# MOEL Y LLYN
# CARREGCADWGAN FARM
# TALYBONT
# CEREDIGION

## TOPOGRAPHICAL AND GEOPHYSICAL SURVEY

**REPORT No 2009/6**

Prepared by Dyfed Archaeological Trust
For Cadw

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Cadw

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**CONTENTS**



*Cover: Geophysical surveying at Moel y Llyn*

**SUMMARY**

*Geophysical and topographical surveys were undertaken around a stone circle at Moel y Llyn, Carregcadwgan Farm, Talybont, Ceredigion. The stones are all very small and survey suggests they may not be set into the subsoil. No sub-surface archaeological features were revealed. There is, therefore, some, doubt that the stone circle is a prehistoric monument, especially as there is a tradition that the site was used for cock fighting.*

# INTRODUCTION

## Project commission

Dyfed Archaeological Trust received grant-aid from Cadw to undertake a geophysical survey and a topographic survey on and around the stone circle at Moel y Llyn, Carregcadwgan Farm, Talybont, Ceredigion (centred on NGR SN 70100 91160) (Figs 1 and 2).

## Scope of the project

The project was designed to establish whether there were other significant buried archaeological features in the area of the monument.

## Report outline

Because of the limited nature of this project, this report is restricted solely to the results of the geophysical survey and plan of the stone circle, although there are numerous other prehistoric sites in the area.

## Abbreviations

Sites recorded on the Regional Historic Environment Record (HER) are identified by their Primary Record Number (PRN) and located by their National Grid Reference (NGR). The Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) hold a collection of aerial photographs of the region.

## THE SITE

### Location and Archaeological Potential

The site is located 4.7km east of Talybont on a saddle between Moel y Garn and Moel y Llyn (Figs 1, 2 and 3). The stone circle, PRN 5438 (SN 70100 91160), is located in the middle of this saddle on reasonably level ground, just to the north of a modern fence with open views to the north and south. The area is used for rough pasture. There are wet areas and pockets of peat in the vicinity of the monument. The other nearest actual archaeological monument is Cregiau Duon Round Barrow, PRN 6263, which is located 190m to the southeast. There are however a number of other sites recorded nearby (Fig 3 and Appendix 1) on the HER database, but these are not always inaccurately grid referenced. These inaccuracies were noted for PRN 5438 and PRN 8568 and it is therefore suggested that the HER database is checked for the other locations.

## METHODOLOGY

### Topographical Survey Instrumentation

A total station EDM was used for the topographical survey recording readings along the tops and bottoms of the stones and used to plot the site in relationship to the modern fences.

### Geophysical Survey Instrumentation

A fluxgate gradiometer survey provides a relatively swift and completely non-invasive method of surveying large areas.

The survey was carried out using a Bartington Grad601-2 dual Fluxgate Gradiometer, which uses a pair of Grad-01-100 sensors. These are high stability fluxgate gradient sensors with a 1.0m separation between the sensing elements, giving a strong response to deeper anomalies.

The instrument detects variations in the earth's magnetic field caused by the presence of iron in the soil. This is usually in the form of weakly magnetised iron oxides, which tend to be concentrated in the topsoil. Features cut into the subsoil and backfilled or silted with topsoil therefore contain greater amounts of iron and can therefore be detected with the gradiometer. There are, however, other processes and materials that can produce detectable anomalies. The most obvious is the presence of pieces of iron in the soil or immediate environs which usually produce very high readings and can mask the relatively weak readings produced by variations in the soil. Archaeological features such as hearths or kilns also produce strong readings because fired clay acquires a permanent thermo-remnant magnetic field upon cooling. This material can also get spread into the surrounding soil leading to a more generalised magnetic enhancement around settlement sites.

Not all surveys produce good results as anomalies can also be masked by large magnetic variations in the bedrock or soil or high levels of natural background "noise" (interference consisting of random signals produced by material within the soil). In some cases, there may be little variation between the topsoil and subsoil

resulting in features being un-detectable. It must therefore be stressed that a lack of detectable anomalies cannot be taken to mean that that there are no below ground archaeological features.

