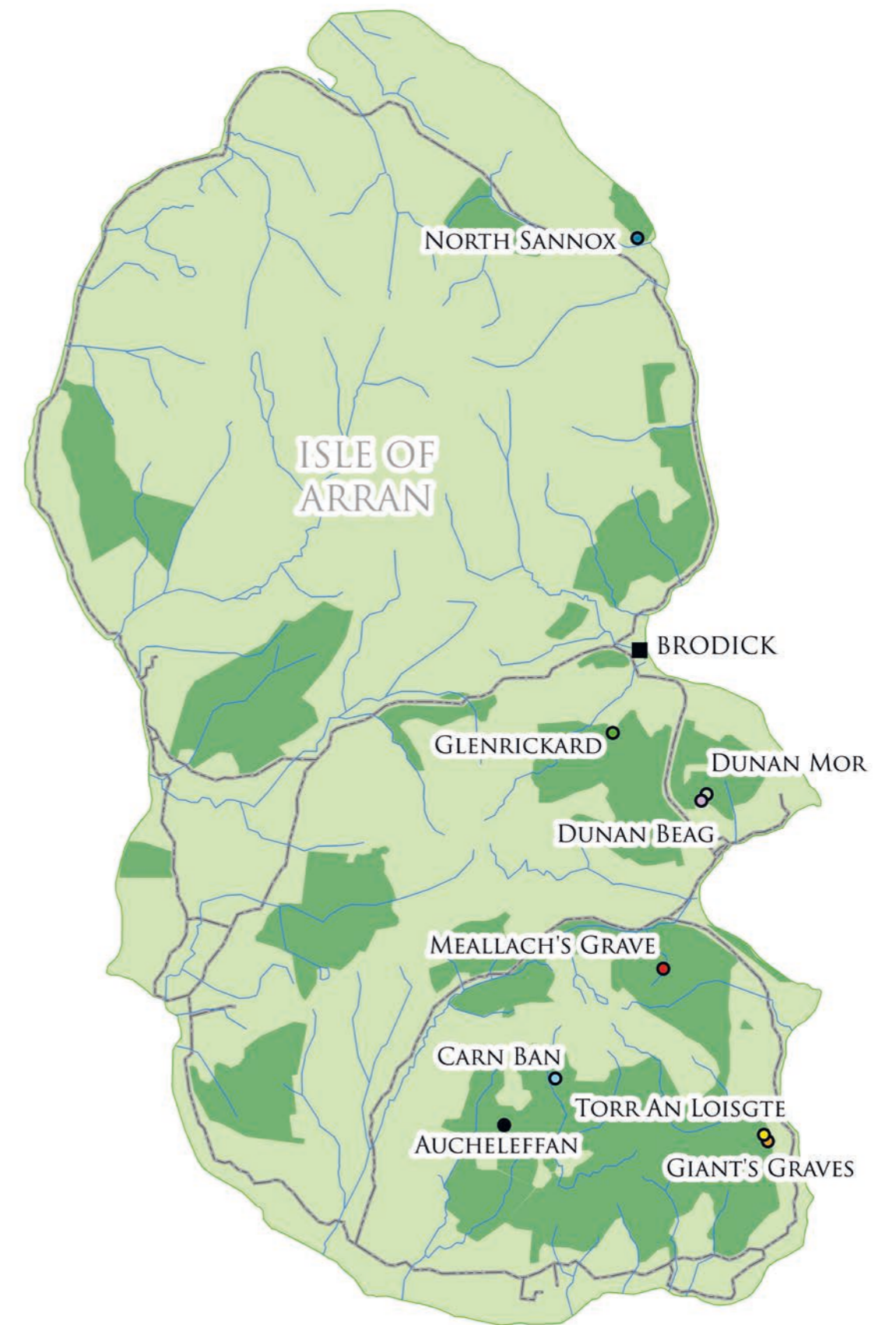




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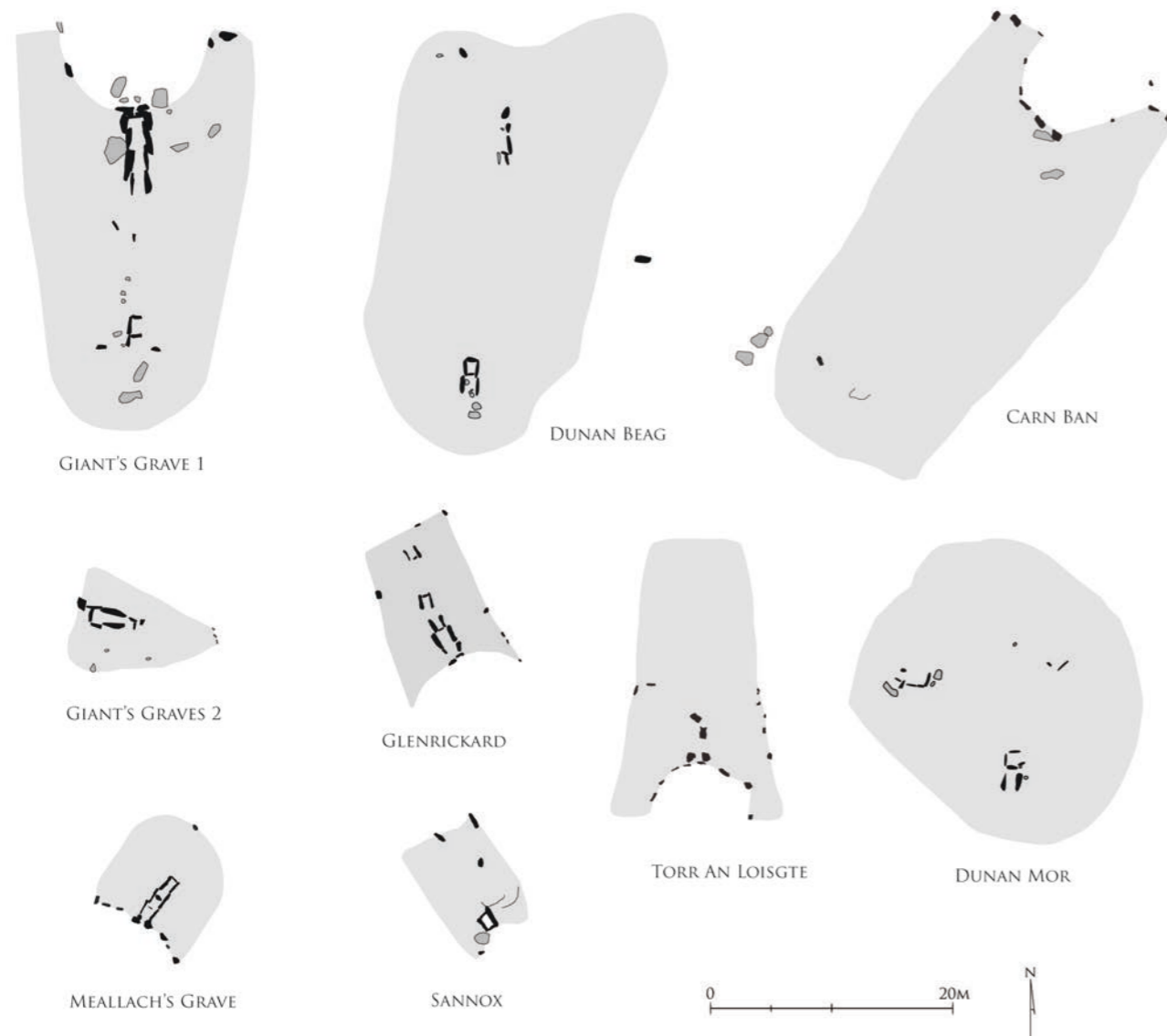


Location of sites surveyed in 2014

Overview

The chambered cairns of Arran have long attracted attention, and have been the subject of numerous studies. The first investigations at this group of monuments to be recorded were those of T. H. Bryce, Professor of Anatomy at the University of Glasgow. Bryce's initial interest was in 'ancient crania' but he soon extended his work to include the dating and structure of the chambered cairns (Forsyth et al 2006). Bryce recorded 24 cairns, of which he excavated the chambers of 19 across southwest Scotland, but mainly on Arran and Bute. Of the sites surveyed during this project Bryce excavated the within the chambers of Giants Grave North and South, Carn Ban and Monamore (Meallach's Grave) as well as recording the site of Glenrickard and excavating at the four-poster stone circle of Aucheleffan. Bryce noted that there were a group of monuments with a similar ground plan comprising a rectangular cairn, defined by a stone kerb which rises to form a semi-circle of orthostats at one end projecting into the body of the cairn. The central pair of these orthostats form a portal into a chamber that occupies one end of the cairn. The chamber is formed of two sections the lower of which is comprised of large slabs set on edge and divided into compartments by septal slabs running across the floor. The upper section of the chamber comprises several courses of small slabs placed horizontally upon the edge set lower slabs, each course of which project out from those below, to form a corbelled base for large capping slabs to sit upon (Bryce 1902, 1903 & 1909). Based on the pottery Bryce considered the chambered cairns to be of late Neolithic date with the builders being the same people as those of English long-barrows and French dolmens with tomb building being a result of the migrations from the west Mediterranean.

Childe divided the cairns of southwest Scotland into two sub-groups, those of the 'Clyde' type centred on the cairns of Arran as described by Bryce and those of 'Solway' type found in Galloway. Childe took a typological approach to dating these sites and argued for the high antiquity of the Clyde sub-group, not just in Britain but in the whole of Europe. Work in Ireland in the 1930's led Childe to group the Scottish and Irish sites together as the 'Clyde-Carlingford culture' highlighting the links between the SW of Scotland and Northern Ireland.



The cairns surveyed as part of this project in 2014.

