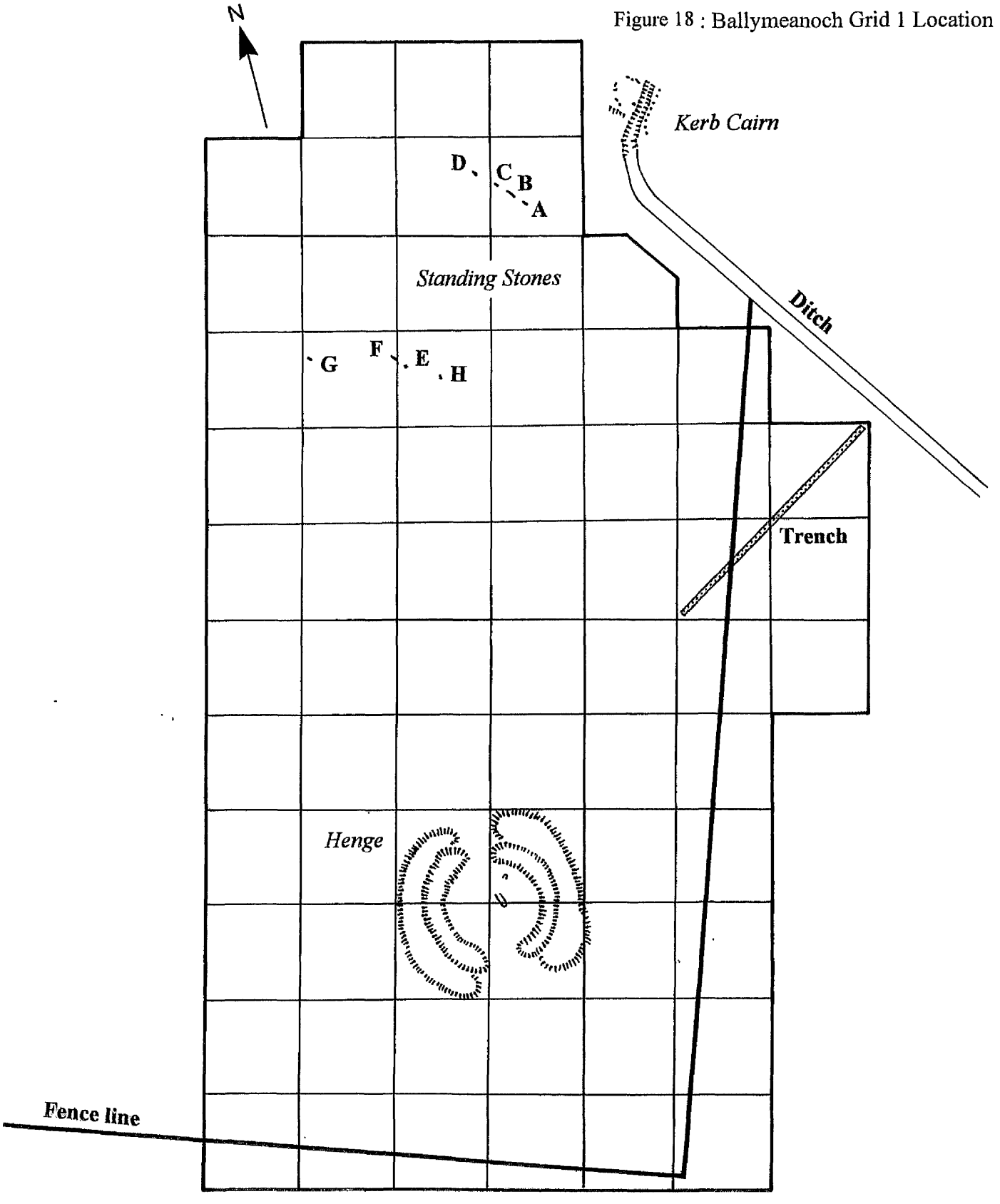
The complex of standing stones appears to be composed of three main elements.

1) Aligned NW/SE are four large, flat sided stones, graded in height and with their long axis parallel to the main alignment (Stones A-D, RCAHMS 1988, 128, Figure A).

2) 41m SW of the above and running parallel is a pair of standing stones (Stones E and F, RCAHMS 1988, 128 Figure A).

3) There is one known outlying stone from the main complex. 18m NWN of Stone F is the site of the fallen stone, Stone G. Like the other six stones it was erected with its long axis running NW/SE (The plan of the Ballymeanoch standing stones, RCAHMS 1988, 128, Figure A., erroneously shows Stone G set at right angles to the linear settings).

Figure 18 : Ballymeanoch Grid 1 Location



area covered by grid (composed of 20 m x 20 m boxes) showing monuments, trench location and fence line of area under landscape management

4.3(ii) Fieldwalking at Ballymeanoch

Within the period of investigation only five different fields in the vicinity of the Ballymeanoch monuments were ploughed and thus able to be walked following the above methodology (Figure 17). Extensive weathering was allowed before walking of Fields 1 and 5, while it was necessary to examine Fields 2, 3 and 4 within one week of ploughing. In four of the five fields surface artefacts were sparse, but four new sites were discovered. Field 1 contains the highest concentration of upstanding monuments in the study area. It contained a very stony ploughsoil with inclusions of gravel and peat yet was very rich in sand and silt. In this field small surface finds were very sparse and were only representative of Early Modern activity. A large flat stone of the local slatey schist was found protruding from the ploughsoil 10 m SE of Stone E and 31m SE of the excavated stump of Stone G (Figure 17, Stone H). It lay almost flat in the plough-soil in a NW/SE direction with up to 0.8m of the NW end exposed and the SE end still buried in the plough soil. Across, the stone measured 0.65m and at its broadest point measured 0.3m. The stone had never been encountered before, or referred to in any records

Fields 2 and 3 are located immediately northeast of the A 816 on gently sloping ground at the head of the Ballymeanoch fluvioglacial outwash terrace between the plateau of the terrace itself and the steeply rising hills to the northeast (Figure 17). The plough soil was the same in these two fields and comprised light red/brown hill washed stony silt. Although somewhat denser in surface artefacts, no surface finds earlier than the post-medieval period were encountered. In Field 3 unrecorded cupmarks were discovered on a rock outcrop 160 m southeast of Ballymeanoch House. On the flat summit of the outcrop, which measures 1.25 m by 1.25 m there are nine distinct cup marks and at least four faint ones. In Fields 4 and 5 the ploughsoil was similar to that in Field 1 but was less homogenous, with areas that contained more peat, or stones, gravel and sand. As well as the usual early modern debris, Fields 4 and 5 yielded prehistoric flint scatters.

Field 4 is located along the southwest tip of the fluvioglacial outwash terrace on the immediate north side of the track known as Long Walk. Fourteen fragments of flint were recovered in an area measuring 100 m by 50 m. The flints were mostly encountered towards the southern side of the grid but randomly over a distance of 100 m, the middle being close to NR 8300 9600, but other than this there was no distinct concentration. The assemblage, which is mostly debitage, includes decortical and rejuvination as well as worked flakes. Field 5 occupies the low terrace between Monadh an Tairbh and the B 8025. The terrace sits at about 15 m OD and was formed by incision of the Kilmartin Burn removing a portion of the main terrace after falling sea levels. Over one hundred lithics have been recovered and mapped in this field (Figure 24). They all fall within an area measuring 200 m by 50 m and on a small D-shaped plateau formed by the edge of the terrace

on one side and a meander of an old fluvioglacial channel on the other. The surface finds occurred in three main concentrations and the parent material was mainly flint, chert and pitchstone. The assemblage included blades, cores, scrapers, worked flakes and a high percentage of mixed debitage and rejuvination material. A programme of additional work has since been conducted at this site which has included a geophysical survey, the results of which are presented below in Grid 2.

4.3(iii) Ballymeanoch Geophysical survey

Like Nether Largie a considerable amount of geophysical surveying has been conducted in the vicinity of Ballymeanoch monument complex utilising different machinery and different sampling strategies. Three different survey grids are presented each from a different area within the vicinity of the upstanding prehistoric monumentality.

Ballymeanoch Grid 1 (Figures 18 to 23)

Due to the mixed success of results with gradiometer surveying at Nether Largie and the cost of conducting two surveys within a limited budget the initial surveying at Ballymeanoch was conducted using electrical resistivity only. The same methodology as at Nether Largie was utilised but with an RM 15 rather than an RM 4. A total of seventy 20m by 20m grids were surveyed with a sampling interval of 1m. The survey concentrated on the ground around the standing stones and the henge (Figure 18). This method proved very successful in detecting a large number of anomalies (Figures 19 and 21). For ease of interpretation the anomalies have been divided into three groups: (i) Geological and Land Use, (ii) Possible Antiquities 1 and (iii) Possible Antiquities 2 (Figure 20). Oblique views of the data have also been included (Figure 21). Anomalies that are easily discernible are represented in the interpretative illustrations by unbroken lines; those less discernible by broken lines. The white circular area in the middle of the southern half of the results (Figure 19) is a patch of dummy readings where the henge is located and was unsurveyable due to ground cover. The location of the standing stones can be pin-pointed by the patches of white at the northern end of the survey area; the dummy readings were due to the large amount of clearance stone dumped around the base of the stones.

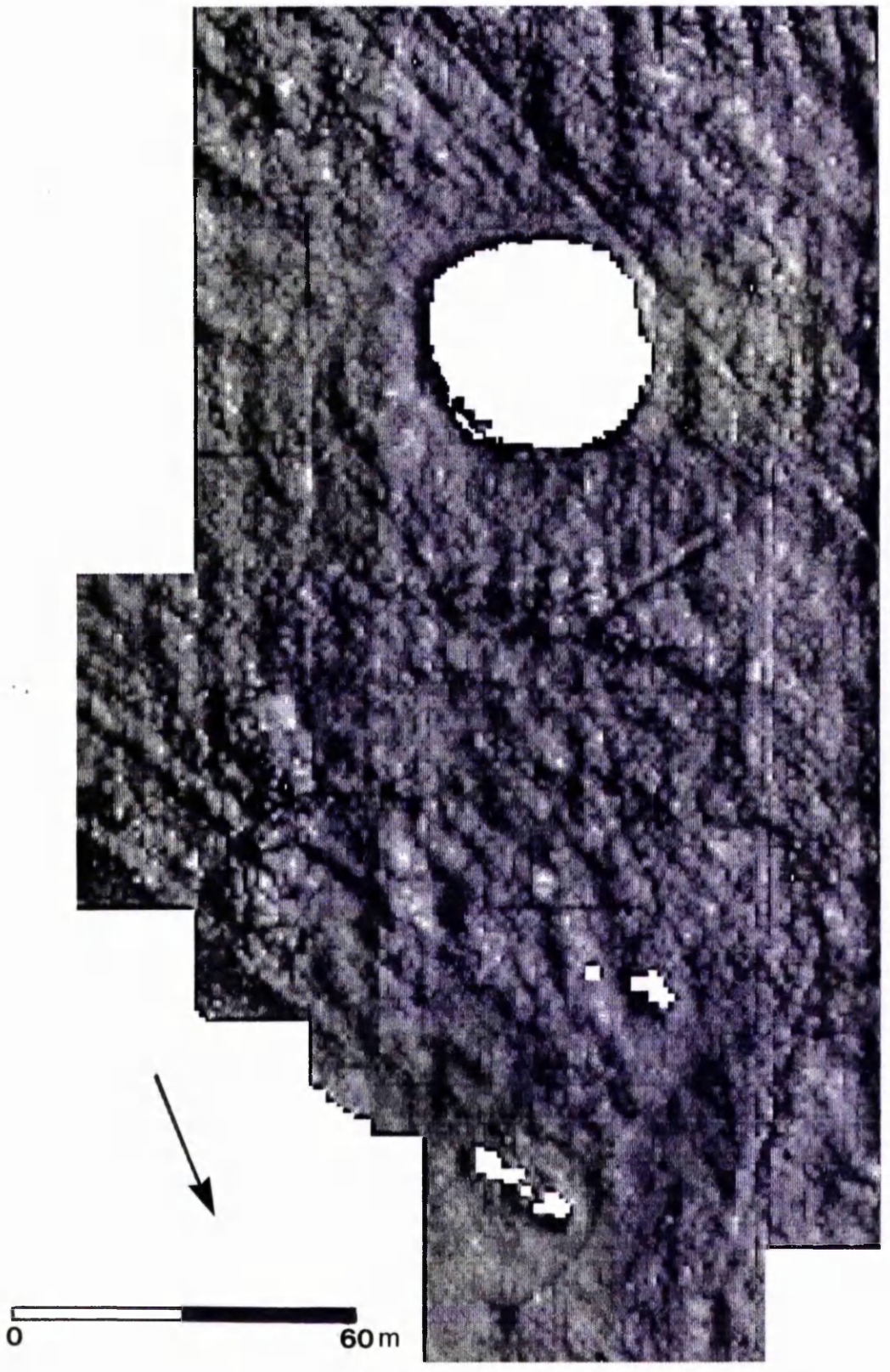


Figure 19 : Ballymeanoch Grid 1 Resistivity Survey – Overhead View

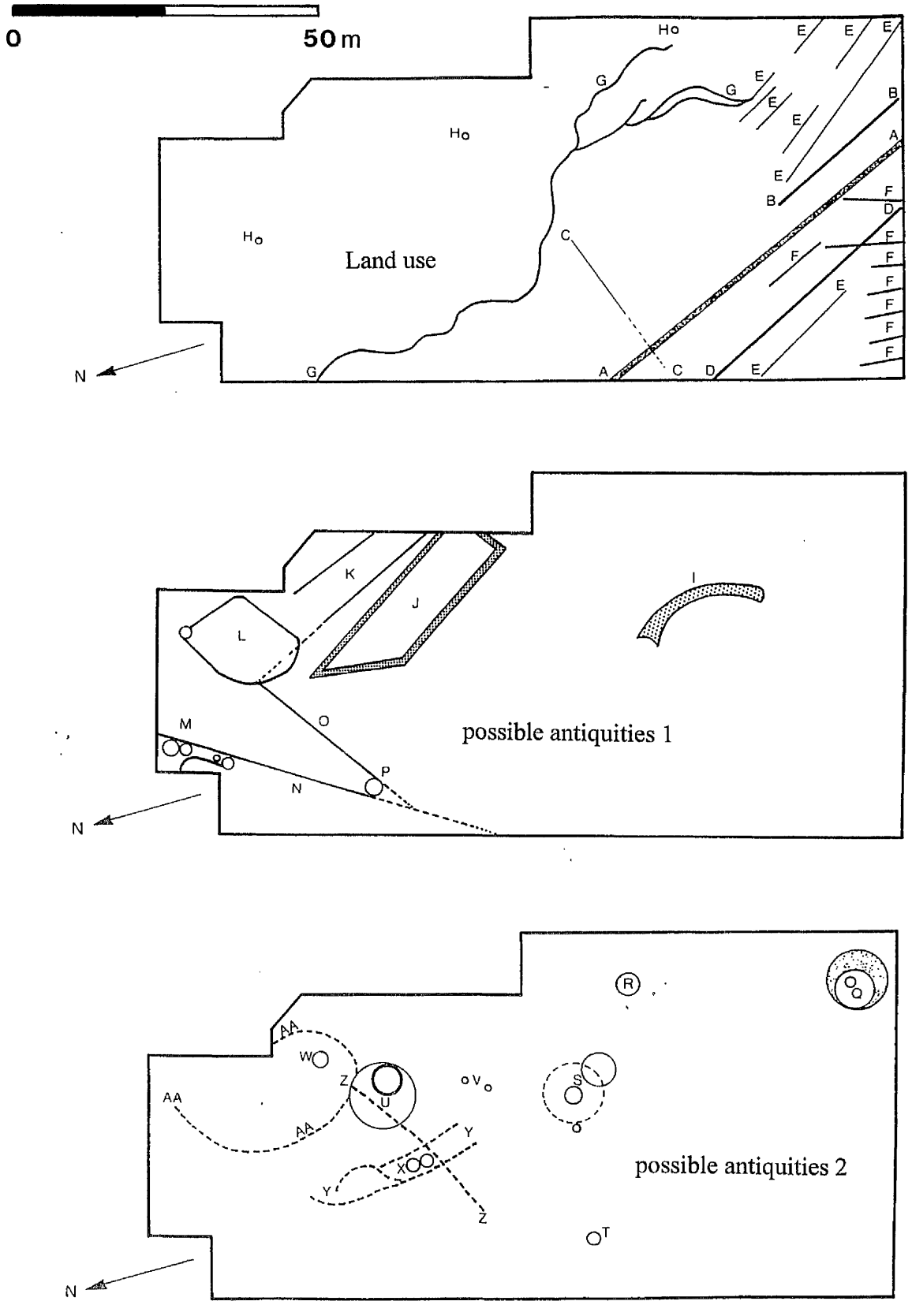
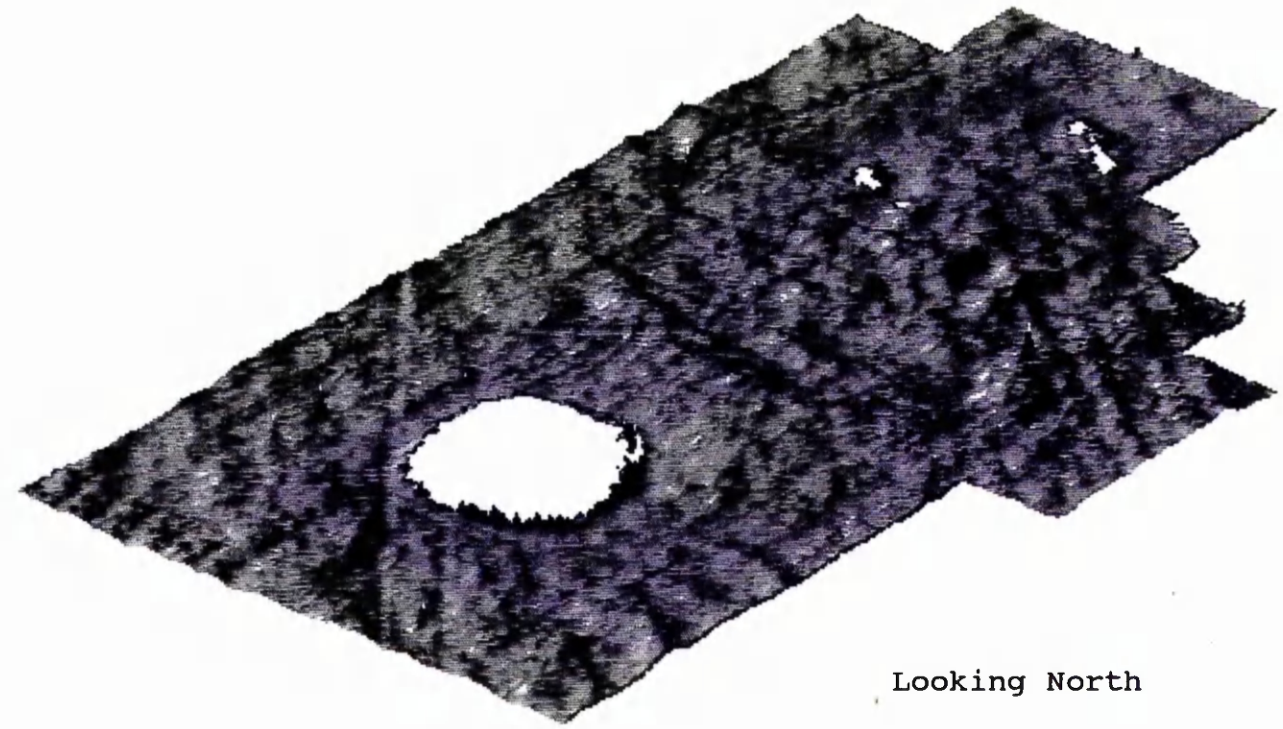


Figure 20 : Ballymeanoch Grid 1 Resistivity Survey - Interpretation



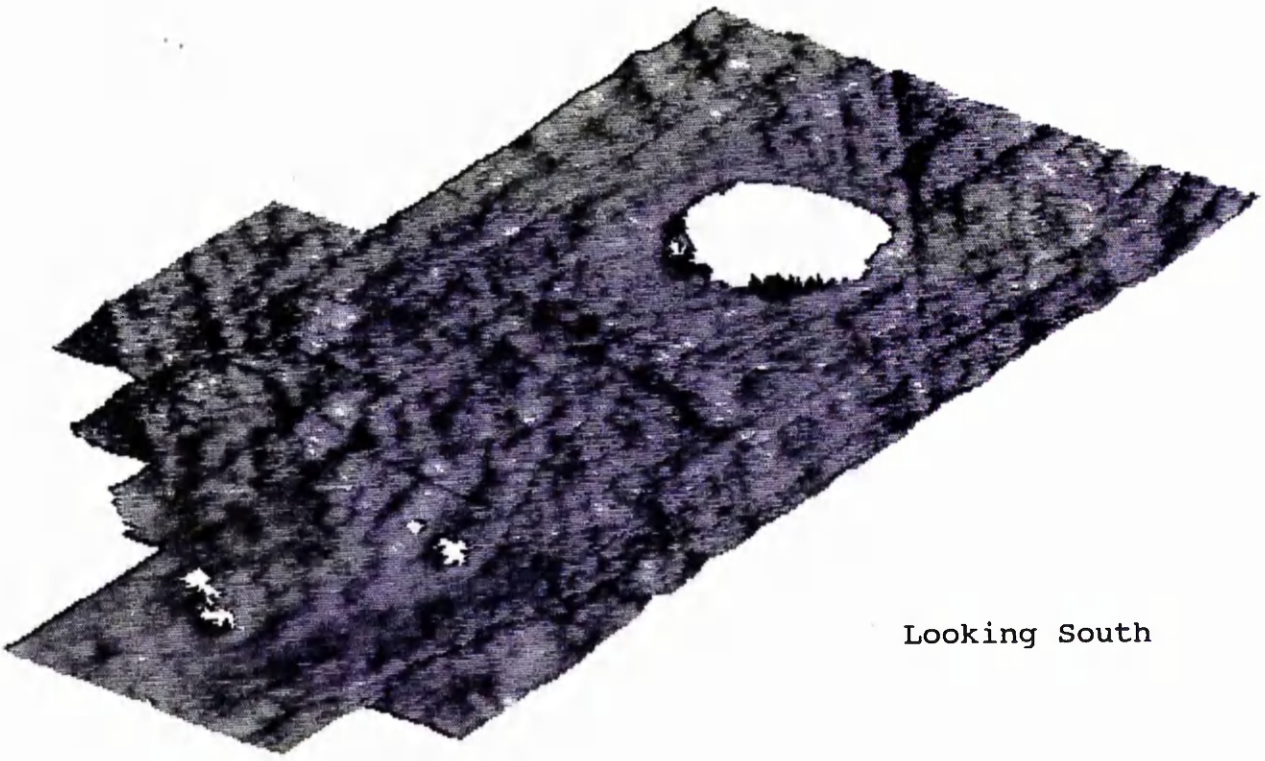


Figure 21 : Ballymeanoch Grid 1 Resistivity Survey – Oblique Views

Anomaly A

Running north/south across the western corner of the survey area are two very close parallel lines delineating a thin stripe of lower than average background resistance. This corresponds exactly with an old field boundary marked on the 1865 1st Edition Ordinance Survey map that has since been removed.

Anomaly B

12m east of Anomaly A and running parallel, but only as far as the henge is a single line of low resistance. This is likely a land division feature contemporary with Anomaly A. Whether it is a field boundary or the demarcation of the ploughed ground or the result of some other agricultural practices, enough information at present is not available to say.

Anomaly C

30m to the N of the henge and at a right angle to Anomaly A are located another pair of lines similar to Anomaly A but much shorter. On some of the graphics they appear to continue through Anomaly A and off the survey area. This is very probably another old field boundary but a match for it is not available on any maps.

Anomaly D

About 20 m south of Anomaly A and running parallel is a narrow line of higher than average background resistance. This could possibly be an old field boundary, but more likely to have a closer association with Anomaly E and be the result of ploughing and the demarcation of agricultural land.

Anomaly E

Also running roughly parallels with Anomalies A and D, and on both sides are various lines of high resistance. Such anomalies are very common on agricultural land and are usually the result of ploughing.

Anomaly F

In the Southwest corner of the survey area are seven roughly parallel lines of high resistance each separated by about 10m. These are probably agricultural in origin and fairly recent as they are such strong anomalies.

Anomaly G

Anomaly G is a long meandering line of high resistance running roughly north/south across the middle of the survey area that appears to fork out and diminish on the east side of the henge. Such

an anomaly is almost certainly geological in origin. Although the pattern resembles that of a dried up stream bed we would expect such a feature to register as a meandering line of low resistance not unless it contained a lot of stone or had been filled with rubble. If it is a stream-bed it appears to be heading towards the terrace edge and a gully viewable on the other side of the plantation that leads down to the Kilmartin Burn

Anomaly H

This comprises three small circular anomalies of low resistance exactly the same distance apart running almost north/south across the survey area. These correspond exactly with the positions of the telegraph poles running through the survey area so the anomalies represent the pits dug to accommodate the telegraph poles.

Anomaly I

A band of low resistance can be seen running round the eastern perimeter of the Henge that corresponds exactly with the remains of the ditch on this side of the henge. On the west of the Henge surveying only included the very edge of the bank. Where readings were recorded over the remains of the bank nothing distinctive was recorded. This is probably as it is now almost all ploughed away.

Anomaly J

This comprises a large rectilinear anomaly of higher than average background resistance running northwest/southeast and off of the survey area. This is possibly the result of plough scars but any other parallel lines in the vicinity are of much lower resistance. This is a very strong anomaly of uniform shape with its southern side in alignment with stones E and F. On some of the graphics a large circular anomaly of very high resistance can be seen adjoining the northern end of Anomaly J. The circular anomaly is described on Interpretation Plan 3 (Anomaly U). The possibility that such a large anomaly in association with settings of standing stones could represent the remains of a prehistoric activity such as a ritual avenue should not be ignored.

Anomaly K

This anomaly comprises two lines of higher than average background resistance, though not as high as Anomaly J but running roughly parallel with it and almost in alignment with stones A-D. On some of the graphics the more southern of the two lines appears to join onto Anomaly L while on others it appears to form a right angle with Anomaly O. If Anomaly O turns out to be a field boundary then Anomaly K could be as well. Then again Anomaly K could be plough scars or some form of land delineation associated with Anomaly L.

Anomaly L

This is a line of higher than average background resistance that appears to enclose stones A-D. It is very strong on the northern end and visible on all the graphics. Lines enclosing the other sides are not as strong so may not be related. On the northeast corner of this enclosure is a small circular anomaly of low resistance. Inside the enclosure and around stones A-D, is mostly of low resistance, but immediately around the stones there is a narrow band of high resistance probably due to packing material and clearance stone lying underground around the standing stones.

Anomaly M

Four small circular anomalies are aligned in the northern corner of the survey area. These might be part of Anomaly N, however the most northerly of the circles is a very strong anomaly and appears to be in alignment with stones A-D (particularly evident in the oblique views) and all may therefore be of archaeological significance.

Anomalies N, O and P

Anomaly N runs northeast/southwest across the northern corner of the survey area and comprises a linear band of low resistivity. As it does not appear on any early maps it is probably a pre 1865 field boundary. Anomaly O is the line running between the intersection of Anomalies K and L and Anomaly P. Anomaly P is a small circle at the intersection of Anomalies N and O and is very close to the location of Stone G. Due to the layout of these anomalies there could be a possibility that they represent a much earlier landscape that utilised monument location in its division.

Anomaly Q

Anomaly Q is about 20m in diameter and is located about 30m south of the henge and consists of two enclosing circles of high resistance, one inside the other and with a small area of low resistance at their centre. This anomaly could represent some structure associated with the use of the henge.

Anomaly R

About 20m due east of the henge is a strong circular anomaly discernible on all the graphics. It comprises a circle of high resistance about 8m in diameter enclosing an area of apparent normal background resistance. With its proximity to the henge the suggestion is that Anomaly R could represent traces of a prehistoric structure built with reference to the Henge.

Anomaly S

Some 20m northeast of the north entrance to the henge there is a strong circular anomaly of high resistance about 7m in diameter. Although it is in the area of geological disturbance it is still discernible and on some of the graphics a larger enclosing circle almost 20m in diameter with a

small circle of high resistance on its western edge can be seen as well. Overlapping this larger outer circle on its south side is another circle some 10m in diameter. These could represent prehistoric activity or may in fact be the result of the unusual geological anomaly that runs through this area.

Anomaly T

About 30m northwest of the north entrance to the henge is a small circular band of higher than average background resistance that appears to enclose a small area of lower than average background resistance.

Anomaly U

At the northwest end of Anomaly J and corresponding with its edges is a circular line of high resistance some 20m in diameter. On some of the graphics this is not immediately apparent while on others it is very strong. Inside the eastern edge is a smaller circular patch of very high resistance, about 10m in diameter. Visible on all the graphics it is the strongest anomaly encountered in this survey and could represent a deposit of stones.

Anomaly V

About 20m SW of Anomaly U are two small circular patches of low resistance. Lying about 5m apart they arouse suspicion simply because they are similar. Such anomalies could be interpreted as pits.

Anomaly W

About 20m south of stone A is a small circular patch of low resistivity.

Anomaly X

Less than 20m south of stones E and F are two small circular areas of low resistivity immediately adjacent to each other and enclosed by a line of higher than average background resistivity. This is an anomaly that is similar to that occurring at the northern pair of standing stones at Nether Largie.

Anomaly Y

Branching off of anomaly O and passing stones E and F on the southwest and curving round to enclose Anomaly X, is a line of high resistivity. This could be the result of geological conditions but the fact it has such a close association with stones E and F lends weight to the possibility of it representing an antiquity.

Anomaly Z

This comprises a faint slightly curving line of low resistivity running almost east/west and cutting through the middle of anomaly U and paralleling the northwest end of Anomaly J.