The Bartington Grad601 is a hand-held instrument and readings can be taken automatically as the operator walks at a constant speed along a series of fixed length traverses. The sensor consists of two vertically aligned fluxgates set 1.0m apart. Their Mumetal cores are driven in and out of magnetic saturation by an alternating current passing through two opposing driver coils. As the cores come out of saturation, the external magnetic field can enter them producing an electrical pulse proportional to the field strength in a sensor coil. The high frequency of the detection cycle produces what is in effect a continuous output (Clark 1996).

The gradiometer can detect anomalies down to a depth of approximately one metre. The magnetic variations are measured in nanoTeslas (nT). The earth's magnetic field strength is about 48,000 nT; typical archaeological features produce readings of below 15nT although burnt features and iron objects can result in changes of several hundred nT. The instrument is capable of detecting changes as low as 0.1nT.

## Geophysical Survey Data Collection

The gradiometer includes an on-board data-logger. Readings in the surveys were taken along parallel traverses of one axis of a grid made up of 20m x 20m squares. The traverse interval was 0.5m. Readings were logged at intervals of 0.25m along each traverse giving 3200 readings per grid square (medium resolution).

## Geophysical Survey Data presentation

The data was transferred from the data-logger to a computer where it was compiled and processed using ArchaeoSurveyor 2 software. The data is presented as grey-scale plot (Fig 5) where data values are represented by modulation of the intensity of a grey scale within a rectangular area corresponding to the data collection point within the grid. This produces a plan view of the survey and allows subtle changes in the data to be displayed. Normally an interpretation diagram showing the main features of the survey would supplement the plan, but as there were no recognisable anomalies it has been omitted from this report.

## Geophysical Survey Data Processing

The data is presented with a minimum of processing although corrections are made to compensate for instrument drift and other data collection inconsistencies. High readings caused by stray pieces of iron, fences, etc are usually modified on the grey scale plot as they have a tendency to compress the rest of the data. The data is however carefully examined before this procedure is carried out as kilns and other burnt features can produce similar readings. The data on some noisy or very complex sites can benefit from 'smoothing'. Grey-scale plots are always somewhat pixellated due to the resolution of the survey. This can, at times, make it difficult to see less obvious anomalies. The readings in the plots can therefore be interpolated thus producing more but smaller pixels

and a small amount of low pass filtering can be applied. This reduces the perceived effects of background noise thus making anomalies easier to see. Any further processing is noted in relation to the individual plot.

### Reliability

Geophysical survey is an immensely useful tool but it should be realised that while a survey will detect a wide range of features, it may not detect *all* buried features. A gradiometer survey detects changes in magnetic flux density and relies on there being a detectable difference between the archaeology and the substrate. This may not occur for many reasons (e.g. a cut feature being backfilled with subsoil). It must therefore be stressed that a lack of archaeological responses from a geophysical survey does not prove that there is no archaeology present.

### Grid locations

The survey grids were located by measurements to fixed points such as field boundaries.

## RESULTS

### Limitations

The survey was undertaken in mid to late September 2008. At the beginning of the survey the weather was overcast, but was much brighter later on, therefore no weather problems were experienced. The rough pasture was uneven with a few clumps of longer grass. This along with some drainage gullies and probable areas of former peat digging hindered smooth walking for the geophysical survey, but do not seem to have caused any significant problems. However, there was a small ponded area in the east of the survey area that could not be included, and the modern fence dividing this area obscured or effected results for about 3m-4m on either side it. Twenty-five, 20m x 20m squares were surveyed with a total area of 1ha.

The underlying geology is sedimentary, Rhuddanian, with a peaty topsoil. The hard geology did not appear to cause any geophysical data issues.

### Topographical

(Fig 6)

The survey was limited to recording the stone circle. This consists of 32 stones, standing to a maximum of c. 0.3m (Photos 1 and 2). However, the ring of stones is not a true circle, having a longer northwest-southeast axis of 22m and a shorter southwest-northeast axis of 21.2m. The stones are not evenly spaced. A few gaps in the spacing of the stones can probably be explained by loss, or by fallen stones now concealed by peat growth. There are two other stones to the north of the circle; these appear, however, to have been cast up from a modern drainage gully.

To the west and south of the stone circle there was evidence of peat cutting, although these excavations appear to have been quite shallow. A few drainage gullies were cut fairly recently using a forestry-type plough (pers comm. Mr Jenkins, landowner). These avoid the stone circle although one passes only just to the north. Neither the peat cutting nor the drainage gullies were recorded in the survey.