The Clyde-type chambered tombs of Cairnholy I & II were excavated by Piggott & Powell in 1949. These excavations gave the first evidence for ceremonies outside the chamber at a Scottish Clyde-Carlingford tomb. The two cairns were quite different, Cairnholy I being long and narrow with an impressive facade and Cairnholy II relatively short without a facade. The chambers were similar with each having two compartments separated by septal slabs so high as to prevent movement between the compartments. A number of tombs were excavated by J. G. Scott who focused his investigations on Argyll and reassessed the group proposing that there was a development from small single compartment chambers in oval cairns of the early Neolithic (early 3rd millennium to around 2700BC) to large multi-compartment chambers in trapezoidal cairn with orthostatic crescent shaped facades in the late Neolithic (2300 to early 2nd Millennium BC). Scott thought that many of the cairns were composite incorporating earlier structures and that their form pointed to Irish influences (Scott 1956).

The excavation of the two chambered cairns by Corcoran (1969) in Wigtownshire proved this multi phase construction and use. At both Mid Gleniron I and II small oval cairns enclosing small rectangular chambers were subsequently encased in larger rectangular or trapezoidal cairns with an orthostatic crescent shaped facade and forecourt. MacKie (1964) excavated in the forecourt of Meallach's Grave, Monamore in 1961 a site previously excavated by Bryce in 1902. As at Cairnholy, there was evidence for the use of the forecourt area for rituals during the life of the cairn and the chamber was sealed when the cairn fell out of use.

Henshall (1972) conducted the task of surveying and describing all of the known chambered tombs in Scotland in the 1960s and 70s. Henshall saw the development of the Clyde cairns as starting from small rectangular chambers under small cairns that had a wide geographical distribution. Additions to fronts of these small chambers led to a two-compartment segmented chamber which then developed into the classic Clyde cairn chamber with two or more compartments. She proposed that this development first appeared on Arran, in Kintyre and in Mid Argyll but then extended later to the areas to the north and south.

Recent research has again turned attention toward the development from single-phase, often circular cairns- such as the example at Dunan Mor on Arran- into larger, more complex Clyde-type cairns. Excavations by Cummings and Robinson in Kintyre at the site of Blasthill have recovered evidence for an early round cairn, subsumed into the later body of a horned Clyde cairn (Cummings and Robinson 2009), supporting the model developed by Scott and Corcoran. The Blasthill excavations have also provided some evidence that significance components of the cairn body at that site may have been of turf construction, a discovery with significant implications for the interpretation of surviving remains of the Arran cairns (ib. id: 18).

Such close inspection of surface traces is an important component of the study of the Arran cairns, since vestigial remains may yet provide an indication of the original form of the monuments. In most cases, the cairn body material has been virtually completely removed, though traces of kerb at Torran Loigste and the substantial stone cairn at Carn Ban attest to their original scale. It is probable that most chambers were capped with corbelling and heavy roofing lintels, though the scale of this may have varied. At Torran Loigste, the collapse of the main chamber corbelling is visible as structured rubble lying in the chamber void, while the roofing lintels still survive in the lateral chamber at that site in an arrangement very similar to that described by Bryce at Carn Ban.

The inspection of structural details is central to the study of chambered cairns, and was the foundation upon which the present survey was undertaken. Making use of modern survey techniques and new approaches to depiction and visualisation, this survey attempts to understand the form and setting of the Neolithic monuments of Arran.

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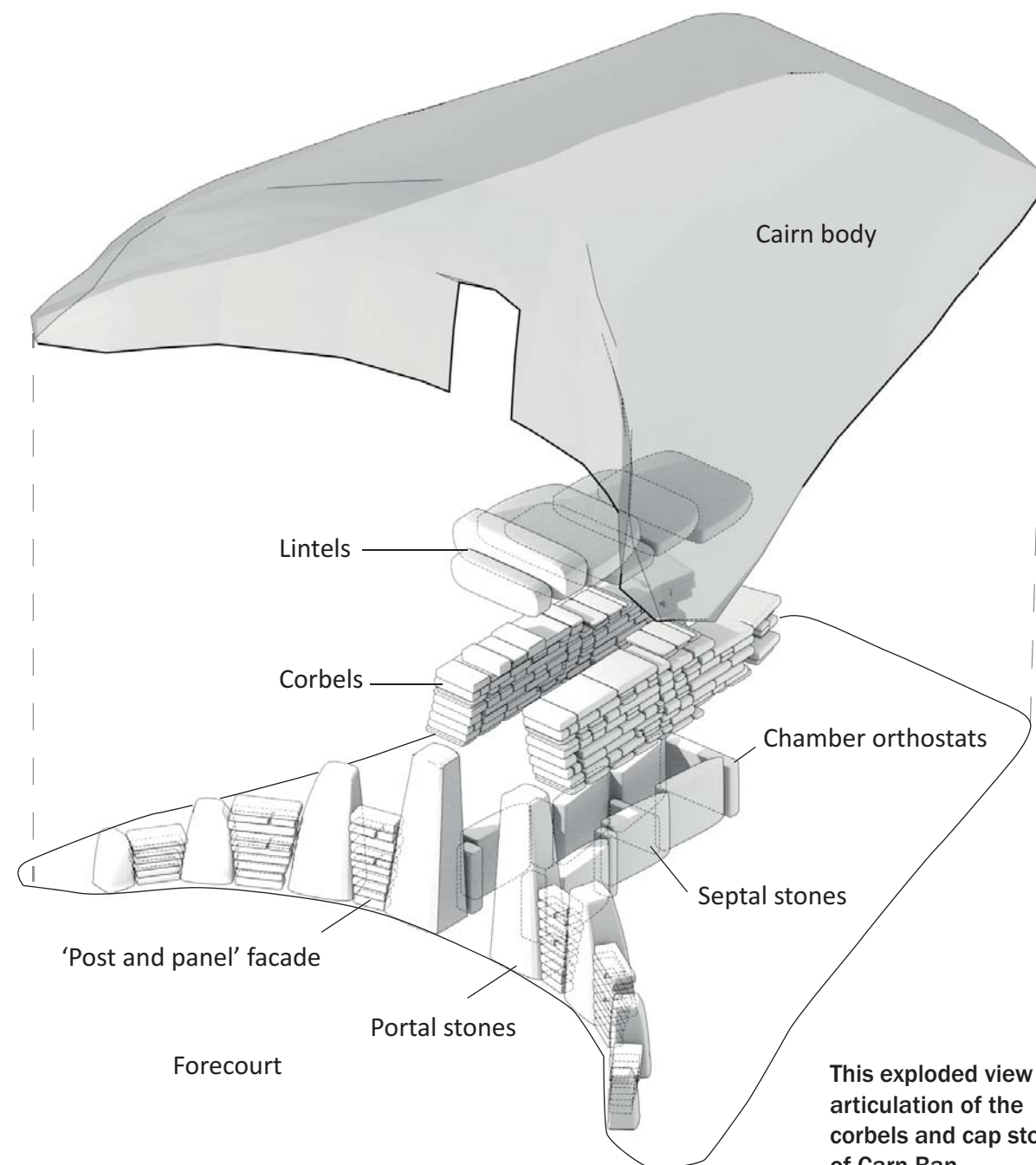
Thomas Hastie Bryce (from Forsyth et al 2006)

Anatomy of a chambered tomb

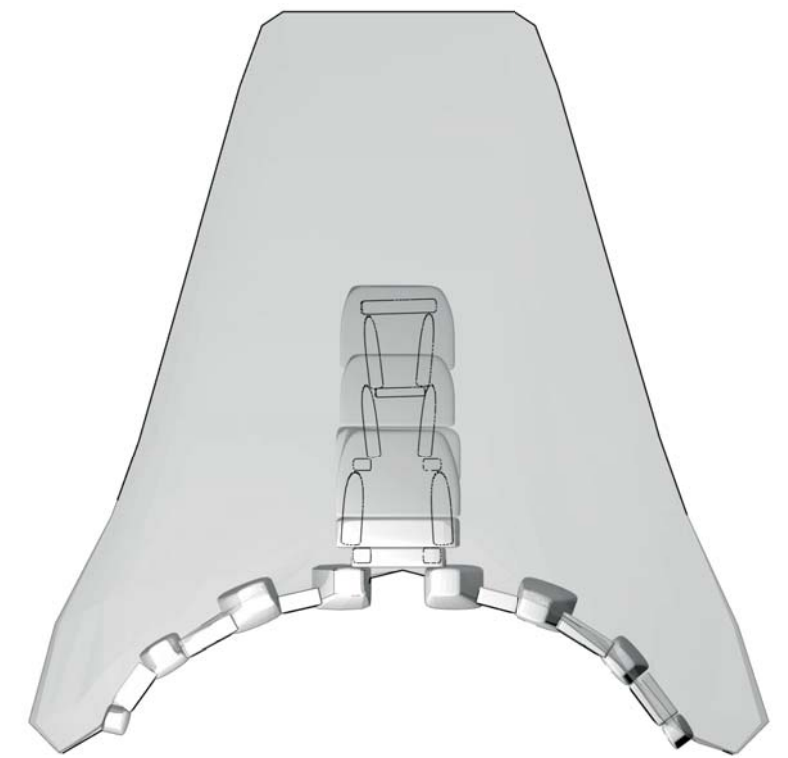
None of the chambered cairns on Arran can be considered complete. All have been subjected to stone robbing, erosion, or dismantling by antiquarian excavations to a greater or lesser degree and, as such, the visible remains require interpretation. Thomas Bryce's excavations at Carn Ban in 1902 provide perhaps the best record of what was probably a near-intact chambered cairn at that time and his records of the cairn and its internal chamber provide a guide for the interpretation of other, less well preserved examples.

