Topographical and Geophysical Surveys at Dinas Emrys, Beddgelert

Commissioned by The National Trust

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registered in England

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Dinas Emrys, Beddgelert

Topographical and Geophysical Surveys

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Dinas Emrys - Introduction

1 Introduction:

Dinas Emrys is a hill fort 2 km NE of Beddgelert currently owned and managed by The National Trust.

The site encompasses a complex of archaeological remains with a possible date range of activity from the Iron Age to the Post Medieval period.

The most prominent features visible today include stone ramparts encircling the hill top with entrances to the west, a tower base on the summit of the hill of possible 12th century AD date, an artificial pool, an oval structure apparently inserted into the rampart on the north east side of the site, and a series of more recent walls which to some extent echo the positioning of the ramparts .

Additionally the site has long been associated with the story of Vortigern, a historical figure of the 5th century AD.

Despite archaeological investigations in 1910 and the 1950's the precise sequence of activity on the site has never been fully understood.

In order to facilitate planning for the management, conservation, access and interpretation of the site the National Trust commissioned a topographical survey and selective geophysical surveys of the site.

1.1 Acknowledgements

EAS Ltd are indebted to the staff at The National Trust Craflwyn Centre for co-operation over site access and bracken clearance. To John Latham, National Trust Archaeologist, for background information and support, and to Peter Crew, Snowdonia National Park Archaeologist, for assistance in the field and invaluable insight.

2 Archaeological Background

In the summer of 1910 C. E. Breese carried out the first known archaeological investigations at Dinas Emrys (Breese 1930, 342 - 354).

He removed collapsed stone obscuring the tower on the summit of the site and investigated three areas, one to the north of the tower, one adjacent to the pool and one adjacent to a suspected entrance in one of the western ramparts.

The artefacts recovered would appear to have been mainly of a domestic nature, fragments of rotary quern, animal bone, and small fragments of pottery. Three iron and copper alloy Don terrets from the area adjacent to the pool and copper alloy artefacts from the tower debris do however give some suggestion of status.

Breese was unable to draw any firm conclusions as to the dating of different elements of the site. The metal artefacts, however, would appear to date to the late Iron Age or early Roman period.

In the 1950's H. N. Savory carried out more extensive investigations of ramparts, entrances and the pool area (Savory 1960, 13-77).

Investigations of the inner entrance to the west revealed a charcoal rich occupation layer which extended beneath the rampart. This layer contained artefacts of late Roman and Dark Age date. A number of post holes, sealed by this layer, were interpreted as an early palisade fence (Savory 1960, 21) .

A similar occupation layer again containing late Roman and Dark Age material was thought to run beneath the outer rampart to the west (Savory 1960, 26).

Elsewhere, sections across the ramparts were somewhat unproductive. Trenches were excavated at three locations along the southern edge and at one to the north east of the tower. In all cases rampart foundations sat directly on the subsoil or rock and no dating material was forthcoming (Savory 1960, 25).

Trenches in the small hollow immediately to the west of the tower revealed two post holes and an occupation layer. Material thought to date to the late Roman and Dark Age periods was recovered (Savory 1960, 49).

Within the pool area Savory was able to suggest a long but not continuos sequence of activity. Summarised in brief the earliest phase, much disturbed by later activities, consisted of a post hole structure and a stone lined pit tentatively dated to the Iron Age or early Roman period (Savory 1960, 29).

Phase two consisted of an occupation layer a circular hut and a possible smelting pit of late Roman and sub-Roman (late 4th and 5th century AD) date (Savory 1960, 37) .

Phase three consisted of the digging of the pool, referred to as the cistern by Savory, in the 5th and 6th centuries AD (Savory 1960, 42).

Phase four consisted of the silting of the pool and a rough stone built structure with associated Dark Age, 6th to 8th century AD, pottery (Savory 1960, 44).

Phase five consisted of the construction of a stone platform partly sealing the peaty lower fill of the pool. No datable artefacts were recovered but analysis carried out of the organic deposits within the pool suggests a period of inactivity when the central hollow became overgrown with hazel thicket. This was later cleared and pasture eventually developed. This tends to suggest a Medieval date perhaps contemporary with the tower for the construction of the platform (Savory 1960, 46).

Deposits above the platform indicate afforistation probably not earlier than the 15th century AD (Seddon, in Savory 1960, 77).

The dating sequence associated with the pool itself has, however, been disputed. Recent writers (Edward's and Lane 1988, 57) suggest that the whole pool sequence is of Medieval date, predated by the late Roman and early Medieval pottery in the pool area.

3 Topographical Survey

The area of the drawn survey is defined as the hill top, with its various features, enclosed by the main ramparts.

The survey work took place during November and December 2003.

The results are presented as contour and hachure plans of the whole survey area and of selected features (Figures 2 - 11).

Three dimensional models have also been produced of the survey area as a whole and of selected features (Figures 12 - 19).

An outline plan has been used to locate the individual features described below (Figure 1).

3.1 Ramparts and Entrances

Approaching the site from the west the first of the main ramparts is encountered (Figure 1, 1). A substantial stone built feature traversing and cutting off a natural spur directly below the west side of the main site. This rampart has a somewhat rounded profile, mainly because of its tumbled condition.

A single entrance is roughly centrally placed (Figure 1, 2). Its precise form is not clear because of its tumbled condition. The terminals of the ramparts can be seen, however, to widen slightly at the entrance and on the north side the rampart terminal turns outwards somewhat. The surviving height of the rampart today is a maximum of 1 m in the entrance. The impression given from it's width, 2 m, and the quantity of tumbled stone, is that this was once a fairly massive defensive wall.

A slight rise in the ground suggests the possibility that this rampart continued to the north along the edge of the spur, now superseded by a wall. This wall exhibits three different building styles, large flat stones set on edge (orthostats) (Figure 1,3), large boulders creating a rough wall (Figure 1,4), and a more carefully constructed wall of smaller stones (Figure 1,5). The different styles suggest different phases of construction. It is not possible to indicate a precise date but its construction is probably relatively recent.

To the south of the rampart a steep rock face negates any need to continue the rampart.

Directly behind the first of the main ramparts is a relatively flat area. A zigzag path then defines an obvious route up a relatively steep slope to an entrance through the second of the main ramparts (Figure 1, 6).

This feature traverses the western side of the hill top between a precipitous edge to the south and a rock outcrop to the north. In places the original shape of the rampart is evident, a 1.5 m wide stone wall with apparently near vertical inner and outer faces. Although, today, it survives to a height of between 0.3 and 1.2 m the quantity of tumbled stone would again indicate a substantial structure.

The entrance occurs towards the southern end of the rampart (Figure 1, 7). There are distinct similarities with the entrance in the first rampart, widening at the terminals and one terminal out turned, in this instance on the south side.

Continuing the line of this rampart to the north is a less structurally distinct rampart (Figure 1, 8). This feature is significantly denuded, much having tumbled down slope. A scatter of stones (Figure 1, 9) above the northern extreme suggests that it may have turned and continued up slope for a short distance.

Outside the first of the main ramparts, to the west, a number of rock built features are encountered often created from moderately sized angular boulders. In some places these are deliberate infill between natural outcrops or placed on deliberate alignments to create barriers. The most prominent of these was interpreted, by Savory (1960, 27) as an outer entrance to the fort itself.

While these features should not be dismissed their lack of coherence and somewhat stylistic difference to the main ramparts sets them apart.

3.2 Ramparts and Walls

Stretches of stone built rampart can be traced along the northern and southern edges of the hill top (Figure 1, 10). They are today very denuded and it is difficult to determine the original shape. The aim appears to have been to link natural features to create a barrier probably originally all the way around the top of the hill.

In places, along the southern side, the position of the rampart is, to a certain extent, echoed by a more recent wall which in some places sits directly on top of the rampart (Figure 1, 11) and in others is outside the rampart, revetted into the slope below (Figure 1, 12). This wall is almost certainly constructed of rampart material. It appears on the AD 1889 Ordnance Survey map (Caernarfonshire sheet 28.1) and thus was already in place by the 19th century AD.

Other walling probably of a similar date is seen on the north side of the site (Figure 1, 13). This drops off the edge of the site and appears to mark a steep but possible approach route on this side. Further down slope irregular barriers have been created from large but deliberately placed boulders. Although different in character these appear to some extent to continue the line of the 19th century wall and may therefore be contemporary with it.

On the north eastern extreme of the site an extra rampart or outwork is encountered (Figure 1, 14). This rampart guards a very distinct access point to the site along a rocky ridge. Although evidence on the ground is indistinct it is possible that there was an entrance way through this rampart at this point (Figure 1, 15).

3.3 Quarrying Activities

Considerable quantities of stone would have been required to construct these ramparts. Quarrying is evident along the south western side of the site in the form of a series of sub rectangular depressions averaging 3.5 m across (Figure 1, 16). It seems likely that some of the exposed rock faces on the central southern sector of the site have also been quarried leaving a series of rock shelves (Figure 1, 17).

3.4 The Tower

The summit of the site is dominated by the tower (Figure 1, 18). Constructed of stone and earth, the internal faces are faced with larger blocks. Today, internal facing is still visible in places on all four sides but is obscured in places by tumble or is missing.

The tower walls are massive, measuring 1.6 to 2 m wide at the surviving top, and wider at the base, the walls being deliberately battered. The surviving height is 1.5 m internally and approximately 2 m externally on the south side. There is the possibility of an entrance feature on the north west corner.

The positioning of the tower with a steep slope to the east and hollows to the south and west provides a natural "dry moat". The lack of a stone rampart along the break of slope to east may suggest that any rampart material here was robbed to construct the tower.

3.5 The Oval Feature

At the north east corner of the site a oval feature, possibly a tower has apparently been added to the rampart, possibly blocking an earlier entrance at this point (Figure 1, 19). Measuring a maximum of 8 by 11 m, this feature has a stone and earth wall measuring 1 m in width with a maximum internal surviving height of 0.8 m. It would appear to be entered from the south west. This feature sits in a notably commanding position overlooking the north eastern approach to the site.

3.6 The Pool Area

To the south and below the tower is a hollow providing a notably sheltered area. Today, this area is dominated by an 19th century AD sheepfold, sub rectangular in shape and roughly constructed of loose boulders (Figure 1, 20). The outline of a sunken feature known as "The Pool" is visible on the south side of the hollow with a short channel draining water to the south (Figure 1, 21). The feature has to a certain degree silted up. The area around the pool is uneven with some distinct hollows and straight edges probably representing the positions of the 1950's excavation trenches (Figure 1, 22).

3.7 The Platform

One area on the top of the site, above and to the north west of the pool area is notably flat and slightly sheltered by the summit of the hill. While no features are discernible this would be one of the most likely candidates for the positioning of structures (Figure 1, 23).

4 Geophysical Survey

Six areas were selected for geophysical survey (Figure 20). Areas were selected on the basis of their potential to reveal features of an archaeological nature, flat areas, gateways and known features. Areas 1, 3, and 4 partly coincide with areas where excavation has taken place while areas 2, 5, and 6 are not known to have been previously investigated.

Each area was divided into 5 or 10 m squares and surveyed using a Geoscan FM 36 Fluxgate Gradiometer with an ST 1 sample trigger. Readings were taken at 0.5 m intervals, along parallel transects 0.5 m apart. Grey scale and X-Y plots were produced using Geoscan Research "Geoplot" V. 3.00e. A colour contour plot of area 5 was produced using Golden Software Inc. Surfer V. 5.01.

4.1 Area 1 - Adjacent to the Outer Rampart

This area consisted of two 5 m squares adjacent to the inner face of the outer rampart. A trench was excavated by Breese (1960, 26) at a location in the southern half of the sample area. The results are shown as a grey scale image (Figure 21) and an X-Y plot (Figure 22).

The results showed only general disturbance in this area (Figure 34). It was not possible to pick out the position of the 1950's excavation trench.

4.2 Area 2 - Inside the Outer Rampart

This area consisted of four 5 m squares situated across a notably flat area inside the inner entrance. The results are shown as a grey scale image (Figure 23) and an X-Y plot (Figure 24).

Magnetic disturbance was revealed in the southern half of the survey area contrasting with an undisturbed area to the north of the survey area (Figure 35). No clear pattern

was discernible within the general magnetic disturbance.

4.3 Area 3 - The Inner Gateway

This area consisted of two 10 m squares behind and to the north of the inner gateway. Parts of this area were uncovered by Savory as part of his investigation of the gateway. The results are shown as a grey scale image (Figure 25) and an X-Y plot (Figure 26).

Several areas of general magnetic disturbance were demonstrated. One possible coherent magnetic anomaly is seen immediately behind the entrance (Figure 36). This anomaly, although giving the impression of a small square structure, should be treated with caution as it may be defining the limits of one of the 1950's excavation trenches.

4.4 Area 4 - The Pool Area

This area consisted of four 10 m squares positioned to the north and west of the pool. Much of this area was investigated by Savory in the 1950's. The results are shown as a grey scale image (Figure 27) and an X-Y plot (Figure 28).

This area was dominated by a general spread of magnetic disturbance with no coherent magnetic anomalies (Figure 37). The southern limit of the survey area is notable for its lack of magnetic disturbance may suggest that this area has not been disturbed by excavation.