Anomaly AA

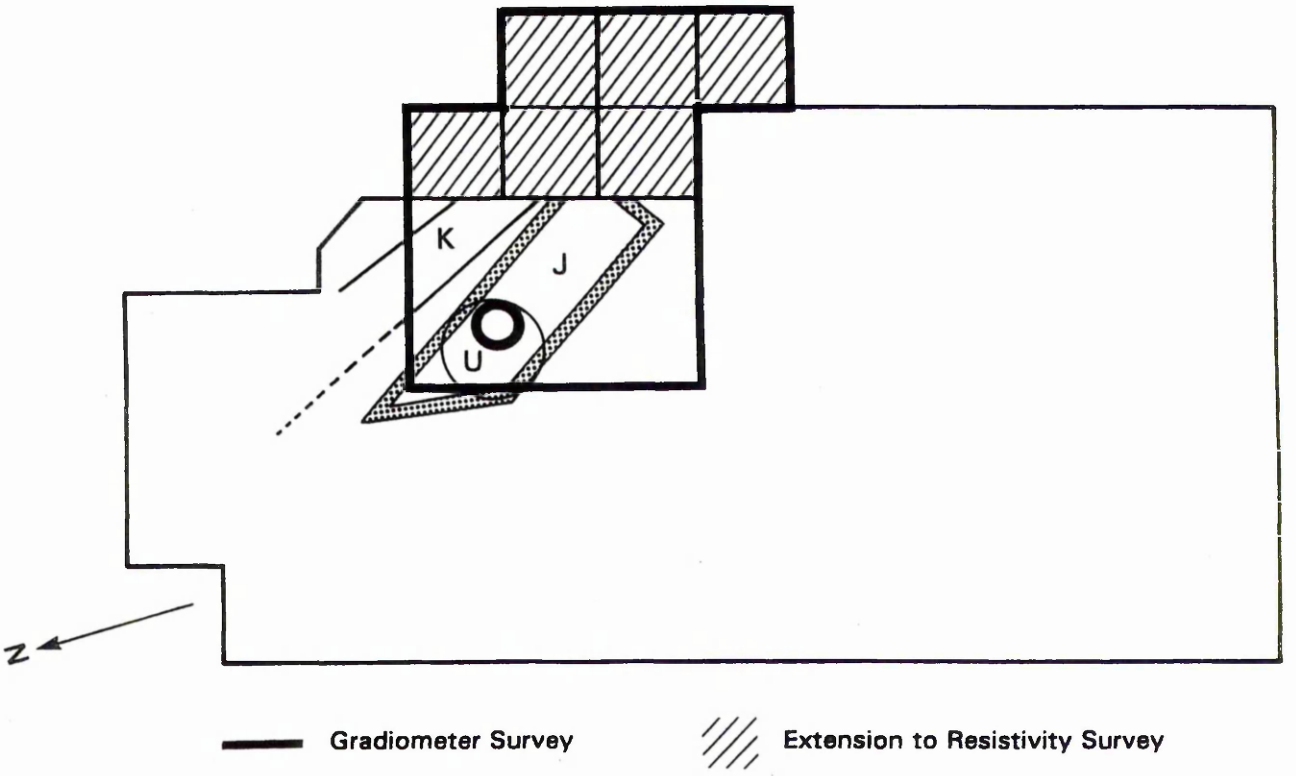
On some of the graphics Anomaly I appears to continue in a southerly direction before turning east in a wide arc to form a large semi circular line around stones A-D. It is likely that this is the result of local geological conditions, but the possibility that the stones were surrounded by a larger circular enclosure should not be overlooked.

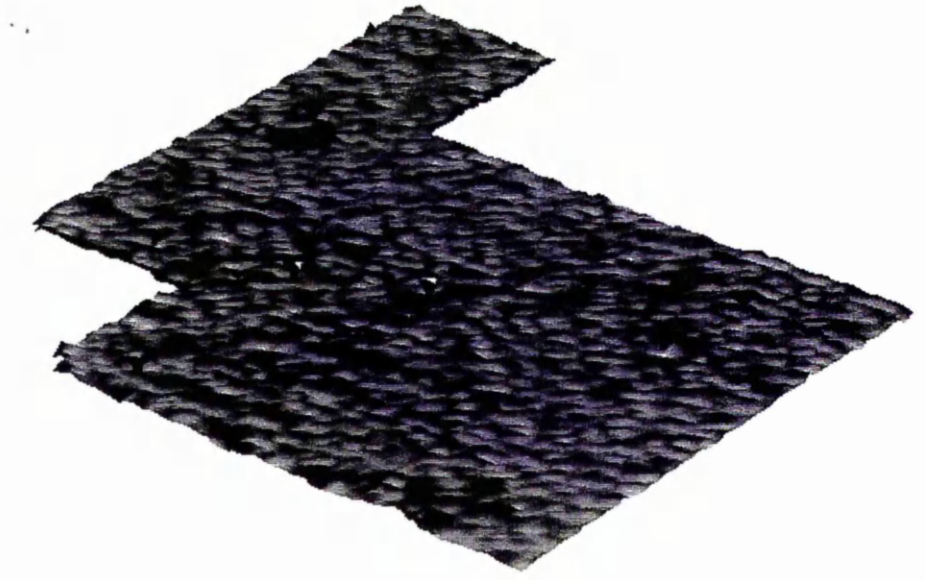
Further Investigation of Anomalies J and U (Figure 22)

As Anomalies J and U appeared to bear some relationship with the alignment of standing stones the possibility that they represented the remains of a prehistoric ritual avenue, delineated by ditches, was investigated further with the aid of an additional grant given by Historic Scotland to conduct this work. An extension of the survey area on the SE side of six 20 m by 20 m grids (grids 65-70) was conducted and added onto the previously surveyed area. This new area was surveyed at 1m intervals by electrical resistivity to see if Anomaly J continued into this area. A gradiometer survey was also conducted logging readings at 1 m intervals covering the ground containing Anomalies J and U and the adjoining new area, nine grids in total covering an area 60 m by 60 m. An electrical profile survey was also conducted within this new area.

Resistivity Survey

In Grids 65-70 the linear anomalies are at their strongest consisting of two sets of double parallel lines about 5m in width and 5m apart with a gap of about 15m between the two sets (Figure 23). 20 m west of Line 4 is situated Line 5. About 40m southeast of Stones A-D lines 1 and 2 appear to merge and continue to meet the stones. Lines 3 and 4 run from the middle of the two groups of standing stones to the edge of the survey area with Line 4 being more discernible. Line 5 is not quite as large and strong as Lines 1 to 4 but clearly related. Running 180 degrees to lines 1-5 and represented by the dotted lines on the interpretation plan is another anomaly of high resistivity. At present it is not possible to say if this anomaly is related to the large linear ones, is a geological anomaly or something more recent.





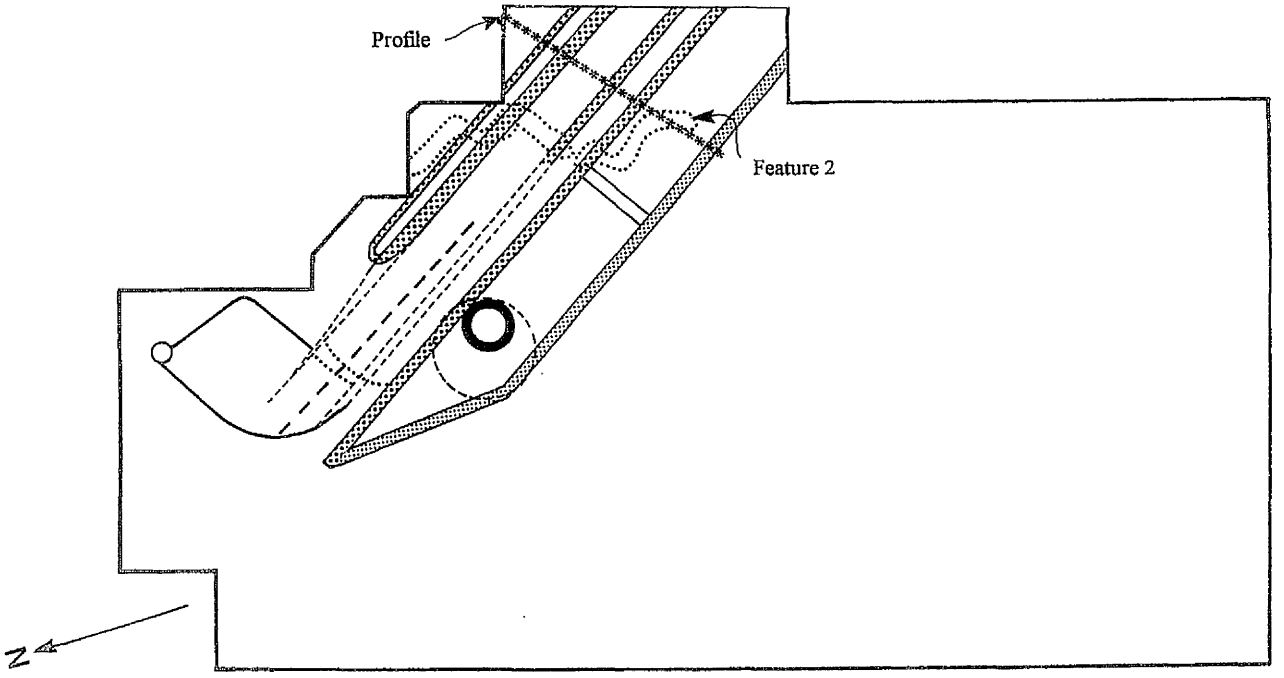
grid 1 gradiometer survey, oblique view looking south

Figure 22 : Ballymeanoch Grid 1 - Further Investigation of Anomalies J and U and Gradiometer Survey Results

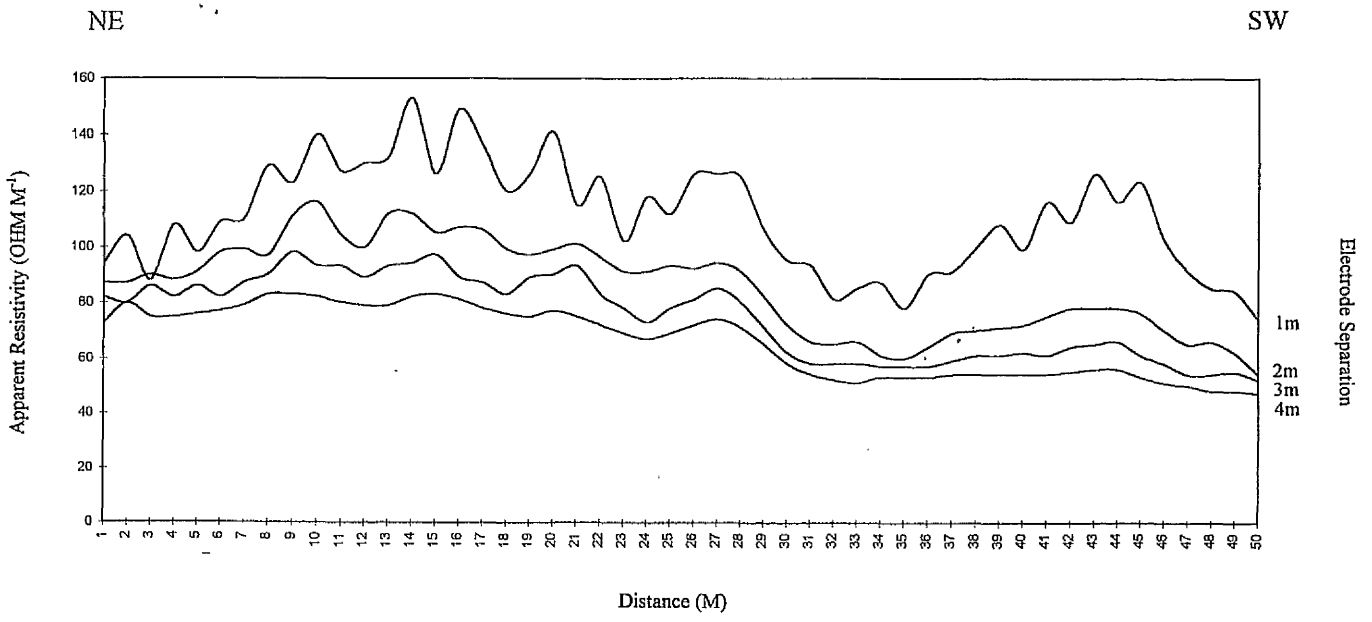
Electrical Profile Survey (Figure 23)

In order to test the validity of the resistivity results produced by these anomalies an electrical profile survey was conducted across them. The system used consisted of a conventional electrical resistivity meter utilising a 'Wenner' electrode configuration, both of 'Geoscan' manufacture. Readings were taken at one metre sampling points along a 50 m profile. Four readings were taken at each sampling point with an array expansion increment of 1.0 m, starting with an initial electrode separation of 1.0m. This resulted in successive measurements for each sampling point where the current supplied by the device was biased to depths of 0.5m, 1.0 m, 1.5 m and 2.0 m. The data was recorded and processed manually. The chosen method of presentation is simple, consisting of four superimposed line graphs of each profile. These reflect the apparent resistivities of the entire profile as a function of electrode separation. Where the profile crosses areas of high resistance the graphic should display peaks and where the profile crosses areas of low resistance it should be represented by troughs. From this the depth of deposits can be inferred, but this can *only* remain an inference. The uses of more sophisticated mechanisms of presentation were avoided for this reason. There can be a tendency to consider apparent resistivity data collected by such a method as being ordered in pre-set spatial relationships and to represent that data in a manner that is sometimes misleading. Many computer-generated graphics programmes assume the 'depth' component to be fact. The only true spatial component of such a survey is in the direction of the traverse and the interval between sampling points.

In general the electrical resistivity profile across Lines 1-5 suggests a high degree of disturbance within the ground, particularly within the top half metre. There is a recognisable trend throughout the readings with peaks and troughs corresponding with the linear anomalies detected during the earlier resistivity survey. One anomaly in particular stands out. Located between 27 and 35 metres along the profile from the northeast end there is a slight peak followed by a sharp drop in the profile which then rises again but displays less disturbance. This location does not correspond to any of the linear anomalies but appears to correspond with the anomaly of high resistance that meanders across the linear anomalies. The area in the profile that records where there is less disturbance corresponds to the gap between lines 4 and 5. A sudden trough in the data suggests that at this point the profile crosses a buried ditch.



Interpretation Plan of Linear Anomalies and Anomaly Corresponding with Feature 2 Showing Location of Electrical Profile Survey



Ballymeanoch Electrical Profile Survey

Figure 23 : Ballymeanoch Grid 1 - Further Investigation of Anomalies J and U, Location of Electrical Profile and Results

Gradiometer Survey (Figure 22)

Due to time, cost, and previous limited success the gradiometer survey of Anomalies J and U was the first time that the FM 36 had been used on this particular site, therefore there was no guarantee it would detect any anomalies. Although the RM 15 and electrical profile surveys proved successful at further delineating the presence of Anomalies J and U and exhibiting distinct reading trends the results of the FM 36 survey within this area proved inconclusive. As with the gradiometer survey in grid 1 at Nether Largie these results suggest that the ground in this area has undergone considerable disturbance. This and the complex surface geology of the area probably have an adverse effect on the FM 36.

Ballymeanoch Grid 2 (Figure 24)

This grid was located on the lower terrace between the Kilmartin Burn and the upper terrace containing Grid 1. It was designed to cover the area in Field 5 that contained the lithic scatter and both resistivity and gradiometer surveying were conducted and utilising a greater sampling interval than in Grid 1. The data collected by both machines was processed and plotted using Geoscan's Geoplot V2.

Ballymeanoch Grid 2 Resistivity survey (Figure 25)

The resistivity survey was conducted first using an RM 15 with a sampling interval of half a metre and comprised forty 20 m by 20 m grids covering an area 160 m by 100 m. The white patch in the northeast corner of the graphic is an area of very low resistance readings and corresponds to gently sloping ground between the remains of a fluvioglacial gully the bottom of a promontory of the above terrace. The low readings would be the result of deep silty topsoil as would be expected in such a catchment area for hill-wash. The white area in the southwest corner of the graphic is probably the remains of a silt-filled watercourse. This anomaly starts in the middle of the plateau and appears to course towards the burn. The very dark area along the western edge of the graphic represents the highest resistance encountered in the grid. This closely corresponds with the edge of the terrace and may be caused by a denser stone concentration in this area as a result of more recent ploughing and field clearance and post glacial erosion by the Kilmartin Burn washing away smaller surface debris. Disturbance from ploughing does not appear to be as evident as in Grid 1. The striping effect running NNE/SSW in the dark area in the southern half of the graphic is probably the result of past geological events. This dark area has silt filled watercourses to the east and west on the same alignment as the dark stripes. These stripes could represent episodic differential erosion in response to the falling levels of water in these courses.

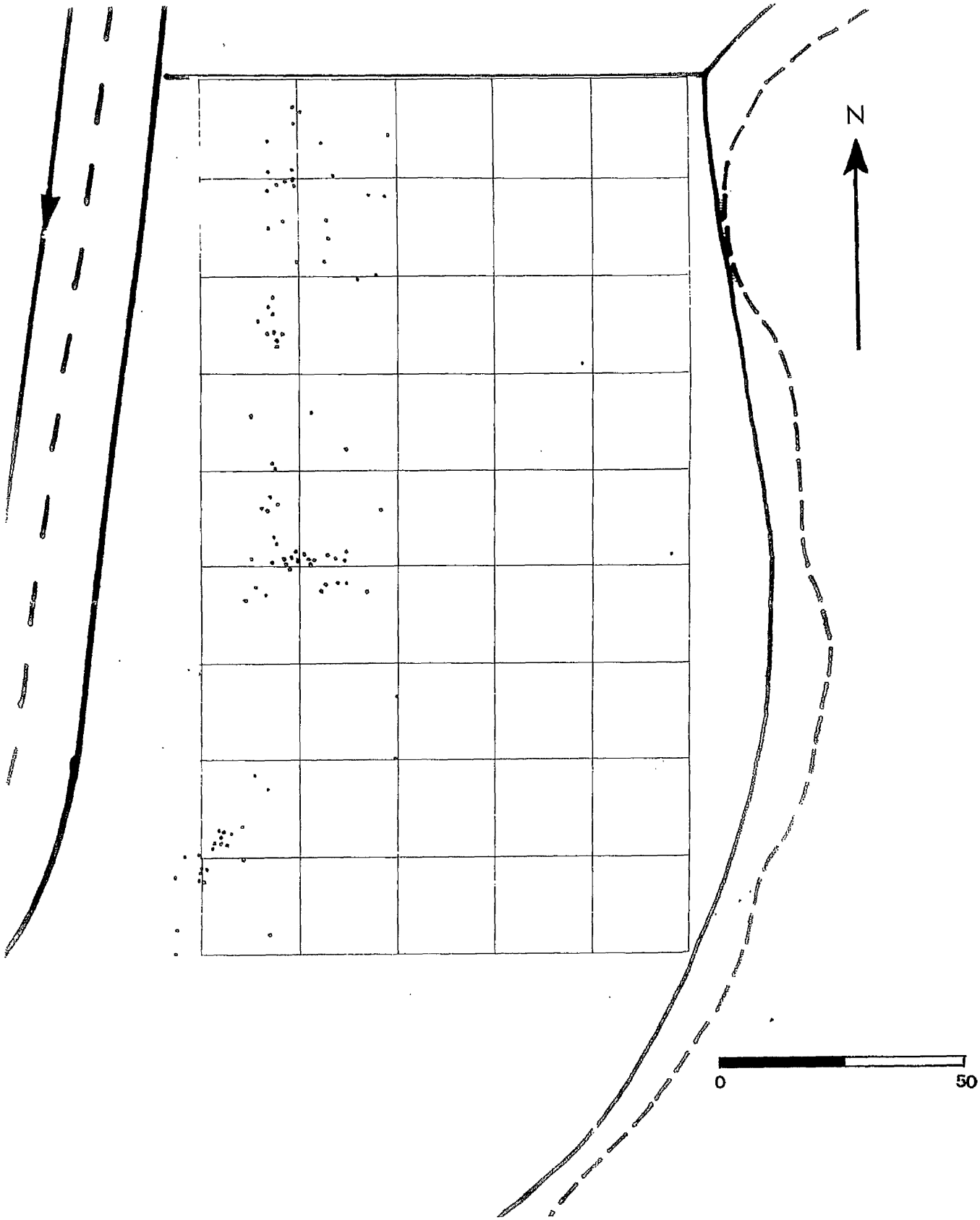
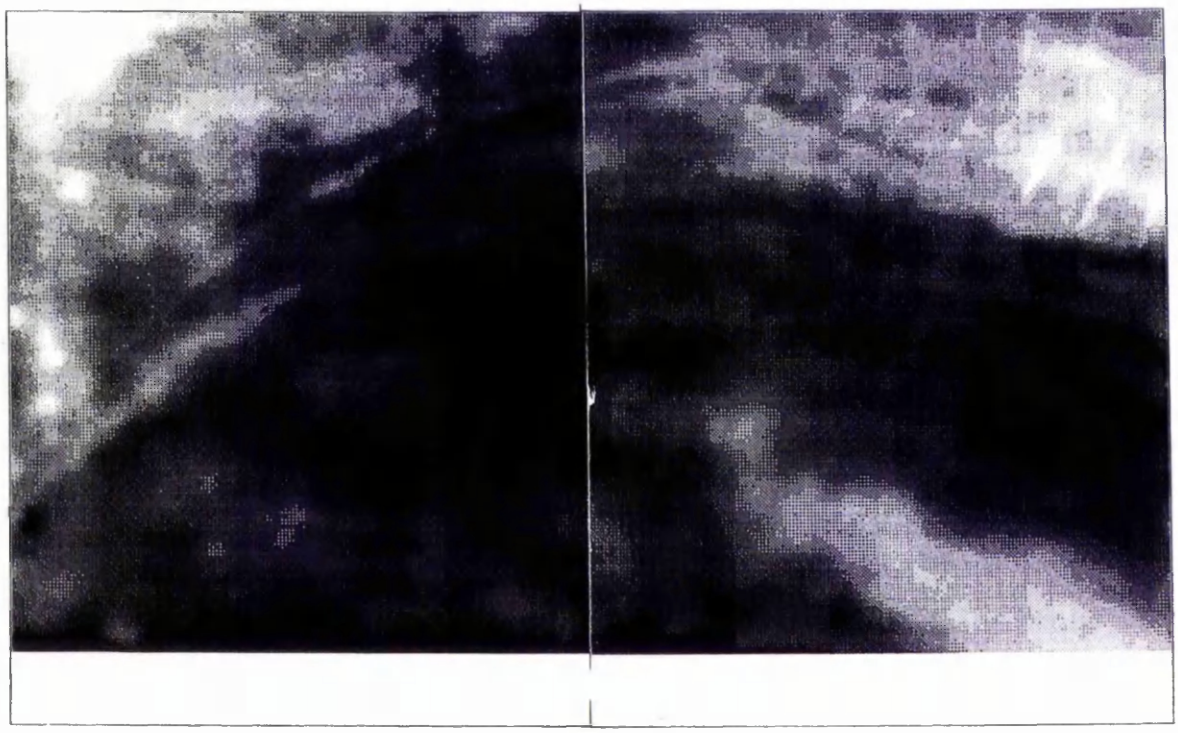


Figure 24: Ballymeanoch Grid 2 – Location and distribution of Flint Scatter



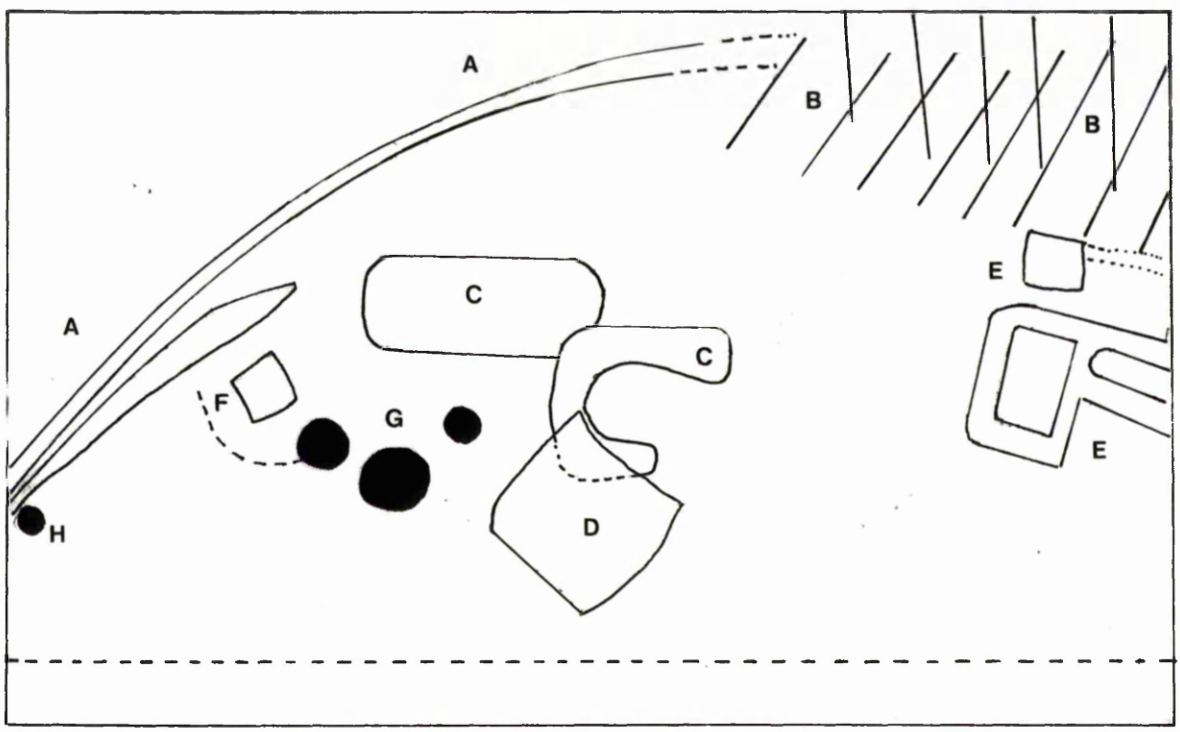


Figure 25: Ballymeanoch Grid 2 Resistivity Survey – Overhead View and Interpretation

Anomaly A and B

Anomaly A comprises a distinct curvilinear path of low resistance immediately southwest of the patch of low resistance mentioned above. On the north a similar anomaly parallels its route for approximately 40 metres. On the southeast corner of the graphic the anomaly runs into an area of low resistance, which contains a herring bone pattern of extremely low resistance (Anomaly B). The route of Anomaly A closely corresponds to the base of the fluvioglacial channel that follows the bottom edge of the upper terrace. This complex of anomalies almost certainly represents the ditches of a drainage scheme. The fact that Anomaly A closely parallels an old watercourse, and its route to the north of the survey area can be traced to meet the Burn, supports this interpretation.

Anomaly C

This comprises a complex of rectilinear anomalies of very high resistance. Although incomplete there appears to be two abutting rectangular outlines of similar dimensions (30 m by 12 m). The fist is aligned north/south and measures 30 m by 12 m. Abutting its southeastern corner and also aligned is north/south is a horse shoe shape of very high resistance that could represent part of another rectilinear enclosure. Readings of this nature are usually representative of the remains of buried walls belonging to buildings.

Anomaly D

Immediately west of Anomaly C is a rectilinear line of high resistance. It encloses an area about 18 m by 18 m and is not as high in resistance as Anomaly C and partially masked by it. It could be the remains of a wall enclosure although there is nothing distinguishable in its interior other than a small blob of high resistance in the western corner. Therefore it could represent an animal pen or agricultural plot.

Anomaly E

Forty metres to the south of Anomaly C are a similar complex of anomalies but slightly smaller and on a slightly different alignment. They comprise a strong rectilinear anomaly of very high resistance measuring some 12 m by 18 m aligned WNW/ESE. There appears to be part of another rectilinear anomaly abutting it to the south. About four metres ESE of the main rectilinear feature is a square area of high resistance measuring about 7 m by 7 m with a line of equally high resistance running south from it. This anomaly is located on the edge of the plateau adjacent to drained area contained within the old fluvioglacial channel.

Anomaly F

Some 15 m to the northwest of Anomaly B is another rectilinear anomaly of high resistance measuring 7 m by 7 m and partially enclosed by an outer line of high resistance. The enclosure

appears to join the northwest corner of Anomaly C or may even continue through it. The pattern is to a certain extent masked by other anomalies and is of lower readings than Anomaly C but where it can be discerned is running on different orientations to Anomaly C. These anomalies could represent another building and enclosure.

Anomaly E, F and G

There are three distinct small circular anomalies of high resistance in close proximity with each other and the western edge of the possible enclosure around Anomaly D. The largest measures about nine metres in diameter while the other two are about 5 m. These could represent the buried remains of areas of stone or hard packed ground such as cairns or floors.

Anomaly H

This comprises an area some three metres in diameter of very high resistance located on the northwestern edge of the graphic. It stands out as it is in an area of much lower resistance and its location on the ground is on the edge of the plateau above the fluvioglacial channel. Such an anomaly could be representative of a large buried stone. It should be noted that as it is also adjacent to the field boundary means there is a possibility that it could have been dumped there.

Ballymeanoch Grid 2 Gradiometer Survey (Figure 26)

Despite the lack of success with gradiometer surveying in Grid 1 it was decided to test this method in Grid 2 as the pattern of lithic distribution and the results of the resistivity survey suggested that the ground had not suffered too greatly from disturbance. The initial results with this instrument were satisfactory and a total of twenty-four 20 m by 20 m grids covering an area 160 m by 60 m over the concentrations of lithics were surveyed utilising a sampling interval of 0.5 m. As time and resources were limited the gradiometer surveying was concentrated on the plateau that contained the flint scatter and any previously detected anomalies of potential archaeological interest. The area to the east of the plateau where the fluvioglacial channel ran was not included in this grid as other than modern drainage it was probably archaeologically sterile. A section of the drain in the north of the grid was included as a test and produced an identical pattern of anomalies to the resistivity survey. At the north end of the grid the gradiometer survey was also started five metres to the south to avoid disturbance by a wire fence that ran along the north edge of the resistivity grid. The gradiometer survey was not affected by surface geology but evidence of ground disturbance and ploughing is apparent in the grid. Fewer anomalies were detected in this grid than by resistivity surveying but some anomalies of potential archaeological interest not detected by resistivity were encountered.