In most cases, the cairn body material of the Arran cairns has been significantly reduced by stone robbing. In some cases such as North Sannox, this likely occurred in antiquity to provide the material for a nearby dun and a later field dyke. In other cases, turf may have been a significant component of the cairn body, and could not have survived to the present day. It is possible that the body material of many cairns was stepped and structured, rather than simply piled over the chamber; evidence for this has been found in cairns elsewhere in Scotland, though not on Arran itself.

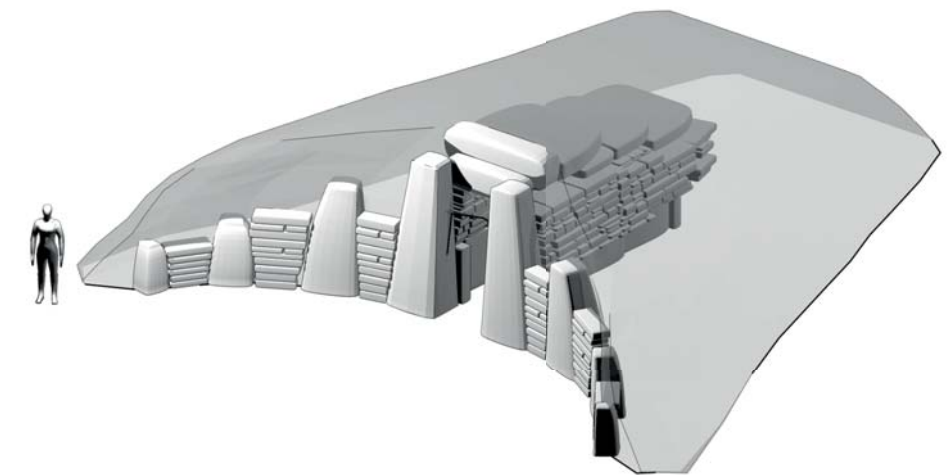
The diagrams presented here are intended to set out a reference for the terminology used in this study when describing the structural remains in the Arran cairns today. The model is schematic, and is based on 'typical' features found variously throughout Clyde cairns in western Scotland: not all of the Arran cairns were built in this fashion, and few have all of the characteristics of this stylised example.



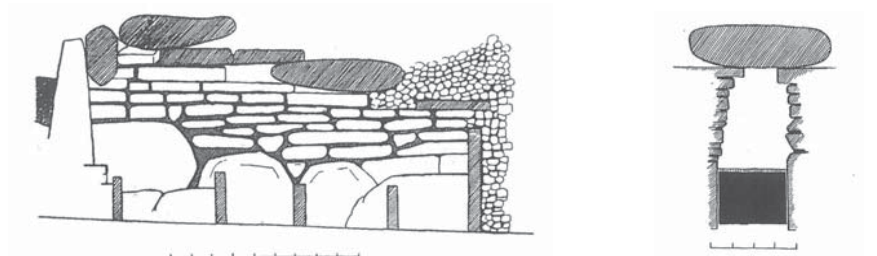
This exploded view illustrates the possible articulation of the chamber orthostats with the corbels and cap stones, based on Bryce's records of Carn Ban.



The typical arrangement of a trapezoidal Clyde-type cairn, with a semi-circular forecourt. The orthostats of the chamber are often imbricated, providing additional structural stability.



This model presents a possible arrangement of a short, trapezoidal Clyde cairn. The cairn body of many cairns was much longer, however, and often incorporated smaller predecessor cairns. In some cases, later chambers may have been inserted into the sides of the cairn body.

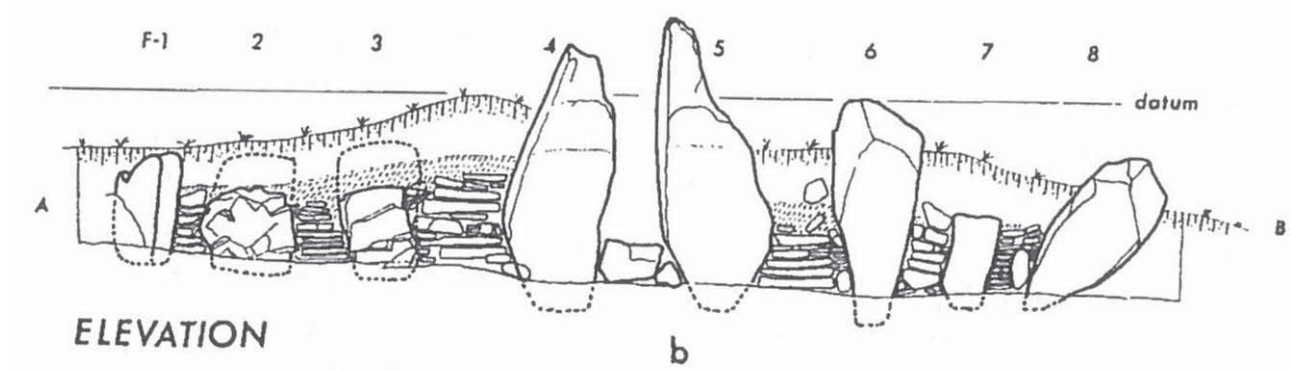


Bryce's records of the chamber at Carn Ban show that the orthostats were capped by corbelling, which was then capped by massive lintels.



Meallach's Grave

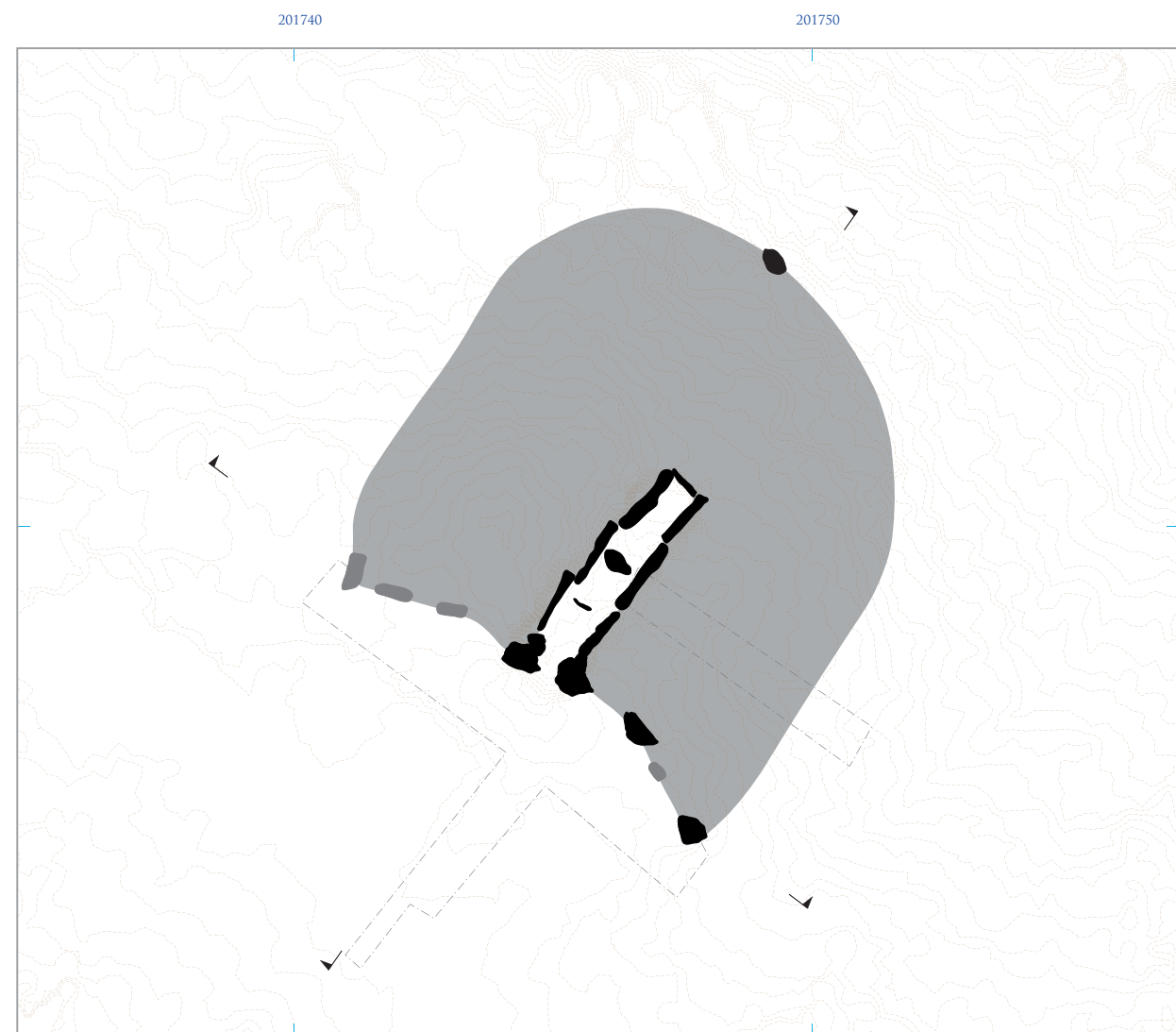
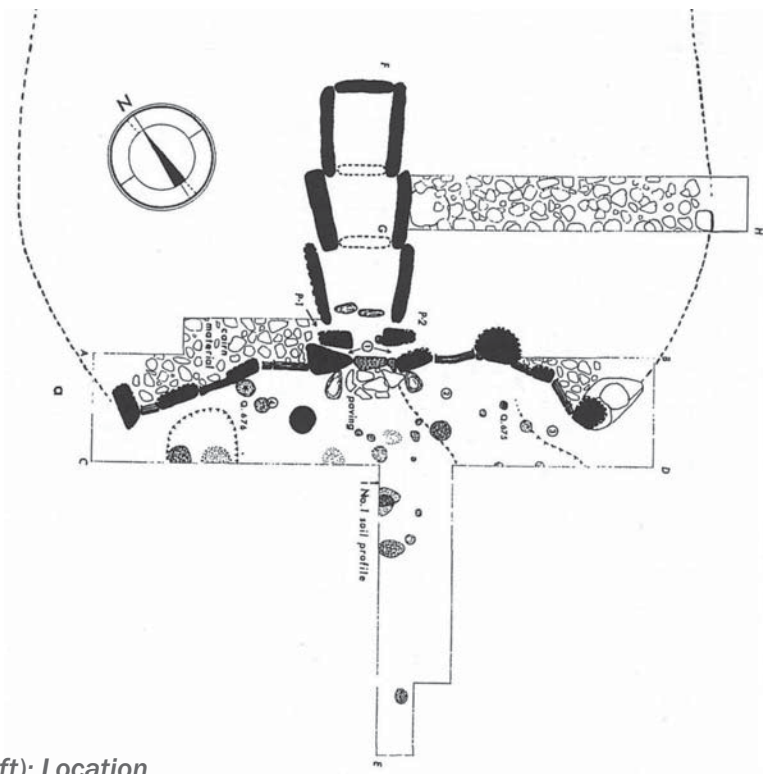
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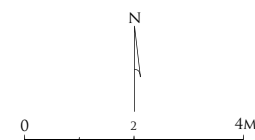
Meallach's Grave lies on the southern side of a small glen through which flows the Allt Lagriehesk, a tributary of the Monamore Burn. The cairn lies on a terrace projecting from the steep hillside at 130m OD with the facade and entrance facing up-slope. The body of the cairn is overgrown and none of the cairn material is visible, except for a few boulders on the northern edge of the cairn. The cairn is roughly trapezoidal and as far as can be seen c. 13m by c. 12m across the facade. Two orthostats forming the entrance to the chamber project to a height of 1.1m, two further orthostats are just visible on the southwest horn of the facade projecting 0.3m above the ground. The chamber is open and empty and comprises six large slabs forming a chamber aligned northeast to southwest. The chamber is entered through a gap 0.5m wide between the two portal stones of the facade, a second pair of portal stones lie behind the facade; these are the same height as the chamber stones. The chamber is built of three pairs of overlapping slabs, each pair forming the side of one of three compartments that are divided by septal stones.