### Geophysical interpretation

(Figs 5)

There were no discernible archaeological features visible in the geophysical survey, either in or around the stone circle. What anomalies there are would all appear to be geological.

A test was also made on a mound, grid ref SN 7028490222 (Photo. 3) 195m to the east of the stone circle. This only produced normal readings. This mound is reportedly the burial place of a beast (pers comm. Mr Jenkins), but equally could be a natural feature or a stone clearance mound.

## DISCUSSION AND RECOMMENDATIONS

Given the "diameter" of the stone circle of over just over 20m it is clearly not a hut/house circle. The stones are small and mainly supported by the peaty topsoil – they do not appear to be set into subsoil, but this is impossible to verify without excavation.

The stones of the circle are all fairly small and roughly of the same size. There are larger stones available nearby so it appears as though theses stones have been deliberately chosen for their uniformity and/or for ease of construction. One or two people could have lifted one of the stones. Although it would appear from the plan that there are a few gaps where stones are missing, it would also seem that the stones are not always evenly spaced. Very few stone circles are true circles; in this example slight sub-circular form of monument may reflect ease or speed of construction rather than deliberate planning.

The farm owner, Mr Jenkins, said that the stone circle was reportedly used for cock fighting, as any one approaching the site could be seen well beforehand. This does not necessarily mean that this site was constructed for this purpose, but may well have been re-used as such.

There would therefore be two particular problems with this site: its date and function. These may not be easily resolved given the apparent lack of sub-surface features demonstrated in the geophysical survey. However, these issues could potentially be solved by two small hand dug trenche; one to examine the setting of a the stones, to see if they are set into the subsoil, and another to see if there is a central feature. Carbonised remains from the excavation would assist in determining its data.

## CONCLUSION

This project has suggested that the circle of stones may be less substantial than first appears and there is no sign of any sub-surface features associated with it.

**ACKNOWLEDGEMENTS**

Thanks to Mr Jenkins, Carregcadwgan Farm, Talybont, for taking us to visit the site and for permission to undertake this project. I would also like to thank Hubert Wilson for undertaking the topographic survey and for most of the figures in the report. Also I would like to thank Andrew Shobbrook, for assistance with both the topographic and geophysical surveys.

**ARCHIVE DEPOSITION**

The archive will initially be held by DAT, before passing it onto the National Monument Record, Aberystwyth.

**SOURCES**

Clark A J 1996 *Seeing Beneath the Soil* (2nd edition). Batsford, London

Ordnance Survey: First, Second and 1964 editions. 6 inch

British Geological Survey 1994 The Rocks of Wales 1:250,000

**APPENDIX 1:**

**Adjacent sites**

| PRN | Site Name | Site Type | Grid Ref | Period |
|---|---|---|---|---|
| 5438 | CYLCH DERWYDDOL;MOEL LLYN;MOEL-Y-LLYN | STONE CIRCLE | SN69949106 | Neolithic;Bronze Age |
| 6099 | MOEL Y GAER;MOEL Y GARN | HILLFORT? | SN692911 | Iron Age |
| 6207 | PANT Y GORLAN GOCH | QUARRY | SN69009064 | Post Med? |
| 6208 | PANT Y GORLAN GOCH | UNKNOWN | SN69409078 | Unknown |
| 6209 | MOEL Y GARN | UNKNOWN | SN698910 | Unknown |
| 6259 | ESGAIR FOEL DDU | STONE CIRCLE? | SN7091 | Neolithic;Bronze Age |
| 6263 | CREIGIAU DUON | ROUND BARROW? | SN70269110 | Bronze Age |
| 8568 | MOEL-Y-GARN | ROUND BARROW?;CLEARANCE CAIRN? | SN69919105 | Bronze Age;Unknown |
| 9427 | BLAEN CLETTWR-FACH | COTTAGE? | SN70059145 | Post Med |
| 9428 | FFRIDD NEWYDD | COTTAGE? | SN70669092 | Post Med |
| 9429 | NANT-Y-NOD | BARRACKS | SN70249075 | Post Med |
| 19575 | CAPEL SEION | CHAPEL | SN69809091 | Post Med |
| 25810 | CREIGIAU DUON;MOUNTAIN LAKE;NANT-Y-NOD;CAREG-GADWGAN | LEAD MINE | SN704907 | Post Med |
| 25811 | LLECHWEDD-LLWYD MINE | LEAD MINE | SN707906 | Post Med |