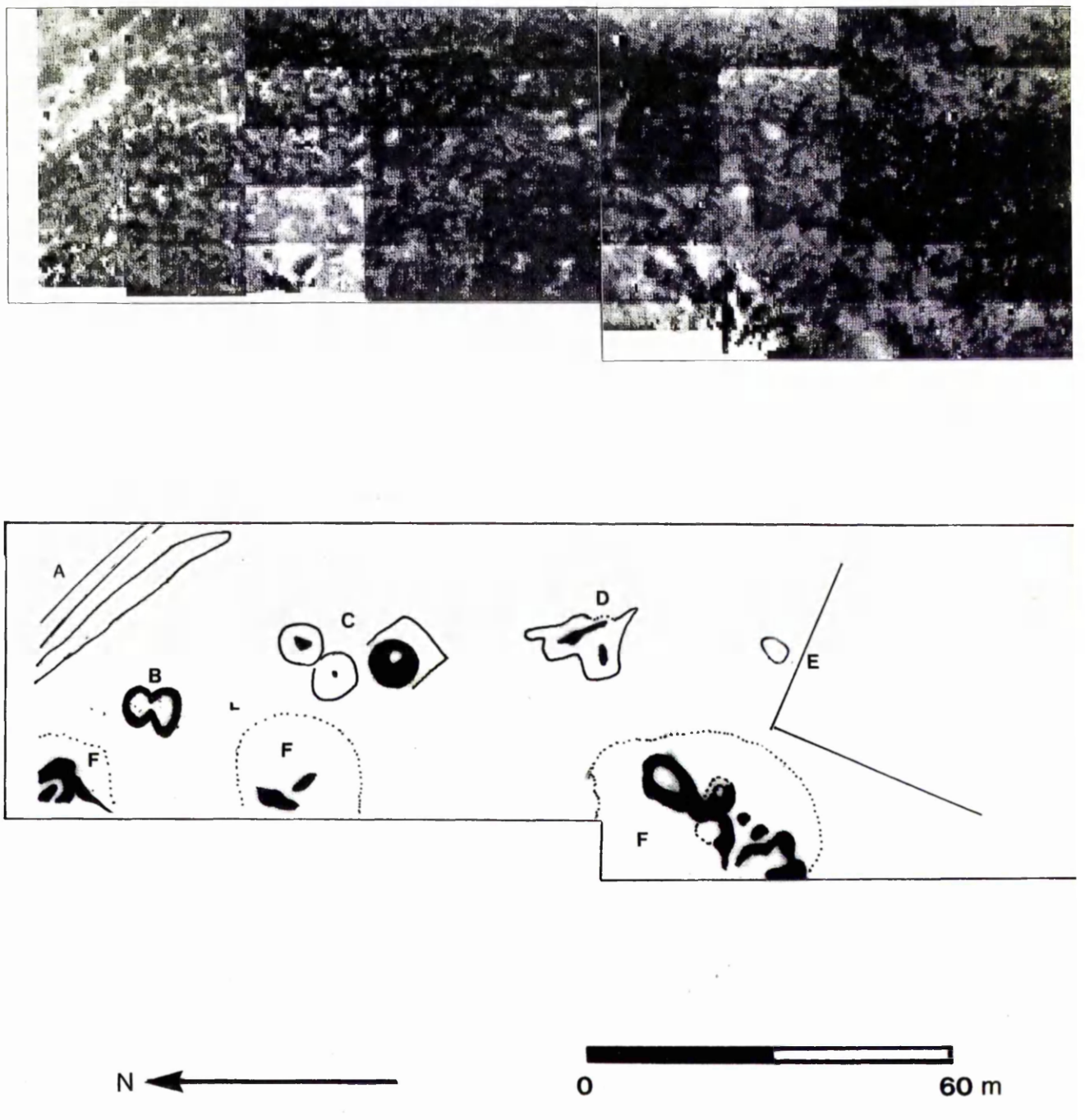


Figure 26 : Ballymeanoch Grid 2 Gradiometer Survey – Overhead view and Interpretation

Anomaly A

Cutting across the northeast corner of the grid at 45 degrees are a set of parallel lines composes of low magnetic susceptibility. These readings suggest a built feature such as a wall rather than one that is cut such as a ditch. These anomalies correspond exactly with the anomalies detected at this point in the resistivity survey (Anomaly A and B) but the resistivity readings suggest that this feature is a pair of ditches.

Anomaly B

Anomaly B is located 10 m southwest of Anomaly A. It comprises a spectacle shaped outline of high magnetic disturbance measuring 7 m by 9 m or two oval shaped outlines each measuring some 6 m by 4 m. This anomaly is within an area of average background readings and suggests the presence of a cut feature such as the remains of ditches.

Anomaly C

This comprises a concentration of magnetic anomalies that are difficult to distinguish as a clear pattern. They consist of adjacent patches of high and low magnetic readings, some of which form areas about eight metres in diameter and enclosed by outlines of high magnetic readings. This area of anomalies appears to be partially enclosed by a curvilinear outline of high magnetic readings, particularly evident on the north and south. Although a number of anomalies were detected in this area by the resistivity survey the only exact correlation is with two small circular areas each only a couple of metres across of low magnetic readings with two patches of low resistance.

Anomaly D

In the middle of the graphic is an area of low magnetic readings part of which appears to be enclosed within a circular outline of high magnetic susceptibility about nine metres in diameter. At the centre of this enclosed area is a small patch of high magnetic readings. This anomaly corresponds to one detected by the resistivity survey.

Anomaly E

About 25 m south of Anomaly D is a strong rectilinear anomaly of high magnetic readings. It runs WNW/ESE for a distance of 30m and then turns ninety degrees at its WNW end to run SSW for a distance of 37 m. Such readings are suggestive of a ditch whereas resistivity readings that correspond to part of this anomaly suggest that it is the remains of a wall. Adjoining the linear anomaly on the north is a distinct patch of low magnetic readings measuring some 4 m in diameter.

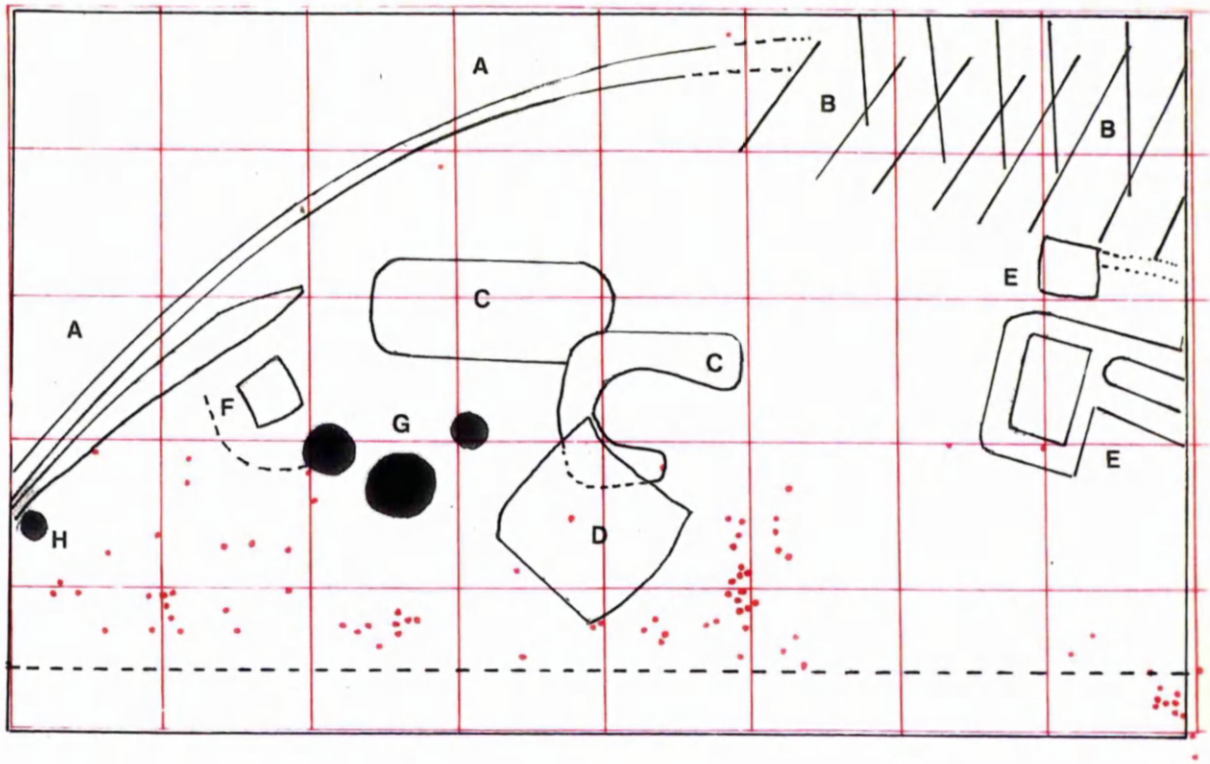
Anomaly F

Along the western edge of the graphic are three areas of high magnetic disturbance. In each case they appear to comprise areas of extremely low magnetic susceptibility containing small patches of extremely high magnetic susceptibility. These anomalies are strongly suggestive of structures where burning and the production of extreme heat has taken place. As these anomalies are on the edge of the terrace adjacent to the Kilmartin Burn and are in close proximity to the flint scatters the most likely interpretation for such anomalies would be that the represent the buried remains of hearths and burnt mounds

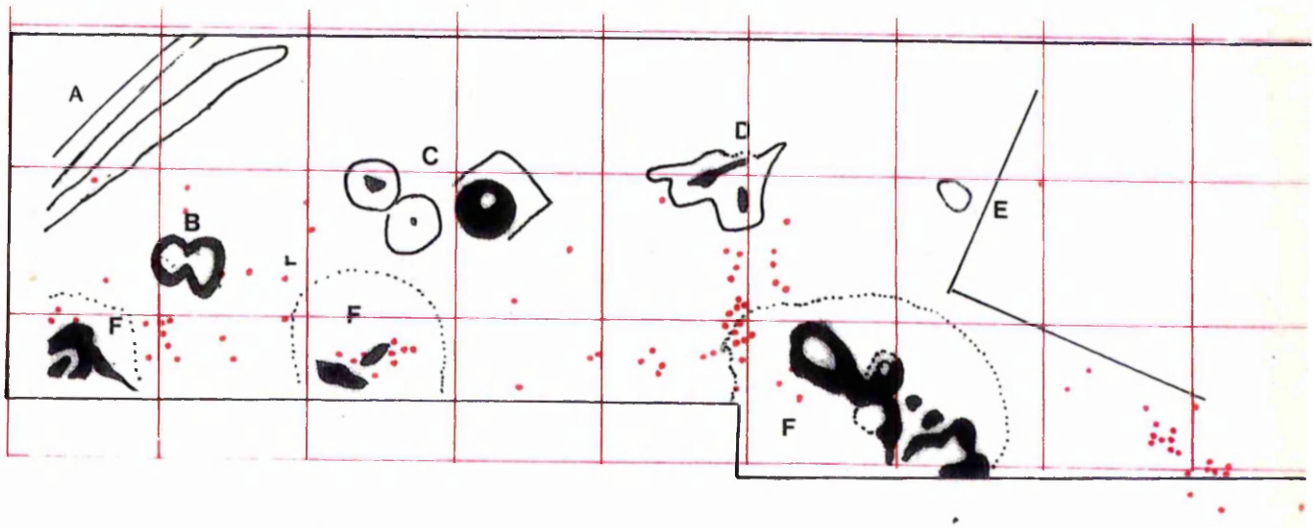
Ballymeanoch Grid 3 (Figure 28)

Since its inception the Kilmartin Glen Project has been responsible for the implementation of a number of environmental improvement initiatives in the Kilmartin area. As a precaution against the disturbance of any buried archaeological remains this has resulted in them funding a number of archaeological investigations and some of the fieldwork involving this project. When new pathways were constructed between Dunchraigaig Cairn and the Ballymeanoch complex of monuments the opportunity arose to conduct more geophysical surveying (Figure 17). Investigation comprised geophysical prospecting along the proposed routes of the new public access pathways before their construction in order to assess the potential for buried archaeological features being present.

Seventeen 20 m by 20 m grids were established over the route of the path along the edge of the terrace between Dunchraigaig Cairn and the walled-off plantation, constructing a 40 m wide corridor for its length. The presence of metal fences and overhead power lines prevented the use of geomagnetic means of prospecting, so only an electrical resistance survey was conducted for this grid. The instrument employed to conduct this was the RM 15 and the sampling interval employed was half a meter. The data collected was processed and plotted using Geoscan's Geoplot V2 (Figure 28). From the data collected in this area, it was immediately evident that the main trends were affected by the surface geology that tended to mask any less striking geophysical anomalies. This necessitated more extensive processing of the data, which can produce 'noisy' graphics where only larger or very distinctive anomalies are easily recognisable. Even after this processing, the most evident anomalies represented geology and later human landscape use. The white area in the southwest corner of the graphic is within the plantation wall and was unsurveyable; so dummy readings were recorded. Similarly, the white line running east/west across the northern end of the graphic contains a stretch of the fence enclosing the area of ground accommodating Dunchraigaig Cairn. The small patches of white within this area are dummy readings where trees and tree stumps are located.



Resistivity Survey



Gradiometer Survey

N

0 60 m

Figure 27 : Ballymeanoch Grid 2 Plan of Anomalies and Flint Scatter

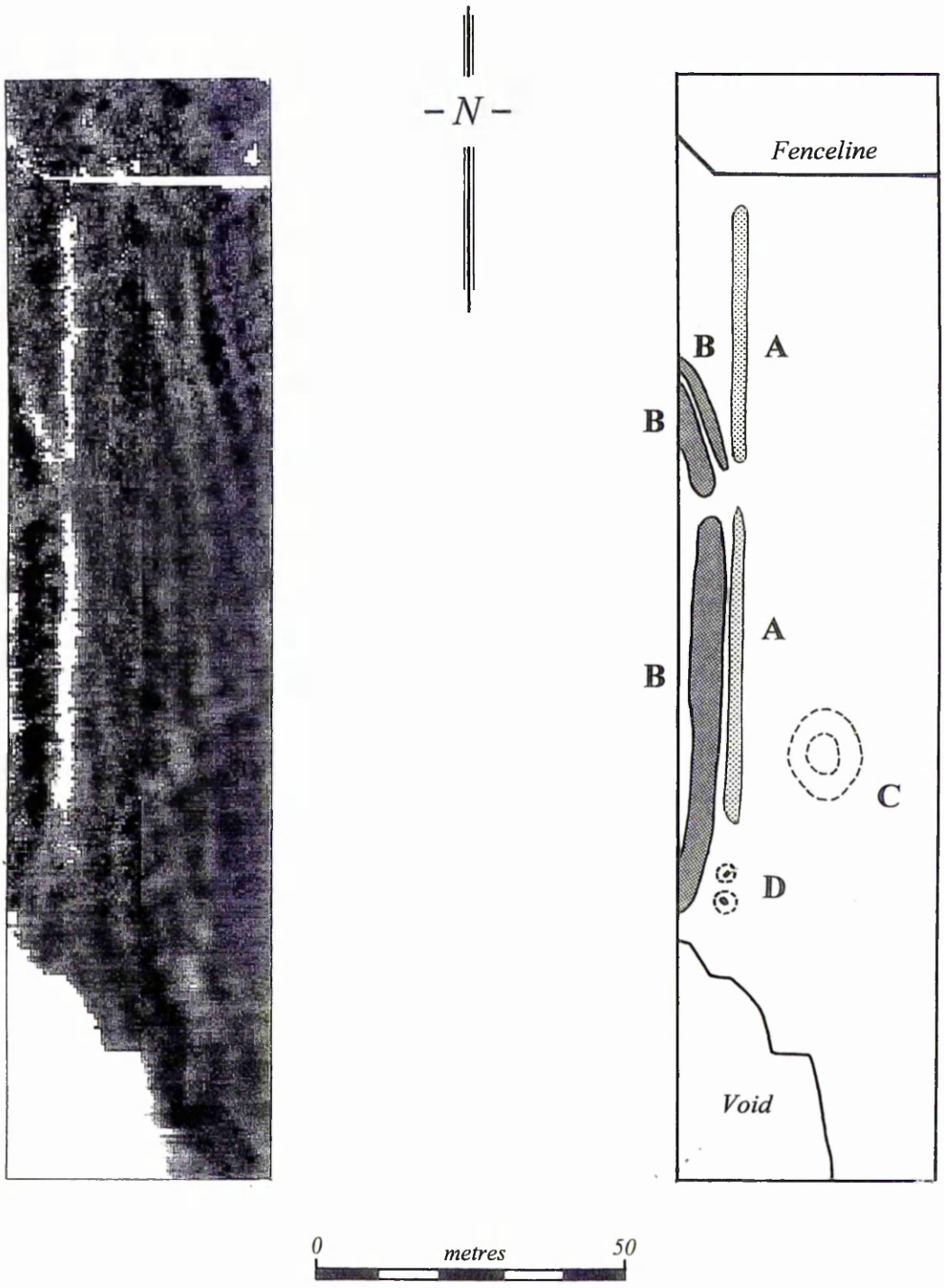


Figure 28 : Ballymeanoch Grid 3 Resistivity Survey – Overhead View and Interpretation

Anomaly A

This comprises a line of low resistance running north/south across most of the survey area, with a small break toward its northern end. The fence that runs along the edge of the terrace lies immediately above it. Unlike the fence line around Dunchraigaig Cairn, dummy readings were not recorded along its length because the direction of the survey traverses was east/west, whereas with the other fence its line followed the direction in which readings were recorded. Readings of this nature usually represent a silted ditch, as the anomaly is too wide and different from the background readings to be caused by a fence line. The fact that a modern field boundary runs on top of it also suggests the possibility of an earlier, associated feature.

Anomaly B

This anomaly runs north/south for some 60 m and parallel to Anomaly A before curving to the west at either end. It comprises a linear band of excessively high resistance, with a band of much lower than average background resistance running parallel. Toward the northern end is a break, perhaps an entrance. The most likely interpretation for readings of this nature is that they may represent a buried ditch and associated wall or bank, probably concerned with drainage or landscape division. However, the ditch runs along the very edge of the terrace, whereas the wall or bank is slightly down slope from it and on steeply sloping ground, so it may represent an attempt at stopping soil erosion from the edge of the terrace. Nothing on any maps consulted matched this feature, so it could have fallen out of use before the nineteenth century.

Anomaly C

There are a number of circular anomalies distributed throughout the graphic, some of which could be of archaeological interest. However, due to the level of disturbance from geology and ploughing they are ephemeral and may in fact be the result of background noise. One example has been illustrated, but further interpretation is not possible without more work. This would involve the separate processing of individual grids. As the purpose of this exercise was to determine if the route of the pathways crossed any possible buried archaeological features and such anomalies are all outwith this line, it was decided to leave this time-consuming processing for subsequent, related research work.

Anomaly D

This comprises two areas, each some 2 m in diameter, of high resistance and about five meters apart. Readings of this nature could represent buried stones, either small stony areas or individual large stones. They are also both on the line of the path, so caution during stripping had to be exercised in this area. The fact that they are also contained within the extent of Anomaly A is somewhat confusing, as it could be a ditch.

Anomaly E

This anomaly is in the area along the northeast edge of the plantation wall where four grids were surveyed. It comprises an area of high resistance with a distinct, almost straight edge running east/west that contrasts sharply to the rest of this area, which is of lower resistance. The most probable explanation is that the anomaly is geological in origin, such as the edge of a silt-filled fluvioglacial gully or wet hollow. It also corresponds with the edge of a lower area visible on the surface.

Anomaly F

This anomaly is located within the area of low resistance adjacent to Anomaly E. It comprises a series of small, circular anomalies of mixed resistance, which appear to be running parallel to Anomaly E. However, they are inside the lower area of ground so are more likely to be associated with it than with the slightly higher and drier ground represented by Anomaly E. If the result of human disturbance, this pattern of anomalies could represent a wet area at the edge of a field which has been used for dumping stone cleared from the field.

4.3(iv) Summary of Ballymeanoch Geophysics

Grid 1

Due to the limited funding available and the nature of the area being surveyed it was considered more profitable to conduct a resistivity survey only and with one metre reading intervals using an RM 15. This allowed a large area encompassing the henge and standing stones to be surveyed quickly with a method proven at Nether Largie. The disadvantage of this strategy was that although it proved the existence of a large number of anomalies many of these were so ephemeral that detailed comment was impossible and only larger anomalies could be discussed in any detail. Where gradiometer surveying was attempted the results proved inconclusive. Interpretation was further complicated by surface geology resulting from glacial drift and the ground having undergone severe disturbance in the past. This was unfortunate as it was hoped to detect anomalies possibly representative of the location of fallen or removed standing stones. Even the key to the identification of such anomalies, the socket of Stone G, proved to be a very ephemeral anomaly. Anomaly A was the most striking anomaly and corresponds with an old field boundary represented on the Ordinance Survey 1st edition map surveyed in 1865 and since removed.

The possibility that this standing stone complex was part of an immediate longer standing stone avenue now seems unlikely. There appears to be a possibility, due to the presence of anomalies J and U, that the stones may be associated with a larger linear complex or avenue of banks and

ditches. It is improbable that a series of anomalies with such dimensions as lines 1-5 could be caused by ploughing, and neither is it indicative of an old field-boundary. The nature of such readings suggests the possibility of a series of parallel ditches with associated upcast or banking. These anomalies also appear to bear some relationship with the standing stones, both spatially and in their alignment. Due to the context of this series of anomalies there is a case to suggest that they could represent the buried remains of a prehistoric ritual avenue or cursus. The most likely candidates for possible stone sockets are Anomalies M and X, which are located some 10 m east of Stones E and F.

A number of circular anomalies were also encountered. Anomalies Q and U are in close proximity to the henge so the possibility that they represent the remains of associated monuments such as ploughed out burial cairn should be considered. Anomaly U is similar to Q, being of similar size and with an internal ring that appears to be offset from the centre. The perimeter of U though is not completely discernible on all of the graphics, but its internal ring is of extremely high resistance and probably represents an area of buried stone some 10 m in diameter. As the gradiometer survey was ineffective in contributing any more information about Anomaly U no further comment can be made at present as to its character. Other than Anomaly I nothing to suggest the presence of additional architecture around the entrances and perimeter of the henge was detected

Grid 2

The results of the two methods of investigation employed in this area did not demonstrate a close correlation but appear to detect different aspects of the nature of the ground under scrutiny. A strong linear anomaly, most likely the result of fairly modern drainage was detected by both methods so the applicability of these methods is at least proven for this grid. The results of the resistivity survey are complicated by the detection of geological anomalies overlapping possible archaeological ones. It is probably the case that the surface geology gives a false impression as to the complexity of possible archaeological anomalies detected through electrical means. There are corners clearly visible in parts of these anomalies though and other lines of high resistance that run at right angles to the geological anomalies which suggest that they result from anthropogenic factors rather than natural.

Only in one area were rectilinear anomalies detected by the gradiometer survey and although different in pattern it correlated with the location of a rectilinear resistivity anomaly. The case for the remains of rectangular buildings being detected is very unlikely, but there is a possibility that the remains of some form of earlier land division or enclosure may be present. There is no information on any early maps and plans to suggest the presence of a settlement in this area, but

200 metres southeast of this location are the remains of stone parapets for an unrecorded bridge over the Kilmartin Burn. None of the resistivity anomalies coincide with any of the lithic scatters although Anomalies D, E and F are immediately adjacent to the most northerly one (Figure 27). Gradiometer surveying did not elucidate these anomalies any further but detected a number of other anomalies in their vicinity and also in that of the flint scatters. Other anomalies were detected by both methods, which confirms the existence of anomalies but unfortunately contributed little to elucidating their character.

An unusual aspect of the gradiometer survey results that further complicates interpretation, and has been encountered on other geophysical surveys as at Forteviot (Johnson forthcoming), was experienced during this survey. Built features such as walls, embankments and roads should register as negative results and cut features such as ditches and pits should register as positive results. Two distinctive anomalies that should be easily interpretable were detected in this area by both methods of investigation but give opposite results as to an interpretation. An identical pattern was detected for the location of Anomaly A in both surveys but the nature of the resistivity readings suggests the presence of a ditch whereas the nature of the gradiometer readings suggest the presence of a wall. The resistivity survey suggests that Anomaly E represents the remains of a buried wall. Where the gradiometer survey coincides with this anomaly it suggests the presence of a ditch.

Despite these problems a number of easily discernible magnetic anomalies of potential archaeological interest were still encountered, some of which correlated to the location of finds of surface lithics. The most promising of these may represent the remains of hearths and burnt mounds along the edge of the terrace.

Grid 3

The most extreme anomalies detected represented geology, landscape reorganisation and agricultural practices which tended to mask the definition of more ephemeral anomalies in the graphics. The striping effect on the east of the graphic is probably the result of past ploughing, but does not intrude into the enclosed area around Dunchraigaig Cairn. The same enclosed area is represented on the first edition Ordnance Survey map surveyed 1871, so the area around the cairn has probably not suffered from modern ploughing. At some point in the past the edge of the terrace was delineated by a substantial ditch with an associated bank or wall. Nothing is visible above ground and no record of this structure could be found. Although probably associated with agricultural improvement, the possibility that it could represent earlier activity should not be dismissed. Anomaly D corresponded to a large earth-fast stone on the top edge of the terrace. It measured 1 m by 0.15 m, with its long axis aligned north/south and the top edge of the stone level with the ground surface. The geophysical evidence suggested that there was more buried stone in its vicinity. The fact that this anomaly was also contained within the extent of Anomaly A, was also unusual. As this was on the line of the path further archaeological assessment of this stone was conducted, the results of which appear in the section on invasive investigation in the next chapter.

4.4(i) Poltalloch (Figure 29)

Poltalloch House and grounds are situated on a series of fluvioglacial terraces and raised beach deposits to the west of the entrance to the Kilmartin Glen and two kilometres west of the Ballymeanoch monument complex. Although topographically and situationally similar to Ballymeanoch, the ground around Poltalloch is far less densely occupied with prehistoric monumentality. Situated near the middle of the South end of the plain at the entrance to the Glen, 2 km SSW of Nether Largie farm and half way between Poltalloch and Ballymeanoch at NGR NR 820962 is the site of an unusual cropmark (Figure 30). It sits on a raised beach jutting out from the west of the Glen at a height of 20m OD. Immediately west of the site is a small ridge which offers excellent views of the Glen and its prehistoric monuments in every direction, but which is now occupied by a plantation. Near its summit there is located a large cist that is closely aligned with, and probably a continuation of, the linear cemetery. Some 375m SSW of the cist is a standing stone 2.6 m in height but without any decoration.

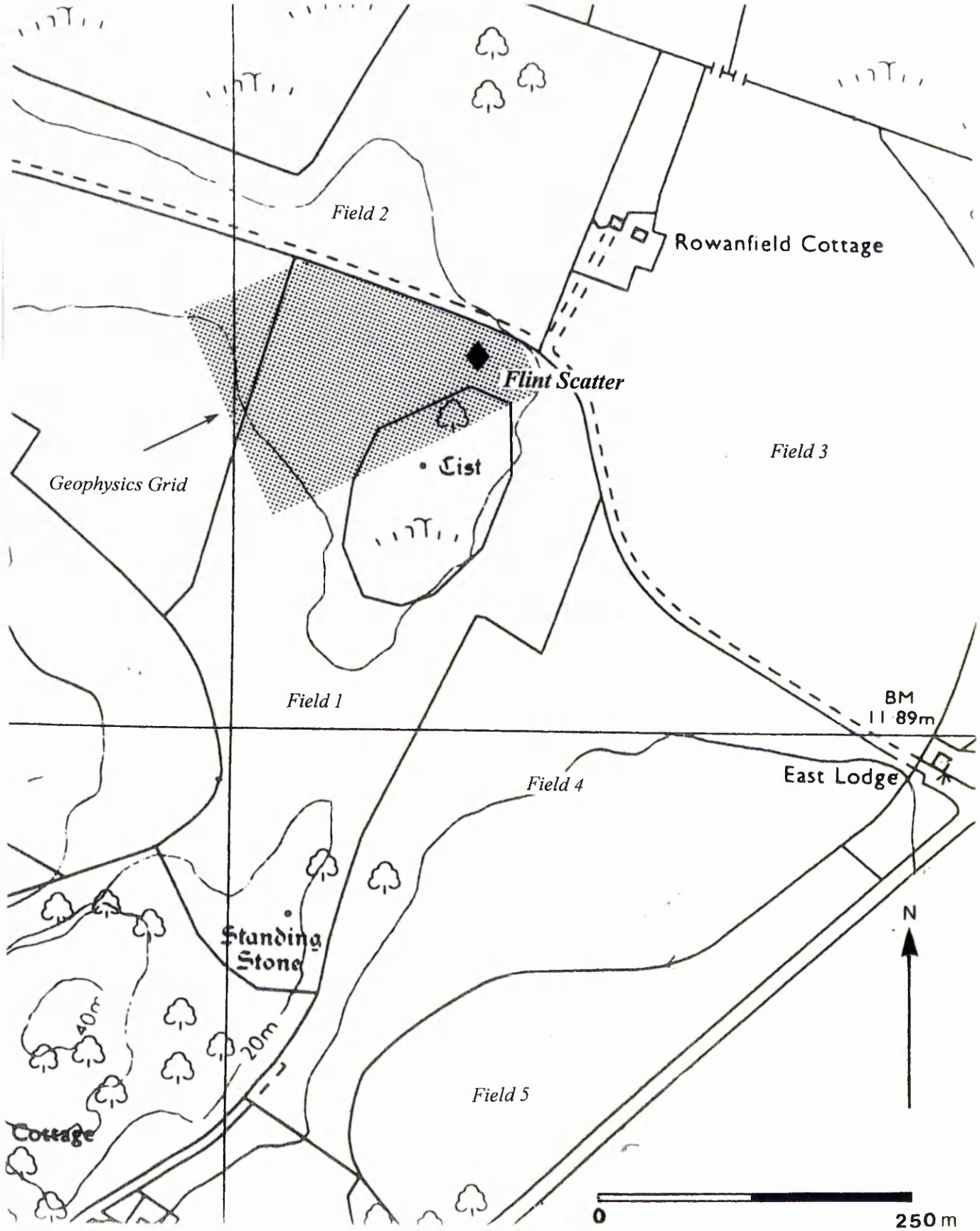


Figure 29 Poltalloch and Areas of investigation

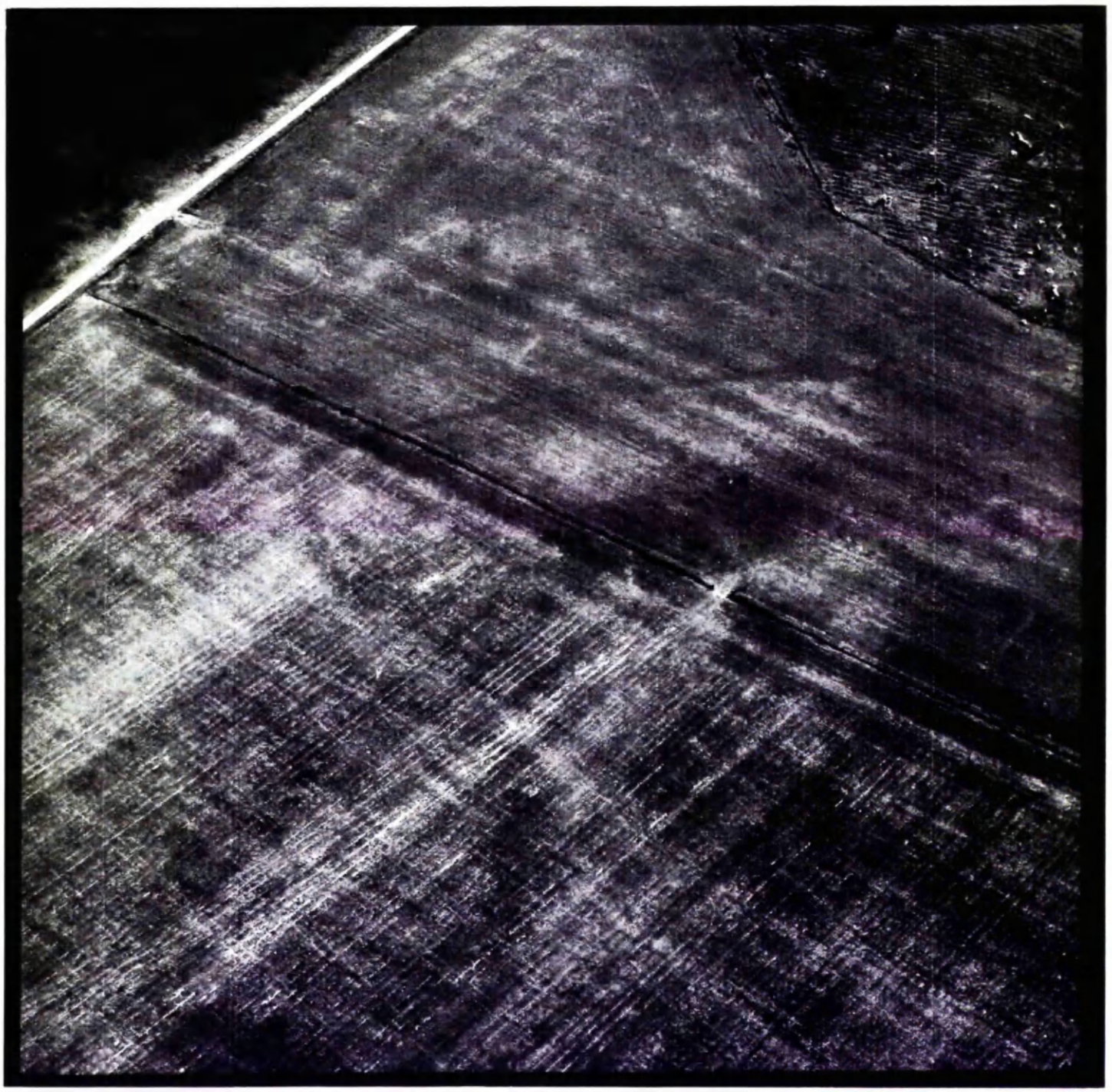


Figure 30 : Aerial Photograph Of Crop Mark At Poltalloch

RCAHMS NR89 NW84 Poltalloch Enclosure 1977 AG/8447

The crop mark has been interpreted as a possible enclosure (RCAHMS NR 89 NW 84) but had elements similar to the some of the anomalies detected at Ballymeanoch Grid 1. Historic Scotland commissioned a geophysical survey of the cropmark in order to investigate the possibility of additional features surviving but not represented on the aerial photograph. A transcription of the aerial photograph (Figure 31) shows that the crop mark consists of a linear feature running northwest/southeast for over 100m and with a small circular feature located at each end on the southwest side. At the northwest end of the crop mark the linear feature turns 90 degrees and continues for about 50m in a southwest direction. It then turns through a further 90 degrees and continues for a distance of about 25m in a southeast direction. The present field boundary also cuts across the northwest end of the crop mark.