The cairn is much reduced and completely grass covered. In appearance the cairn seems to only have the vestige of a facade, but the excavations of 1961 showed that the majority of this survives below ground suggesting that the remaining cairn may be better preserved than its current appearance suggests.

The main view from the forecourt over the cairn is of the gentle valley to the north with Holy Island just visible to northeast, and Goatfell in the distance to the north-west.



- ORTHOSTAT
- ORTHOSTAT EXTRAPOLATED FROM MACKIE 1963
- 0.1M CONTOUR
- APPROXIMATE EXTENT OF CAIRN



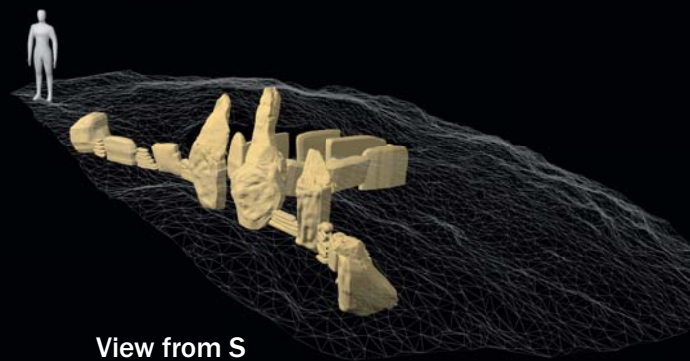
Captions:
 Photograph of Meallach's Grave, facing northeast (top left); Location of Meallach's Grave on map of Arran (top centre); Mackie's section and plan of the excavation of Meallachs Grave (top right, bottom left); Topographic survey of Meallach's Grave in 2014 (bottom right)

Meallach's Grave

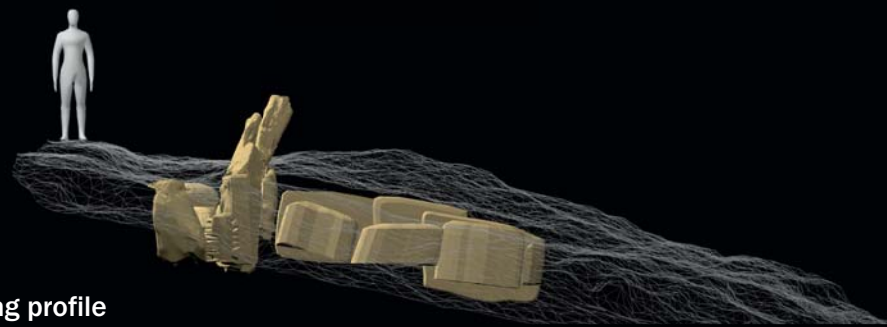
The modelled stones in these images are based on Mackie's excavation records, merged with the modern 3D laser scan.



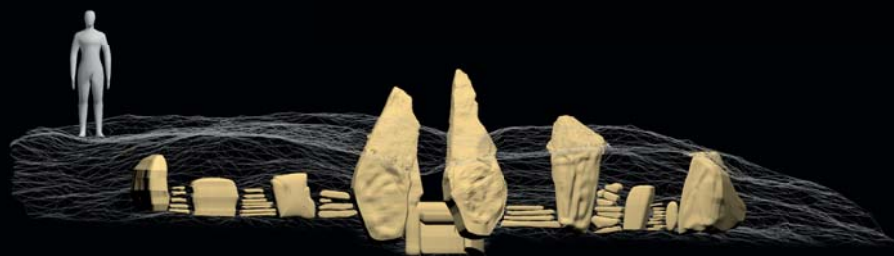
Plan



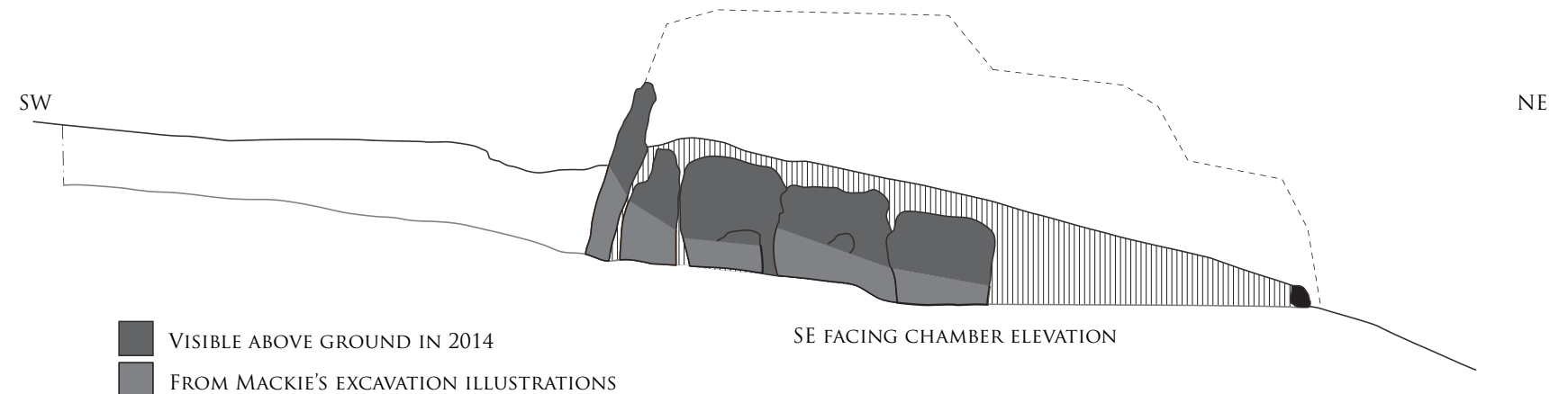
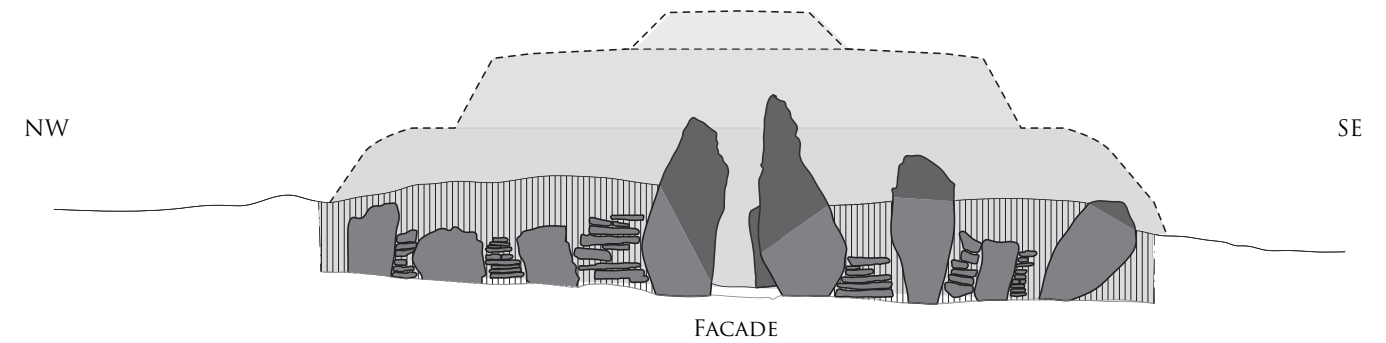
View from S



SE-facing profile



Facade



■ VISIBLE ABOVE GROUND IN 2014
 ■ FROM MACKIE'S EXCAVATION ILLUSTRATIONS

Meallach's Grave illustrates how the surviving remains of the Arran cairns can be far from representative of their original form. Mackie's excavations uncovered the full facade of the monument, under around a metre of slope-washed soils, while none of the upper parts of the cairn that would have encased the chamber roofing lintels survive. These modelled views relate the surviving remains to the buried structure. The section profiles (top right and middle right) indicate the postulated extent of a stepped cairn body encasing the chamber, evidence for which has been recorded on other heel-shaped cairns in western Scotland.