4.5 Area 5 - The Platform

This area consisted of six 10 m squares positioned to test a notably flat platform for the presence of structural features. The results are shown as a grey scale image (Figure 29) an X-Y plot (Figure 30) and a colour contour plot (Figure 31).

Several areas of magnetic disturbance are seen in this area. Only one area, roughly in the centre, corresponding topographically to a shallow hollow adjacent to a rocky shelf, appears to form a coherent anomaly. This is best represented on the colour contour plot (Figure 31) and is tentatively interpreted as a circular structure (Figure 38) .

4.6 Area 6 - The Oval Feature

This area consisted of one 10 m square and was positioned to test for the presence of archaeological features within the oval feature. The results are shown as a grey scale image (Figure 32) and an X-Y plot (Figure 33).

The results of the survey indicate that although the outline of the structure is defined by a feint magnetic anomaly there are no features giving a magnetic response within the structure.

There are, however, areas of magnetic disturbance corresponding with the north east and north west external corners of the structure where the ramparts merge with this feature (Figure 39).

4.7 Magnetic Scanning

The results from Area 6 (4.7 above) pointed to the potential for the ramparts to be giving a magnetic response. The ramparts were then systematically scanned using the Geoscan FM 36 Fluxgate Gradiometer. The results are shown in Figure 40.

Notably high readings were recorded, of between 50 and 200 nT above the background readings along the line of the denuded ramparts which encircle the hill top, shown by solid red on Figure 40. Similar readings were also noted where there are no visible above ground features, suggesting the positions of now lost ramparts.

In addition there were some areas giving readings of up to 20 nT above the background reading, shown by red diagonal shading on Figure 40.

These readings suggest the presence of vitrification (burning) of the ramparts. The level of this burning must have been extensive as tests on a modern bonfire within the tower gave readings of 20 nT above the background which rose to 90 nT on direct contact with the magnetometer.

It is notable that the more pronounced ramparts and entrances to the west did not produce a magnetic response.

5 Discussion

By careful examination of features on the ground and in particular the results of the magnetic scanning of the ramparts has allowed for some tentative phasing of the stone ramparts.

The magnetic response broadly comparable for the denuded and no longer visible sections of rampart around the top of the hill idicates the activity of burning and resultant vitrification. This is further supported by the presence of fragments of vitrified stone amongst the assemblage from Savory's excavations held at the National Museum of Wales (Peter Crew pers. com.). The presence of vitrification may suggest the presence of some form of wooden internal structure (timber lacing) to the rampart in its original un-vitrified form.

It is not possible to determine the precise method or reason for this activity or indeed at what point in the active use of the rampart it occurred. It seems likely, however, that it happened during one event. This would indicate the contemporary nature of the ramparts encircling the top of the hill and point to a different phase for the unvitrified ramparts and entrances to the west.

Vitrification is not common in Wales and is more normally associated with Iron Age hill fort sites in Scotland (Cunliffe 1975, 237). The only other site in Gwynedd where some vitrification is thought to occur is at the Iron Age hill fort of Caer Euni, near Bala (Lynch 1995,83). In Scotland vitrification is associated with timber laced ramparts which in Cunliffe's western zone are dated to between the 7th and the 4th centuries BC (Cunliffe 1975, 239).

Savory found no dating evidence for the vitrified rampart. All that can be said is that it would appear to predate the western ramparts.

The western ramparts appear structurally distinct and survive better than those around the top of the hill. Savory's excavations suggest that they post date Dark Age occupation activity. His findings, however, also indicate the possible presence of an earlier wooden palisade predating the innermost of the western ramparts.

It seems, therefore, that while the denuded ramparts around the top of the hill represent the earliest defensive use of the site, the more prominent ramparts and entrances to the west represent a reuse and beefing up of the existing defences during the medieval period. This may be associated with at least some of the activity in the pool area and possibly even the siting of the tower.

Although we can now draw some conclusions to the sequence of rampart construction, without further work it is not possible to be precise about the sequence of activity across the site as a whole. While many questions remain unanswered it remains to be said that Dinas Emrys has clearly been of significance for a very long period of time.

6 References

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Edwards, N. and Lane, A. 1988 Early Medieval Settlements in Wales AD 400-1100. Research Centre Wales, University of Wales, Bangor.

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Appendix 1 : Techniques of Geophysical Survey

Techniques of Geophysical Survey:

Magnetometry:

This relies on variations in soil magnetic susceptibility and magnetic remenance which often result from past human activities. Using a Fluxgate Gradiometer these variations can be mapped, or a rapid evaluation of archaeological potential can be made by scanning.

Resistivity:

This relies on variations in the electrical conductivity of the soil and subsoil which in general is related to soil moisture levels. As such, results can be seasonally dependant. Slower than Magnetometry this technique is best suited to locating positive features such as buried walls that give rise to high resistance anomalies.

Resistance Tomography

Builds up a vertical profile or pseudosection through deposits by taking resistivity readings along a transect using a range of different probe spacings

Magnetic Susceptibility:

Variations in soil magnetic susceptibility occur naturally but can be greatly enhanced by human activity. Information on the enhancement of magnetic susceptibility can be used to ascertain the suitability of a site for magnetic survey and for targeting areas of potential archaeological activity when extensive sites need to be investigated. Very large areas can be rapidly evaluated and specific areas identified for detailed survey by gradiometer.

Instrumentation:

1. Fluxgate Gradiometer - Geoscan FM36

2. Resistance Meter - Geoscan RM4/DL10

3. Magnetic Susceptibility Meter - Bartington MS2

4. Geopulse Imager 25 - Campus

Methodology:

For Gradiometer and Resistivity Survey 20m x 20m or 30m x 30m grids are laid out over the survey area. Gradiometer readings are logged at either 0.5m or 1m intervals along traverses 1m apart. Resistance meter readings are logged at 1m intervals. Data is down-loaded to a laptop computer in the field for initial configuration and analysis. Final analysis is carried out back at base.

For scanning transects are laid out at 10m intervals. Any anomalies noticed are where possible traced and recorded on the location plan.

For Magnetic Susceptibility survey a large grid is laid out and readings logged at 20m intervals along traverses 20m apart, data is again configured and analysed on a laptop computer.

Copyright:

Key to Drawings

Boulder built wall

Wall

Rampart

Tumbled Rampart

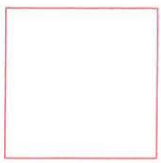
Survey Station

Othostat

Bottom of slope

Top of slope

Rock face



Geophysical grid

Contour

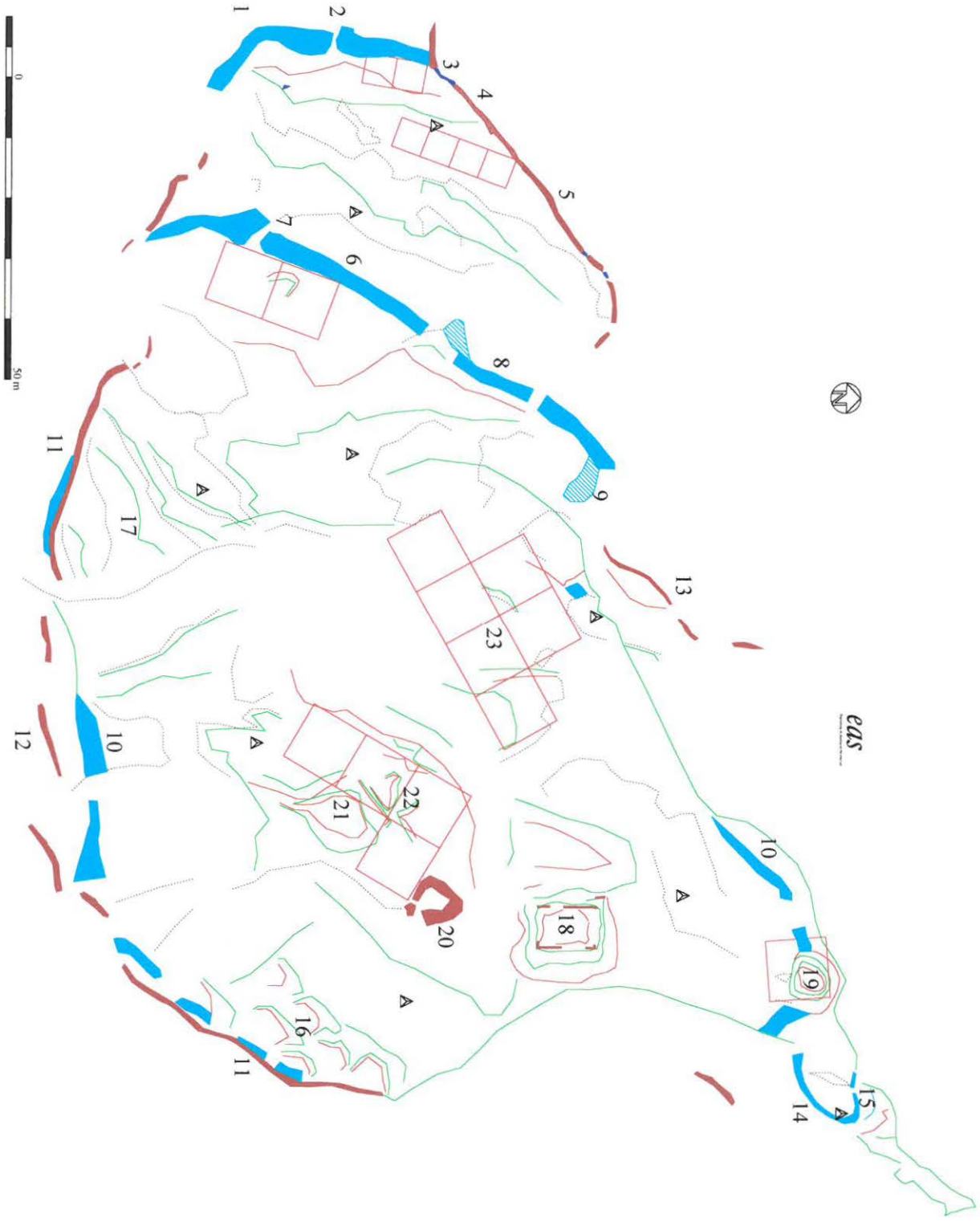


Figure 1: Dinas Emrys Hillfort
Location of Features
Scale 1:1000

Figure 2: Dinas Emrys Hillfort
Contour Plan
Scale 1:500

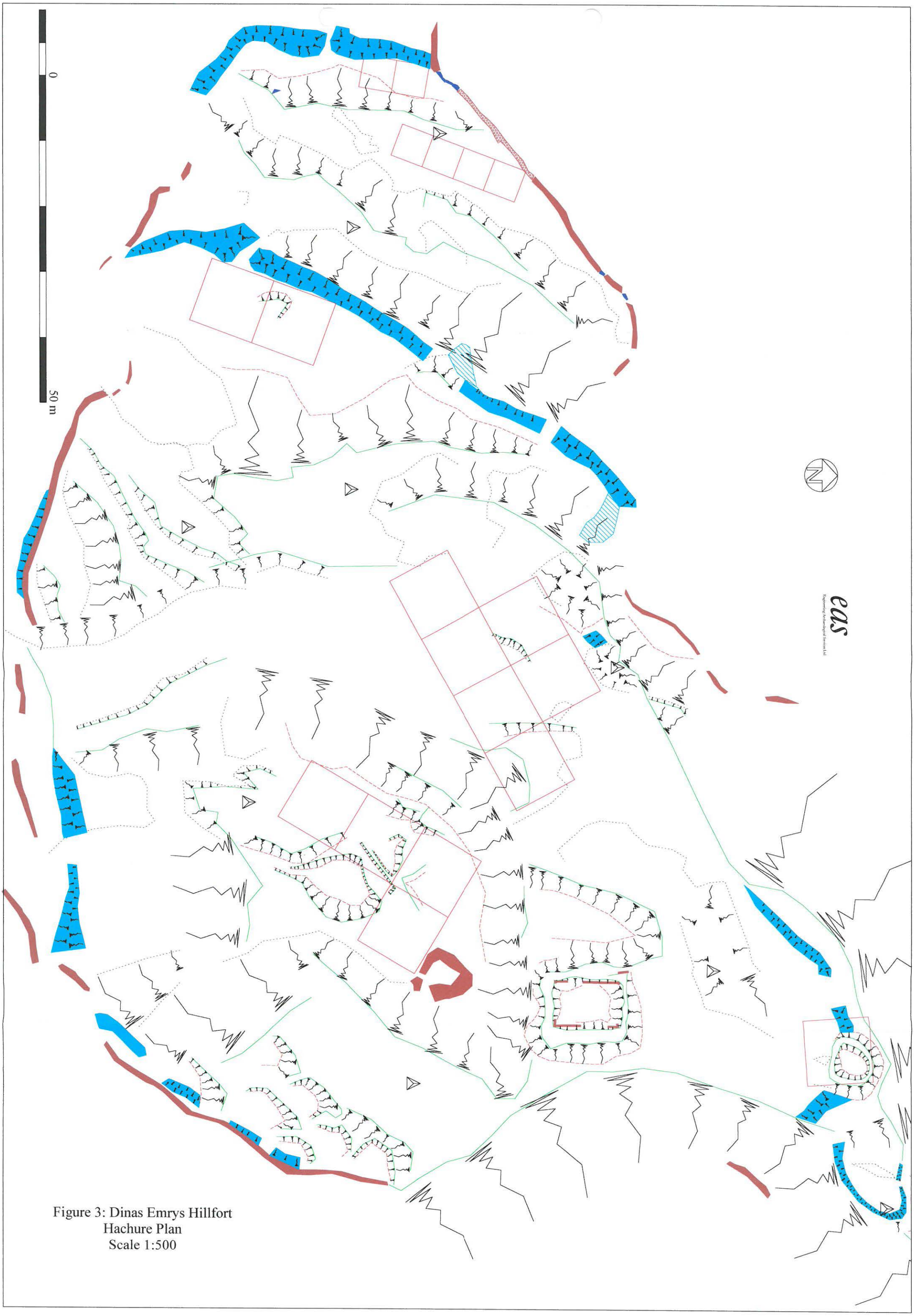
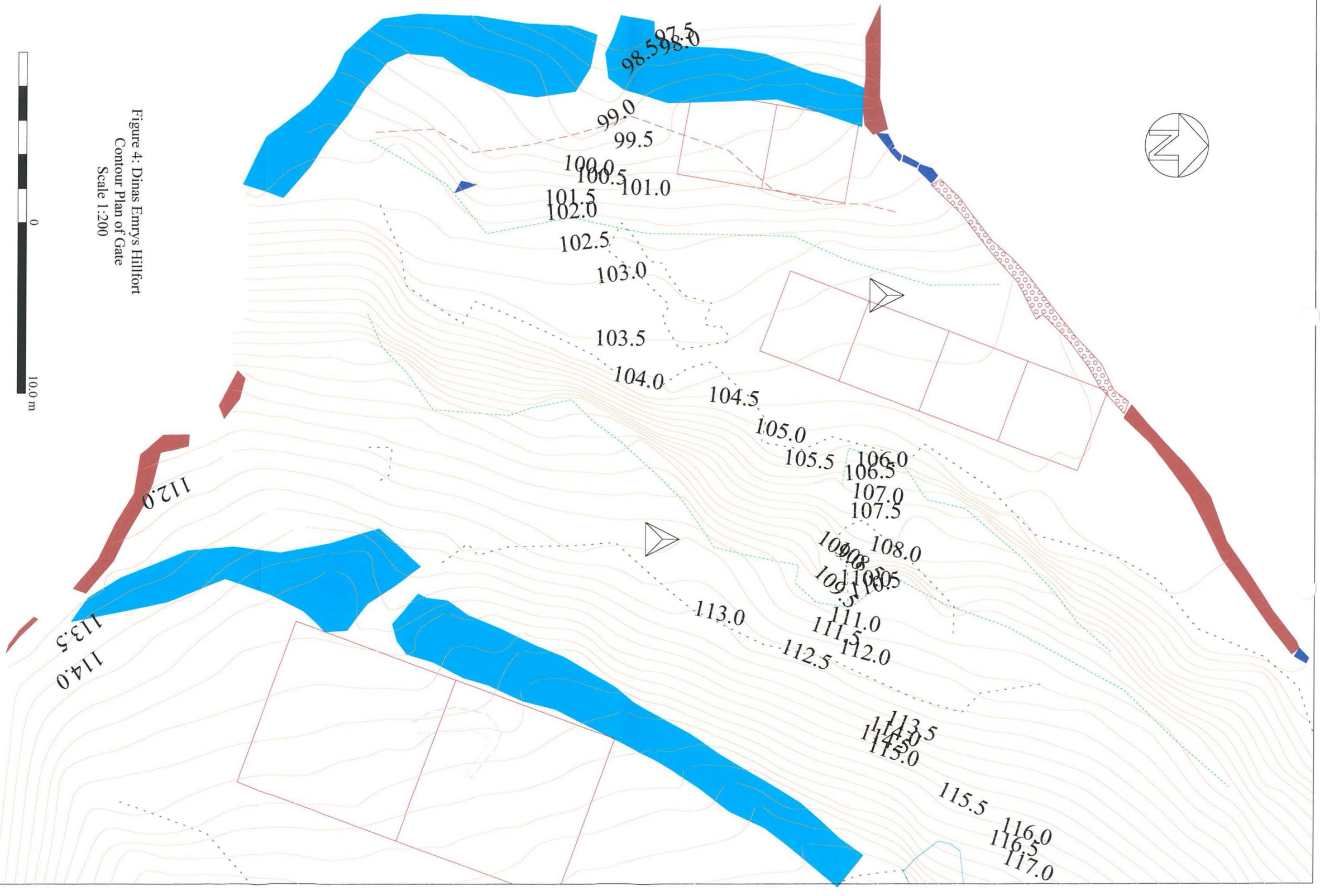