On a site visit large fragments of burnt flint were observed lying on the ground surface in the vicinity of the crop mark so a field walking exercise was undertaken before conducting the geophysical survey. The ground around the crop mark is amongst the best arable land in the Kilmartin Glen but is not regularly ploughed. When the field was walked it had been ploughed the season previously so stubble from that crop with a sparse growth of pasture in between covered the ground surface. These conditions are not conducive for fieldwalking but as surface finds were being encountered it was considered necessary. Some of the neighbouring fields to this one are regularly ploughed so this provided an opportunity to expand the fieldwalking element following the same methodology as in earlier ploughed fields.

4.4(ii) Poltalloch Fieldwalking

Throughout the phase of fieldwork that is included in this study five of the fields in this area were ploughed to allow walking following the methodology above (Figure 29). Although the surface of Field 1 had extensively weathered it was also almost covered in grass. Fields 2 and 4 had undergone moderate weathering before examination while it was necessary to examine Fields 3 and 5 within one week of ploughing. In these fields surface finds were sparse and belonged mainly to the early modern period but a previously unrecorded flint scatter was discovered. Fields 1 and 2 are on a raised beach at 20 m OD. The cropmark is located in Field 1. To the northeast and separated by a track is Field 2. Both contained the same very stony plough soil with abundant sand and silt but also a flint scatter occupying an area contained in both fields. Eleven lithics were discovered within an area measuring 150 m by 150 m, nine in Field 1 and another two were recovered later in Field 2 after it was ploughed (Figure 31).

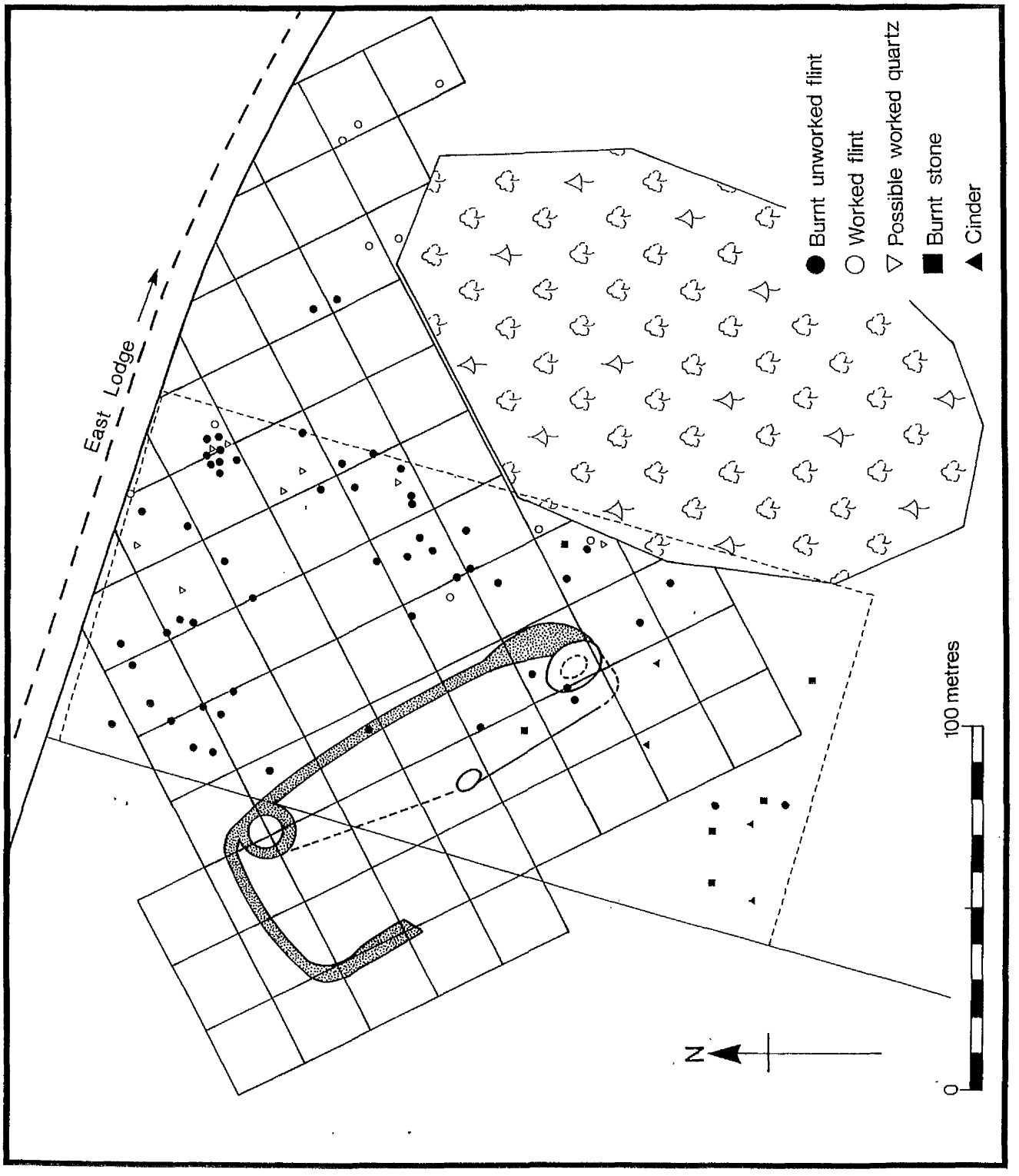


Figure 31: Poltalloch - Transcription Of Aerial Photograph, Geophysical Survey Grid and flint Scatter

Both burnt and worked flints were encountered in Fields 1. Given the heavily vitrified nature of some of the burnt flint, its derivation from field liming processes during the 19th century seems likely. In order to manufacture lime, limestone from which the flint deposits derive, are subjected to high temperatures in kilns. There are a number of 19th century limekilns in the Glen and surrounding area and some of the pieces of the burnt flint also appeared to have small patches of slag adhering to the surface. The lithics were all encountered to the north of the crop mark and include cores and flakes of flint and chert with probable Neolithic origin. Burnt flint from liming was mainly encountered to north of the crop mark whereas cinder and burnt stone was mainly encountered to the south of the cropmark.

Fields 3, 4 and 5 are located immediately west and southeast of Fields 1 and 2 and on the floor of the Glen adjacent to the Kilmartin Burn. Fields 3 and 5 contained a stony peaty top soil whereas the stony topsoil in field 4 contained a high content of sand, silt and gravel and in the low lying stretch along the west bank of the burn comprised only of heavy clay. Only early modern finds were encountered in these three fields. The remains of a cairn were found in Field 3 but it was made up of a particular type of stone whose only parent source is near the standing stone mentioned above where there are several disused small quarries. There are also some field walls some 200 m southeast constructed from the same source so it is suspected that this cairn has been dumped there to use as building material.

4.4(iii) Poltalloch Geophysical Survey

The geophysical survey consisted of sixty-eight 20 m by 20 m grids established across the line of the crop mark, its immediate environs, and over the lithic scatter to the northeast (Figure 31). The site grid was deliberately established at 45 degrees to the direction in which the field had been ploughed in order to prevent confusion between plough scars and grid imbalance. In addition, this made any anomalies detected easier to distinguish. The instrument employed in this survey was the RM15 and readings were logged at 1 m sampling intervals as at the time of investigation it was desirable to investigate as large an area as possible within the time allowed for the survey. The data was initially processed using Geoplot with further data processing using 'Datasurv' (Figures 32 and 33). Anomalies that are of more interest and possibly indicative of antiquities have been labelled and represented on the interpretation plan (Figure 32). Where these anomalies are considered to be of a more equivocal nature they are represented by dotted lines.

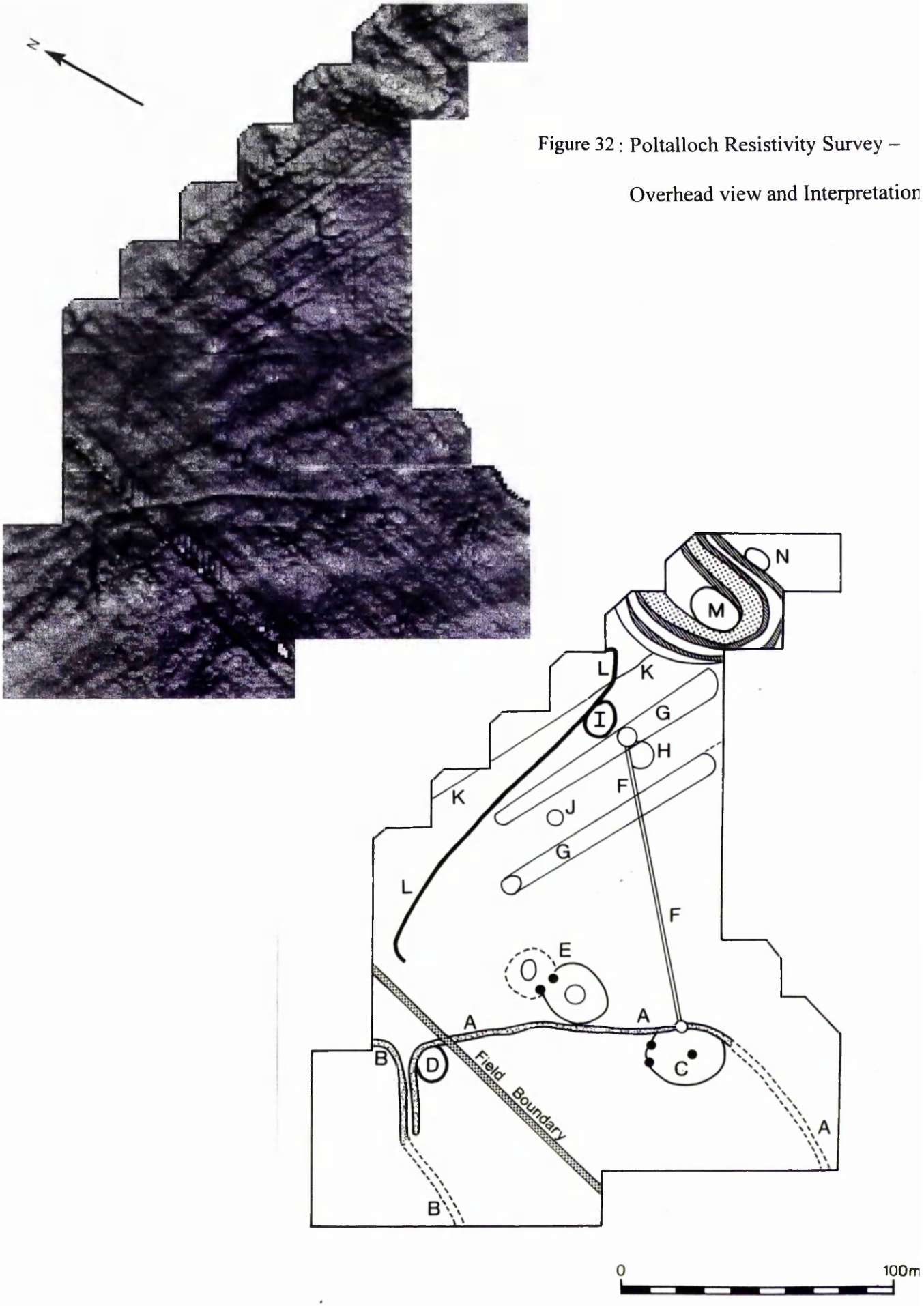
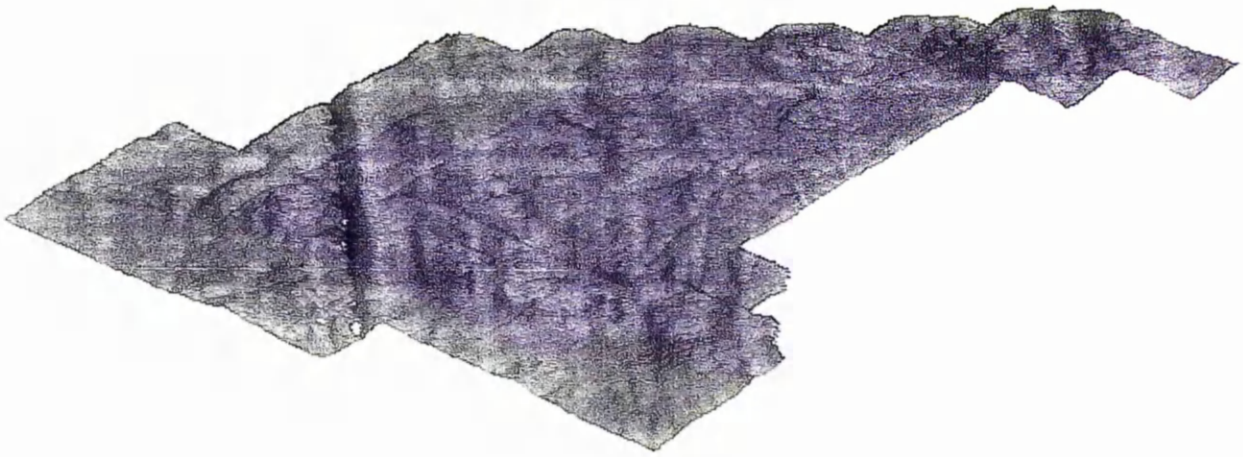
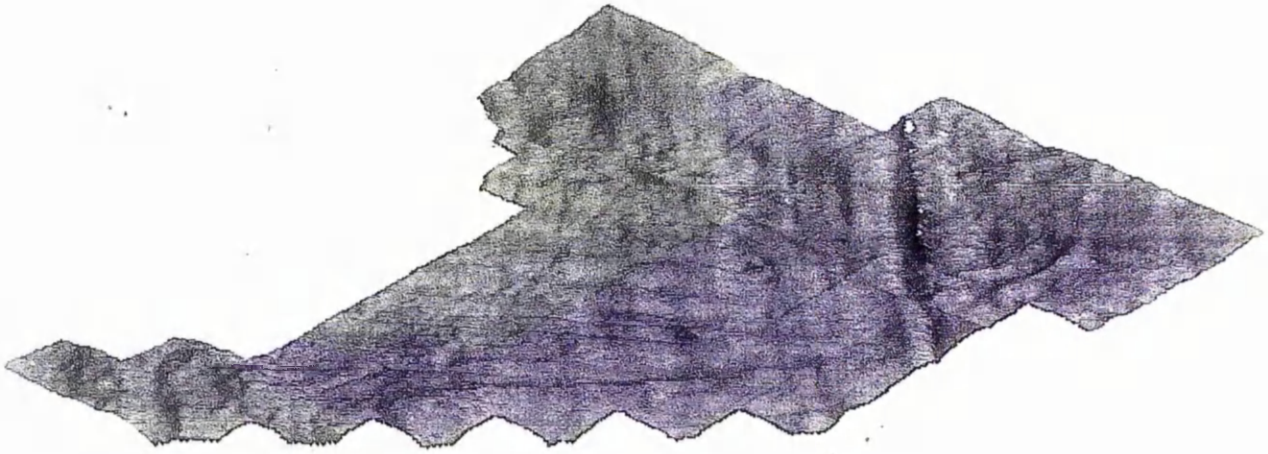


Figure 32 : Poltalloch Resistivity Survey –

Overhead view and Interpretation



Oblique View Looking North.



Oblique View Looking South

Figure 33 : Poltalloch Resistivity Survey – Oblique Views

Anomalies A and B

These anomalies comprise most of the crop mark visible on the aerial photograph. They are composed of low resistivity readings so may be representative of a ditch. They appear to be running almost southeast/northwest with each end curving round to the south. On both the aerial photograph and the overhead view, Anomaly B appears to be a continuation of Anomaly A. From the oblique views it appears that Anomaly B is a separate feature that turns north and exits the survey area instead of intersecting Anomaly A. On some of the graphics the opposite end of Anomaly A appears to curve in a southerly direction towards the edge of the survey area, but as there is so much plough damage in this area it is difficult to be certain about this line. Due to the size and irregularity of the ditch, it is likely to be an antiquity, possibly part of a ditched enclosure or some other form of land division.

Anomaly C

This anomaly is visible on the aerial photograph as a circular feature of at the Southeast end of the main linear feature (Anomaly A). The geophysical survey revealed a low resistivity anomaly of similar shape and dimension except that four additional small circular areas of high resistivity readings are visible within it.

Anomaly D

At the intersection of Anomalies A and B, another smaller circular anomaly composed of low resistivity readings is recognisable. This is also visible on the aerial photograph. Both Anomalies C and D appear to be contained within the enclosure formed by Anomaly A.

Anomaly E

Towards the middle of the overhead view and immediately northeast of Anomaly A are two circular areas of low resistivity readings with smaller circular areas of lower resistivity readings at their centres. The larger circle measures about 20m in diameter, immediately to the North of this is the smaller circle. The outer perimeters of these appear to intersect at which point there are two small circular patches of very low resistivity readings similar to those on the perimeter of Anomaly C. It could be the case that these are pits that represent some sort of architectural elaboration to the northern side of these burial cairns.

Anomaly F

Anomaly F is more easily discernible on the oblique views. It comprises a straight line composed of low resistivity readings running Southwest/Northeast with small circular patches of low resistivity readings at each end. This may represent a ditch. It appears to intersect Anomaly A at

its southwest end and link the two small circular anomalies located at its extremities. It may represent a later addition to Anomaly A and may also be concerned with land division.

Anomaly G

Running almost northwest/southeast are two parallel anomalies. Each comprises a set of parallel lines of low resistivity readings separated by about 10m and running for a distance of about 90m before turning to join each other. These anomalies probably represent ditches. Inside and around them are situated a number of small circular anomalies. As a few pieces of worked flint were recovered on the ground surface over these anomalies and since previous geophysical surveys in the Glen have revealed the possibility of prehistoric earthworks, the possibility that these anomalies represent a prehistoric earthwork should not be ignored. Alternatively they could be the result of ploughing or other agricultural practices.

Anomaly H

This anomaly comprises a small but distinct circle of high resistivity readings surrounding an area of low resistivity readings. Readings of this nature could suggest a small circular enclosure where the outer band of higher readings could represent the remains of a wall or bank.

Anomaly I

This comprises a circular area of higher than average background resistivity readings about 10m in diameter that is enclosed by a distinct band of higher resistivity readings. This could be representative of a deposit of buried stone such as a ploughed out cairn.

Anomaly J

This comprises a small circle of low resistivity readings surrounded by a small band of high resistivity readings. In geophysical terms this anomaly is similar to Anomaly H but much smaller. In archaeological terms such anomalies could represent a pit surrounded by hard packed upcast.

Anomaly K

This is another strong line of low resistivity readings. Given its proximity to the present day field boundary it may represent an older example. Anomaly K also runs parallel to Anomaly G and is of similar magnitude so there is a possibility that their origins are similar.

Anomaly L

Anomaly L comprises a broad line of high resistivity readings running east/west and almost paralleling the present northern field boundary. It is almost certainly the remains of the wall or embankment of an earlier field boundary.

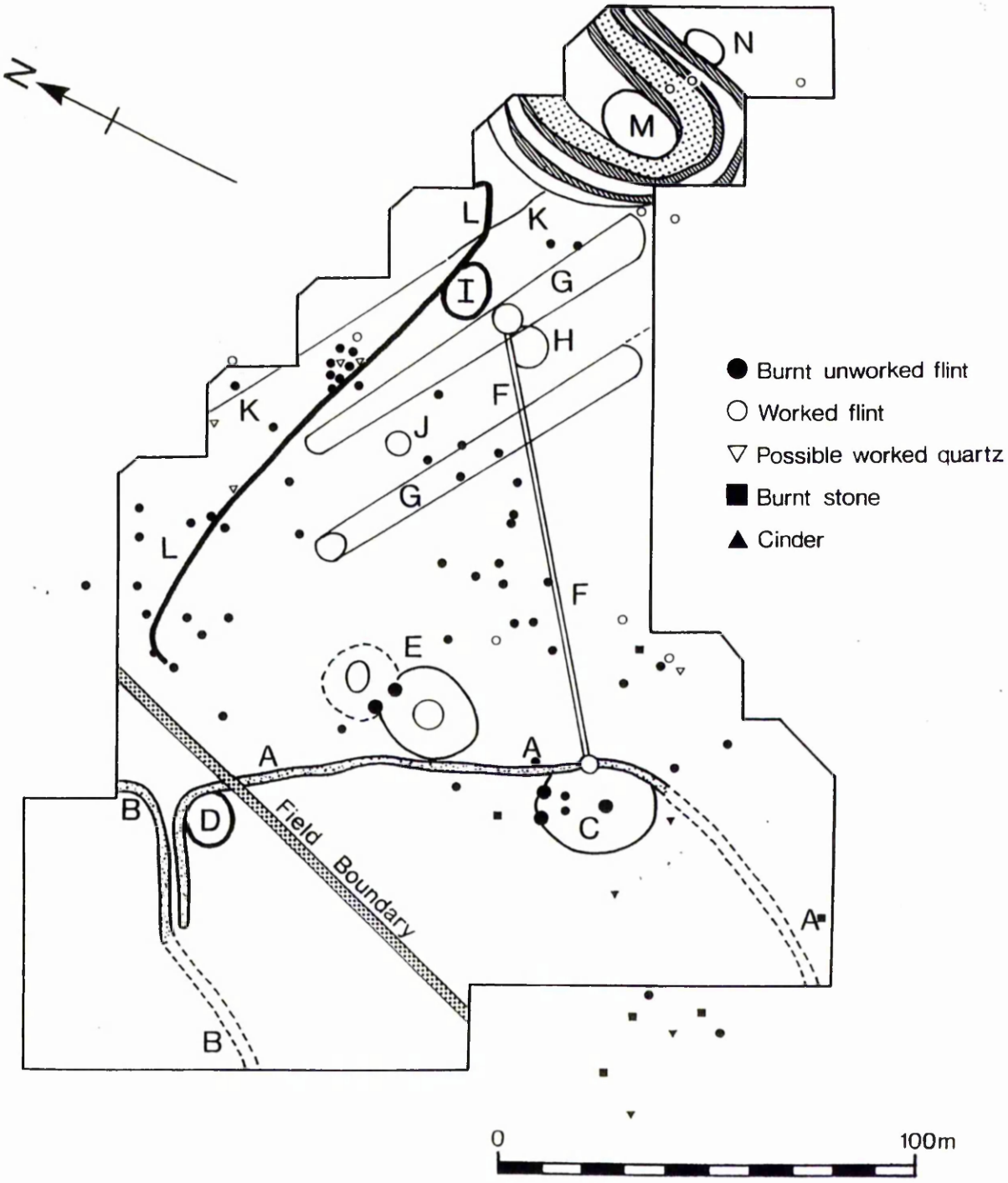


Figure 34: Poltalloch Resistivity Survey - Plan Of Anomalies With Flint Scatter

Anomaly M

This anomaly comprises multiple bands of alternate high and low resistivity that appear to form an enclosure. This is suggestive of a series of ditches and banks. When field walking this area, five pieces of worked flint were discovered lying on the ground surface, whilst very surface material of other activity was observed. This was also the area containing the greatest concentration of worked flint encountered within the survey area.

Anomaly N

On the eastern edge of Anomaly M is a small circular area of high resistivity readings some 6 or 7 metres in diameter. This encloses a smaller circle of very low resistivity readings. Anomalies of this nature are suggestive of silt filled pit.

Electrical Profiling Survey

In order to further test the results of the electrical resistivity survey, electrical resistivity profiling, was used to perform an investigation of a more specific nature where anomalies of potential archaeological interest were encountered. The system used, sampling interval and presentation of results are the same as that used at Ballymeanoch. Three locations within the survey area were selected for electrical resistivity profiling (Figure 35). It was felt that specific aspects of the archaeological nature of the site as a whole could be elucidated by attempting to examine the third dimension of the deposits in these locations (Figure 36).

Location 1

This comprised a 25 m profile running southwest/northeast bisecting Anomaly C and the southern end of Anomaly A. Anomaly C is visible on the aerial photograph as a circular feature located at the southeast end of the main linear feature (Anomaly A). The electrical resistivity survey revealed anomalies of similar shape and dimension with the addition of four small circular anomalies of low resistivity readings. The results from the earlier resistivity survey suggested that Anomaly A was indicative of a ditch. The electrical resistivity profile located in this area demonstrates that where the profile should cross the southwest boundary of Anomaly C, at about the 2 m to 4 m mark, there is very little activity in the reading trend. This suggests that either the southwest border of Anomaly C has been missed or that it is so ephemeral that the technique failed to detect it. Where the profile is supposed to cross Anomaly A, at around the 18 m mark, a deep trough of low resistivity readings in the graphs can be observed. Such an anomaly in the data may represent a section through a ditch. From the data it can also be inferred that the feature appears to survive up

to a depth of 1.5 m (see p 35 for explanation) as very little variation occurs for the readings obtained at the 4 metre electrode separation, which are biased to a depth of 2 metres.

Location 2

This comprised a 20 m profile running SW/NE and bisecting Anomaly A, represented by the feature visible on the aerial photograph as a linear feature running NW/SE for over 100 m. The results show that where the profile should cross this anomaly, at about the 8 m mark, a trough in the line graphs is indeed observed. The readings for this feature, though not as distinct, are similar to those displayed where the profile at Location 1 crossed Anomaly A. As stated above, a trend in the data of this nature is usually likely to represent a section through a ditch. As with Location 1, the inferred depth of survival of Anomaly A at this location is up to 1.5 m.

Location 3

This comprised a 50 m profile running east/west and bisecting Anomaly M. The nature of the resistivity data suggested the possibility that Anomaly M represented a ditch and banked enclosure. The results from this profile depict a trough in the line graph at the 4 m mark that rises sharply to a peak at about the 20 m mark. The data then appears to level out for a distance of about 20 m before rising to another peak that starts to fall just as the profile ends. Such readings appear to represent a section through a ditch and internal bank enclosing an area some 20m in diameter and correlate with the readings obtained from the resistance survey. The inferred depth of survival for this feature is, once more, up to 1.5 m. It is also interesting to note that, particularly on the 1m reading line graph, both of the peaks contain a trough within them. If this feature had only occurred on one of the peaks it might be attributed to prevalent local topsoil conditions. Since the reading trends for both anomalies are so similar, almost mirror images, the possibility that they could represent trenches cut into the bank should not be ignored.

The results of the three electrical profiles undertaken at Poltalloch (Figure 36) correlate closely with the results from the earlier electrical resistivity survey and the pattern of the crop mark. Although the profile across Anomaly C has revealed little that might elucidate this feature, the north-eastern extremity of this profile, where it crosses Anomaly A, appears to detect a ditch. Similarly, the profile at Location 2 also suggests that this Anomaly is a ditch. The results of the electrical profile across Anomaly M support the assertion that it is representative of a ditch and banked enclosure. The application of an electrical profile survey has enabled not only the further testing of results previously obtained but has given an insight into the depth to which these archaeological features may survive.