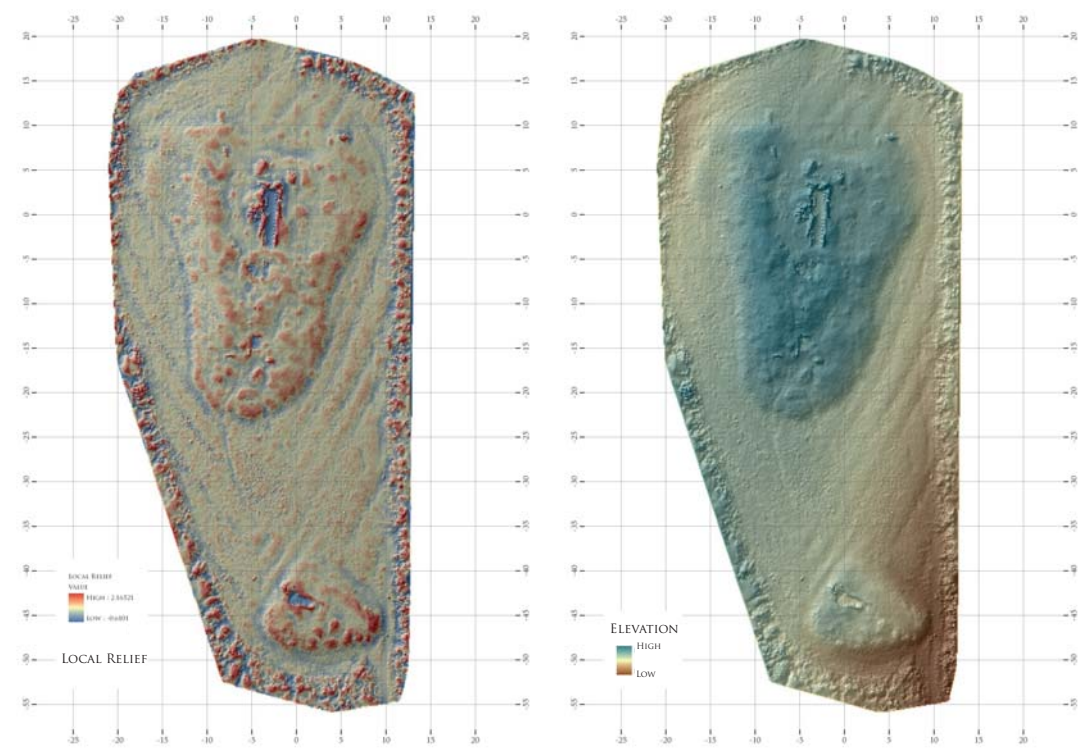




Giant's Graves

North: NMRS No: NS02SW 2
NGR: NS04302 24680

South: NMRS No: NS20SW 3
NGR: NS04312 24637



Giants Graves North and South are located around 150m to the north of the Allt Crompucaidh burn on the east coast of Arran to the south of Whiting Bay. The two chambered tombs lie on a level terrace at c.130m OD on a steep hillside sloping down to the coast with panoramic views over the Clyde estuary.

Giants Grave 1 (North) is a trapezoidal Clyde-type cairn (see photograph above), aligned north to south along a prominent ridge, with the forecourt facing towards the space between the peak of Goatfell and Holy Isle. Giants Grave 2 (South) is a trapezoidal cairn (see photograph to right) aligned northwest to southeast.

There are remnants of rig and furrow, aligned northeast to southwest, between the two cairns of Giants Grave and to the north and east of Giants Grave 1 (see local relief model, left). Further rig and furrow, aligned northwest to southeast is visible to the west and southwest of Giants Grave 1.

The monuments are heavily robbed with both cairns being much reduced in height, with a clear depression around the main chamber of Giants Grave 1 that is probably the result of the 19th and 20th century excavations. The body of both cairns are grass covered but unaffected by forestry plantation in the immediate vicinity.

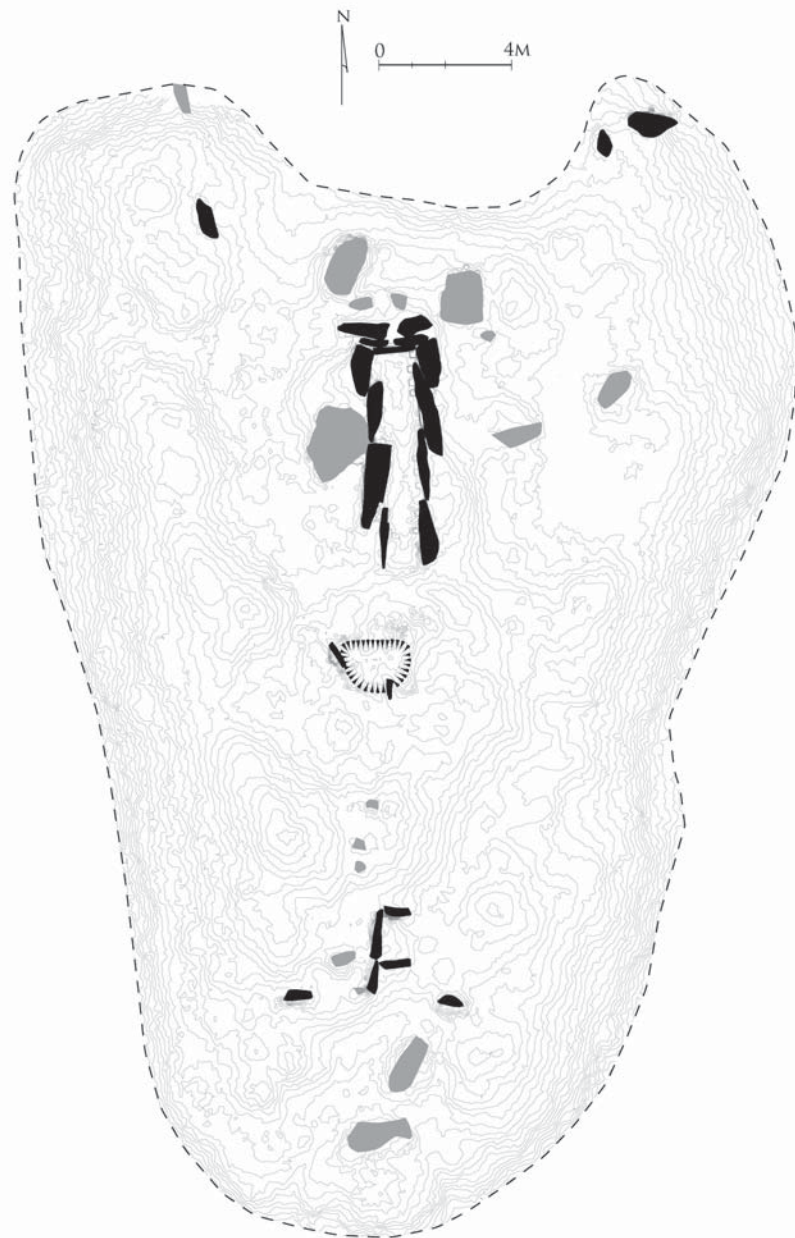
There are extensive open views to the east of Giants Graves to Holy Isle and the Firth of Clyde and also to the north looking towards Goatfell and the Arran mountains along with an area of coastal arable farmland around Kingscross.

Giants Graves North and South were excavated by Bryce in 1902. At Giants Grave North Bryce cleared out the interior of the chamber and noted that though the interior of the chamber had been previously disturbed it contained a great quantity of burnt bone, nearly all in small fragments, with a charcoal rich layer at the base of his excavations. Four leaf shaped flint arrowheads, three flint plano-convex knives and small sherds of pottery were recovered. Bryce also excavated within the chamber of Giants Grave South which "contained only soil and stones, with no signs of charcoal or bones, and no relics were observed" (Bryce 1903).

Captions (clockwise from top right):
 Photograph of Giants Graves 1 and surrounding views, facing north; Location map of Giants Graves; Photograph of Giants Graves 2 chamber from the north-east; Local relief model (left) and terrain model (right) of both the cairns and their immediate surroundings.