Figure 3: Dinas Emrys Hillfort
Hachure Plan
Scale 1:500

Figure 4: Dinas Emrys Hillfort
Contour Plan of Gate
Scale 1:200



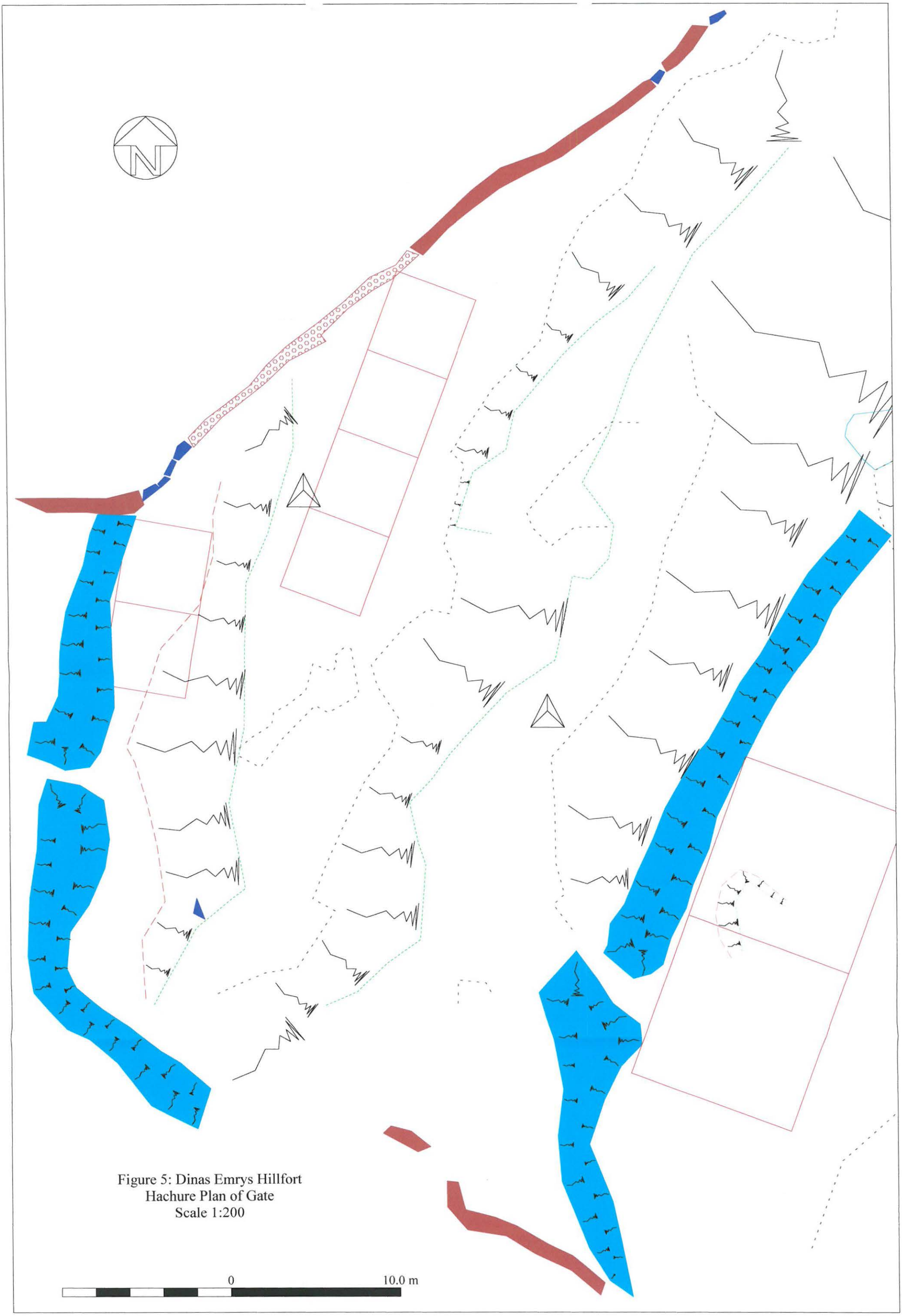


Figure 5: Dinas Emrys Hillfort
Hachure Plan of Gate
Scale 1:200

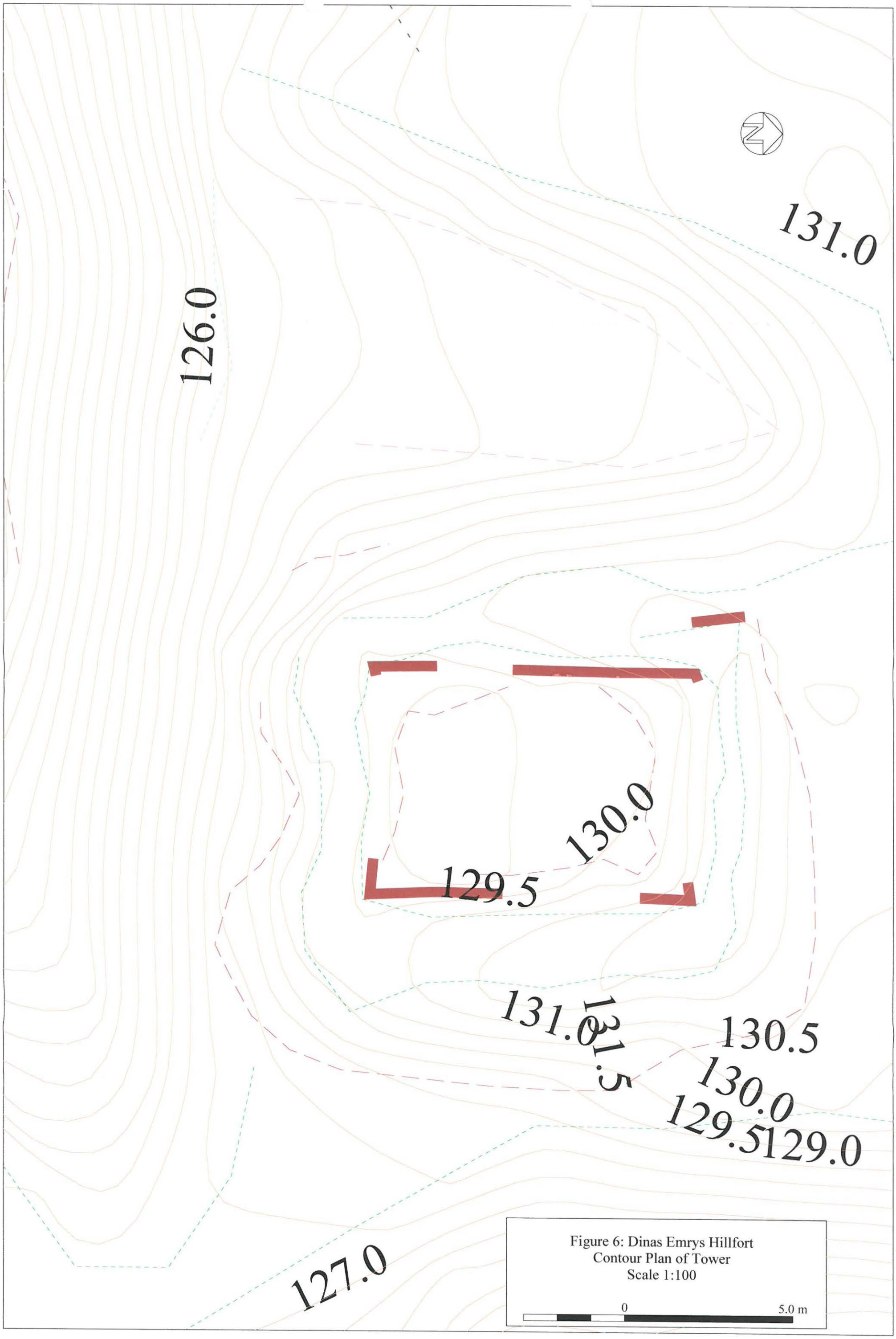


Figure 6: Dinas Emrys Hillfort
Contour Plan of Tower
Scale 1:100

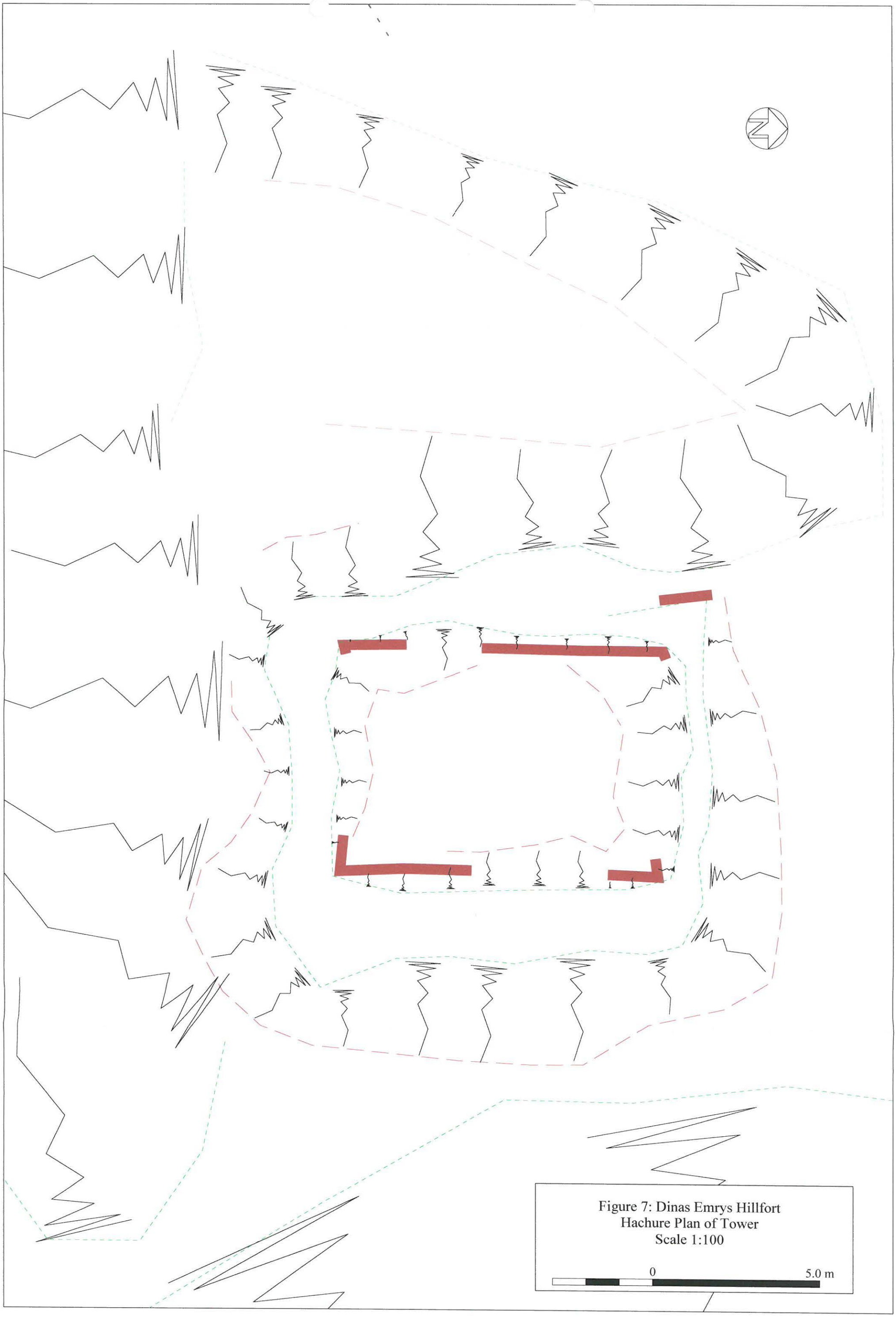


Figure 7: Dinas Emrys Hillfort
Hachure Plan of Tower
Scale 1:100

Figure 8: Dinas Emrys Hillfort
Contour Plan of Oval Structure
Scale 1:100