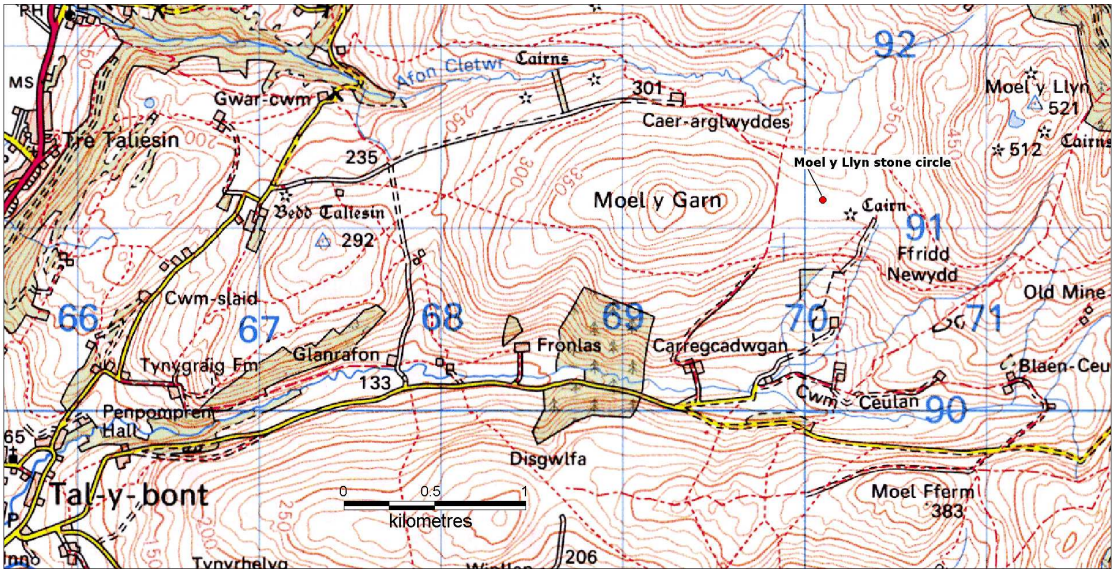


**Figure 1:** Location of Moel y Llyn
Reproduced from the 1997 Ordnance Survey 1:50,000 scale Landranger Map with the permission of The Controller of Her Majesty's Stationery Office, © Crown Copyright Cambria Archaeology, The Shire Hall, Carmarthen Street, Llandeilo, Carmarthenshire SA19 6AF. Licence No AL51842A.