Giant's Graves

Site 1 (North): NMRS No: NS02SW 2
NGR: NS04302 24680



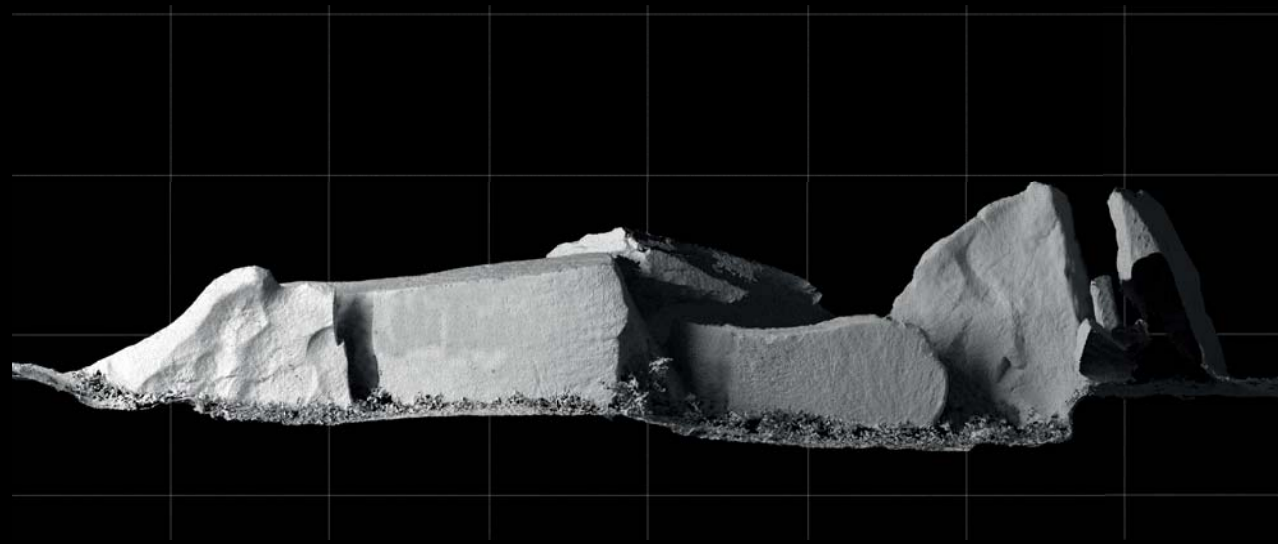
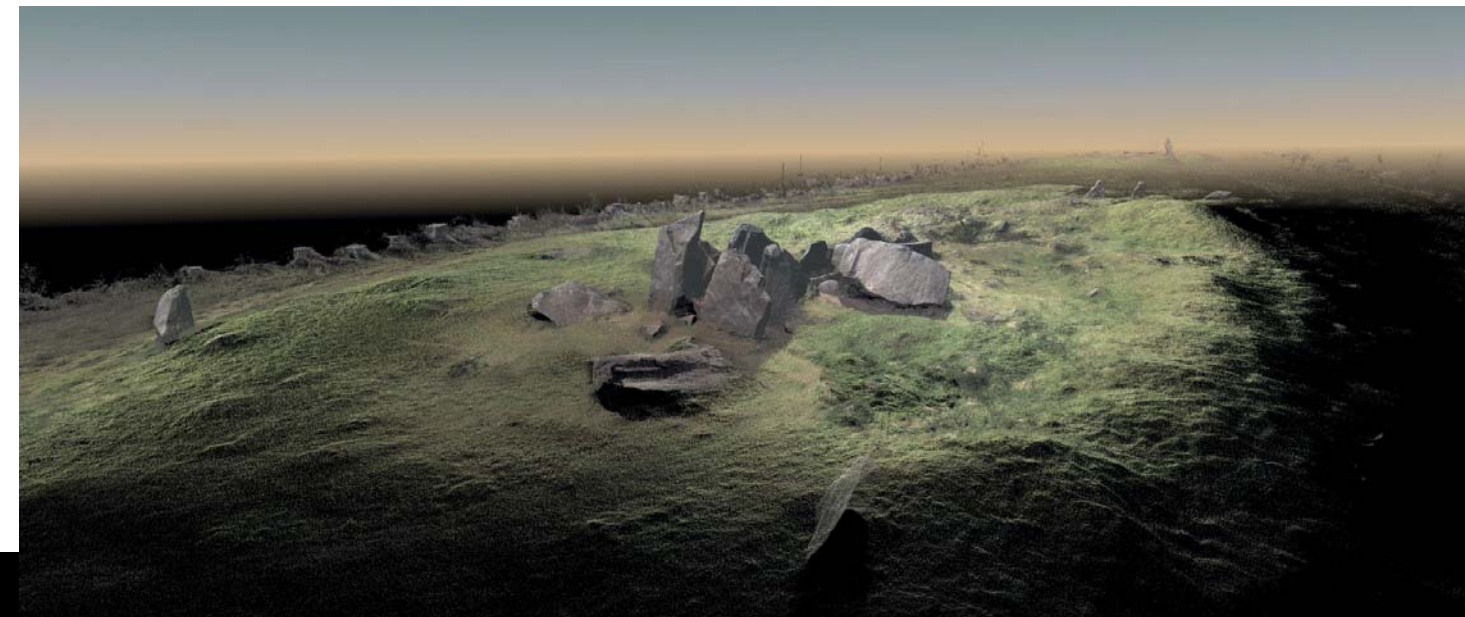
Giants Grave 1 (North) is a trapezoidal Clyde-type cairn, aligned north to south. The monument is much robbed and partly confused by the disturbance of 19th and 20th century excavations. The facade and forecourt area are clearly visible at the north end of the cairn, though only two or three of the facade facing stones remain in-situ. The chamber is 7.1m in length and averages 1.2m in width and is defined by very large slabs set as orthostats, the largest of which measures 2.7 m by 0.6m by 1.2m. The chamber is entered through a gap 0.5m wide; the canopy stones have been removed, though one lies immediately to the west of the main chamber and measures over 1.7m in diameter; this stone is covered with incised graffiti dating from the 18th century onwards.

Immediately to the south of the main chamber excavations have exposed a second chamber, now ruinous and rubble filled, measuring 1.4m by 1.6m internally. This chamber lies off centre to the west of the centre line of the main cairn. Although the cairn material surrounding this is disturbed it is possible that this comprises a circular cairn which has been encased in the later Clyde cairn.

Around 8m to the south of this second chamber a third chamber is visible. This is defined by three orthostats which would have formed the western and northern sides of a chamber along with a possible septal slab. There are a further two surviving orthostats set transversely to the cairn axis immediately to the south of the chamber. It is possible that these formed the facade of an early cairn with access into the chamber from the south. The chamber of this cairn is now exposed due to robbing or excavation but has been completely encased by the larger cairn mound, the south end of which is a further 6m to the south. Two large slabs, up to 1.7m by 0.8m, located to the south of this chamber are possible capping lintels.

Captions:

Surveyed contour plan of Giants Graves 1 (left);
Giants Graves 1 pointcloud, perspective view from
the northwest (right); elevations of Giants Graves 1
chamber (below).



Giant's Graves

Site 1 (North): NMRS No: NS02SW 2
NGR: NS04302 24680



Captions :

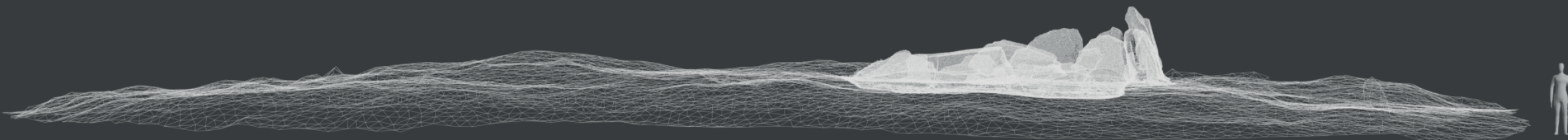
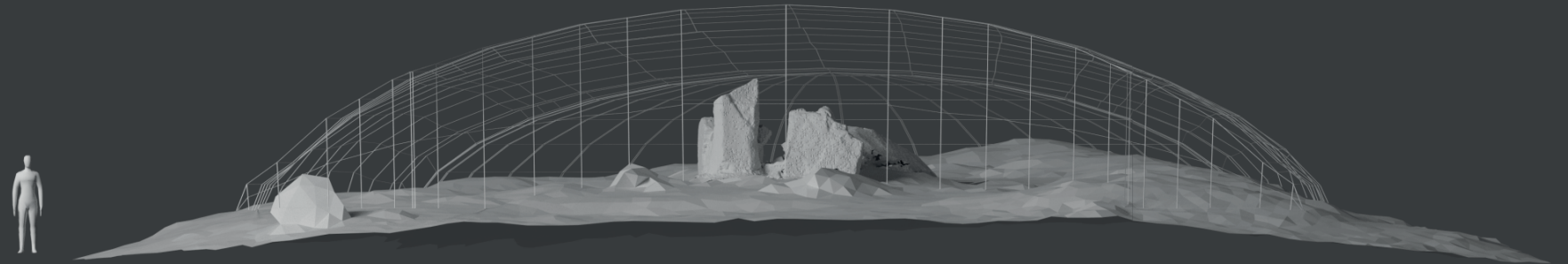
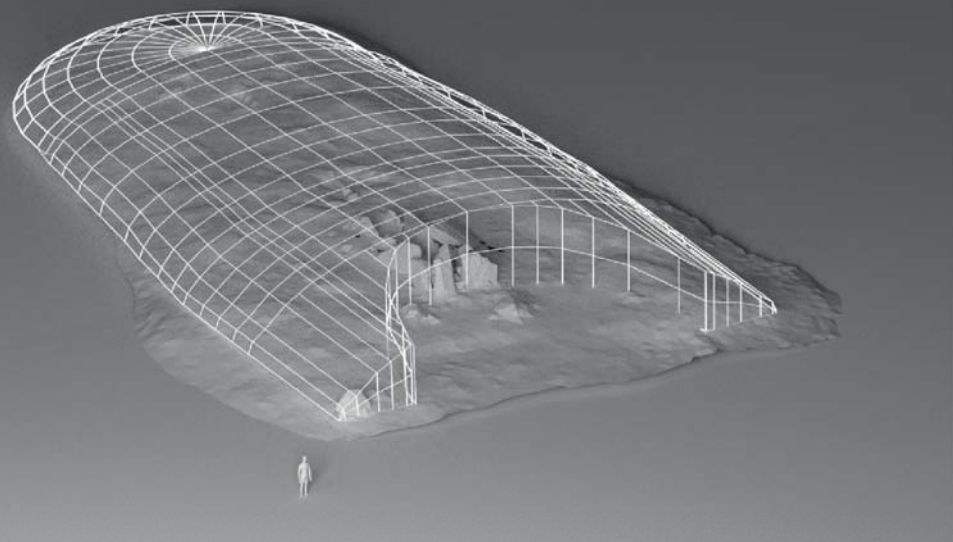
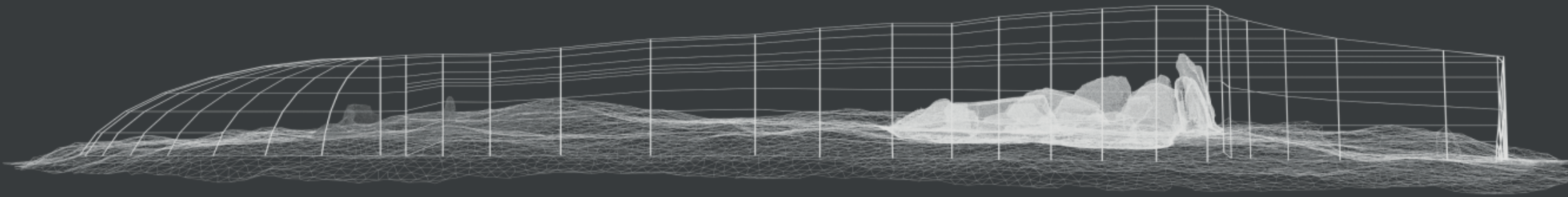
Photograph of Giants Graves 1 main chamber from the south-east (top left); Photograph of Giants Graves 1, ruinous possible central chamber from the northeast (top centre); Photograph of Giants Graves 1, southern chamber from the southeast (top right); Photograph of main chamber orthostats in Giants Graves 1 forecourt from the north (bottom right); photograph of main chamber, Giants Graves 1, from the SW (bottom left).