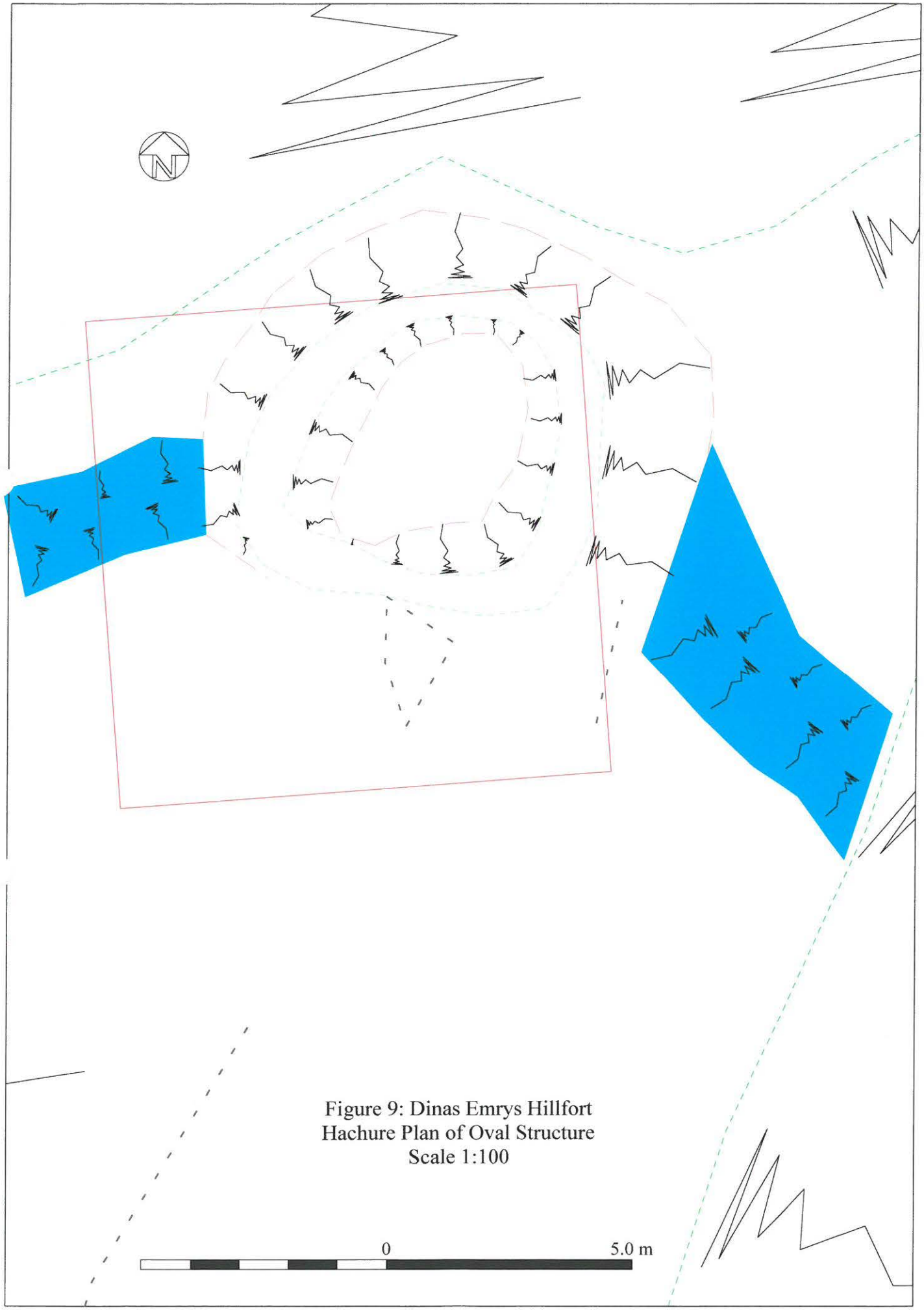


Figure 9: Dinas Emrys Hillfort
Hachure Plan of Oval Structure
Scale 1:100

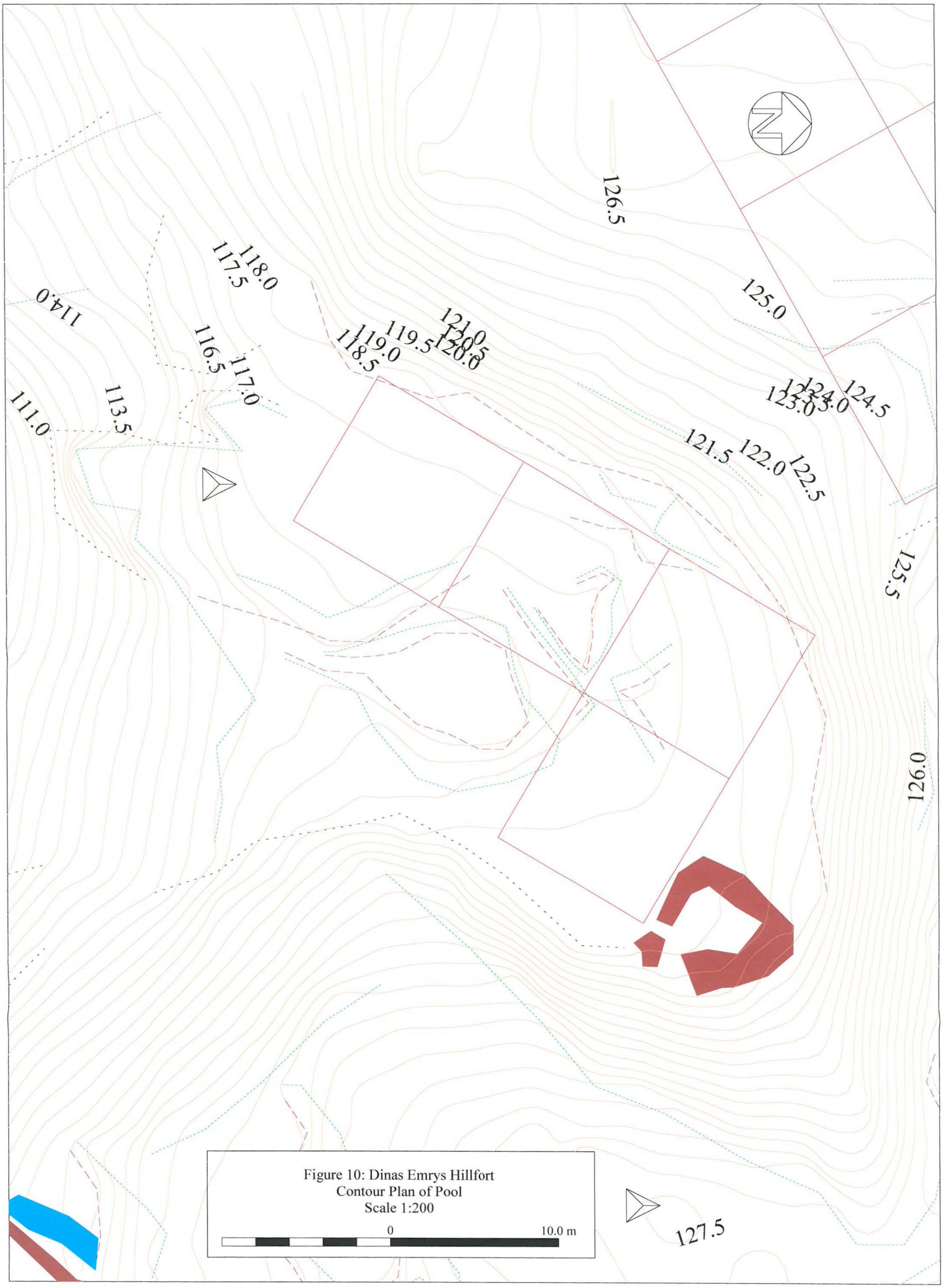


Figure 10: Dinas Emrys Hillfort
Contour Plan of Pool
Scale 1:200

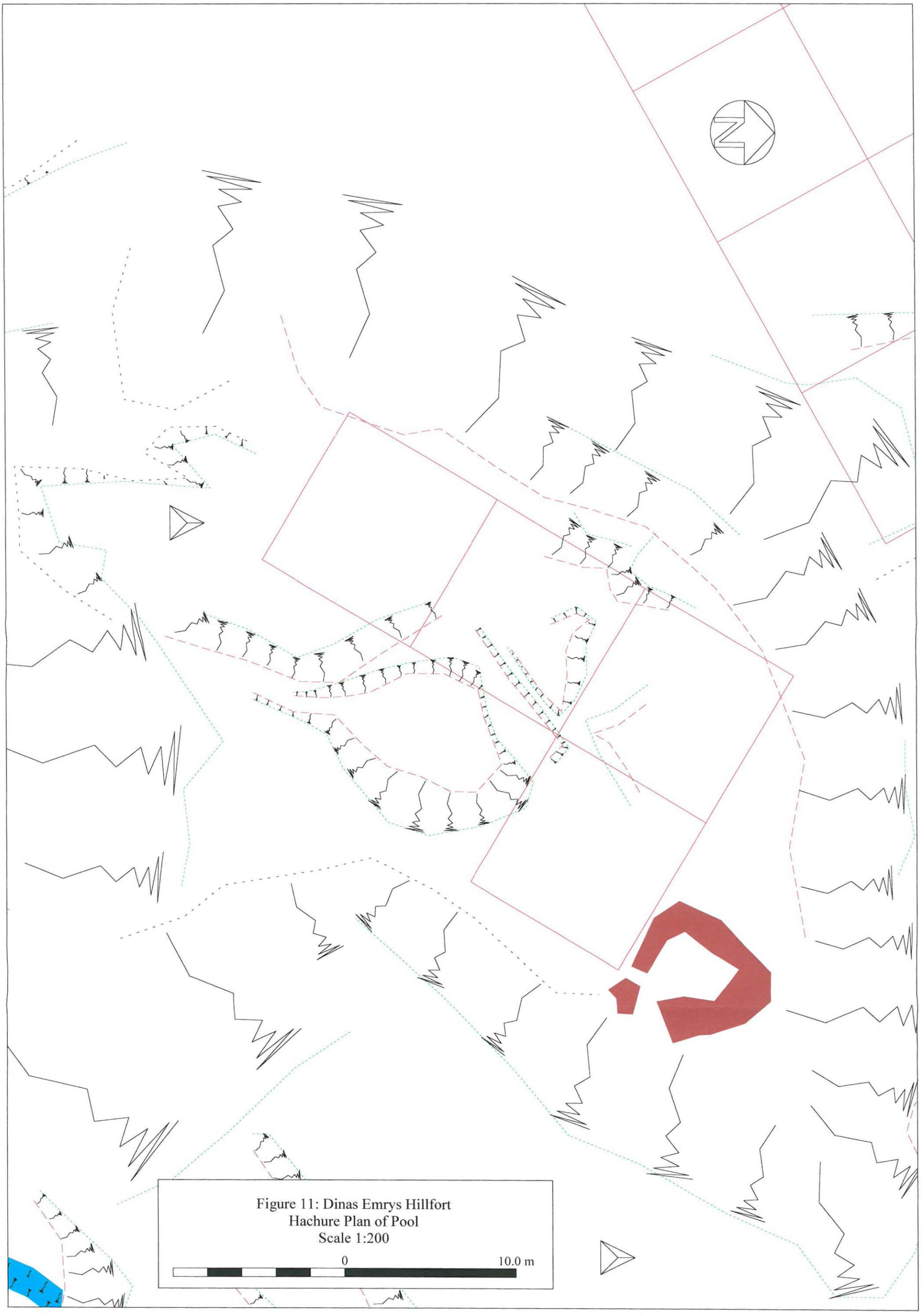


Figure 11: Dinas Emrys Hillfort
Hachure Plan of Pool
Scale 1:200

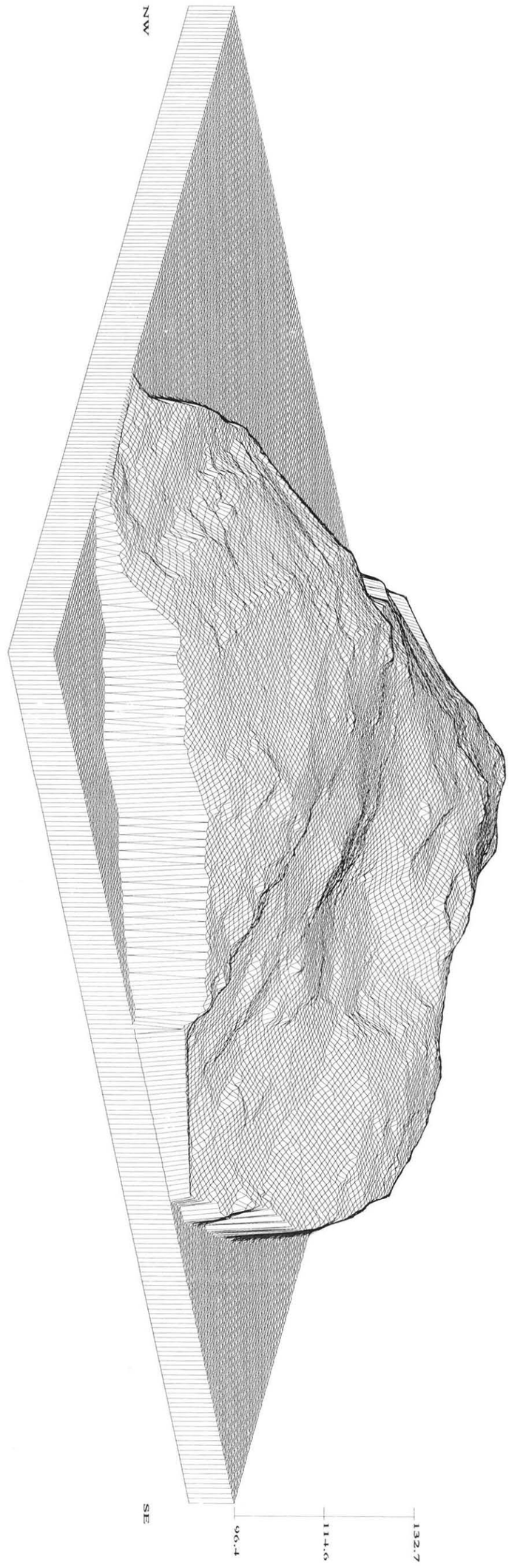


Figure 12: Dinas Emrys Hillfort
Ground Model

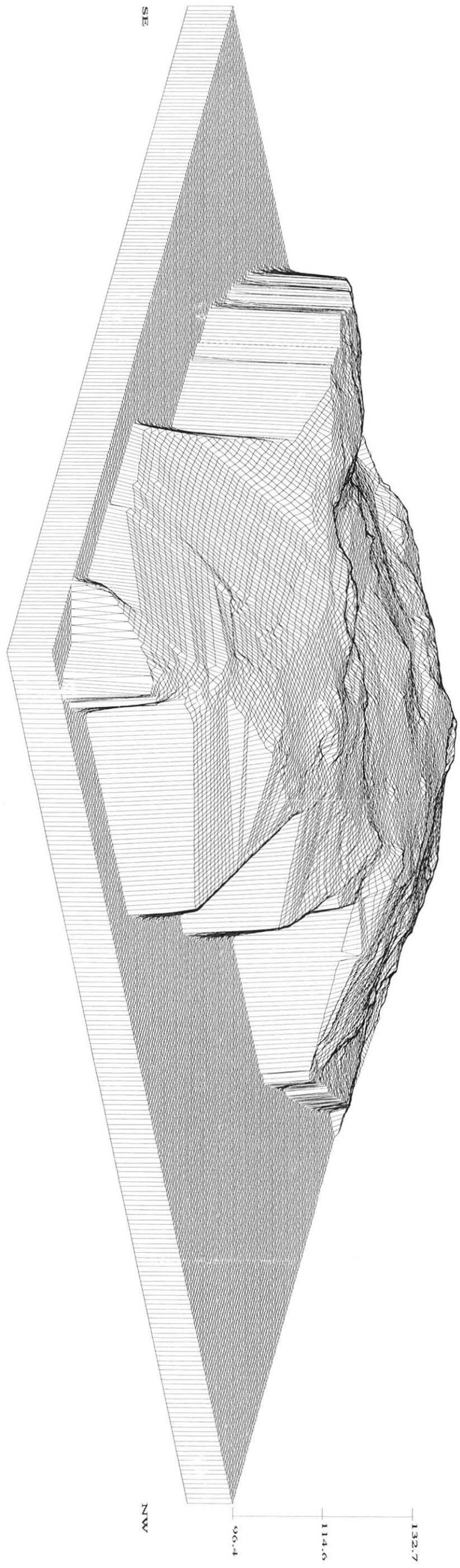


Figure 13: Dinas Emrys Hillfort
Ground Model

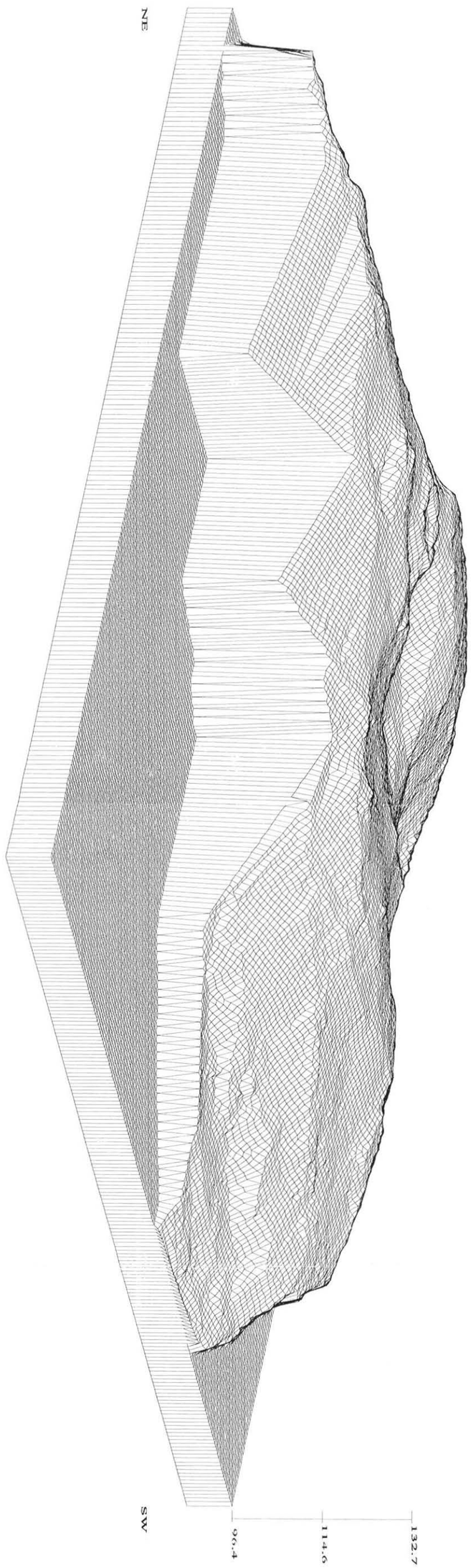