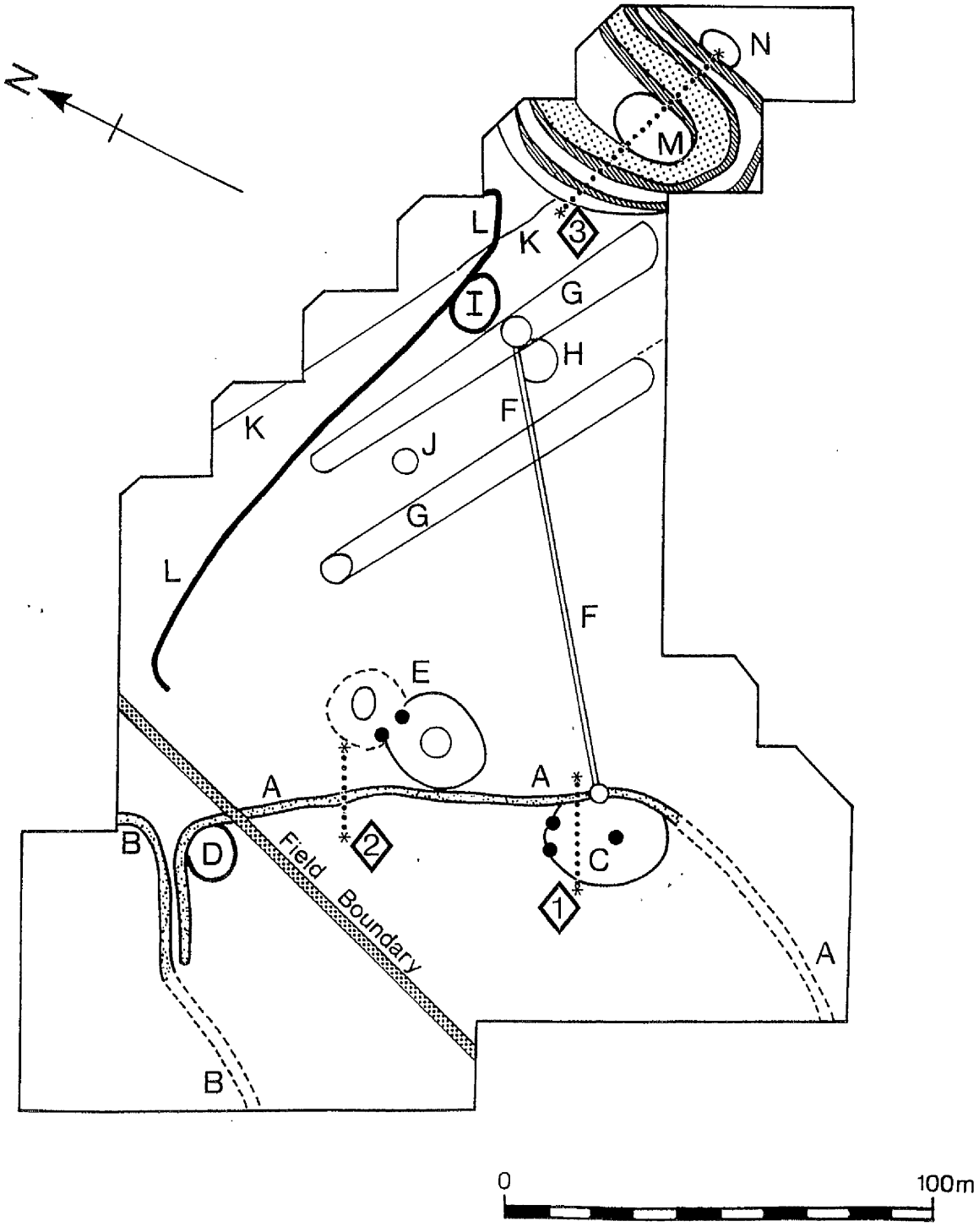
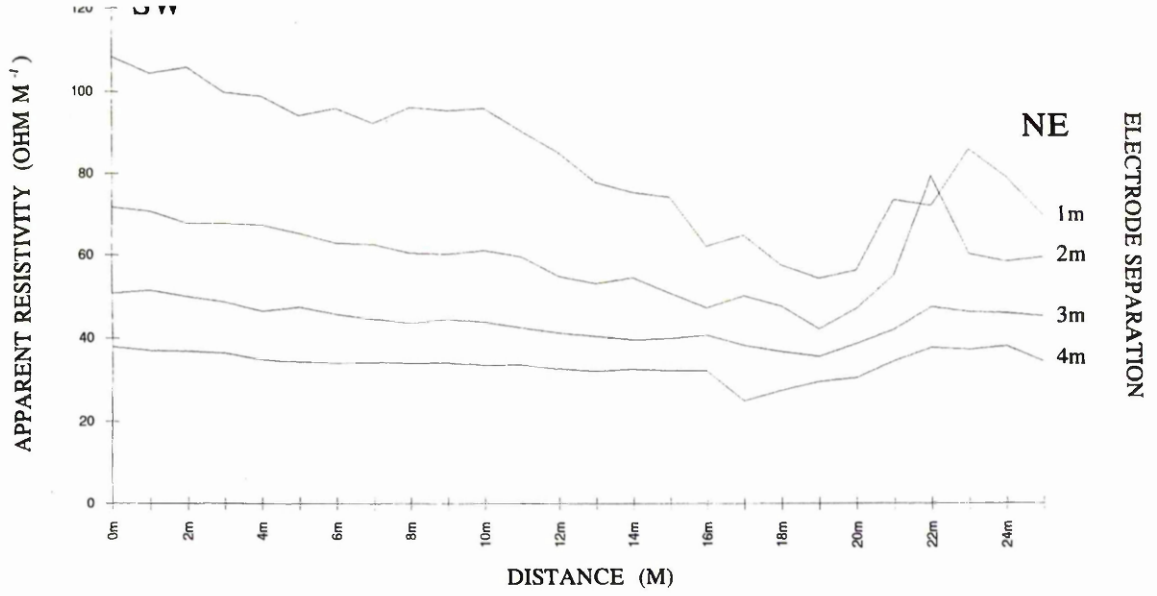
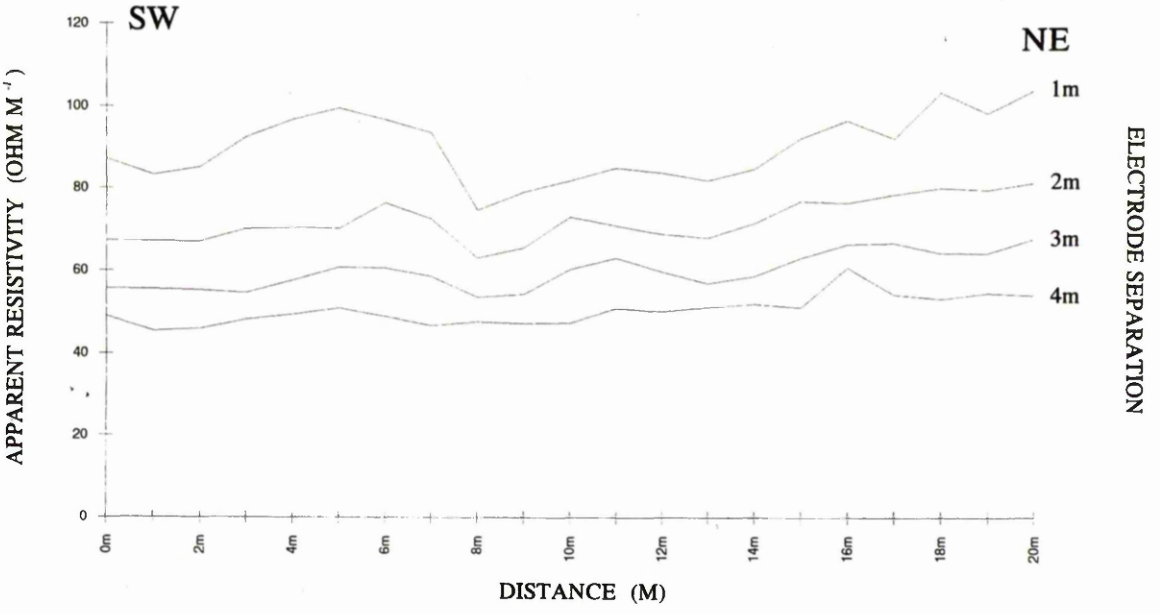


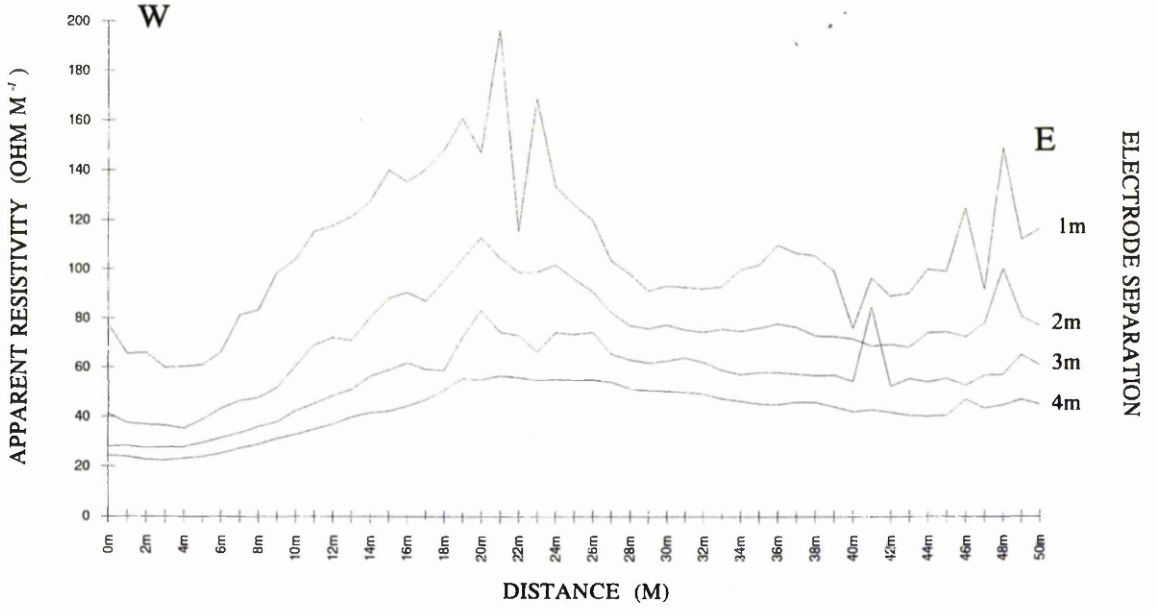
Figure 35 : Poltalloch Electrical Profile Survey – Locations of Profiles 1 to 3



Location 1, Electrical profile bisecting Anomaly C and the southern end of Anomaly A.



Location 2, Electrical profile bisecting Anomaly A.



Location 3, Electrical profile bisecting Anomaly M.

Figure 36 : Poltalloch Electrical Profile Survey - Profiles 1 to 3 Results

4.4(iv) Summary of Poltalloch Field Walking and Geophysical Survey

The strongest anomaly detected during this survey was the present day field boundary. On the overhead view (Figure 32) it appears as three parallel lines of low resistivity with the central line being the strongest. They run roughly north/south across the graphic and cut across the crop mark. On the oblique views (Figure 33) it is easily discernible as a large trough. Running parallel to the field boundary and visible on most of the graphics is a series of parallel lines. These are plough scars and unfortunately this site has been badly affected by such activity. About 25m southwest of Anomaly A and running parallel is a large band of low resistivity readings that run across the whole survey area. This may be geological in origin, although anomalies such as this are often representative of hollow ways.

The geophysical survey has not unequivocally confirmed the crop mark's identification as an enclosure, although this seems to be the most plausible explanation. The results from resistivity and electrical profile surveying suggest that part of the crop mark is the result of a buried ditch. The apparent turn at the northwest end of the crop mark has been demonstrated to be a separate anomaly, but, if the feature is representative of an enclosure, this might indicate the location of an entranceway. As to its interior, the circular anomalies might be the remains of small enclosures containing further small distinct anomalies and there appear to be other similar anomalies to the immediate north and its outside. Had lithics indicative of prehistoric activity been found in this area this would have raised the possibility that these anomalies are representative of a settlement. Anomaly G is suggestive of the remains of a prehistoric earthwork such as a small cursus, but as it appears to run almost parallel with Anomaly K and the current field boundary, it is probably associated with them rather than an antiquity. Anomalies H, J and I are more likely to be representative of antiquities. Certainly the area around these anomalies yielded a number of pieces of worked flint and possible worked quartz (Figure 34).

Anomaly M appears to be a circular enclosure about twenty metres in diameter and possibly enclosed by a series of banks and ditches. The nature of the resistivity and electrical profiling data suggest that it is apparently surrounded by the remnants of a large bank and ditch which in turn appears to be surrounded by a complex of smaller ditches and banks. The location of this anomaly also corresponds to where the majority of worked flints were encountered. It would be expected that a feature such as this would be evident as a crop mark but, unfortunately, it does not appear on any of the aerial photographs used in this study.

The three methods of investigation employed; aerial photography, field walking and geophysical survey have worked well in conjunction with one another on this site, although the information

derived from each of these techniques did not directly match one another. In this case it should be considered that each technique complimented the other. Aerial photography located the site; geophysical survey produced an anomaly with the same pattern as the aerial photograph but with several additional anomalies not visible on that photograph. Unfortunately, probably due to plough damage and the chosen sampling interval, the geophysical survey was unable to clarify the nature of the circular features visible on the aerial photograph. Fieldwalking suggested that additional surveying should be concentrated to the north and northeast of the crop mark where anomalies of potential interest were encountered whereas it implies little activity in the area within the crop mark itself. This particular study has demonstrated how much information can be obtained from a combination of non-invasive investigation techniques on a site from which more information is desired but where excavation is, at present, not possible. Had any one of these techniques been used in isolation then the full archaeological potential of this site may not have been recognised.

4.5 Summary and Conclusions of Field Walking and Geophysical Surveying in Detailed Study Areas

The geology, soils, ploughing practices and recent history of the Kilmartin area do not provide the most suitable conditions for the formation, survival and detection of buried archaeological anomalies or, the recovery of prehistoric surface artefacts. Despite such detrimental conditions this exercise has proved successful in discovering a number of new sites and geophysical anomalies of archaeological potential. Detailed discussion of these is reserved for the next chapter.

The agricultural revolution is highly evident in the results from the fieldwork. A landscape that has been systematically reorganised, especially in the 19th C, with the ground around the monuments undergoing severe disturbance from peat stripping, field boundary construction, drainage schemes, ploughing and general agricultural improvements has been revealed. Even so it is evident from this work that the upstanding remains were far more complex and extensive than is visible and ephemeral traces of ancient activity can exist within a modern agricultural landscape.

These results also suggest that when the blanket peat was stripped it resulted in the loss of the ancient ground surface and any *in situ* prehistoric evidence that it might have held. This left the remainder to the ravages of modern ploughing as well as natural erosional processes such as wind, water and worms. If prehistoric archaeological features do survive in such situations they will be severely truncated. It is also suggested that, if buried archaeological deposits are present in improved areas they will be better preserved if in ground that has not been stripped of peat.

Unfortunately ground conditions were not ideal in all of the fields walked during this investigation. Despite this it is doubtful if any concentrations of surface lithics were missed as two lithic scatters were encountered in fields where recovery conditions were not ideal. It is probably the case that these scatters are far greater in complexity and magnitude, comparable to Monadh an Tairbh (Ballymeanoch Field 5) which was investigated under very favourable conditions.

In comparison Nether Largie and Ballymeanoch have very similar landscape and monument histories as well as erosional processes and preservation problems. If we compare the anomalies that are possibly representative of the prehistoric occupation encountered at both sites there are many similarities as well. The majority of these anomalies were circular, often enclosing other anomalies and are in close proximity to the upstanding monuments. The suggestion is that the activity represented by these anomalies is not part of the earliest activities but relates to a period after construction of the monuments while they continued to act as foci of attention. The remains of this later associated activity are far less monumental and enduring. It may also be the case that some of the anomalies that appear to enclose standing stones, and field boundaries that incorporate other anomalies, may have taken place after the monuments went out of use.

It should be noted that there are materials used in monumental construction that are far less enduring than stone and, if destroyed, are less likely to leave behind notable evidence. A distinct feature of the upstanding prehistoric monuments of the Kilmartin Glen is that they are constructed of stone and that monumental earthworks are rare. The only definite example is the Henge, as there is still some doubt surrounding the authenticity of the Barrow nearby. Another possible barrow (NR 820969) is located 500m WSW of Ri Cruin cairn but still remains uninvestigated. The evidence from the programme of geophysical surveys suggests that prehistoric monumental earthworks were more abundant in this area than has been realised previously. Although the arrangements of standing stones at Nether Largie and Ballymeanoch do not appear to be part of longer stone rows, there is a possibility that they are associated with monumental earthworks. If this proves to be the case it is suggested that these could be earlier structures that have been reused. It is within the areas of improved landscape that the majority of upstanding monuments exist. As this is where their destruction has been greatest, it is probably reasonable to assume that these concentrations of monuments may have been denser, but not necessarily more widespread unless some were wholly constructed from less enduring materials.

The results of the survey at Poltalloch also suggested the presence of monumental earthworks but due to the history of landscape use at Poltalloch some of the geophysical anomalies detected there probably represent a greater variety of periods in the archaeological record. The archaeological deposits in and below the ploughsoil at Poltalloch could be better preserved than those immediately

around the monuments at Nether Largie and Ballymeanoch. It therefore seems that the upstanding archaeological remains in the Kilmartin area that represent different periods are not a true reflection on the use of the wider landscape. In such areas of severe disturbance and constant human occupation only the most enduring forms of construction appear to survive.

Although the more ephemeral results from the geophysics are difficult to associate with archaeological activity, particularly in such badly disturbed ground conditions, the anomalies representing field boundaries, drainage and other reorganisation of the landscape are easy to determine thus demonstrating the effectiveness of the investigative machinery. In order to make sense of smaller or less discernible anomalies within these conditions without excavating, it would be necessary to conduct surveys at a smaller sampling interval. This should be done with a variety of instruments suited to detecting different anomalies that also complement each other. At the very least a possible compromise could be initial surveys consisting of an area being surveyed by both magnetometry and resistivity. Readings could be taken at one metre intervals but offsetting the readings taken with one of the instruments by half a metre so that effectively a survey done with two instruments that log readings at half metre intervals for the overall survey area is conducted.

It should be noted that the quality of electrical resistivity and electrical profiling data are dependent upon the degree of ionic mobility within the moisture content of the soil, which in turn is affected by, buried archaeological features. If the deposits under examination are extremely dry then they may not conduct the applied current. Conversely, if the ground is waterlogged, the readings obtained may actually conceal buried archaeological features that might otherwise have been detected due to short-circuiting between the electrodes. Consequently if undertaking a geophysical survey in which the aim is to test or replicate previous results it should be conducted at such times when the prevalent soil conditions are as similar as possible to those when the original survey was undertaken.

The validity of the above results and how they contribute to a better understanding of the patterns of prehistoric occupation in Kilmartin is discussed in greater detail in the next chapter. This will include the results of invasive investigation carried out during this programme of field investigation and discussion of relationships and associations between the monuments and the landscape.

CHAPTER 5 Detailed Study Areas: Excavation

5.1 Introduction

Despite the geological background, erosion and disturbance from landscape improvements, particularly peat striping, the results of the non invasive fieldwork exercise presented in the last chapter proved successful in discovering a number of new sites and geophysical anomalies of potential archaeological interest, some of which are probably representative of prehistoric activity other than monument building. A small number of invasive investigations were carried out during this programme of field investigation, which allowed further testing of these results and conclusions. This included the further investigation of a number of different geophysical anomalies at Ballymeanoch, the discovery and trial trenching of a burnt mound at Nether Largie and some work on an on-going rescue excavation in advance of the extension of quarrying operations at Upper Largie Quarry. Most of the invasive work was funded by and conducted in advance of development projects. Some additional desk-based research was also conducted, as well as extensive walking of the landscape around the monuments.

5.2 Peat Stripping

The results of the research and fieldwork presented in earlier chapters suggest that Nether Largie, Ballymeanoch and Poltalloch are on ground that has undergone agricultural improvements and the greatest determining factor as to the survival of archaeological deposits in these areas is peat stripping. There is clear evidence that Nether Largie was covered by peat which was deliberately removed, whereas the evidence for such activity at Ballymeanoch and Poltalloch is not so affirmative. Evidence so far demonstrates that both are in the vicinity of peat deposits, but whereas Ballymeanoch was probably covered Poltalloch probably was not.

Further research on agricultural improvements proved very vague in supporting these assertions, and like the reports of the antiquarians, do not give precise locations and descriptions of events. However, Roy's Map (Figure 3) records what is probably the Ballymeanoch terrace as being uncultivated ground but the map is too vague to match the ground around Rowanfield. Scott refers to the agricultural improvement and land drainage proceeding "...steadily in the Kilmartin Valley and along the road to Lochgilphead "(Scott 1989, 55). Barber, when excavating the socket of stone G at Ballymeanoch comments on the leached layer of the podzol as being "...intermixed with a thin overlying peat to produce the present top soil." He also suggests "that only man's continuing

interference prevents the re-establishment of peat bog in the area" (Barber 1978, 106). Examination of a pit for gravel extraction within the forestry plantation at Mondah an Tairbh for a new access road revealed a layer of peat about 0.3m thick below the modern top soil (Abernethy 1995, 14). Archaeological assessment of the ground after harvesting the trees classified the topsoil as being stagno- or peaty podzols but could also be equally viewed as being shallow blanket peat (Carter 1976, 4). Carter also suggests that when the plantation was first established it was planted on unimproved ground.

The two areas containing flint scatters at Ballymeanoch are both on small plateaus between one and two metres above the surrounding topography and at the edge of terraces. Such topography would provide good drainage hence create islands surrounded by peat. Mapleton comments on a number of gravel banks protruding through the moss, many of which contained cist burials and cairns (Mapleton 1870a, 1870b). The peat deposits at Ballymeanoch would probably not be very deep, as this was probably a relatively young part of bog. Certainly the layer revealed in the gravel pit was only 0.3m in depth. There is now a much stronger case to suggest that the ground around the Ballymeanoch monuments was at one time covered by a blanket of peat which was deliberately stripped taking the prehistoric ground surface with it. Poltalloch is situated on ground in an area of natural good drainage located above surrounding fields containing evidence of peat deposits. This area also contains a crop mark and surface lithics therefore it is reasonable to assume that it was never covered by peat. Alternatively the lack of surface finds in certain parts of the Kilmartin area that date to before the post-medieval period may be due to as yet unidentified processes concerning their deposition.

5.3 Testing of Geophysical Anomalies

In the light of the field and geophysical survey results it was important that a sample of the geophysical anomalies encountered were trial trenched. This is necessary for a number of reasons:

1) In order to validate present work and assist with the identification of geophysical anomalies encountered in Kilmartin it is necessary to clarify the nature of some of these anomalies by excavation. This is an essential task given that the interpretation of any geophysical data set is a subjective process and therefore must be tested in order to maintain the credibility of such methods of investigation.

2) It is important that the nature and extent of the archaeological evidence from these sites is fully recognised before models for prehistoric activity based on this information can be accepted.

3) Present geophysical investigation suggests that the plough soil is severely disturbed, but below this there appears to be a level containing possible prehistoric archaeology. The excavation trenches to examine the causes of some of the geophysical anomalies should also allow the testing of this theory and ascertain the condition of any archaeology if present.

Any invasive work carried out should only involve the minimal disturbance of any sites or buried archaeological deposits as well as minimal disturbance to any farming activities. The level of disturbance and cost of such work meant that it was mainly limited to when other ground disturbance was being carried out. Further work instigated and funded by Historic Scotland and Kilmartin Project allowed some invasive archaeological investigation to further the testing of some of the conclusions arrived at in the end of the last chapter. This work included the establishment of new landscape management agreements for the ground around the monuments of Ballymeanoch and the Nether Largie Standing stones and a number of environmental improvement initiatives in the Kilmartin area (Abernethy 1995; 1998). The area of ground containing the Ballymeanoch monuments were taken out of cultivation, fenced off, and gates installed for public access. Revised public access was also agreed between the adjacent sites of Dunchraigaig Cairn and Baluachraig prehistoric rock carvings. New interpretational and directional signage was also erected at these sites. As the ground around the monuments at Ballymeanoch had previously been under cultivation some landscape works were necessary in order to improve the appearance of the sites, as well as further assessing their archaeological characteristics. This work was commissioned by Historic Scotland, and funded by Kilmartin Glen Project. It was proposed that while conducting this work a trial trench could be excavated at the site in order to test the nature of some geophysical anomalies (Figure 37). The programme of work during winter 1997-98 included the construction of new pathways between Dunchraigaig Cairn and the Ballymeanoch complex of monuments and between the Nether Largie standing stones and the adjacent monuments of Temple Wood and Nether Largie South. In addition, a nearby small area of wood and waste ground (NR 829 976), adjacent to the B8025 where it joins the A816, has been purchased and is undergoing landscaping works and the construction of a car park (Figure 10).

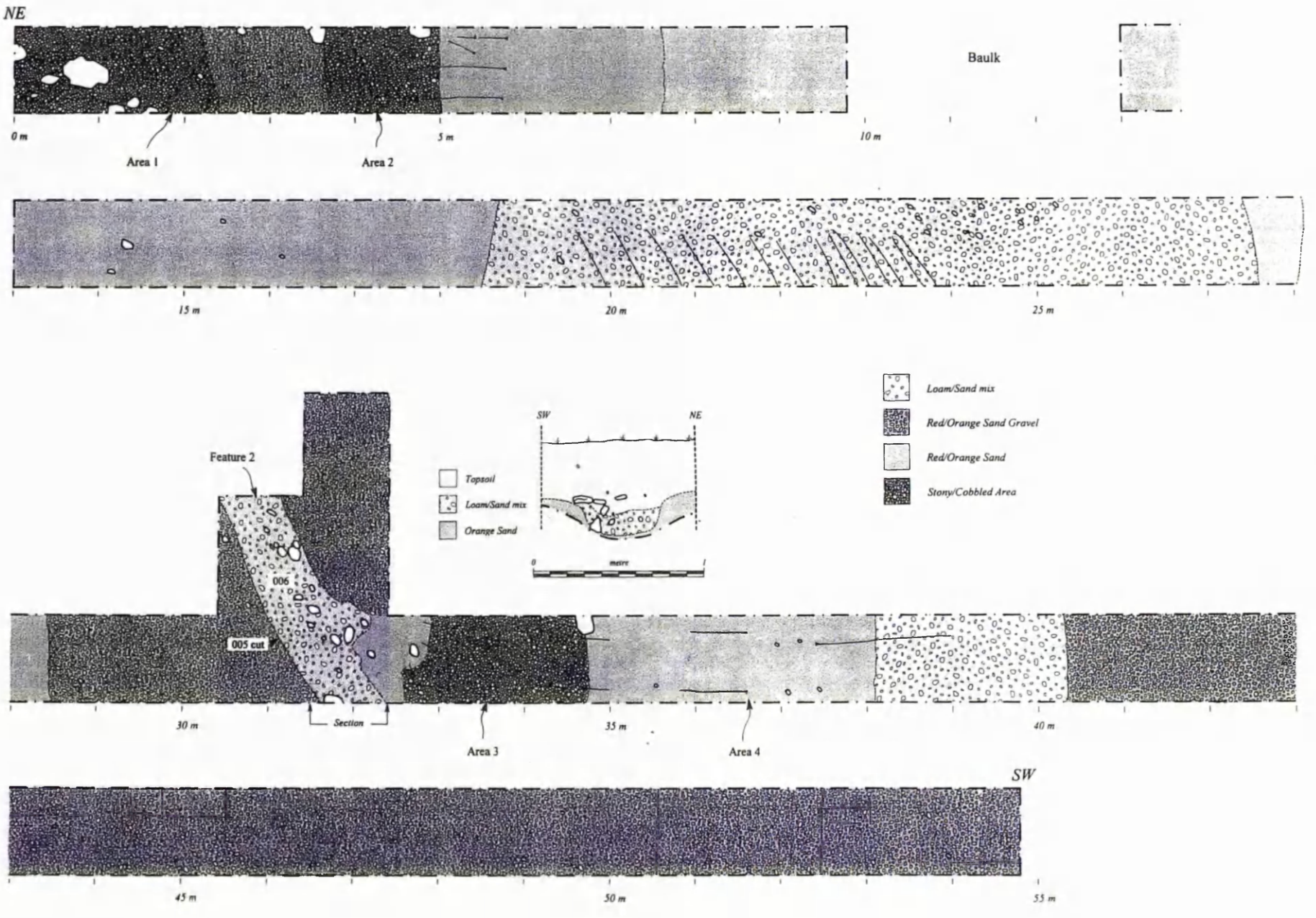


Figure 37 : Ballymeanoch Grid 1 - Plan of trial Trench and Section of Feature 2

Ballymeanoch Grid 1

The series of geophysical anomalies at Ballymeanoch that are of particular interest are on the same alignment as the row of four standing stones (NW/SE), and running up to meet them at their SE end. They were initially detected by resistivity surveying and comprise two sets of parallel anomalies about 5m in width and about 5m apart with a gap of about 15m between. It is unlikely that anomalies with such dimensions could be caused by ploughing, nor are they indicative of field boundaries. An electrical profile survey was also conducted across these anomalies. The nature of the readings from this survey appeared to represent two large parallel ditches with residual upcast on each side. As other Late Neolithic and early Bronze Age monuments are occasionally found in association with large linear ditch and bank structures running through the landscape, there is a case to suggest that these anomalies may represent an earthwork avenue or cursus. The excavation of a trench across this series of anomalies was intended to test this hypothesis.

A 50 m by 1 m trench was excavated across the course of the large linear anomalies (Figure 18) and 37). The location of the trench followed the line of the electrical profile. After deturfing by hand, 0.25 m of dark brown, clayey loam, plough soil (001) was removed from the trench by mechanical digger to reveal an orange to red natural deposit of sands, gravels and clay (003). This deposit was of differing compaction, varying along the trench from patches of cobbles to patches of sand. Between 20 m and 24 m from the NE end of the trench lay a thin layer of pinkish, grey plastic clay (002) on top of 003. A similar deposit was encountered on both of the previous excavations at the site (Barber 1977, Abernethy 1993) which Barber had interpreted as the remains of the leached podzol. Cut into this were a number of parallel grey sandy strips measuring from 0.05m to 0.1m broad and about 0.2 m to 0.3 m apart (004). They ran in a N/S direction and when sectioned proved to be 0.05m in depth and almost certainly represented plough scars. Barber (1977) encountered similar features although these were broader and further apart. It would have been expected that these plough scars would have been detected as a geophysical anomaly but this does not appear to be the case.

Although some of the stony areas appeared to be archaeological in nature they proved to be natural when sectioned. The only other feature encountered was a ditch crossing the trench at 32m from the NE end (005). It ran in a north/south direction, measuring an average of 0.6m across and when sectioned proved to be only an average of 0.11m in depth. Its fill (006) was similar to (001) but containing more sand and gravel particles. As the west side of the feature contained more stone than the east this indicated the possibility that it represented the packing material of a palisade trench. The geophysical anomaly that it corresponds with appears to meander across the linear anomalies and is represented by the meandering dotted lines (Figure 23). At the southern end of

this anomaly it runs north/south for about 10 m before turning northwest. The electrical profile survey also indicated that this feature was present.