The visible remains at Giant's Graves North are only fragments of what was originally a very large cairn. The laser scanned mesh combined here with a reconstruction of the possible extent of the original cairn body material gives an impression of the monument's scale. The main chamber was probably corbelled and capped with massive roofing lintels in a manner similar to Carn Ban.

Giant's Graves North

Captions:

The surviving remains of Giants Graves North, shown in elevation (bottom), and with the possible extents of the original cairn body shown in wireframe from the NE (middle, left), from the north (middle, right) and in elevation from the east (top).

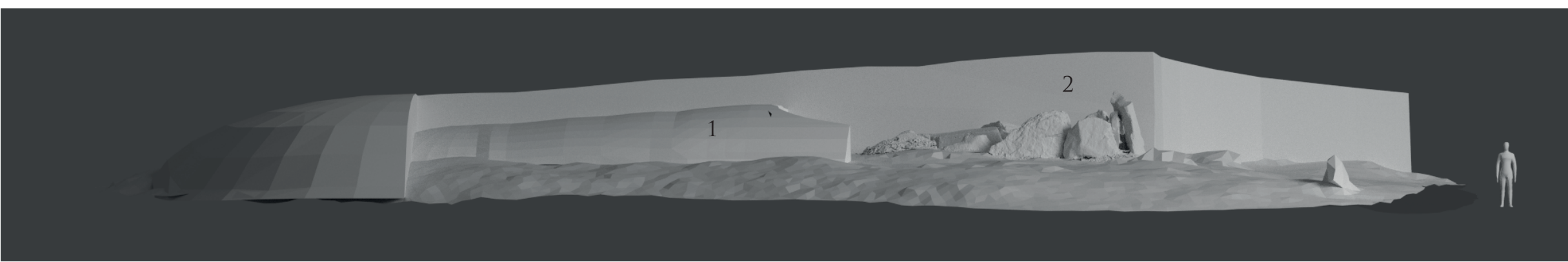
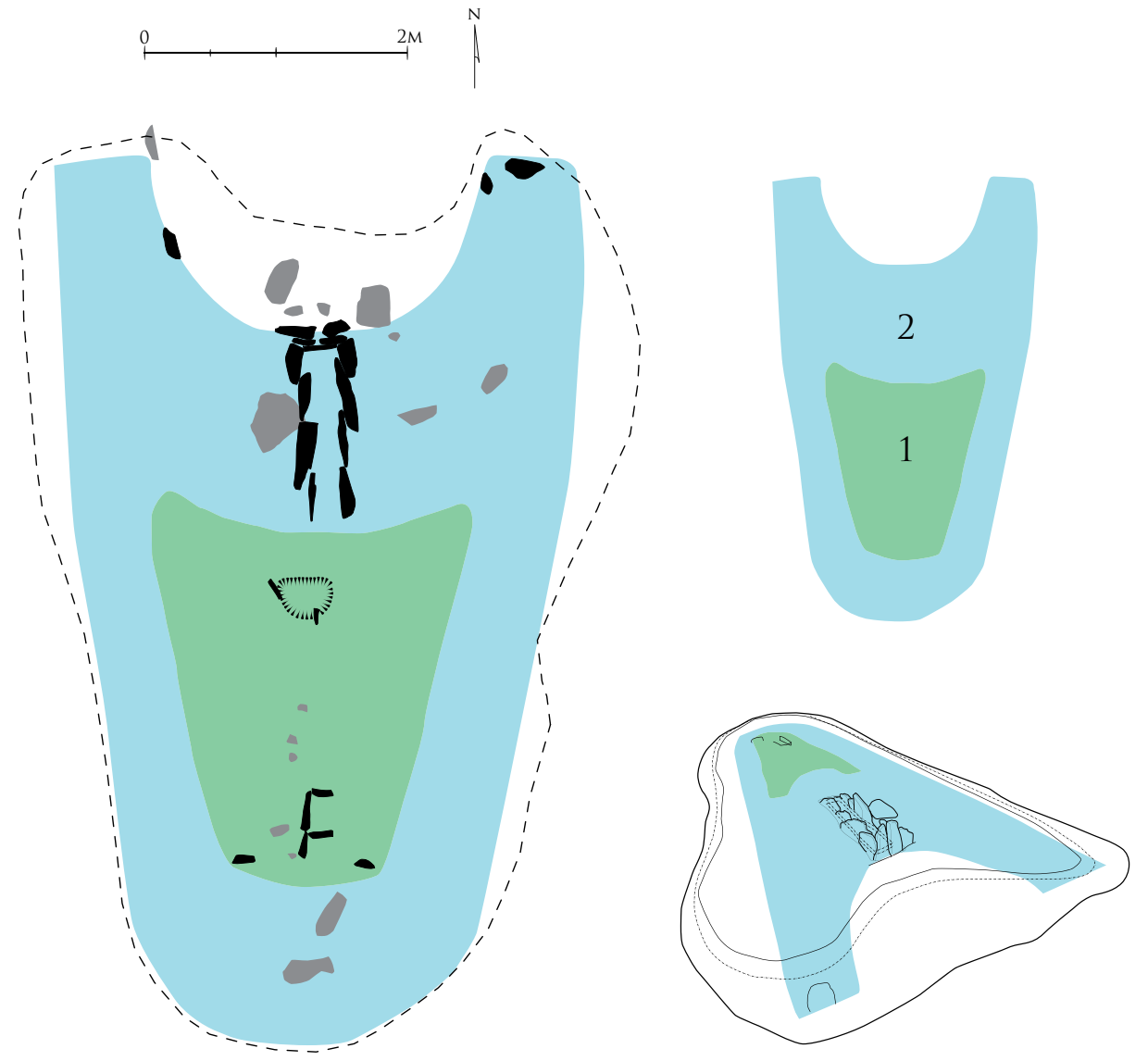
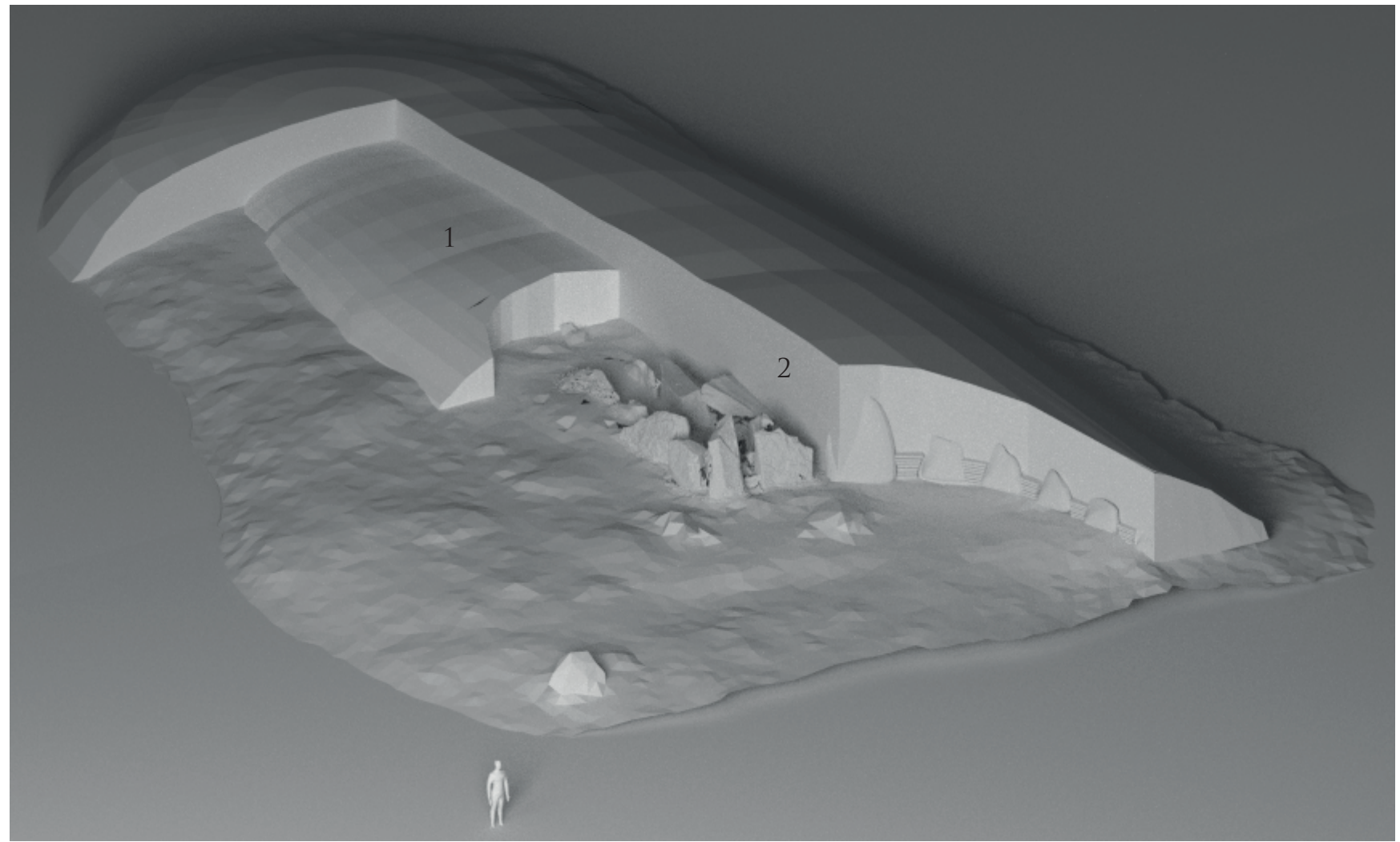