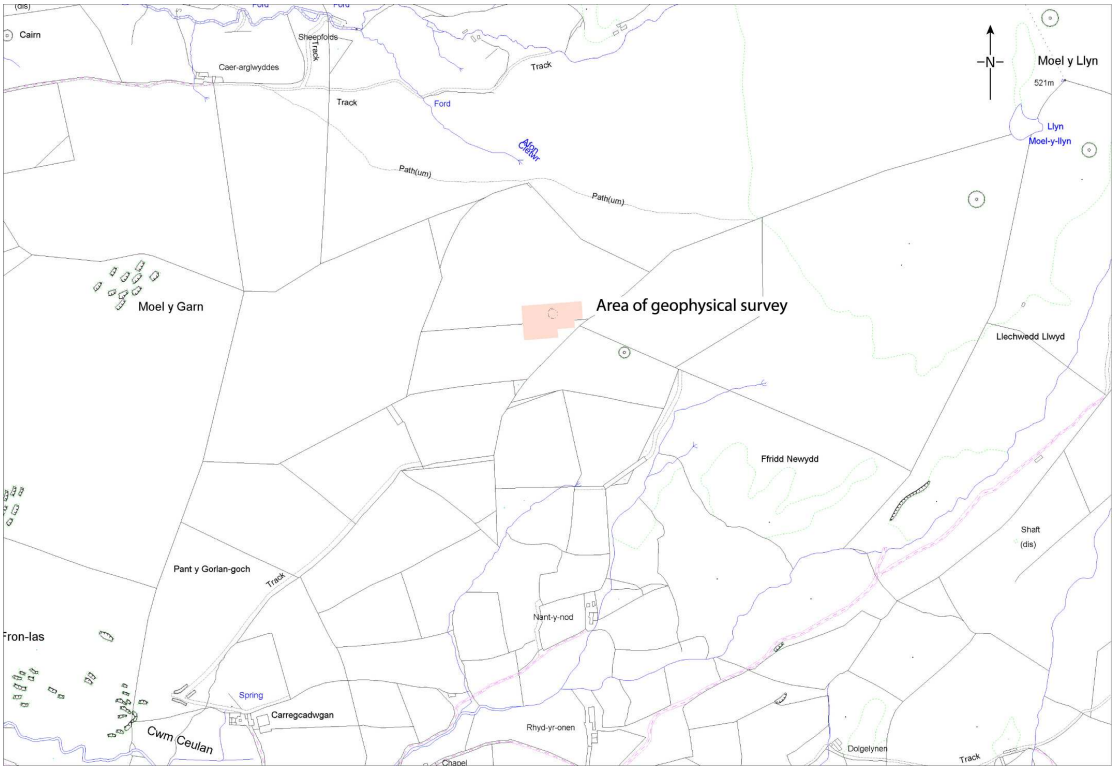


**Figure 2:** Location of survey
This map is based upon Ordnance Survey Material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Welsh Assembly Government: Licence Number: 100017916.2005