It was decided to trace the ditch further. Unfortunately time only allowed for the clearing of a 1 m by 1 m box on the northern side of the trench. This indicated that for the two metre stretch of the ditch revealed it continued in a straight line in a north/south direction with the stonier infill concentrated to the west side of the feature. If this feature is the remains of a foundation trench for a palisade, which meanders across the large linear anomalies, then it raises the possibility that it may represent the foundation trench for a screen or façade. Such an architectural embellishment could restrict access or view of the stones and the interaction of an audience or visitor to the monument. The existence of such screens has been postulated at a number of monuments that have avenues leading up to them such as Durrington Walls and Stonehenge (Barrett 1994, 24; 47). Apart from this feature no finds or anything else of archaeological significance was encountered. The excavation of the narrow trench failed to reveal archaeological deposits, which might explain the large linear anomalies and the corresponding results of the electrical profile survey. Nothing to suggest the remains of parallel sets of ditches or banks were encountered in the trench.

Ballymeanoch Grid 3

Geophysical surveying in advance of the construction of a new pathway between Dunchraigaig Cairn and the Ballymeanoch complex of monuments detected an anomaly comprising two areas, each some 2 m in diameter, of high resistance and about five meters apart (Ballymeanoch Grid 3 Anomaly D). Readings of this nature could represent buried stones, either small stony areas or individual large stones. The Anomaly corresponded to a large earth-fast stone that measured 1 m by 0.15 m, with its long axis aligned north/south and the top edge of the stone level with the ground surface. The fact that Anomaly D and its corresponding stone were also contained within the extent of a larger anomaly (Ballymeanoch Grid 3 Anomaly A), which suggested the presence of a large ditch was unusual. As this was on the line of the path further archaeological assessment of this area was conducted (Figure 38).

After machine stripping the turf along the route of the path, a mainly dark brown stony silt and clay of loose compaction was encountered. More earth-fast stones were encountered in the vicinity of Anomaly D and all within a 10 m stretch of the path. It was intended to hand clean the 10 m stretch of the path down to the subsoil (002) which was encountered on the west side of the trench at 0.10 m to 0.15 m deep and consisted of compact, rusty-coloured gravel. No clear horizon could be recognised on the east side of the trench, even though it was cleaned to a depth of 0.30 m in order to give an even surface, as the edge of the terrace was on ground slightly sloping to the west.

The topsoil on the east side did appear to contain more red/brown silt below 0.20 m depth. The reason appeared to be that this area was on top of the fill of a ditch (004 and Anomaly A) and there was no clear horizon between the topsoil and the fill of the ditch. The results of the geophysics suggested this ditch was 3 m to 5 m wide.

Trench 1 (Figure 38)

A linear arrangement of stones (005) that included the large stone running north/south, was clearly evident. A section was first excavated across the north end of the large stone to ascertain if this stone was *in situ,* as there was a possibility that it represented the stump of a standing stone or side slab of a cist. It had been stated in the project design that there was a possibility that cists might be encountered along this terrace edge. It was also hoped that the exercise would locate the cut of the ditch (003). A 1 m by 0.50 m by 0.50 m deep box trench was excavated across the path at the north edge of the stone and it was revealed to be a large slab of schist. The bottom of the slab and ditch edge could not be clearly identified due to a deposit of stones on the west side of the trench (005) abutting the large slab. On the east side of the trench a deposit of fine red/brown silt with occasional small stones was encountered (004). As the deposit of stones (005) may have been significant archaeology rather than the remains of a stone drain, it was decided to temporarily abandon Trench 1 in favour of a second trench.

Trench 2 (Figure38)

It was intended that this trench would ascertain whether or not the stone deposit encountered in Trench 1 represented the remains of a drain without causing additional disturbance to the schist slab. If this deposit represented significant archaeology it would be necessary to open a larger area around the slab before further excavation could proceed. Trench 2 was located 1.70 m south of Trench 1, across the path and the linear arrangement of stones. It was a box trench measuring 1 m by 0.50 m by 0.50 m deep and revealed a deposit of stones from 0.10 m to 0.50 m in diameter mixed with dark, damp silt on the west side and red/brown fine silt with occasional small stones on the east. This established that the linear arrangement of stones represented the probable remains of a drain which, appeared to have been excavated into the fill of the ditch. Given these circumstances it appeared unlikely that the large stone was in its original position. Trench 1 was then extended in order to characterise the nature and location of the schist slab.

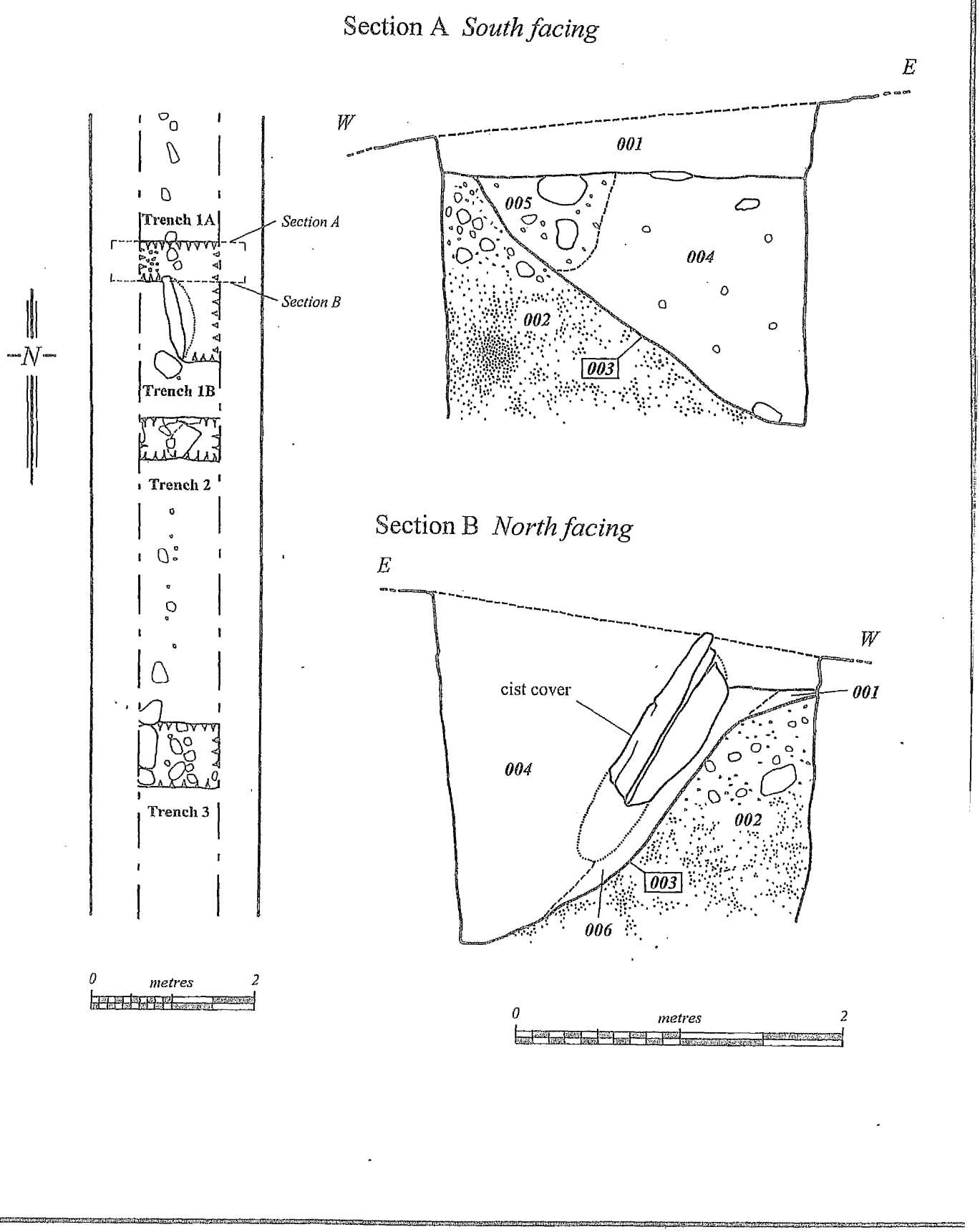


Figure 38 : Ballymeanoch Grid 3 – Excavation Plan andSections

Trench 1B (Figure 38)

An extension to Trench 1 measuring 1 m by 0.50 m was opened immediately east of the slab of schist to form an L-shaped trench extending 0.50 m to the north and east of the slab. Trenches 1A and 1B were excavated beyond the full depth of the slab and revealed it to be 1.15 m by 0.90 m and 0.20 m thick (Section B). The revealed face of the slab was decorated with at least seven cup marks and two possible axe head carvings. It was lying against the west side of the ditch at an angle of about 45 degrees and separated from the cut of the ditch (003) by a thin layer of light brown fine loose silt (006). 1 m east from the edge of the cut the depth of the ditch was 1.05 m and levelling off which suggests that this was near its base. The geophysical anomaly created by the ditch suggests that it is 3 m to 5 m wide. Hence, it was only possible to record the angle of cut (003) on the west and a small part of its fill (004).

Trench 3 (Figure 38)

As the decorated slab was a very significant archaeological find, a third box trench measuring 1 m by 0.75 m by 0.50 m deep was opened 4.50 m south of the slab, where a further large earthfast stone was located. This trench revealed the stone to be an unmodified boulder on the top of the stone drain that had been excavated into the fill of the ditch. Dr Carol Swanson (West of Scotland Archaeology Service) advised that the slab be reburied. This was achieved by excavating underneath the slab and then levering it away from the side of the ditch to allow it to slide to the ditch bottom. This exercise provided an opportunity to inspect the other side of the stone, but it bore no decoration.

The decorated stone almost certainly represents the cover slab of a cist, as several similar slabs have been found *in situ* in the Glen (Nether Largie North; Brouch an Druimein; Glennan). The fact that the cist cover was lying against the west side of the ditch and almost on the ditch bottom suggests it was dumped there either during the excavation of the ditch or soon afterward. The later drain was probably built around the dumped cist cover. It should be noted that a cut for the east side of the drain was not clearly distinguishable; therefore, instead of a drain, the stones inside and on the west side of the ditch could be tumble from the possible wall represented by Anomaly B Grid 3 (Figure 28)

Had the slab not been decorated with cup-marks and possible axe head carvings, the case for it being a cist cover would be much harder to argue. Within the Kilmartin area, Bronze Age cists decorated with various carvings, such as cup marks, lozenges, axe heads and rebating grooves, are well attested (RCAHMS 1988; Stevenson 1997). The assigning of such motifs to different phases of prehistoric activity and the re-use of stones carved in the Neolithic period in Bronze Age cists and cairns in Kilmartin have also been discussed (Bradley 1993; Stevenson 1997). In Kilmartin,

axe head carvings are found exclusively in Bronze Age cists. Four sites are currently known, three of them in different cairns in the linear cemetery: Ri Cruin, Nether Largie Mid, Nether Largie North and a fourth discovered during quarrying at Kilbride. The condition and quality of these axe head carvings varies from being almost indistinguishable (Nether Largie Mid) to roughly pecked outlines (Kilbride) to the well known, neatly executed examples at Ri Cruin. The possible axe head carvings encountered during this investigation could not be completely verified as the time, resources, and specialist photographic equipment needed were out-with the constraints of this study. Never the less, the presence of cup marks alone is enough to allow a confident interpretation of the slab's function.

Even though this cist cover was not *in situ,* it is probably near to its original location. It may have been encountered while excavating the ditch and left next to where it was found. Alternatively, its presence on the edge of a field boundary suggests that if it was encountered while ploughing, it had been dumped in the nearest convenient location to where it was found. Vantage points on the edges of terraces appear to have been favoured locations in the Kilmartin Glen for siting cists. The origins of the ditch are probably associated with the agricultural improvements. As noted by Dr John Leydon in 1800, 'The drainage operations were spectacular, with water flowing through the main trench at half a ton a minute' (Michael Davies, written pers comm). As far as can be ascertained this quote refers to the drainage in the area covered by Experiment Farm (Barsloichnach). There is still a network of large drainage ditches all over the original extent of the Poltalloch Estate, and it is reasonable to assume that some were temporary and later back-filled. It appears that much of the ground on the Ballymeanoch terrace has been heavily affected by agricultural improvements (Abernethy 1993, 1995; Carter 1996). The possibility that the ditch encountered during this exercise and some of the anomalies detected at Nether Largie represent such activity should not be dismissed.

The discovery of both the ditch and the cist cover slab may be connected to past records of cists in the woods around the Ballymeanoch area. Carter reviews the history of these records and concludes that, 'at least two more cists must be present in the plantation' (Carter 1996). He cites Mapleton (1871a) and Craw (1930) as the source of this information and gives an account of the second-hand nature of nineteenth century reporting for site locations and recognises the vagueness of Mapleton's references. Carter also explains how Craw was able to make sense of these references and put place names to unrecorded cist sites as he had access to Mapleton's manuscript notes. Mapleton's original statement which Craw connects with Ballymeanoch reads:

> "In two of these, that I did not see, but was told of by a man who opened the cist while trenching the ground for a plantation, bronze was found" (Mapleton 1870a, 151).

Carter highlights the importance of the need to know more about Mapleton's 'archaeological activities' and states:

> "It is unfortunate that these notes have not been located as they offer the only chance of a firm link between Ballymeanoch and the early discoveries of cists" (Carter 1996).

It is Mapleton's reference to trenching that could provide a link with the cist cover encountered during this exercise. The vagueness of the location of these cists and the fact that Mapleton never saw them increases this possibility. Alternatively, it is quite possible that the cist cover does not represent one of the cists referred to by Mapleton, as it is a distinct possibility that this particular terrace contains the sites of numerous cists.

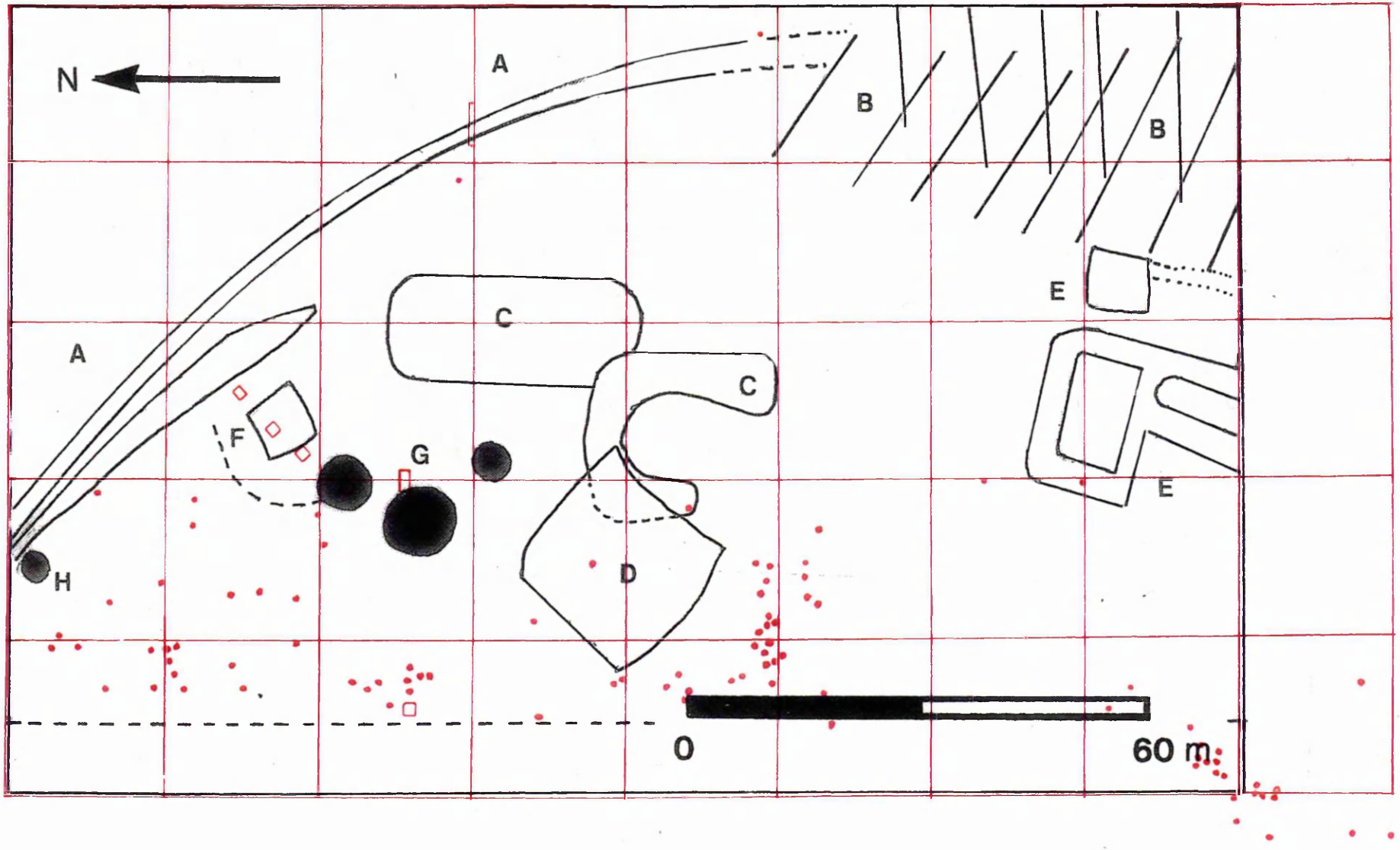
Also worth noting are comparisons with the site of Bruach An Drumein, a similar gravel terrace on the opposite side of the Glen and some 1.3 km to the north-west. Excavation at this site revealed a multi-period settlement, a cist cemetery and a network of ditches (Cregeen 1961). The ditches vary in size from about 3-6 m in width, but are all about 2 m deep. Excavation of part of this network,

> "...established that the settlement had been enclosed by an arc shaped defence, consisting of an inner and an outer ditch, with bank between, which ran across the terrace to isolate the natural promontory to the south of it. It is likely to be of Iron Age date" (Cregeen 1962, 8).

Unfortunately, very little exploratory work was carried out on the rest of the ditch network and only relative dates are known for the areas that were investigated. Although all of the ditches had been deliberately back filled, unlike the ditch encountered during this exercise they contained stratified deposits related to human activity and evidence of re-cutting. The excavation of the ditch during this exercise did not provide any dating evidence for its origin and it does not appear on the first edition Ordnance Survey map either. The uniform nature of its fill also suggests that it had been deliberately back-filled, which could explain its absence from any maps consulted.

Ballymeanoch Grid 2

Further investigation of the flint scatter in Grid 2 at Ballymeanoch was highly desirable. As it was outwith any scheduled areas or areas of monumentality and as further work did not infringe upon any farming practices, it was deemed acceptable to conduct some test pitting within the grid (Figure 39). These were hand excavated only to the depth of the subsoil and the turf was carefully removed first. After recording the subsoil surface the pits were backfilled and the turf replaced. Three geophysical anomalies were examined with varying degrees of success.



Flint Scatter ● Test Pits □

Figure 39 : Ballymeanoch Grid 2 – Location of Test Pits

A burnt mound is clearly identified in the top right of the magnetic survey and is seen in contrast with midden deposits forming wall core material in two circular structures to its south.

Figure 40 : Geophysical Survey of Shelly Knowe Burnt Mound Complex, Toft Ness
(From Dockrill and Gater 1992, 29)

A very distinctive curvilinear anomaly was detected by both resistivity and gradiometer surveying (Anomaly A, both surveys). Each method revealed identical patterns for the anomaly encountered. This was somewhat confusing as the nature of the resistivity readings suggested that the anomaly represented a ditch whereas the nature of the gradiometer readings suggested that the anomaly represented a wall. Whatever the construction of the anomaly it was interpreted as being concerned with drainage due to its particular relationship with the surrounding topography. In order to help clarify this situation a small 1.0 m by 5.0 m trench was hand excavated to the depth of the sub soil across the course of the anomaly. The topsoil measured 0.35 m in depth and comprised a mid-brown, silty-loam with, the subsoil comprised a water-borne, light-brown, sandy-silt. Towards the middle of the trench a feature measuring one metre in width and comprising a mixture of dark brown silty loam with patches of grey clay was encountered. Its location corresponded with the location of the geophysical anomaly. After removal of 0.10 m of this deposit large stones and chunks of rubble were encountered. The full depth of this deposit was not determined but it was excavated to a depth of 0.75 m to confirm its character, which matched that of a rubble cundy. This is a construction used for drainage. A ditch is simpley excavated then filled with large stones and rubble.

The nature of electrical resistance measurement is most sensitive at half of a metre in depth whereas gradiometer surveying is not so much affected by depth of deposits but by extent of magnetic disturbance. This would mean that resistivity surveying would be detecting the damp fill immediately above the deposit of rubble. Although the rubble cundy was a cut feature the content of its fill was mainly large stones which would result in less magnetic disturbance than if the fill consisted entirely of soil.

A series of 1 m by 1 m test pits were excavated in the vicinity of Anomalies E, F and G (Figure 39) encountered during the resistivity survey. These anomalies comprised a group of small circular areas of high resistance. No features cut into the sub soil to suggest the cause of these anomalies were encountered but a number of additional flints were discovered.

In archaeological terms the anomalies of high magnetic disturbance encountered along the edge of the terrace in this grid were suggestive of the presence of areas of burning such as hearths, kilns or burnt mounds. The presence of flint scatters in their vicinity also suggested that these anomalies might be prehistoric in nature. As the anomalies were adjacent to the Kilmartin Burn they were interpreted as being possibly representative of burnt mounds. Further evidence to support this assertion can be obtained by comparison with other magnetic surveys of prehistoric burnt mounds. For example the results from gradiometer survey at Tofts Ness, Orkney during 1986-87 and conducted before excavation, was able to distinguish between the remains of round houses, burnt

mounds and burials (Dockrill and Gater 1992). The magnetic signature representing the Tofts Ness burnt mound is similar to that encountered at Ballymeanoch (Figure 40).

A 1 m by 1 m test pit excavated over one of these high magnetic anomalies did not encounter any recognisable archaeological features, but a sherd of Neolithic pottery was discovered. Unfortunately this discovery was at the end of the programme of field investigation and time and resources were against the further investigation of a possible important prehistoric site at this stage. Fortunately more detailed examination of another site close by may throw some light on this site.

Nether Largie: Lady Glassery Wood Car Park (Figure 10)

During the construction of the new car park at Lady Glassery Wood an area of burnt silt and fire cracked stones measuring almost 2 m by 1 m was encountered some 0.50 m below the ground surface. The topsoil at this location was 0.25 m to 0.35 m in depth. This covered a fine golden/orange sandy silt with occasional patches of gravel, below which the burnt feature was located. The digger bucket had damaged the feature and a section through it was partially observable. It measured an average of 0.20 m in depth and 0.80 m across and appeared to be contained by a basin-shaped cut. Due to the characteristics and location of this deposit, further investigation was carried out to explore the possibility that it was a prehistoric burnt mound (Figure 40).

The trench containing the feature was enlarged using a mechanical excavator. The base of the trench was hand cleaned until the edges of the feature could be discerned. This revealed a crescentric or kidney shaped spread of burnt, blackened and fire-cracked stone and black silt measuring 3 m by 1.80 m at its widest points The terminals of the feature tapered to a width of 0.30 m, with one pointing east and the other north. The trench, which measured 4 m by 2.80 m, appeared to contain no additional features to the burnt material. The trench was limited, as there were no additional features apparent immediately around the burnt area. Further expansion of the trench without the resources to excavate and record a larger area that may have been archaeologically sterile was not justifiable. After consultation with WOSAS it was agreed not to fully excavate the burnt mound feature, as it was going to be covered over and not destroyed by the car park. Much of the burnt feature escaped damage through the removal of the tree stump and, apart from root intrusion and truncation, was not too badly disturbed.

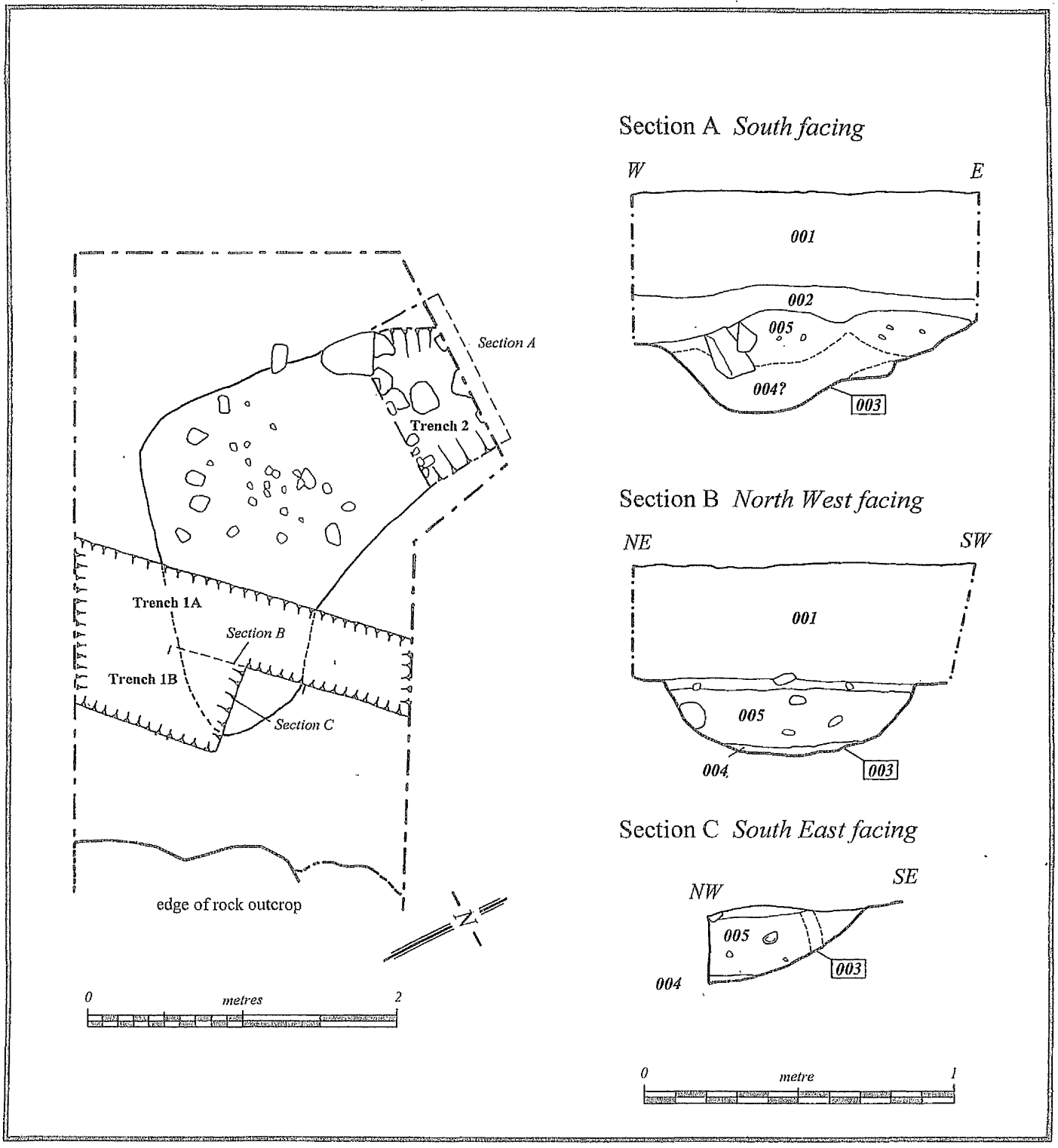


Figure 41: Lady Glassary Wood Carpark - Plan of Burnt Mound and Sections

Two exploratory trenches were excavated in order to gauge the depth and nature of deposits and provide samples of suitable material for radiocarbon dating and the potential recovery of paleo-environmental and artefactual remains. The majority of work was concentrated in the damaged area. This also allowed the examination of the subsoil below the feature and adjacent to the damaged area for the presence of any associated features. Apart from taking some samples from the middle of the burnt area, it remained undisturbed.

Trench 1A

This trench measured 2.30 m by 0.50 m and was located across the full extent of the opened area and through the damaged east terminal of the burnt mound, 0.50 m from its southern terminal extent. It was cut in an attempt to characterise the nature and depth of deposits as well as examining the subsoil below and/or either side of the burnt mound. This exercise revealed the east terminal at this point to be 0.80 m wide by 0.26 m deep with a basin-shaped, almost flat-bottomed cut (Figure 41: Section B). The top 0.02 m to 0.05 m of the fill was mixed burnt material and disturbed redeposited subsoil, below which was mainly blackened and dark brown burnt silt with occasional fragments of burnt stone. The bottom 0.02 m to 0.05 m of the section comprised fine, burnt black silt with fragments of charcoal, which may represent the remains of the bottom of a trough. The subsoil below the mound was of similar composition to that around the mound but sandier and much redder in colour, possibly as a result of extreme heat. No additional features were observed in the subsoil within this trench.

Trench 1B

Trench 1A was then extended by 0.60 m by 1.00 m to the southeast. This allowed the recording of the southwest facing section of the end of the east terminal (Figure 41: Section C) and the examination of a larger area of subsoil below the burnt deposit for the presence of any associated features. At the top of this section the terminal continued for 0.50 m and the fill contained fewer fragments of burnt stone but more dark brown silt. At the bottom of the section the black silty deposit continued into the terminal end for 0.15 m and then the cut curved sharply to meet the top of the section's end. There were no other features observed in the subsoil examined within this quadrant.

Trench 2

A second trench measuring 1m by 0.5 m was excavated at the edge of the northern terminal to ascertain whether this feature continued into and under the northern section of the main trench. This section would also establish the stratigraphic relationship between the burnt deposits and the underlying and overlying material. This trench established that the northern terminal did not continue into the section for more than a couple of centimetres, so an extension of the main trench

to the north was not necessary. The northern terminal was similar to the eastern terminal in that it comprised more dark brown silt than black but contained more burnt stone. The section revealed the burnt deposits to have a maximum depth of 0.34 m and a maximum width of 1 m (Figure 41: Section A). At the bottom of the trench, toward the south side, was a deposit of black, burnt silt with fragments of charcoal and what may be the remains of the opposite end of the trough. Its maximum depth at this point was 0.07 m.

The section also revealed that the burnt feature was sealed by the subsoil that in the section was observed to be 0.05 m to 0.15 m deep, but before machine excavation had been considerably more. The subsoil above the burnt feature contained a much higher proportion of fine brown silt than the subsoil around and below the feature and it is assumed that this is the result of water-borne silt deposited by flooding. It should be noted that only a small area around the burnt mound was opened and subject to detailed examination. The site appears to lie within an old meander of the adjacent burn and is covered by a layer of water-borne silt. Even today this stretch of the burn is prone to flooding. This would suggest that any settlement activity, or significant occupation associated with the site, would probably be outside the flood zone. Of possible significance may be the fact that although close to the Nether Largie monuments the site would have been on the opposite side of the burn and adjacent to the rising ground on the eastern side of the glen.