Figure 14: Dinas Emrys Hillfort
Ground Model

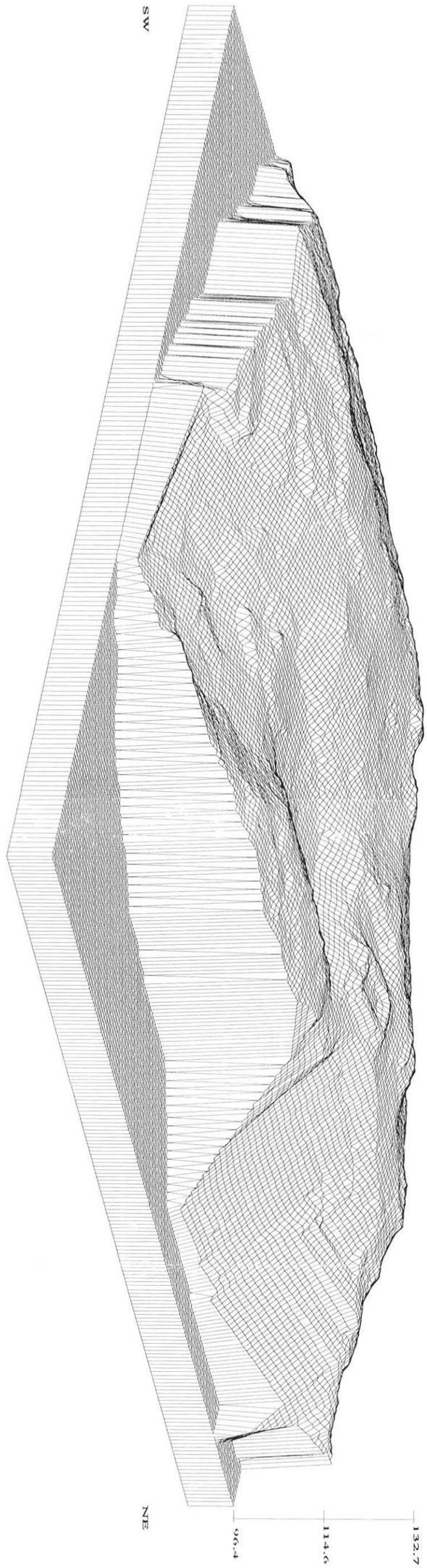


Figure 15: Dinas Emrys Hillfort
Ground Model

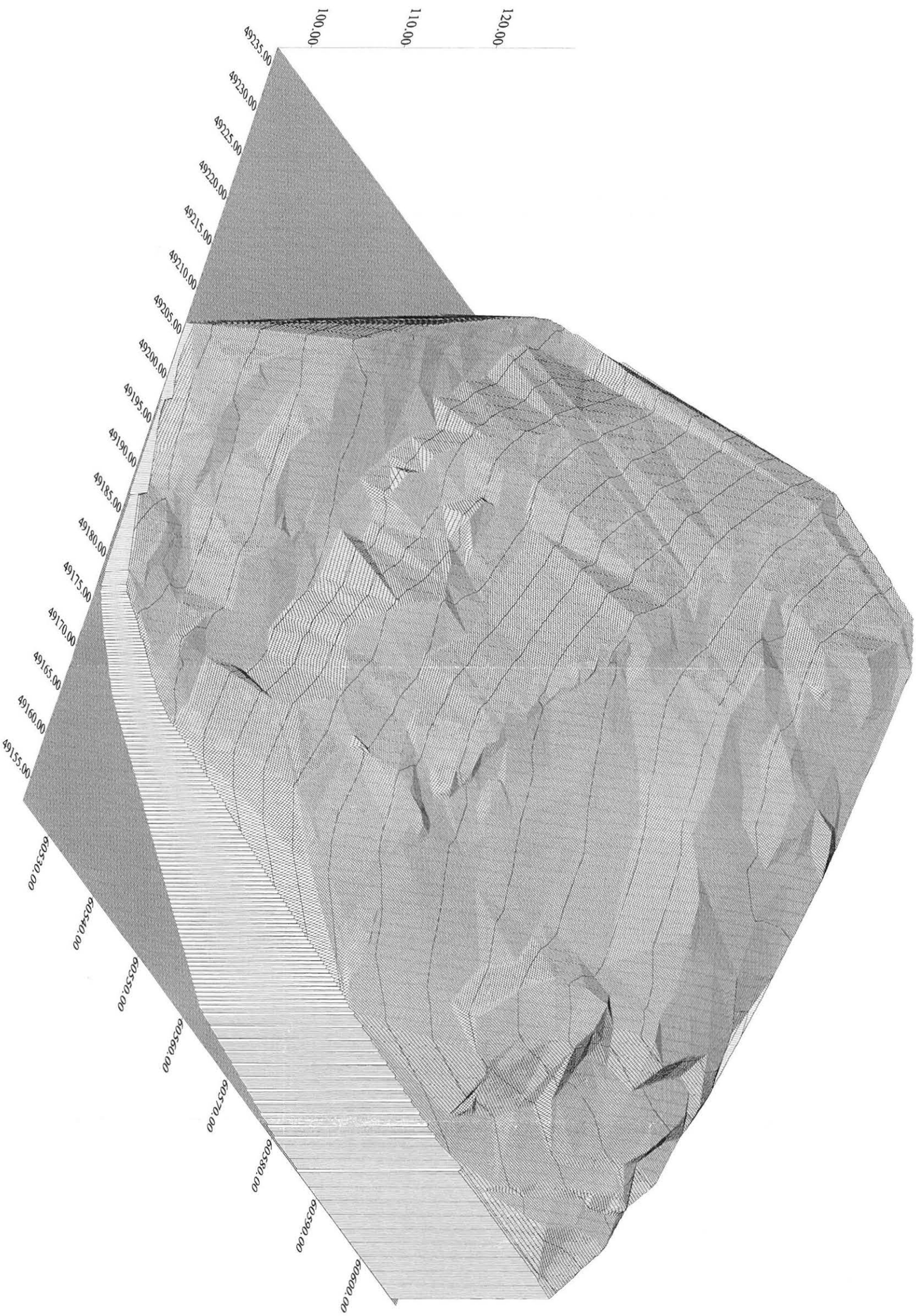


Figure 16: Dinas Emrys Hillfort
Ground Model of Gates

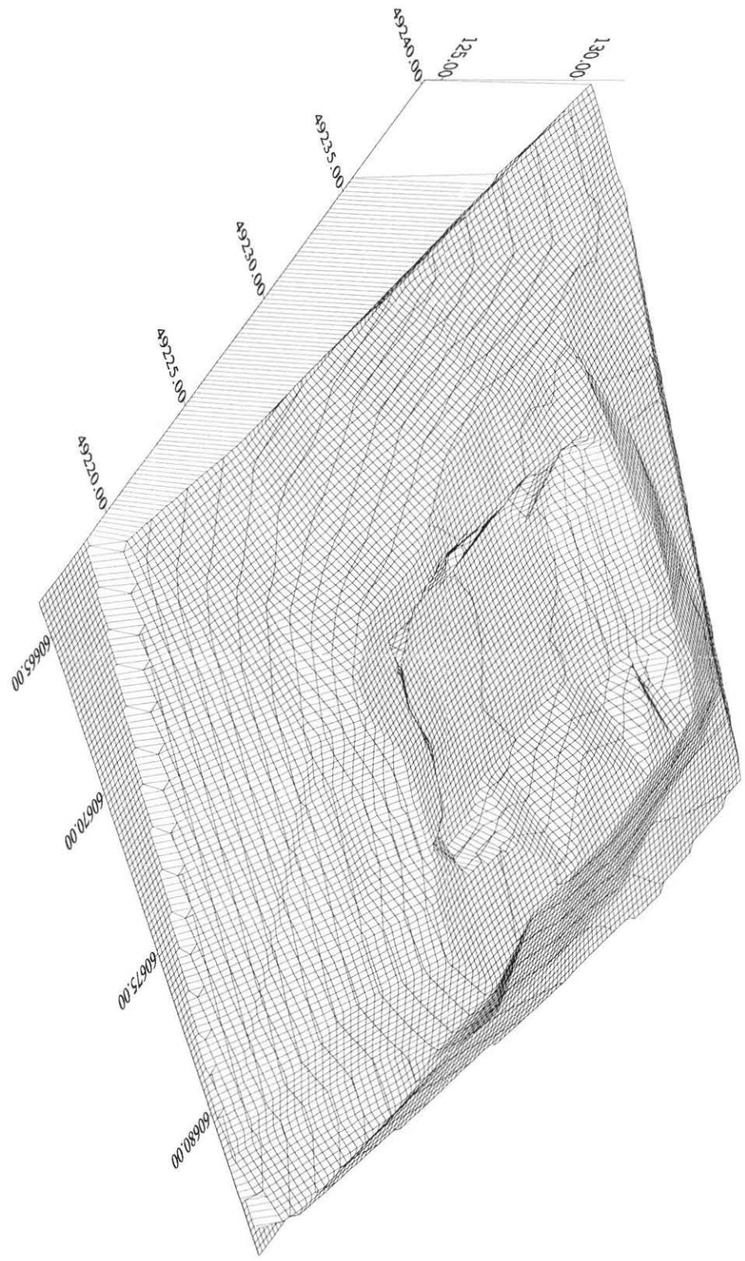


Figure 17: Dinas Emrys Hillfort
Ground Model of Tower

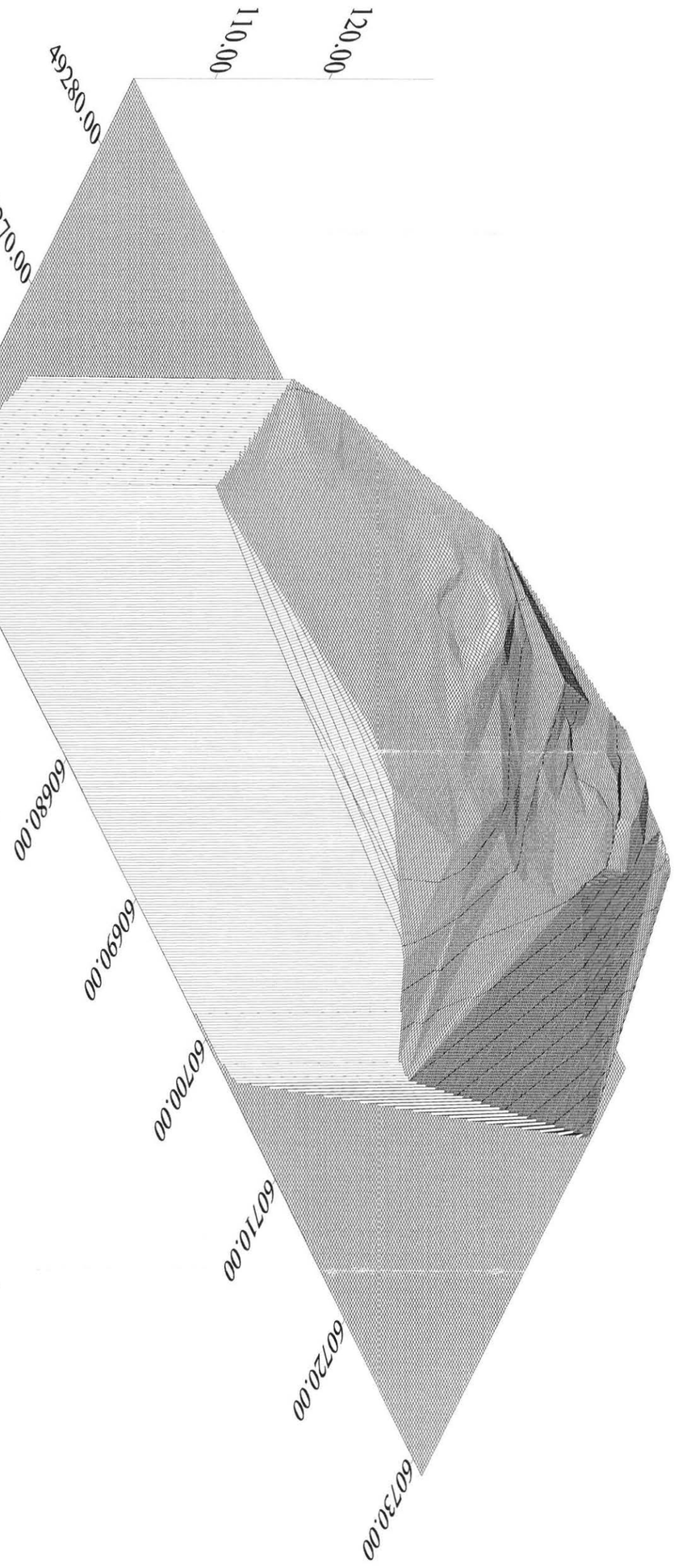


Figure 18: Dinas Emrys Hillfort
Ground Model of Oval Structure

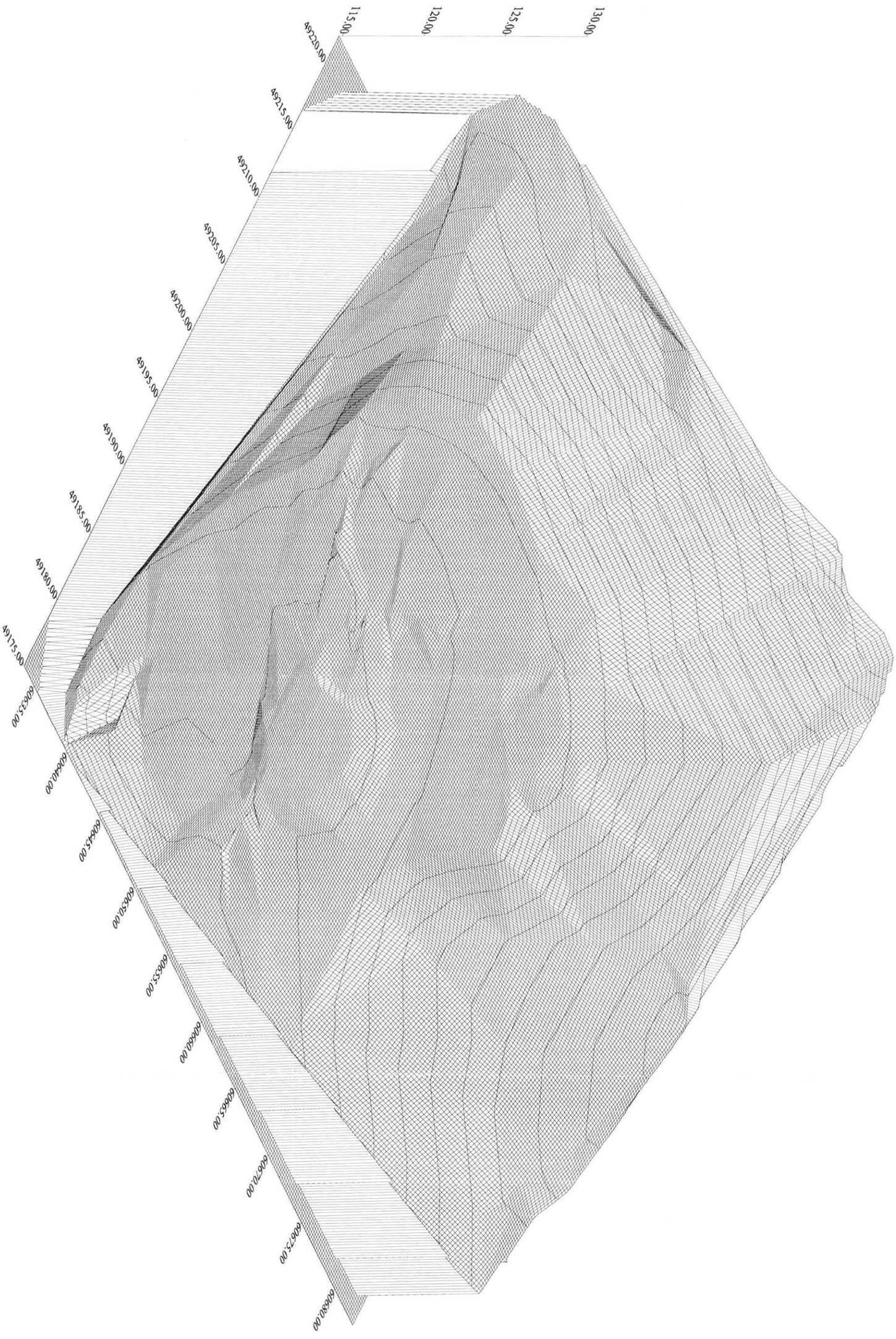
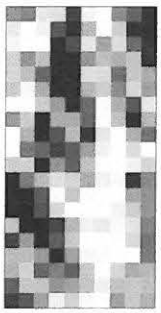