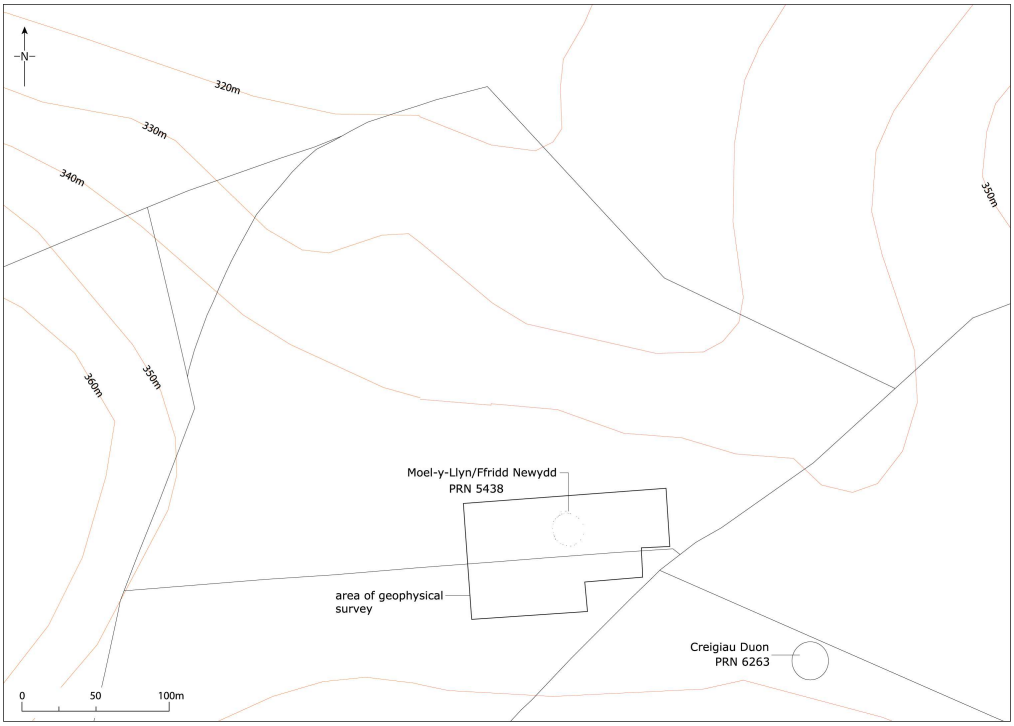


**Figure 3:** Detail location of geophysical survey

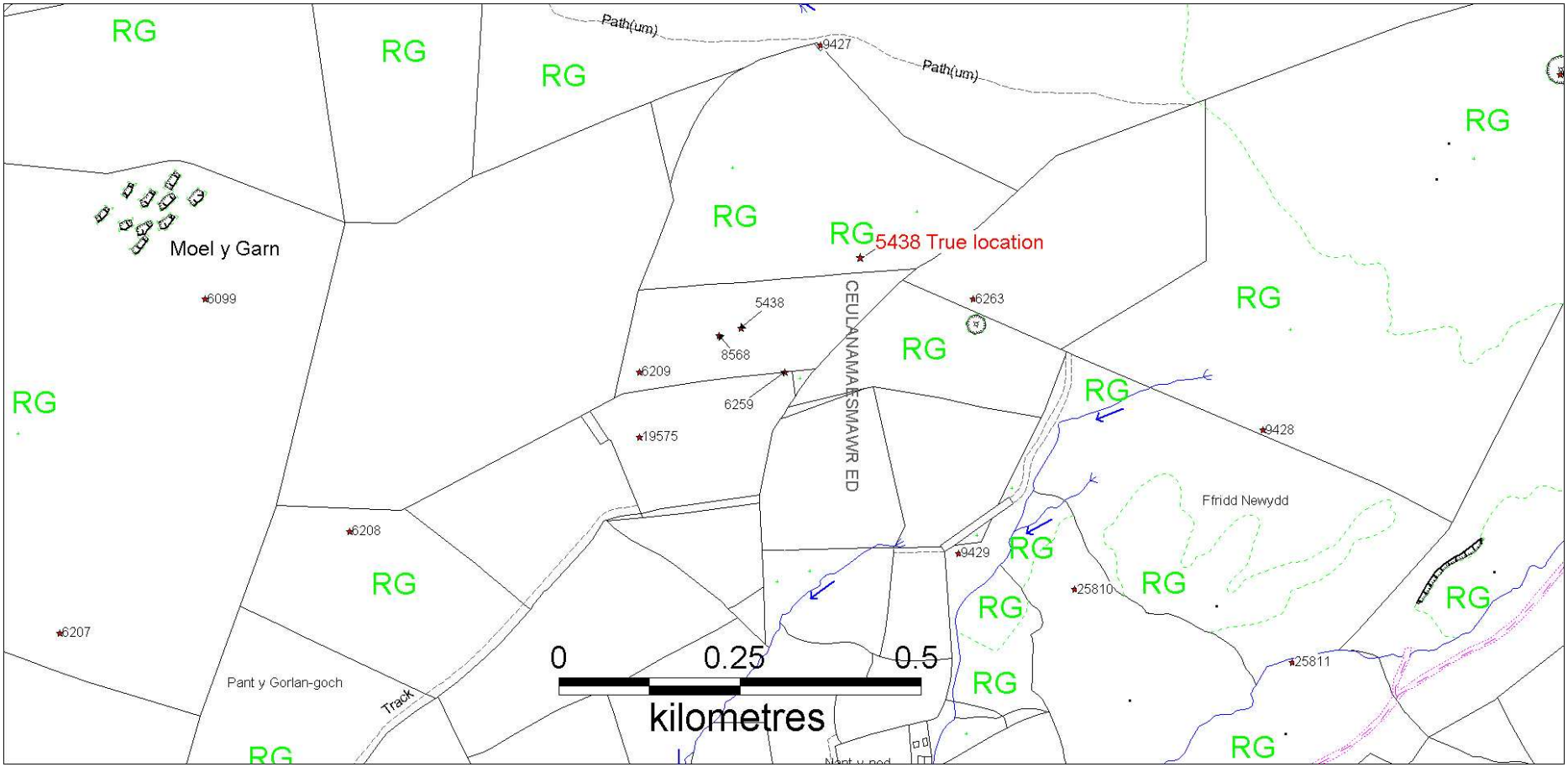


**Figure 4:** Adjacent sites to 5439 as recorded on the HER database (see Appendix 1 for table)

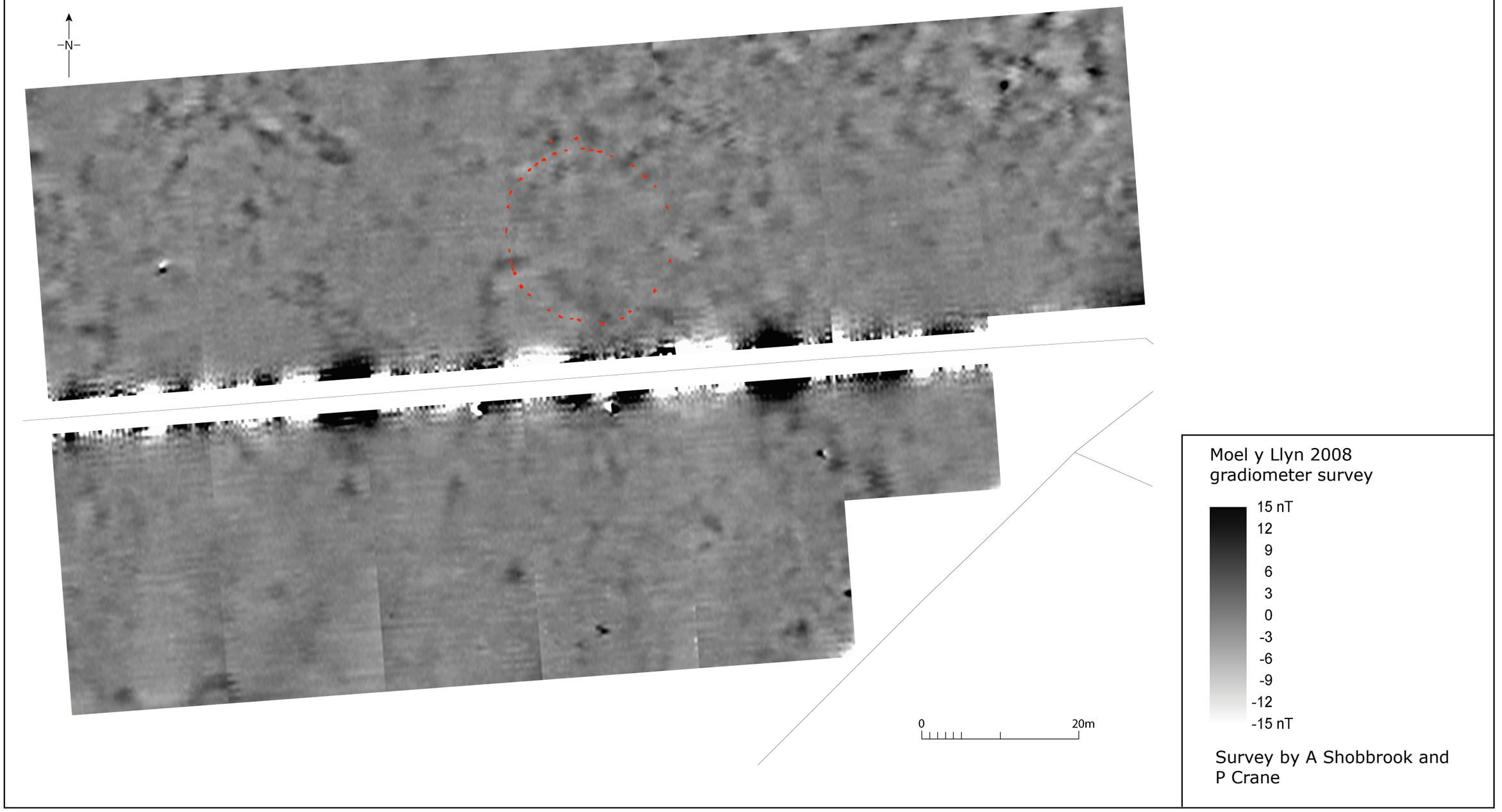




**Figure 5:** Gradiometer survey, grey-scale, with plan of stone circle. Scale 1:500 at A3

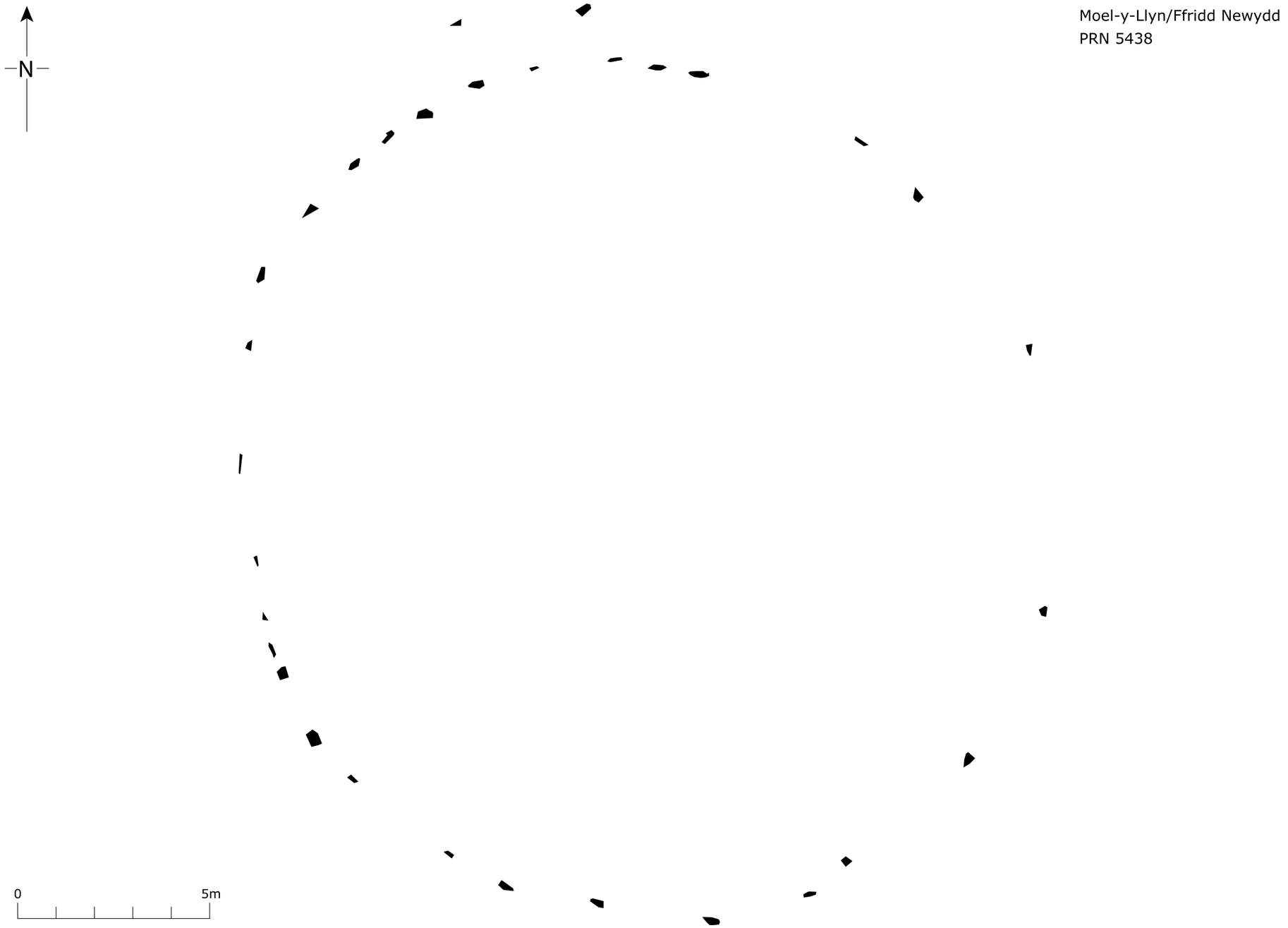


**Figure 6:** Topographical Survey: Moel y Llyn Stone Circle PRN 5438

**Photo 1:** Part of stone circle. View NE

**Photo 2:** Part of stone circle. View NE

**Photo 3:** Mound at SN 70284 90222 grid ref view SW

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Paratowyd yr adroddiad hwn gan / This report has been prepared by Pete Crane

Swydd / Position: Senior Archaeologist

Llofnod / Signature ..... Dyddiad / Date

Mae'r adroddiad hwn wedi ei gael yn gywir a derbyn sêl bendith
This report has been checked and approved by Ken Murphey

ar ran Ymddiriedolaeth Archaeolegol Dyfed Cyf.
on behalf of Dyfed Archaeological Trust Ltd.

Swydd / Position: Trust Director

Llofnod / Signature ..... Dyddiad / Date

Yn unol â'n nôd i roddi gwasanaeth o ansawdd uchel, croesawn unrhyw sylwadau sydd gennych ar gynnwys neu strwythur yr adroddiad hwn

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