This investigation had revealed a feature that exhibited many of the characteristics of a prehistoric burnt mound (Barfield and Hodder 1987, 370), including its form, location and lack of associated features and artefacts. As there are different types of these sites with different associations Barber has divided them into four classes (Barber 1989, 98). The Lady Glassery site closely fits the description of class1 which, Barber feels are quite distinctive from the others and the name of fulachta fiadh should be reserved (*ibid*). Burnt mounds usually comprise a trough dug into the ground and lined with clay, with a mound of heat-shattered stones and blackened, burnt silt and charcoal on top. It is generally accepted that the trough was used for holding water, which was heated by the addition of hot stones. There are numerous interpretations as to the use of these sites, but it is traditionally accepted that many were used for cooking (Barfield & Hodder 1987, 370). Alternatively, Barfield and Hodder (*ibid*) have suggested that they were prehistoric saunas.

Many burnt mounds have been recorded throughout Britain and Ireland, particularly in the past few years. Dates for these mounds are predominantly in the second millennium BC (Buckley 1990, 9). Sites on Bute, Arran and Islay have produced radiocarbon dates in the third and second millennium BC (Barber 1990, 102). However, on the mainland these sites are very sparse but, "undoubtedly many burnt mounds remain to be discovered in Argyll" (Ritchie 1997, 49). Two methods of scientific dating were applied to samples taken from this burnt mound (Anthony 1999; Abernethy

et al forthcoming). Luminescence dating was applied by Iona Anthony, to samples of both burnt quartz and feldspars, giving a mean date of 2800±300BC. After calibration the radiocarbon date obtained (GU7865) produced an age range of approximately 2800-2400 cal BC which closely correlates with the luminescence age

The only other investigated burnt mound site in the Kilmartin area was encountered during the previously mentioned excavations at Bruach an Drumein. Although several hollows containing burnt material were encountered, only one of them had classic burnt mound characteristics; it contained a clay-lined trough. Although no date is known for these hollows they are interpreted as being the earliest feature of the multi period settlement at this site (Creegen 1962; RCAHMS 1988).

Although reports on the cist cemeteries at Bruach an Drumein have been published (Craw 1929; Cregeen and Harrington 1981) only DES reports have been published on the excavation of the settlement (Cregeen 1961; 1962; 1963). Unfortunately no dating evidence was recovered from the burnt mound which is now destroyed. The relationship of the burnt mound to the settlement site, or the cist cemeteries, or possible earlier activity at the site has not been fully established. The main phase for the settlement is Iron Age but small finds during the 1961 season of excavation,

> "included the equipment of more than one period: stone pounders, flints worked and unworked, corroded iron tools, a glass bead which is probably Dark Age, and fragments of several types of pottery" (Cregeen 1961, 10).

Until further work is carried out on the archive and finds from this site, we cannot ignore the possibility that other activity contemporary with the cist cemeteries or dating to the Neolithic period is present.

The discovery of the burnt mound during this investigation not only contributes to our understanding of the distribution of this type of monument, but also raises the likelihood of the existence of more of these sites in the Kilmartin Glen and their possible associations with more wide-spread activity throughout the landscape. This is also suggested by the possible burnt mound sites at Bruach an Druimein and Mondah an Tairbh as they appear to be associated with evidence of additional activity, whereas the Lady Glassery site is classed as a *fulachta fiadh*

5.4 Summary of Testing of Anomalies

Only five geophysical anomalies underwent further investigation through trial trenching and test pitting. Ground disturbance was deliberately kept to a minimum due to resources available and the remit of the project. Both documentary research and trial trenching have confirmed the identification of several anomalies representative of drainage and old field boundaries. The detection of the cist slab demonstrates that even small features can be located by this method as long as they are in an area where the background reading trend is very different and fairly uniform as was the case with the fill of the ditch in which the cist cover was located.

The context of the cist cover and burnt mound also highlight the erosional processes, both natural and human, that can affect the survival of monuments in Kilmartin. They demonstrate that even in a severely disturbed and reorganised landscape, it is possible for significant archaeological deposits to be encountered. Both of these sites are unusual examples of survival, both having been reburied: the cist cover deliberately after its earlier discovery and probable site destruction, and the burnt mound by natural processes. The burnt mound site could easily have been destroyed, as quarrying has taken place either side of the mound with only a small area left undisturbed between. Although the investigation of some of the anomalies of greater potential archaeological interest in grid 2 proved inconclusive at least they revealed more archaeological finds indicative of the importance of the site.

Evidence suggests that the anomaly tested in Grid 2, Ballymeanoch is in ground that has been improved and had peat striped and then been regularly ploughed. Under such conditions it is probably the case that any buried archaeology would only survive in an easily recognisable form if the deposits were originally of some depth. It may be that the suggested linear earthwork is not a continuous feature and is broken by causeways, however the location of the trial trench was deliberately placed across an area where the anomalies appeared to be stronger and continuous.

Where anomalies are more ephemeral it appears that they cannot be recognised by the opening of small pits and narrow trenches. A similar problem was encountered during the investigation of a cropmark complex at Inverness (Carter & Russell-White 1993) where excavation failed to locate features relating to the cropmarks. The excavators concluded that in order to make sense of poorly contrasting features the stripping of larger areas would be necessary (*ibid*). The stripping of larger areas over geophysical anomalies would also be a more profitable method of investigation as greater comparison of possible features and subsoil conditions is allowed and, soil sampling for chemical analysis can be conducted. Not only could the results of soil sampling be matched to archaeological features but also possibly geophysical ones, which are not apparent when excavated.

The addition of chemicals such as fertilisers can increase the ionic mobility within the soil pore solution, which would result in a low resistance to an electric current. Through leaching, greater amounts of chemicals could be deposited along the line of buried remains of ditches and banks. Although the remains of a buried ditch may be very ephemeral it could be detectable by a concentrations of chemicals, which also produce a low resistance to an electric current. Unfortunately soil samples were not collected along the line of the trench as no archaeology was encountered. It is recommended that in future, particularly under similar conditions, soil samples should be collected. The invasive investigation of this anomaly has been minimal, and the case to suggest that it might represent a considerable archaeological feature is still fairly strong.

An aerial photograph taken of the Ballymeanoch monument complex when the ground was water logged (aerial photographic survey commissioned by Kilmartin Glen project) revealed a double linear crop mark on the same alignment as the standing stones and leading up to them. Aerial photographs of this area previously consulted failed to reveal any such crop marks, which may be due to them having been taken immediately after harvesting. The latest aerial photographic survey commissioned by Kilmartin House Trust has clarified the alignment of the main pattern of plough scars for the field containing the henge and standing stones. Their direction parallels the route of the anomalies so the association of these anomalies with this activity cannot as yet be dismissed.

Although there have been are several geophysical surveys conducted in and around stone circles and henges, research to date has been unable to locate any geophysical studies directly comparable to those conducted for this study. Some of the aspects of prehistoric monumental architecture that were being specifically addressed by this study were linear arrangements of standing stones, evidence of earthworks and processional activity. An interesting case worth noting is that of the series of investigations on one of the standing stone avenues that leads to Avebury henge and stone circles. William Stukeley first suggested the existence of the Beckhampton Avenue in the eighteenth century (1743, 34-6), when many of the stones were destroyed. In 1989 a geophysical survey was conducted by the Ancient Monuments Laboratory to try and locate evidence confirming the existence of the Beckhampton Avenue (Ucko *et al* 1990, 195-9). The strongest anomalies to be detected by this survey were the result of former ridge furrow, which tended to obscure more ephemeral anomalies and the existence of the avenue, was neither proved nor rejected. Despite this, the tentative remains of a ditched enclosure and four sarsen settings on the possible route of the avenue were suggested. In 1997 aerial photographs taken by The Royal Commission on Historical Monuments of England revealed a cropmark at this location that had not been revealed in previous aerial photographs, and that was indicative of a large enclosure. As part of a programme of investigation on this cropmark another geophysical survey was conducted that allowed the testing of the 1989 results (David 1999). The results of this recovered significant

information and confirmed the existence of the tentative anomalies suggested by the results of the 1989 survey. As part of the investigation, excavation was carried out that also allowed testing of the geophysical anomalies (Gillings *et al* 1999). This not only revealed a late Neolithic earthwork enclosure but also six stone settings forming a section of the Beckhampton Avenue, three of which had been detected in 1989. The major differences between the two geophysical surveys were firstly the ground conditions (a wet winter in 1989 and a dry summer in 1999) and secondly, ten years of advancements in data collecting technique, geophysical software and data processing. It is hoped that the reprocessing of some of the data presented in this thesis may give a clearer indication as to the nature of the more ancient buried archaeological deposits in the Kilmartin area.

The conclusions of the geophysics, walking of ploughed fields and invasive investigation suggest that evidence of late Neolithic/Early Bronze Age activity representative of the wider use of the landscape exists within the Kilmartin Glen. The results of the geophysical surveying and what methods proved successful varied. This is probably due to two main factors: levels of ground disturbance and the abundance of alluvial deposits. Geophysical surveying in alluvium is a recognised problem and has been addressed, particularly by Clark (1992). This mainly concerns archaeological deposits covered by alluvium, whereas evidence from Kilmartin Glen suggests that the archaeological deposits are cut into alluvium. This would result in feature fills being similar to the surrounding sub soil and difficult to detect. The added dimension of disturbance from ploughing, peat removal and drainage, results in a 'noisy' background reading that can mask more ephemeral anomalies. As far as conducting geophysical survey in alluvial deposits the results gained from this study strongly support the assertion,

> "There can be no preferred recommendation until the merits of each individual site or area have been assessed" (English Heritage 1995, 11)

This document outlines choice of survey technique, recommendations of practice and basic standards for conducting geophysical surveys in England. Unfortunately such a document has not yet been produced for Scotland

Even when presented with favourable and uniform geological conditions in which to conduct geophysical surveying, immediate success cannot be guaranteed. The Stonehenge Environs project has been employing geophysical surveying under such conditions for some years and has been able to test a number of sites of varying archaeological character. It was concluded that, if magnetometry surveying was applied on its own it produced a very incomplete picture of the archaeological character of a site which can only be gained by the application of multiple techniques (Richards 1990, 12).

The Kilmartin study has been successful at discovering a number of previously unrecorded sites, some of which probably represent prehistoric settlement. Where this evidence is clearest, it appears to be more indicative of a late Neolithic date and strong evidence for wider activity of the Bronze Age landscape additional to what is known was not encountered. A better understanding of the earlier activity and how it relates to a model for prehistory can however allow us to suggest patterns for the Bronze Age activity.

Only a small percentage of the ground in the Glen was in a condition to be searched for the presence of surface artefacts. The majority of field walking took place in unbroken ground in a variety of topographical situations. As well visiting known sites and looking for unrecorded ones, an assessment of condition, erosional processes operating and any information on past land use was also observed. There appeared to be a definite ordering to how and where many of the prehistoric sites were placed in the landscape so when visiting sites careful consideration was given to the associations with other sites, topographical features, view-sheds, resources, astronomical observations and natural route-ways or boundaries. All the new sites and possible sites were included in this exercise to see if there appeared to be any particular ordering to their location and relationship with the known sites. In the next section the relationship of the monumentality to the landscape, topography and other monuments is discussed, and it is through this medium that evidence for additional monumentality associated with the standing stones at Ballymeanoch and additional activity on the linear cemetery can be suggested.

CHAPTER 6 Synthesis

6.1 Introduction

This final chapter attempts to bring together the results of the fieldwork with more recent approaches to interpreting prehistoric monumentality and landscape. Richard Bradley has discussed how prehistoric monuments often utilise and embellish natural, prominent features in the landscape that may have already had a special significance (Bradley 1993, 26-9). He notes that natural features such as caves, prominent rocks and viewpoints can be a focus for specialised deposition of artefacts or decoration that change the meaning of such locations without any major altering of the topography. Colin Richards (1996, 190) has noted that complexes of prehistoric monuments are often located in highly visible positions in the landscape such as on the floors of natural bowls or basins. Christopher Tilley (1996) has examined the relationship of landscape and topography to different classes of monuments and how this affected the experience of the people that used the monuments. The present work has shown that there appears to be a distinct order to the location of upstanding monuments at Ballymeanoch and Nether Largie. Not only are the ceremonial complexes in places that are naturally bounded, each monument is placed in such a way as to maximise the natural topography so enhancing the prominence of its location and the experience of people approaching them.

6.2 Ballymeanoch and Nether Largie

Within the wider landscape the Ballymeanoch monuments relate to a fluvioglacial outwash terrace that forms a low plateau overlooking the flat expanse of the former marine embayment to the south and west while on the north-east it backs onto steeply rising and rugged hill terrain. The Nether Largie monuments relate to what would have once probably been a low island at the edge of a flood plain and surrounded by meandering fluvioglacial water channels. Before the embellishment of this landscape by monumentality these two areas would have provided easily accessible, low-lying dry land in prominent locations between the estuarine and upland environments.

Ballymeanoch

The perimeter of the Ballymeanoch plateau and in particular, where there are additional natural topographical features and where there are natural route-ways leading from the lower ground up onto and across it, appear to be the main focus for the location of monuments. Around the edges of

the plateau are seven known prehistoric sites, four of them discovered during this study, whereas the only upstanding monument to embellish the centre of this plateau is a henge. As well as being located in relation to localised topographical features that are part of larger special natural places, the approaches to them appear to be via controlled routes that are designed to install a sense of awe and manage the sequence of movement and experience of participants in ceremonies. Such approaches to monuments have been recognised at some of the most famous prehistoric sites in Britain. The Kennet Avenue that leads to the southern entrance of Avebury stone circle has a distinct kink in its course 50 metres from the entrance. Burl (1979, 198) has suggested that the kink in the avenue is to prevent people being able to see the interior of the monument until the last possible moment so increasing the sense of awe experienced by visitors. Immediately before the Stonehenge Avenue turns to start its final approach to the henge it runs through an area of low ground for over 100 m where site of the monument is lost. In this low area the avenue turns to approach the monument so that the monuments reappearance is even more dramatic (Souden 1997, 42).

The possible settlement site at Ballymeanoch is located on a terrace below the plateau but above the floor of the glen. Access to the monuments could quickly and easily be gained by walking up the edge of the adjacent terrace but there is evidence to suggest that the route to the upper terrace and the monuments is carefully managed, and even incorporates how the monuments come into view, thus heightening the experience of visitors. A fluvioglacial channel can be followed from the possible settlement for 300 metres to the bottom of a large gully that leads a distance of 100 metres to the upper terrace (Figure 42). As one enters the gully the view becomes limited to the interior of the gully, but as one moves up the gully the tops of the row of standing stones that are graded in height gradually come into view in the middle of the horizon. Then the tops of the outlying pair also appear but to the right of the centre of the horizon as if catching the corner of your vision. When you reach the top of the gully there are the remains of a cairn. It is not until this point that a full view of the plateau and the monuments is available. The cairn is also in direct alignment with the row of stones 125 metres to the southeast.

When J. Hewat Craw was excavating Dunadd in1929 wet days were set aside for investigating cairns and cists for as he stated "Dry weather being essential for the riddling of soil at Dunadd" (Craw 1930, 127). One of the cairns he investigated was the site at the top of the gully. His report on the investigation reads

> "Rather over a day was spent thoroughly examining this site, on 22nd and 23rd May. It proved to be of recent origin, with no sign of construction and no excavation in the ground beneath" (Craw 1930 p. 136).

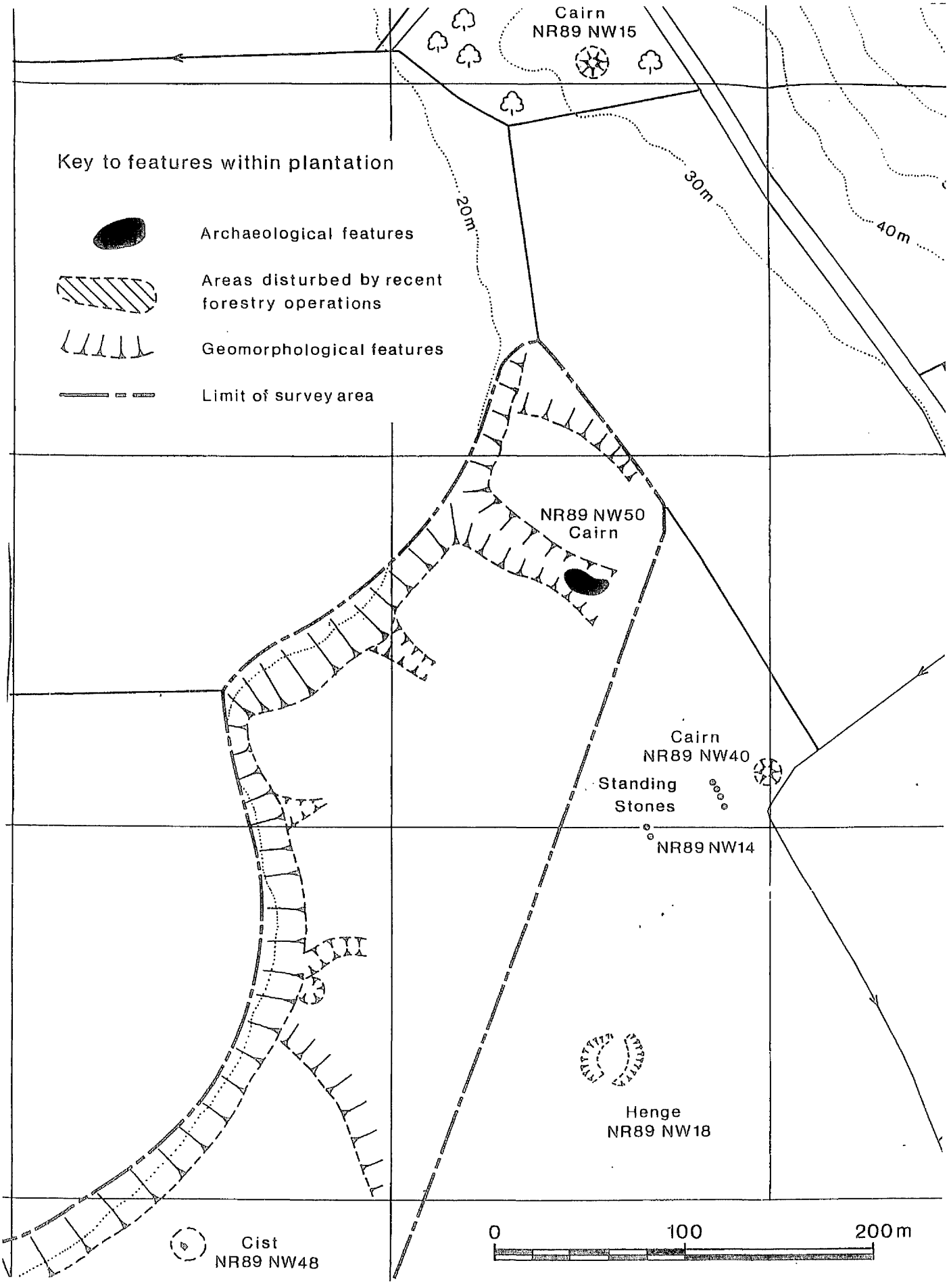


Figure 42: Ballymeanoch – Plan of West Gully and Geological features (after Carter 1996)

As shall be further demonstrated the location of this cairn is such to suggest that it has been a focus for prehistoric activity. What makes this argument even more convincing is the fact that a continuation of the alignment of the gully, cairn, and the row of standing stones meets the entrance to another gully at the opposite side of the terrace, almost 400 metres to the southeast. Almost exactly the same experience can be gained by using this other gully to approach the standing stones from the southeast. As one approaches this gully the right hand side of the entrance is much more defined and there is a mound some 20 metres in diameter located at this point. On the middle of the mound lies a large flat slab, which could be a cist cover (Kahane 1978, 23). This site appears to parallel the location of the cairn at the other end of the row of standing stones and is in direct alignment with it and the stone row. The approach to the stones would probably continue past this monument and into the gully. As one moves up the gully, the tops of the row of four stones appear on the centre of the horizon then the outlying pair come into view to the left. As one continues up the slope a full view of the standing stones is gradually achieved.

In a description of a possible processional way between two stone circles on Bodmin Moor, Christopher Tilley (1996) describes how perspective and natural topography were utilised along this route. His account bears some remarkable similarities to those that can be experienced at the Kilmartin monument complexes. The two stone circles, Stripple Stones and Trippet Stones are situated 1.2 km apart.

> "From the centres of both circles the view is dominated by the distant outline of Rough Tor. They are intervisible, with the entrance to the Stripple Stones henge positioned so that the Trippet Stones is visible through it to the WSW. Walking east towards the Stripple stones from the Trippet Stones one starts going down a fairly steep slope. After no more than c. 50 m Rough Tor becomes lost on the skyline, before crossing a stream. After this natural landscape boundary has been passed the only visible landmark ahead is the tip of Hawk's Tor. Walking now upslope, away from the stream, the tips of the Stipple Stones gradually come into view again, but Rough Tor remains concealed behind Hawk's Tor to the north-east. Passing through the entrance to the Stipple Stones, across the bank, Rough Tor is still invisible. The tip becomes visible on the skyline only immediately after crossing the ditch. It gradually becomes more and more prominent as one proceeds to enter the stone ring and move towards the centre of the circle with its large marker stone" (Tilley 1996, 169-170).

As well as incorporating the Ballymeanoch monuments with natural topographical features it could be the case that the monument builders also altered some of these features as well. The fluvio glacial channel that runs across the entrance to the gully has been filled in at this point and on aerial

photographs the gully looks unnatural in its size and orientation compared to the surrounding topography (Figure 8). Further emphasis on the importance of these natural routes up to the terrace is demonstrated by the location of two decorated rock sheets. Balluachraig looks across to the possible settlement and the route between it and, in particular, the entrance to the gully some 400m to the southeast. It is interesting to note that the section of rock sheet that overlooks this view contains a distinct and isolated, densely carved area as well as the most complex carvings on the rock outcrop.

The entrance to the gully on the southeast of the terrace and the mound is overlooked by a decorated rock outcrop, 300 metres to the east, and found during the earlier field walking exercise. Again it is interesting to note that this is an outcrop that has undergone quarrying and the carvings may have originally been more extensive. Other than a rock outcrop 200 metres northwest of Baluachraig containing a single cupmark, and cupmarks on a rock in the garden of the house 50 metres to the north-east, the two rock sheets commanding the views to these gullies are the only two known that are in such close proximity to the Ballymeanoch monuments.

The stone row at Ballymeanoch is aligned on important solar and lunar events (Ruggles 1984, 149; Thom 1971, 52). To the southeast the row of stones are aligned on the mid-winter sunrise and to the northwest they are aligned on the most northerly setting point of the mid-winter full moon at the major standstill, an event that happens only every 18.6 years. Not only would such astronomical alignments imbue the stones with added significance but would add another element to be incorporated into ceremonies designed to impress. Many cursus monuments are aligned on the rising or setting sun at important times in the solar cycle, for example the Dorset cursus is aligned on the midwinter sunset (Bradley 1993, 62) and the Dorchester on Thames cursus is aligned on midsummer sunset (Souden 1997, 125). Although now tentative, I have suggested the standing stones were erected on the site of an earlier cursus that was contemporary with the possible burnt mound/settlement site. At important ceremonies preparation of food or purification rituals could be performed on the lower terrace before moving to the upper terrace. Although there is strong evidence for reuse of the other sites on the plateau in prehistory, evidence of a long sequence of activity at the flint scatter is lacking. The standing stones probably relate to the period of reuse represented by the construction of a cairn on top of the henge and the decorated cist cover discovered on the edge of this terrace. A possible date for the row of four standing stones of 1800-1200 BC is suggested by Burl's chronology for this type of site (Burl 1993, 23).

The Ballymeanoch monuments were all placed to make maximum advantage of the lie of the ground, view points to other monuments and movements of the sun and moon thus controlling the experience of participants in the ceremonies that may have taken place there. Bradley stresses the

importance of the visitors' knowledge of how the architecture of the monument complex orchestrates their level of participation and during ceremonies it is important for them to know where and when to place themselves (Bradley 1993, 62).

Nether Largie

At Nether Largie the earliest of the upstanding monuments are located around the edge of an ancient island and adjacent to where there are abrupt meanders in the watercourses. These sites include Temple Wood, Nether Largie South and the single standing stone 175 metres southwest of Nether Largie South (Figure 43). The monuments are placed in such a way as to maximise the natural topography so enhance the prominence of their location and the experience of people approaching them. As well as incorporating natural topographical features into monument construction it may even be the case, as at Ballymeanoch, that the monument builders also altered some of these features as well. There appears to be a certain unnatural rectilinearity to the course of some of the channels on the perimeter of the ancient island (Figure 9), whereas the natural meandering can be observed in other channels immediately south of this. The placing of these monuments within an enclosed area highlights their importance and can imbue a sacredness on a particular area of landscape and create a boundary between the every day usage and usage of a more specialised nature. This again can also limit access to the monuments because it acts not only as a physical but psychological barrier with access via a transitional zone (Evans 1988, 92)

This appears to be a demonstration and extension of ideas concerning restricted access to space being a metaphor for having specialised restricted knowledge in order to legitimise physical access. This is most evident in the particular forms of architecture and use of space predominant in much of the monument design during the Neolithic. These ideas are most commonly demonstrated by reference to the Neolithic monuments of southern England. Thomas and Whittle (1986) and Barrett (1991; 1994) emphasise the placing of deposits in closed and concealed areas that are not readily visible means that practice and knowledge associated with the deposits and reproduced through ritual would have been socially restricted. A common form of Neolithic tomb design throughout the British Isles is to have the chamber opening onto a façade, such as with Nether Largie South. When referring to West Kennet, Barrett (1991, 8) has suggested that there would have been a distinction between those who might have observed practices in front of the façade and those who were actually able to enter the chamber. He envisages select individuals in positions of social responsibility and power who also held sacred knowledge mediating on behalf of an audience with the contents of the chamber. Once the mediator turns and enters the chamber though, their movements are not decided by its ground plan but by the deposits in the chamber and the rituals centred on them.

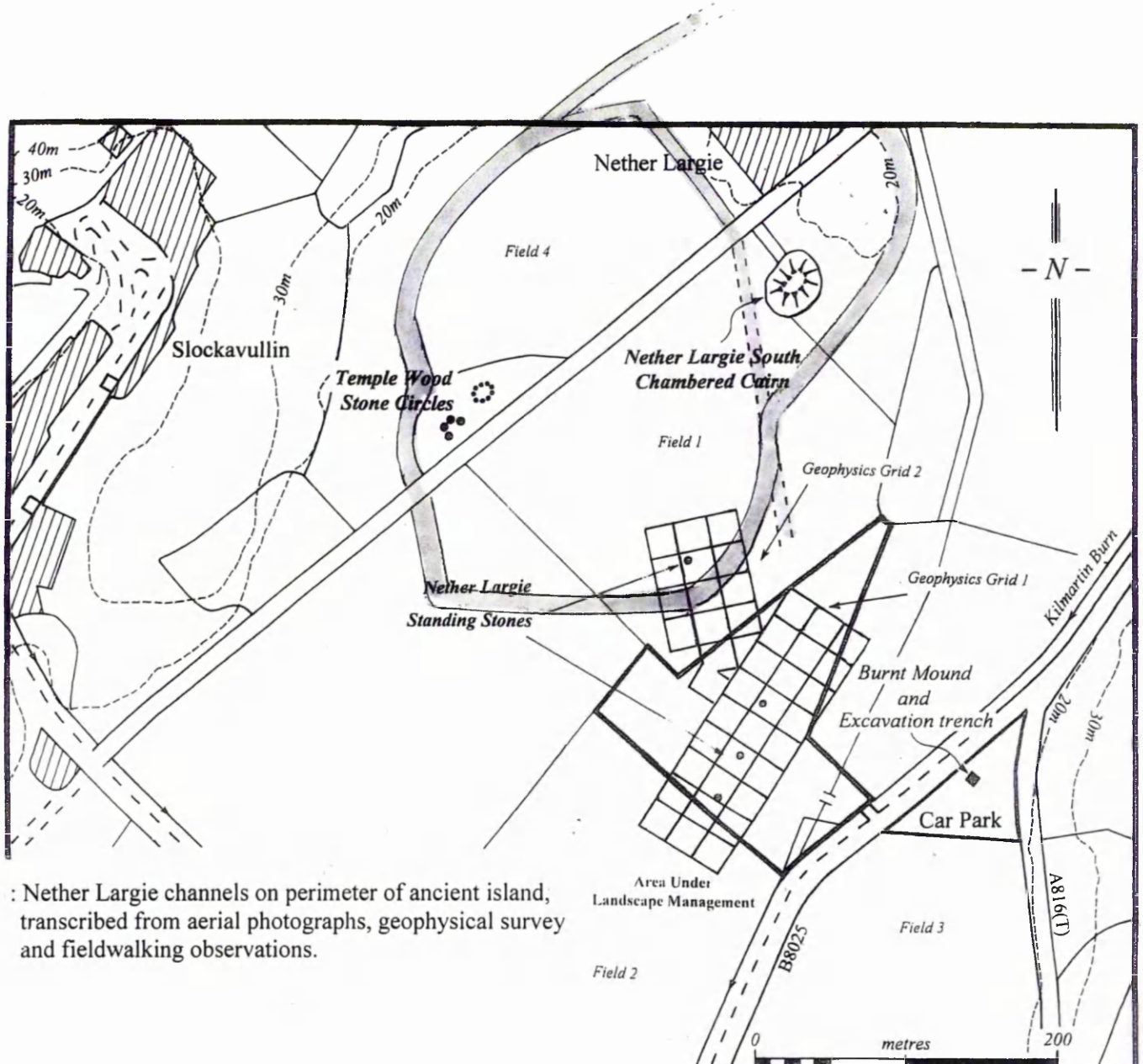


Figure 43 : Nether Largie channels on perimeter of ancient island, transcribed from aerial photographs, geophysical survey and fieldwalking observations.

The idea of practices and knowledge associated with the inner areas of monuments being socially restricted is also emphasised by henges and stone circles. If particular ceremonies were considered so important as to be sacred then an area of equal importance to perform the ceremony around would be essential. This would require some delineation of space, such as a boundary around the sacred area. This is particularly evident in the control of space at Stonehenge and Avebury where the architecture represents an initial boundary with a concentric redefinition of inner space. Allen (1985, 25) views such architecture as expressing a hierarchical relationship between its spatially successive zones. For example on crossing the causeway over the ditch at the southern entrance to Avebury one is confronted by two standing stones, larger than any of the neighbouring ones, delineating the entrance. The ditch is also wider, deeper and better finished either side of the entrance. Once through the entrance, the Ring Stone (now destroyed) would have stood in the gap between the entrance and the southern circle. Within the southern circle is a row of standing stones running for a distance of 26 metres. Barrett (1994, 17) suggests that this row could represent a screen or façade from which people could face an audience then move through the stones to a secluded area. Barrett also stresses a similar point made by Bradley above. He comments on how such a sequence of architecture experienced at Avebury not only maintains a level of distinction as to the degree of participation throughout such ritual dramas but this understanding is dependent on the interaction of people with the layout of the monument (*ibid.* 19). This type of spatial organisation with initial boundaries followed by more demarcation of inner space acts to conceal the centre of focus and exclude the inner area to all but a few individuals. Essentially, this ensures individuals are in the right place at the right time while maintaining the difference between guider and follower, participant and observer.