Figure 19: Dinas Emrys Hillfort
Ground Model of Pool

Figure 20: Dinas Emrys Hillfort
Location of Geophysical Surveys

Scale 1:1000



5.02
4.26
3.50
2.74
1.98
1.21
0.45
-0.31
-1.07
-1.83
-2.60
-3.36
-4.12
nT

Figure 21: Dinas Emrys Hillfort
Area 1, Grey Scale Plot

Scale 1:250

20.0
nT

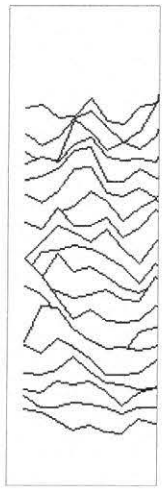


Figure 22: Dinas Emrys Hillfort
Area 1, X - Y Plot

Scale 1:250

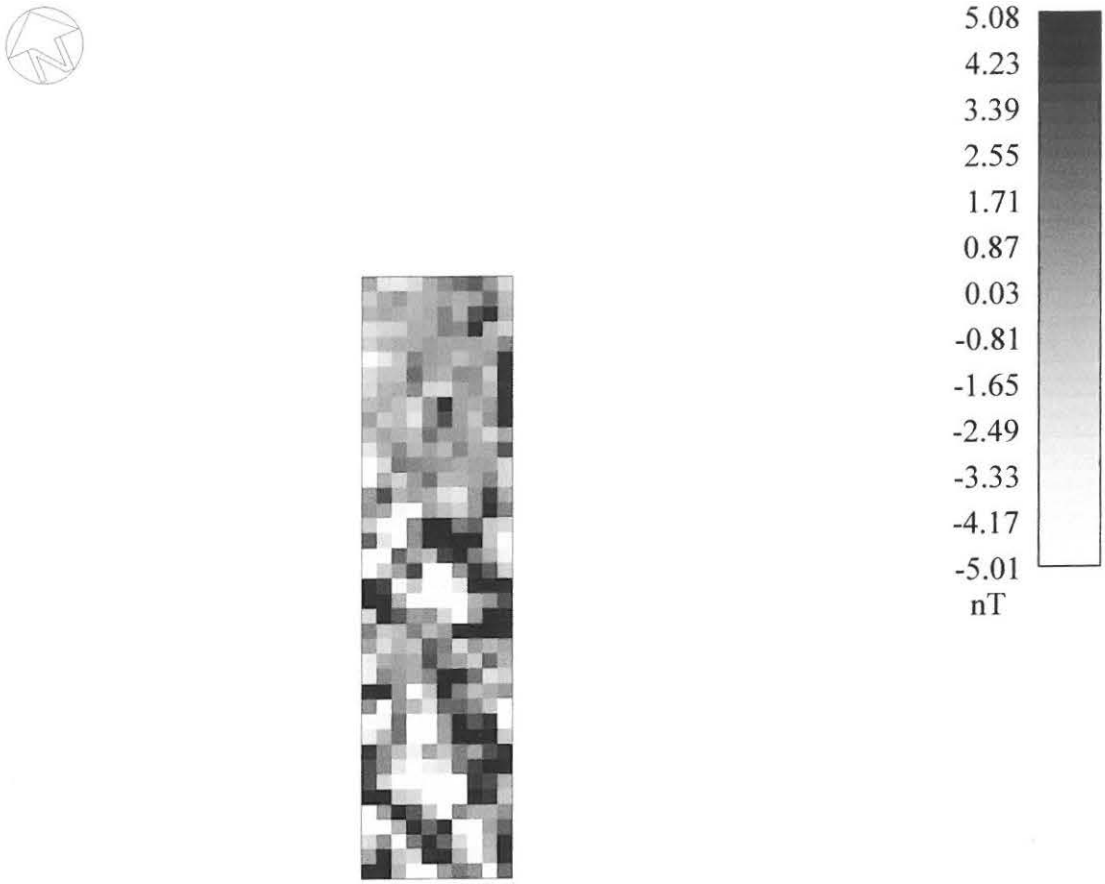


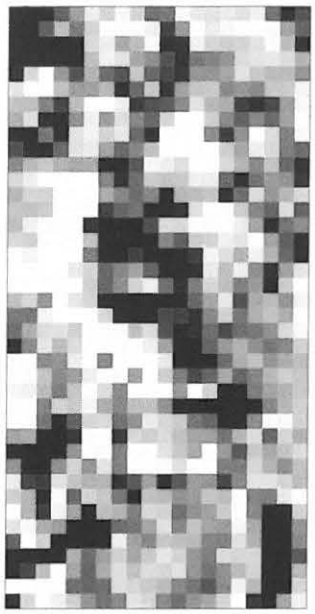
Figure 23: Dinas Emrys Hillfort
Area 2, Grey Scale Plot

Scale 1:250

20.0
nT

Figure 24: Dinas Emrys Hillfort
Area 2, X - Y Plot

Scale 1:250



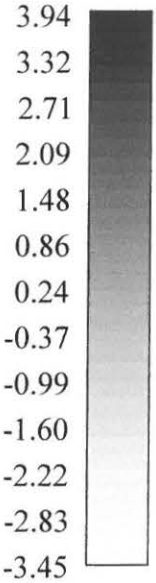
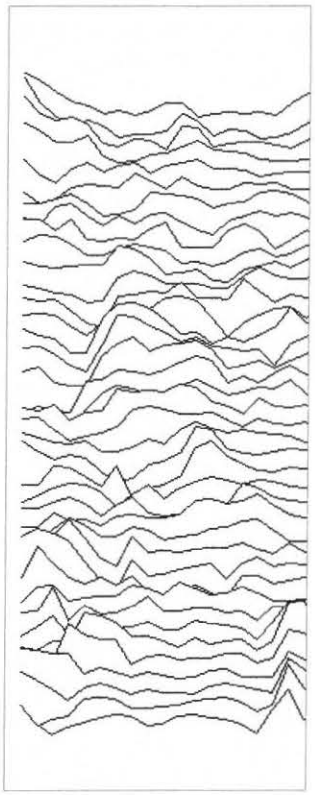