Even though the boundary around the Neolithic monuments at Nether Largie would always be present the perception of it can change, as the amount of water within the channels would vary throughout the year which again may affect the types of ritual dramas being enacted there. Water is also an important medium, as is fire, in cleansing rituals both before and after the participation in further ceremonies. The wading through or bathing in these channels for purification purposes may have been necessary before participating further. The crossing of water in itself is traditionally symbolic of the moving from one world to another. Colin Richards (1996, 203) suggests that the Stones of Stenness and the Ring of Brodgar are deliberately placed in such a topographical location in order to create a microcosm of the surrounding landscape. He also suggests that the enclosing ditches around these monuments would have been full of water and states,

> "This may also betray a specific attitude to water as representing both a natural architecture and a potent symbolic agent of transition and division (*ibid.* 203)".

The suggestions I wish to put forward are that the area discussed above already held a special significance to the people that inhabited and moved around a much wider landscape. This area then became a focus for monument building whose architectural design reflected a control of access to space, which may have legitimated a ritual authority. The architecture of chambered tombs is a metaphor for restricted access to particular forms of knowledge and concealment of certain rituals. This is also mirrored in the architecture of stone circles, timber circles and henges but with less emphasis on concealment and a greater emphasis on controlled participation. The site of the timber circle at Temple Wood may not have adequately fitted this role so was abandoned before completion of its upgrading to stone and the larger stone circle was constructed adjacent to it but in a more prominent position on the island. Sometime after this event the excavation of trenches further defined the perimeter of the island. The burnt mound or *fulachta fiadh* discovered at Lady Glassery car park is only 250 metres from the perimeter of the ancient island and provided a date range of 2400-2800 BC (GU-7865), which fits with Scott's suggested date for the dismantling of the northern circle at Temple Wood and the construction of the Southern circle (Scott 1989, 108) and the suggested recutting of some of the channels around the island. Interestingly the primary function of burnt mounds is the heating of water. Other than for cooking, could this site have been involved in ritual activity associated with access to more important areas? These events would have taken place over several centuries and although the island was probably one of the most important areas for ceremonial activity, monument building was also being conducted in the surrounding landscape.

6.3 Linear Cemetery

Further evidence on the importance of the Nether Largie monuments and the relationships operating amongst sites and specific locations in the landscape can be seen in the linear cemetery. Some researchers have commented on the extent and importance of monument intervisability in the Kilmartin area (Bradley 1991; Gaffney et al 1995). Others have specifically commented on intervisibility within the linear cemetery and how far into the landscape the cemetery would have extended (Scott 1989, 55; RCAHMS 1988, 14). Such writers suggest that this line of cairns possibly extends from Glebe Cairn to the site on Crinan Moss over five kilometres to the south-west. Some would even include Carn Ban, Carnasserie in the linear cemetery. The fact that Nether Largie South is an important and much earlier element of the linear cemetery is not in doubt (RCAHMS 1988, 14). Scott (1989, 100-6) suggested that Glebe cairn is on top of an earlier stone circle. When it was investigated by Greenwell, he encountered two circles of stone, one enclosing the other and with a cist at their centre (Greenwell 1866, 339). Richard Bradley (1993, 93) has suggested that Nether Largie North Cairn is also on top of an earlier site, possibly a stone circle, as

when the site was excavated it contained a number of features that predated the final construction of the cairn, including an enclosing stone bank. He also notes that the decorated cist cover from this site may have originally been a standing stone (*ibid.* 93). There appear to be a number of points being raised concerning the linear cemetery that have never been considered together. These include: the length and linearity of this arrangement of sites; the level of intervisibility between them; and the amount of reuse of earlier monuments and the material from them.

If length, intervisibility and linearity were important components of this particular arrangement of monuments, the sites of the Glen that comply with those criteria are Glebe Cairn, Nether Largie North, Nether Largie Mid, Nether Largie South, the single standing stone 175 m south-west of Nether Largie South, Ri Cruin and Rowanfield cist (Figure 44). All of these monuments are on a straight line across low-lying ground of the glen. Other than the standing stone all of these sites have been used for Bronze Age burial. The standing stone site may have been reused for burial and a cairn added which has not survived. The stone is located near to the summit of a low mound at the edge of the island, and the edge of a meander of a channel, thus enhancing its position within this important area. The only prehistoric surface find from the field walking exercise at Nether Largie was found on this mound. The geophysical survey of this area suggested that there had been some form of construction associated with the mound, possibly an enclosing bank and ditch (Chapter 4.2 iii).

Stevenson (1997, 112) has noted that there is a distinct concentration of the reuse of Neolithic rock art in cists during the Early Bronze Age in the Kilmartin area. It is interesting to note that the majority of evidence for this activity is in this particular alignment of monuments. It is suggested here that the Bronze Age linear cemetery is a reuse and extension of an earlier alignment of Neolithic monuments; that the single standing stone is a monument belonging to this earlier phase; and thus is earlier than the main complex of stones that it is classed as being an outlier to (RCAHMS 1988, 136). Two other sites with probable Neolithic or earlier origins are also on this line that would have been intervisible with the other monuments. Six hundred and fifty metres northeast of Glebe cairn is a prominent rock outcrop with a with a single cup and ring mark (Van Hoek 1994, 75). The outcrop has undergone quarrying in the past so may have at one time contained additional carvings. This location commands a view along the route of the linear cemetery to the southwest. At the opposite end of the alignment is the other site which is located one hundred metres northeast of the cist at Rowanfield. It comprises a flint scatter discovered during the fieldwalking exercise (Chapter 4.4 ii). Geophysical survey of this area revealed an anomaly at this point (Chapter 4.4 iii), which is on the alignment and suggestive of a fairly substantial circular earthwork. The cist at Rowanfield sits to the northeast side of the summit of the rocky spur on which it is located commanding a view along the monument alignment to the

northeast (now unfortunately surrounded by conifers). There is a possibility that the cist could be located on top of a decorated rock sheet that would have originally commanded this view and paralleled the location of the rock art site at the opposite end of the alignment. In other parts of Britain such as Northumbria a small number of Bronze Age cairns are located on top of decorated rock sheets (Bradley 1993, 43).

This alignment of monuments is 3.6 km in length, so conditions would have to be particularly special to see the complete length of the alignment. Concerning this aspect it is suggested that it is the views along the alignment from the rock art sites at each end that are important. The views from the sites within the alignment itself would allow a far greater degree of intervisibility along the entire line of monuments. This closely aligned and easily intervisible arrangement of sites could be involved in extending the sacredness and the power that is associated with the use and access of the island into the wider landscape and could even be representative of the beginnings of change in perception from cyclical to linear time. New attitudes and new ways of thinking about the world had to be in place before the domestication of the landscape could seriously begin. These sites were then later embellished and other monuments added as a different understanding of the landscape and time came about. As Bradley puts it,

> "Both farming and monument building involved new relationships between culture and nature and together they amount to a process of altering the earth, but for that transformation to be thinkable at all required a quite different attitude of mind. That is really what constitutes the Neolithic" (Bradley 1993, 21).

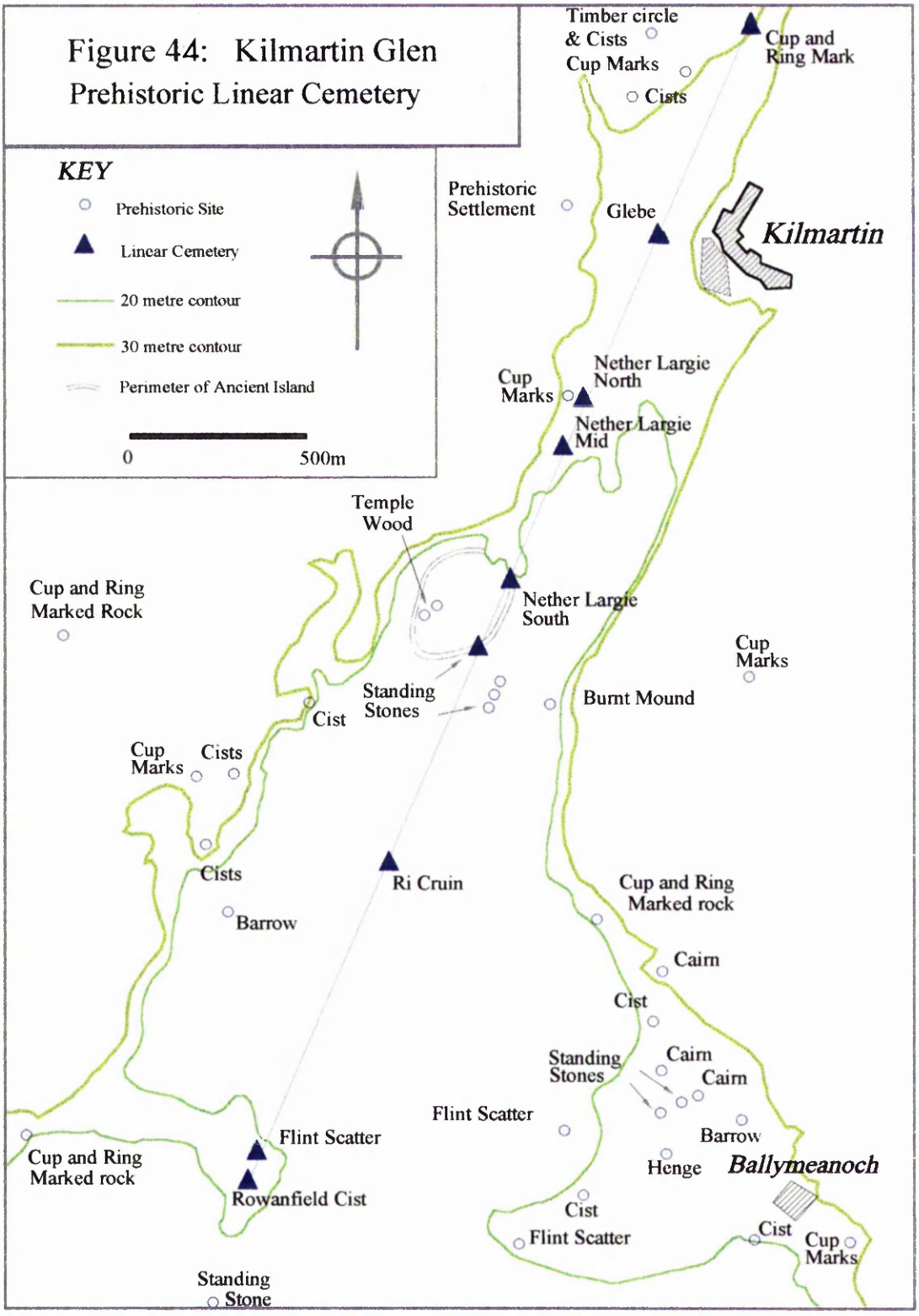


Figure 44: Kilmartin Glen
Prehistoric Linear Cemetery
KEY
Prehistoric Site
Linear Cemetery
20 metre contour
30 metre contour
Perimeter of Ancient Island
0
500m
Timber circle & Cists
Cup Marks
Cists
Cup and Ring Mark
Prehistoric Settlement
Glebe
Kilmartin
Cup Marks
Nether Largie North
Nether Largie Mid
Temple Wood
Cup and Ring Marked Rock
Nether Largie South
Cup Marks
Standing Stones
Cist
Burnt Mound
Cup Marks
Cists
Cists
Ri Cruin
Barrow
Cup and Ring Marked rock
Cairn
Cist
Standing Stones
Cairn
Cairn
Flint Scatter
Barrow
Henge
Ballymeanoch
Flint Scatter
Cup and Ring Marked rock
Rowanfield Cist
Cist
Flint Scatter
Cist
Cup Marks
Standing Stone

6.4 Models for monument patterns

Ballymeanoch and Nether Largie represent the possible beginnings and expansion of the domestication of the landscape. In such a scenario, a more mobile population who perceive a landscape as a series of paths and route-ways between places of natural significance changes to a more sedentary one, which begins to put greater emphasis on embelishing places of natural significance and the perception of boundaries. Hand in hand with this domestication is a greater emphasis on the relationship of monuments to each other and to the landscape. As monuments become more open and more viewable, control of access shifts emphasis from monuments to landscape. What has to be addressed now is the fact that in Kilmartin, once this domestication has been achieved, it appears that mobility of the population within it may have increased as evidence for Bronze Age settlement is still lacking. John Barrett suggests that in southern England greater agricultural intensification and fixed agricultural plots did not emerge until the second millennium BC and the difference in perception of such a landscape to one of less agricultural intensification would be

> "...a landscape which was held together by movement across its surface between a constellation of places each of which was loaded with social and religious significances, and a landscape which was viewed from the centre of a domain, with distinct boundaries between an internal world belonging to the household and the self and the outside world of others" (Barrett 1994, 147)

Both Bradley and Barrett stress similar points in how the architecture of a monument orchestrates degrees of participation during ceremonies and how it is it is important for visitors to know what their role is and where and when to place themselves (Bradley 1993, 62; Barrett 1994, 19). Tilley views the physical and mental processes used when moving within around and between prehistoric ceremonial architecture would require a level of education and instruction which, would legitimise a ritual authority.

> "Controlling access to the ritual secrets of the stones enabled social equalities to be both established and then reproduced. I want to argue that one vitally important part of the ritual knowledge embodied in the stones, to be both conveyed and selectively 'released' by ritual specialists, was knowledge of the landscape and the spirit powers embedded in it" (Tilley 1996, 168).

The model for prehistory in southern England emerging is one of a rapid cultural change from Mesolithic to Neolithic whereas the adoption of agriculture as a main economic base is more

gradual with an emphasis on rapid change during the second millennium BC. Julian Thomas suggests

> "...that it is unhelpful to subsume the actual changes which took place in Britain around 4000 BC (c. 3200bc) within a more large scale or long term process of either economic or ideological transformation" (Thomas 1999, 16-17).

He suggests that domesticated plants and animals were only part of a new set of cultural resources which marks the start of the Neolithic and that there was great diversity amongst populations in how they chose to adopt and use them. He states

> "...it is the potential variability of economic practice at both the regional and local scale which has yet to be fully recognised (*ibid.* 33)".

This is one of the main factors that this thesis has been addressing. As mentioned earlier there are certain exclusive elements in the patterns of prehistoric archaeology found in the Kilmartin area. This is true of archaeological deposits everywhere but what is distinctive about the Kilmartin Glen are the wide range of very distinct patterns concentrated into such a small locale.

Richard Bradley (1993, 45-46) has suggested that one of our problems is that we tend to take monument alignments for granted and the unit of analysis we use becomes the individual monument, which immediately limits the range of questions we can address. Hopefully by using the landscape as a unit of analysis questions that can give a better understanding of how the prehistoric world was ordered, used and redefined can be realistically approached. The relationships, associations and locations for these sites are not rigid and this medium of expression was open to negotiation and reinterpretation by the people that used it. Throughout prehistory monuments were constantly being modified and reinterpreted, but it should be stressed that it is not just the monuments that were redefined and reinterpreted, but entire landscapes and the lives of people who operated among them. It is through agencies such as this that social change, power structures and different attitudes of mind can come about, but it must be stressed that amongst prehistoric populations there was great diversity in how they used and manipulated the cultural resource at their disposal.

6.5 Summary of the Kilmartin pattern for prehistoric monumentality

To sum up, assuming a certain degree of contemporanity of continued use amongst the sites of the third millennium BC in the Kilmartin Glen, the pattern now emerging is one of different types of site commanding different aspects of the landscape. In the Kilmartin Glen there are three main concentrations of Late Neolithic/Early Bronze Age sites: Ballymeanoch, Nether Largie and Upper Largie. The first two of these have been discussed previously, but Upper Largie has no present day recognisable upstanding monumentality. Ongoing archaeological excavations at Upper Largie in advance of gravel quarrying have revealed the buried remains of a complex of prehistoric monuments including a timber circle, pit alignments and a possible cursus (Radley 1994, 75; Terry 1997, 19). In 1998 a possible prehistoric settlement was discovered 300 metres southwest of the terrace containing this complex (Abernethy, in print). The three Late Neolithic ceremonial complexes occupy natural amphitheatres and command areas of landscape with all round views of the immediate vicinity and horizon and have carefully managed approach routes designed to enhance the experience of the visitor. The potential settlement sites tend to command areas of landscape overlooking wide stretches of low lying ground. The rock art sites on natural outcrops or boulders command areas of landscape associated with boundaries, paths, and access to and from the wider landscape. Richard Bradley (1993) noted that rock carvings of greater complexity are located at view points overlooking the main routes across the landscape particularly those leading to important monuments. This aspect of the rock art has now been demonstrated to have a much closer association with the monuments and the immediate access routes to them. Not only is this evident at Ballymeanoch and is also highly apparent for the routes leading to the timber circle at Upper Largie.

Assuming that a certain degree of perceived intervisibility amongst the Neolithic/Early Bronze Age sites also contributed to their location, it appears that the three ceremonial complexes, even if in a landscape devoid of trees, are not mutually intervisible, yet this is clearly an important component of the sites within each group. Monument intervisibility becomes increasingly important as the landscape becomes more domesticated and Bronze Age cists, many containing Neolithic carvings are placed in vantage points on the edges of terraces. The potential settlements are intervisible but appear to be secluded from the ceremonial centres, yet both settlement sites and ceremonial complexes and the natural access routes between them can be viewed from rock art sites. Evidence recovered so far would suggest that the Late Neolithic/Early Bronze Age ceremonial complexes were located in naturally bounded and significant areas of ground that could be differentiated from the rest of the landscape. Evidence of settlement activities has been located but outwith the natural boundaries that delineate these monument complexes. These significant areas were probably not set aside for monuments and everyday use of the landscape would continue around them. What

may have been important was to maintain the dichotomy between living and dead and where they resided.

Without the discovery of a number of previously unknown prehistoric sites during this study and the greater elucidation of some of the upstanding ones, the above interpretations for how these sites are structured in the landscape would not have been possible. The strongest argument to suggest that these additional sites represent what they do is that they closely fit a particular pattern of ordering in their location and relationship with the known sites and the topography. Being aware of such localised patterns is important to future strategies of investigation in the area and demonstrates the remarkable amount of information to be gathered before any serious excavation work can commence.

These sites demonstrate how with minimum effort and labour a major important monument can be created by using and embellishing the natural topography. Here is the equivalent in heightening the visitors' experience as with much larger ceremonial monuments but with minimal alteration of the landscape. The size, amount of labour and extent of alteration are all important components of large monuments and are statements in themselves as to the importance of these sites and the types of societies and social systems that created them. It is interesting to note that the standing stones at Ballymeanoch are amongst the largest in the area and would have required a greater labour input than any other monument built in the area.

6.6 Proposals for future work

From the above work there is a suggested ordering to the places in the landscape where prehistoric activity is likely to have taken place and for where it is likely to survive. It is in such locations that the use of geophysics may prove profitable, but only after its validity has been properly tested. As mentioned earlier in the text the testing of geophysical anomalies has been fairly minimal to date and with mixed results. Obviously some testing on the anomalies with corresponding flint scatters would be extremely useful as the presence of surface artefacts in an improved landscape suggests that any buried archaeology in their vicinity might be less badly disturbed than in areas that were stripped of peat. Such testing should give an indication as to the extent of the buried archaeology in relation to information from the results of the prior non-invasive investigation. By excavating certain sites a better understanding of the erosional processes will be gained thus allowing us to better manage the preservation of the others.

By conducting extensive non-invasive investigation first, it allows us to be very selective about sites for invasive investigation. Sites that require rescue or verification or locations of preserved ancient ground surfaces and places suitable for the collection of samples for post excavation analysis can be suggested. Testing of these areas may provide answers to more general questions without disturbance to recognised important sites. For example, the cairn at the top of the gully at Ballymeanoch is in a very poor condition and has undergone considerable past disturbance. Further investigation of this site may reveal prehistoric archaeological deposits.

The henge at Ballymeanoch would probably be the most informative site to excavate. Its history would provide a fascinating comparison with Temple Wood, but with a greater level of sealed and stratified deposits related to particular events in its history. However, it is a monument of outstanding importance that is not under any immediate threat and its disturbance would not only be difficult to obtain permission for but would go against the philosophy of this project. It might be considered acceptable though to locate a small trench across its ditch. With minimal disturbance a large amount of information could be gained particularly in the collection of samples for environmental analysis that could provide both a very localised and general environmental history.

If a programme of environmental sampling is undertaken it would involve a number of small excavations in the vicinity of various monuments with a view to collecting samples, from ancient ground surfaces, for palaeobotanical analysis and radiocarbon dating. As well as answering other more specific research questions about each site investigated the results obtained from these samples will be applicable to the overall picture of the environmental history within the Kilmartin area. Samples from natural phenomena such as peat bogs and river channels could also be taken in the form of cores. These cores can provide a sequence of pollen deposition as well as being scientifically datable. Cores from river channels should be of particular interest, for as well as providing a pollen sequence, they can also provide a history of soil erosion. Analysis of these cores will provide an environmental history of the area and a better framework within which to study the landscape and its archaeological remains.

A series of nationally important environmental resources are located in the Kilmartin Glen. These include an extensive series of fluvioglacial terraces and raised beaches, the extensive raised mire of the Moine Mhor, upland bogs and the silted meanders of the older channels of the River Add. These resources present a remarkable opportunity for investigating Flandrian sea level changes, vegetation changes and the human impact, through time, on the environment. By sampling these natural resources and the ancient ground surfaces it would be possible to construct a history of human impact, use, alteration and management of the landscape, as well as a history of the natural landscape altering processes, from the post glacial era and the arrival of Mesolithic cultures to the

present day. This information can then be combined with a refined programme of site locational analysis that a number of researchers are already involved in. This is represented in the form of a computer-based Geographical Information System (GIS) which combines landscape characteristics such as topography, geology and landscape use in relation to monument location.

Once all this information is combined a proper assessment of the history of human occupation of the Glen can be mapped against a detailed understanding of the archaeological and environmental deposits resulting from this occupation and the natural processes operating through time. Such a project should provide crucial information about an important area of Scotland's heritage that is virtually uninvestigated but has in recent years had an increasing demand, from both the general public and educational bodies, for better and more comprehensive information concerning its nature.

The monument alignments discussed above are only two of several that can now be recognised in the Kilmartin area. At Dunamuck 3.25 km and 4.2 km to the southeast of Ballymeanoch stones are several groups of standing stones. Group 1, (NR 847929) consists of a row of three stones of which the central one has fallen. They average about 3m in height and are aligned in a similar orientation as the stones at Ballymeanoch. Group 2, (NR 848924) consists of only two standing stones, 2.75m and 4m in height. These are also aligned in a similar orientation as Dunamuck 1 and Ballymeanoch. There is a third group about 200m south of Dunamuck 2 that consists of two fallen stones. Although not closely aligned on each other these locations form a relationship of linearity across the landscape, which may be intentional rather than coincidental.

The Late Neolithic and Early Bronze Age monuments at Dunamuck have perhaps suffered more destruction than any others in the Kilmartin area, particularly during the improvements of the 19th century. Two mounds near the fallen standing stones may be the remains of other cairns (RCAHMS 1988, 59) now cleared, but were documented by Simpson (1865, 37). In the same paragraph he also refers to three 'cairns and circles' being removed by blowing up with gunpowder in the adjoining lower field. Over the years ploughing has revealed two cists in the vicinity of the groups of standing stones (RCAHMS 1988, 78). 400 metres northwest of Dunamuck group one is a cropmark probably representative of a cursus (Campbell 1996, 22). Although not closely aligned on each other these locations also seem related to the one of linearity mentioned above.

The location of this monument complex in the landscape and presence of decorated rock sheets around its perimeter and the history of landscape use mirror some of the activities at Kilmartin. Despite this, there are a number of distinct differences that require to be tested such as a lack of evidence for reuse, the types of burial monuments and the lack of extensive decoration on

monuments. Although monuments have been removed there is no documentary evidence to suggest peat stripping in their vicinity. More detailed examination of this monument complex would provide an opportunity to test some of the results and ideas generated from the work nearer Kilmartin, particularly the ideas generated from localised studies. The use of geophysical prospecting could prove particularly useful, as the sites of removed cairns should leave large recognisable anomalies. If substantial buried anomalies are located such sites could also provide good candidates for excavation as they would be under threat from ploughing and already damaged anyway. In such cases the best method of preservation would be through record by excavation.

6.7 Conclusions

This study has succeeded in locating a number of sites that are suggestive of activities other than those usually associated with the upstanding monuments and it now appears that the Kilmartin Glen was not a landscape exclusively devoted to prehistoric burial and ritual. It should be noted that ritual and beliefs would have been an important aspect in every element of the lives of the monument builders and, the patterns of sites they have left should be considered as being more reflective of cultural values rather than ritual practices (Barrett 1988, 31). It is therefore unhelpful to try and differentiate between sites associated with ritual and sites associated with other activities. More helpful is the recognition that the sites in the Kilmartin Glen relating to the period covered in this study appear to fit a particular pattern of ordering in their location and relationship with the known sites and the topography. Being aware of such localised patterns is important to future strategies of investigation, preservation and interpretation.

To date, archaeological fieldwork conducted for a programme of research, and fieldwork that has been prompted by development, both suggest that despite the abundance of upstanding prehistoric archaeology in the Kilmartin Glen, it represents only a fraction of the remains that would have originally been present. Whereas the research work is deliberately non-invasive, the ideas generated by it can be tested by developer funded excavation. Unfortunately, the post excavation budget on such projects is often insufficient. It is hoped that work carried out on samples taken from other recent archaeological projects in the Glen will contribute towards rectifying this situation. The excavation, dating and palaeo-botanical study of these remains are crucial to their interpretation but an equally important aspect to understanding and interpreting the prehistory of the Kilmartin Glen is being aware of the relationships between the landscape and the monuments and how these are redefined throughout this period. This has been made possible by extensive long-term fieldwalking within the landscape occupied by these monuments.

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APPENDICES

Data processing details

During the course of this study different geophysical instruments and software were used, hence the graphical outputs included in this thesis are not uniform. The various geophysics graphics featured all required a degree of processing in order to produce an image in which anomalies representative of possible archaeological activity can be more easily identifiable. This is standard practice and the means to do this are designed into the software and are becoming increasingly more sophisticated with the advancements in computer technology. The techniques and terminology utilised follows that in the manuals for the machinery and software.

Geoplot Version 1

Nether Largie Grid 1 FM 36 Gradiometer Survey

Minimum Reading	-15.35
Maximum Reading	15.52
Contrast	2
Plotting Parameters	-5.00 SD Below Mean and 2.00 SD Above Mean

Nether Largie Grid 2 FM 36 Gradiometer Survey

Minimum Reading	-13.56
Maximun Reading	9.90
Contrast	1.5
Plotting Parameters	-2.50 SD Below Mean and 2.50 SD Above Mean

Geoplot Version 1 and Surface

Data collected with Geoscan R M 4 was recorded manually so readings checked and corrected if necessary during collection.

Nether Largie Grid 1 RM 4 Resistivity Survey

Minimum Reading			235				
Maximim Reading			662				
Overhead View						Verticle 0.7/Dither on	
		Sun	280	Eye	30	Sun	30
Oblique View Looking South						Verticle 0.8/Dither Off	
Eye	230	Sun	190	Eye	30	Sun	70
Oblique View Looking North						Verticle 0.8/Dither Off	
Eye	50	Sun	190	Eye	30	Sun	70

Nether Largie Grid 2 RM 15 Resistivity Survey

Minimum Reading			173				
Maximum Reading			497				
Overhead View						Verticle 0.7/Dither On	
		Sun	220	Eye	90	Sun	70
Oblique View Looking South						Verticle 1.0/Dither Off	
Eye	230	Sun	190	Eye	30	Sun	70
Oblique View Looking North						Verticle 1.0/Dither Off	
Eye	50	Sun	10	Eye	30	Sun	70

Ballymeanoch Grid 1 RM 15Resistivity Survey

Minimum Reading			153				
Maximum Reading			747				
Overhead View						Verticle 1.6/Dither Off	
		Sun	200	Eye	30	Sun	70
Oblique View Looking South						Verticle 1.6/Dither Off	
Eye	230	Sun	200	Eye	30	Sun	70
Oblique View Looking North						Verticle 1.6/Dither Off	
Eye	50	Sun	200	Eye	30	Sun	70

Ballymeanoch Grid 1 FM 36 Gradiometer Survey

MinimumReading			–31				
Maximum Reading			11				
Overhead View						Verticle 0.03/Dither On	
		Sun	280	Eye 50		Sun	70

Poltalloch RM 15 Resistivity Survey

Minimum Reading			167				
Maximum Reading			819				
Overhead View						Vericle 1.6/Dither On	
		Sun	100	Eye	50	Sun	70
Oblique View Looking North						Verticle 1.8/Dither Off	
Eye	140	Sun	260	Eye	50	Sun	70
Oblique View Looking South						Verticle 1.8/Dither Off	
Eye	320	Sun	100	Eye	50	Sun	70

Geoplot Version 2

Processing had to be minimalised as the Memory Chain of the software limits the amount of information that can be dealt with during a calculation.

Ballymeanoch Grid 2 FM 36 Gradiometer Survey

Despike	X=1, Y=1	Threshhold=3	Spike Replacement=Mean
Low Pass Filter	X=1, Y=1	Weighting=Gaussian	
Interpolate	DirectionY	Expand x 2	Sin X/X
Minimum Reading –9		Mean 2	Maximum Reading 17
Plotting Parrameters		-4 Below Mean	9.5 Above Mean

Ballymeanoch Grid 2 RM 15 Resistivity Survey

Interpolate	DirectionY	Expand x 2	Sin X/X
Minimum Reading 149		Mean 238	Maximum Reading 583
Plotting Parrameters		175 Below Mean	300 Above Mean

Ballymeanoch Grid 3 RM 15 Resistivity Survey

Despike	X=1, Y=1	Threshhold=3	Spike Replacement=Mean
Low Pass Filter	X=1, Y=1	Weighting=Gaussian	
Zero Mean Traverse		N=Off	
Zero Mean Grid		N=0.25	
Minimum Reading 328		Mean 498	Maximum Reading 787
Plotting Parrameters		-2 SD Below Mean	2 SD Above Mean