Figure 25: Dinas Emrys Hillfort
Area 3, Grey Scale Plot

Scale 1:250



20.0
nT

Figure 26: Dinas Emrys Hillfort
Area 3, X - Y Plot

Scale 1:250

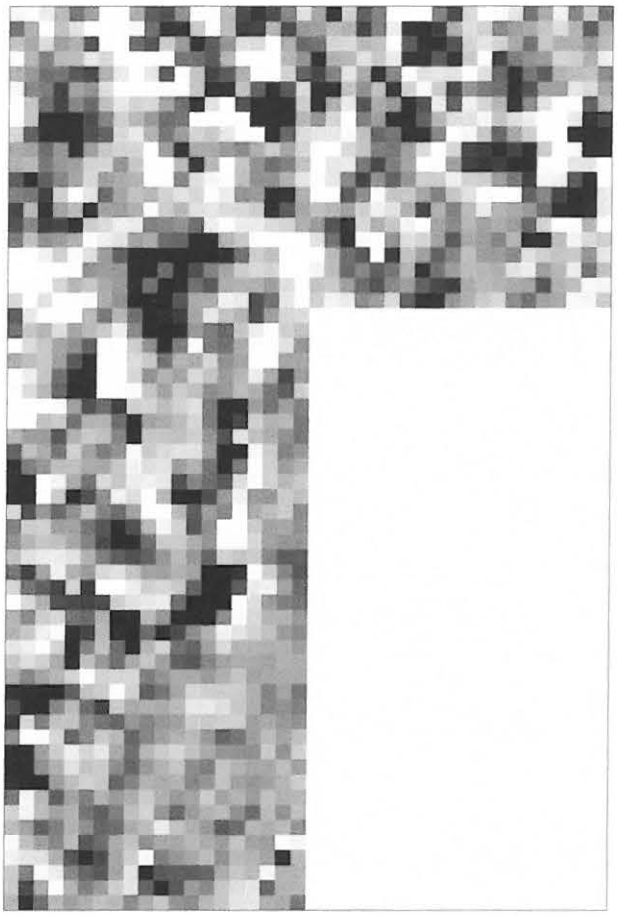


Figure 27: Dinas Emrys Hillfort
Area 4, Grey Scale Plot

Scale 1:250

20.0
nT

Figure 28: Dinas Emrys Hillfort
Area 4, X - Y Plot

Scale 1:250

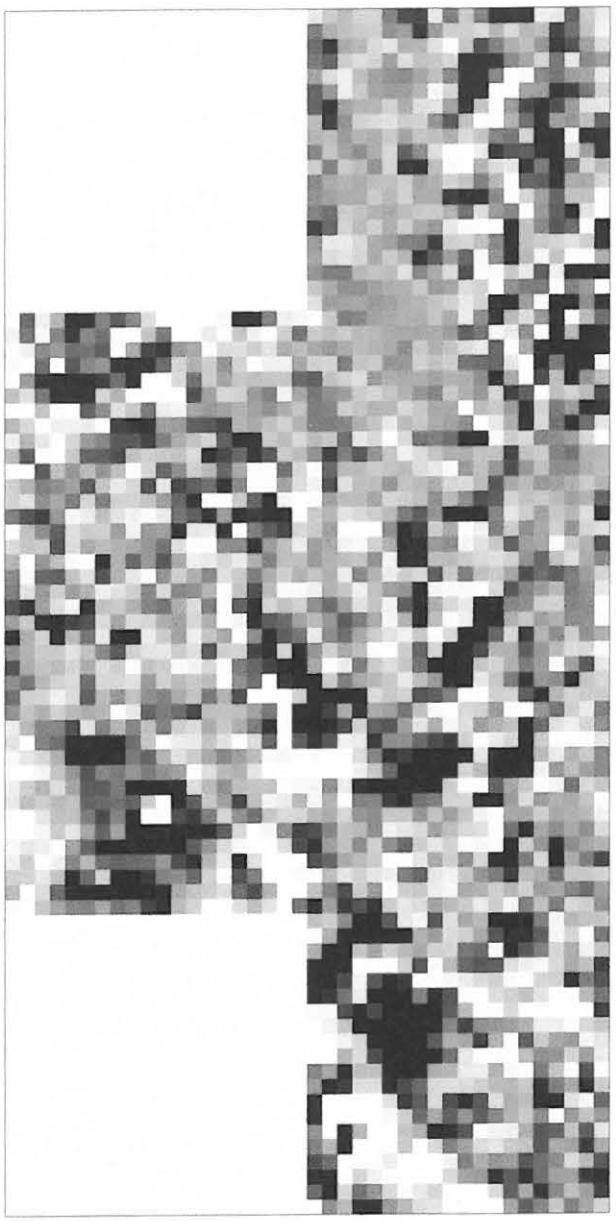


Figure 29: Dinas Emrys Hillfort
Area 5, Grey Scale Plot

Scale 1:250

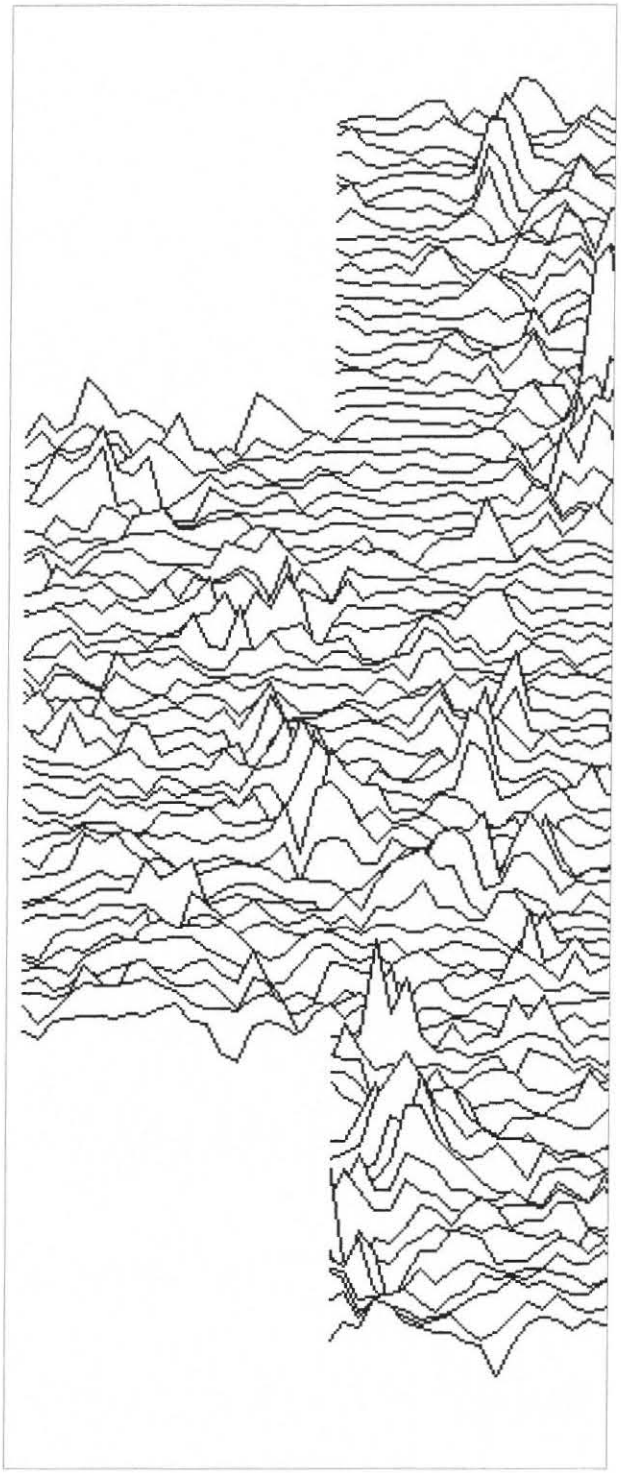


Figure 30: Dinas Emrys Hillfort
Area 5, X - Y Plot

Scale 1:250

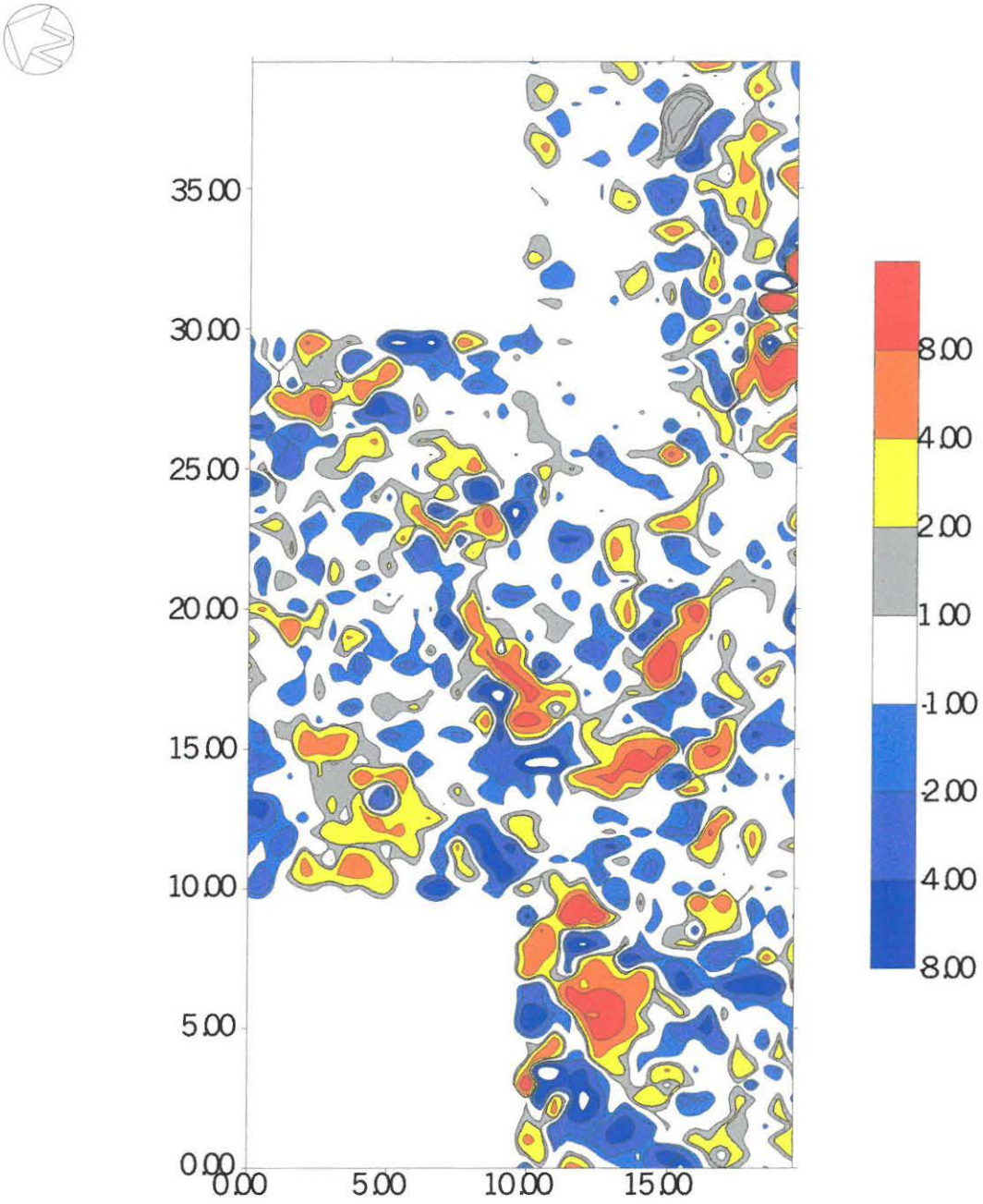
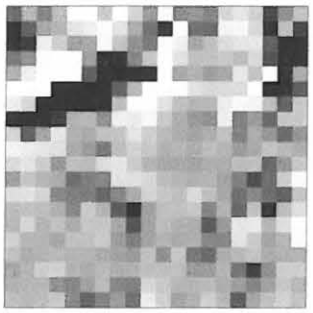


Figure 31: Dinas Emrys Hillfort
Area 5, Filled Colour Plot

Scale 1:250



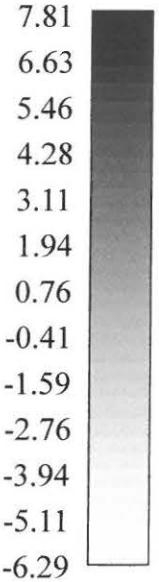


Figure 32: Dinas Emrys Hillfort Area 6, Grey Scale Plot	Scale 1:250

20.0
nT

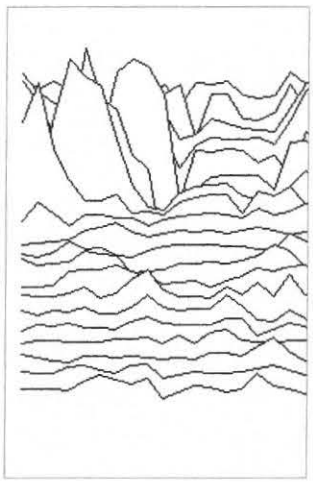


Figure 33: Dinas Emrys Hillfort
Area 6, X - Y Plot

Scale 1:250

Area of magnetic disturbance

Possible coherent magnetic anomaly

Figure 34: Dinas Emrys Hillfort Area 1, Interpretation	Scale 1:500

Area of magnetic disturbance

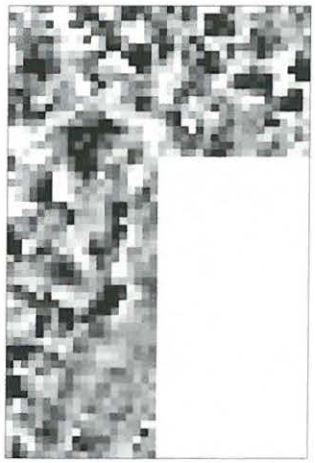
Possible coherent magnetic anomaly

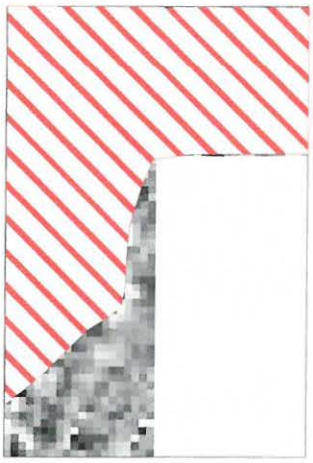
Figure 35: Dinas Emrys Hillfort Area 2, Interpretation	Scale 1:500

Area of magnetic disturbance

Possible coherent magnetic anomaly

Figure 36: Dinas Emrys Hillfort Area 3, Interpretation	Scale 1:500





Area of magnetic disturbance

Possible coherent magnetic anomaly

Figure 37: Dinas Emrys Hillfort Area 4, Interpretation	Scale 1:500

Area of magnetic disturbance

Possible coherent magnetic anomaly

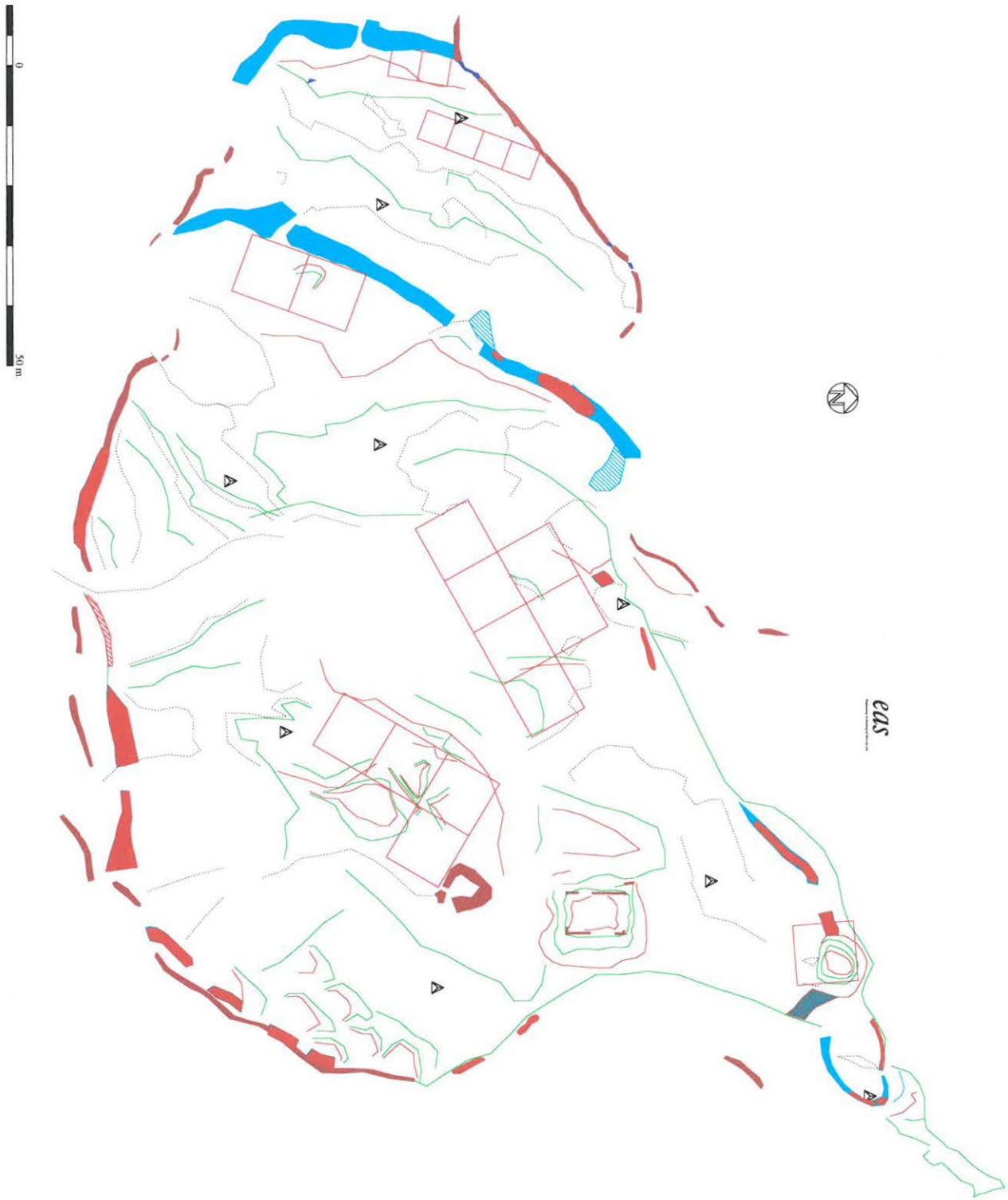
Figure 38: Dinas Emrys Hillfort
Area 5, Interpretation

Scale 1:500

Area of magnetic disturbance

Possible coherent magnetic anomaly

Figure 39: Dinas Emrys Hillfort Area 6, Interpretation	Scale 1:500



Anomalies up to 20 nT

Anomalies over 20 nT

Figure 40: Dinas Emrys Hillfort
Results of Magnetic Scanning
Scale 1:1000

Stations used for the Dinas Emrys Hillfort Survey

Station	Eastings	Northings	Height	Permanent Marker
01	60669.000	49248.000	132.000	*
02	60686.433	49202.479	127.615	*
03	60595.688	49193.092	125.856	*
04	60643.605	49177.580	116.854	
05	60622.670	49233.436	128.799	
06	60555.694	49193.532	111.890	
07	60601.572	49168.421	121.757	
08	60657.196	49286.116	110.136	
09	60541.405	49206.631	103.724	
10	60705.107	49274.242	122.565	