Giant's Graves

Site 1 (North): NMRS No: NS02SW 2
NGR: NS04302 24680

Possible 2 phase interpretation

A possible sequence for the construction of Giants Graves 1 is that of a small Clyde cairn (1) with a forecourt to the north, which is later encased by a larger Clyde cairn (2) with forecourt to the north.



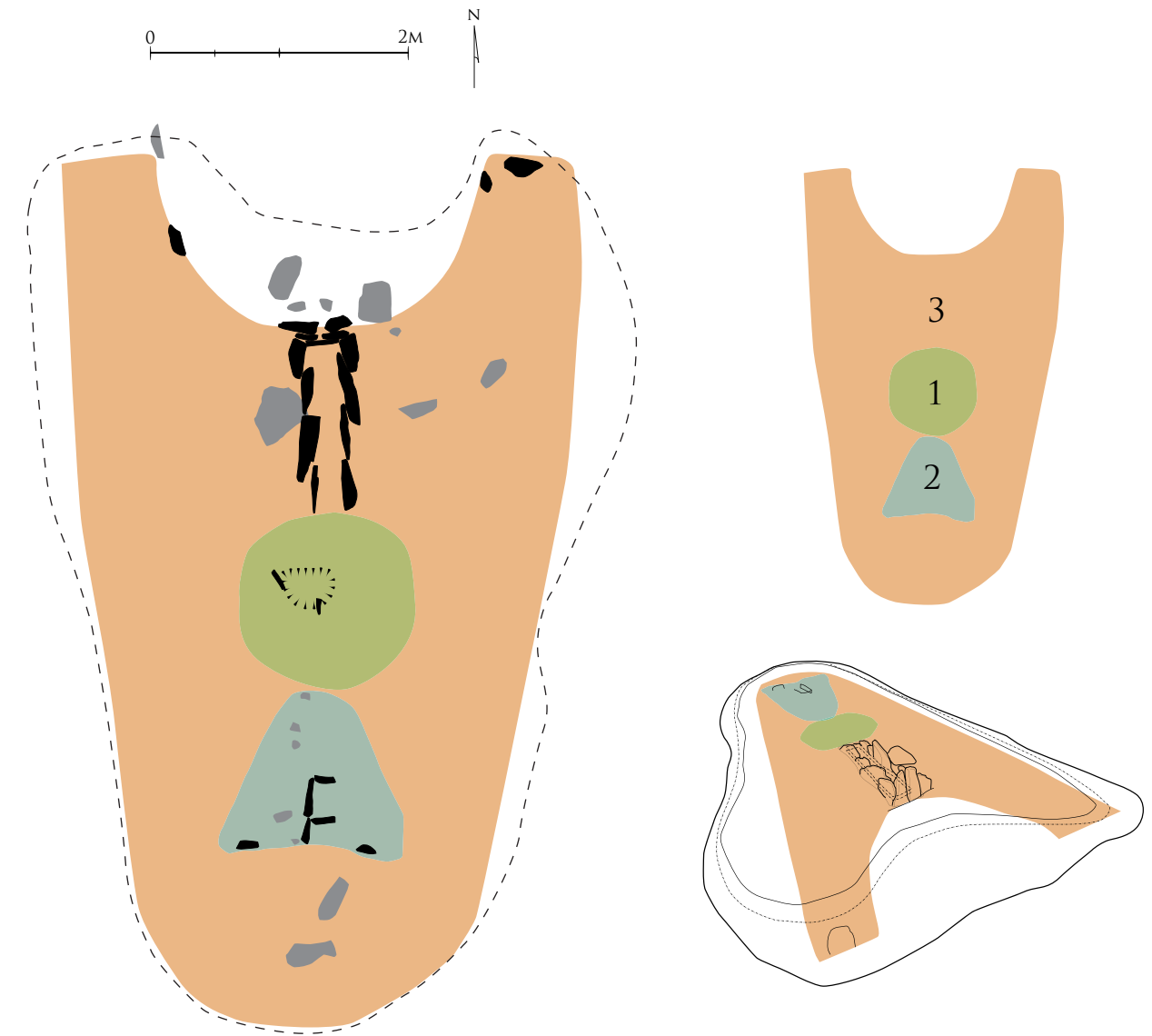
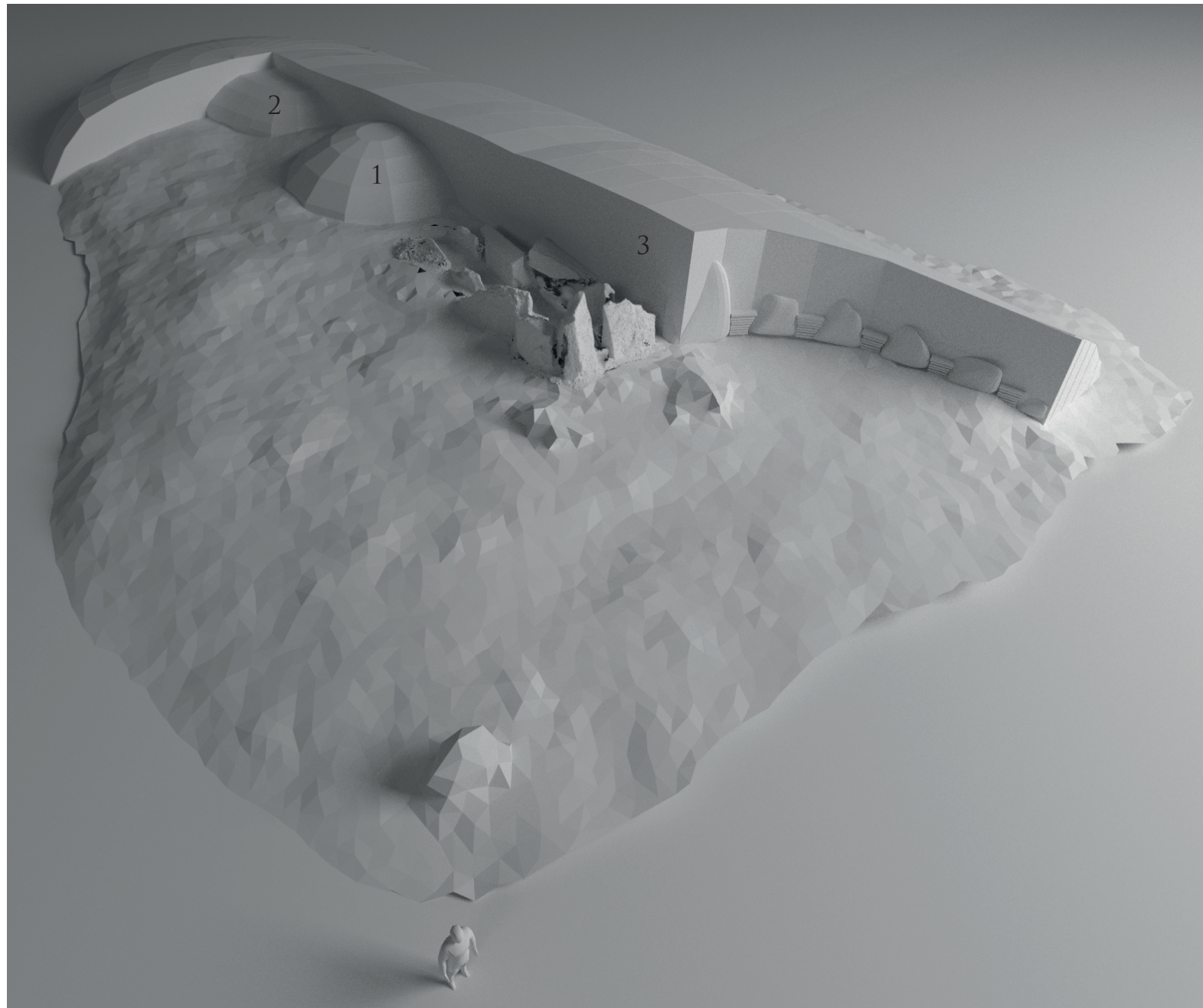
*Captions (clockwise from top left):
Isometric view of meshed scan data and hypothetical modelled reconstruction of two phases of cairn body;
Survey plan with proposed two phases of cairn body;
Phase plan key; east-facing elevation of meshed scan data with modelled hypothetical two-phase cairn bodies.*

Giant's Graves

Site 1 (North): NMRS No: NS02SW 2
NGR: NS04302 24680

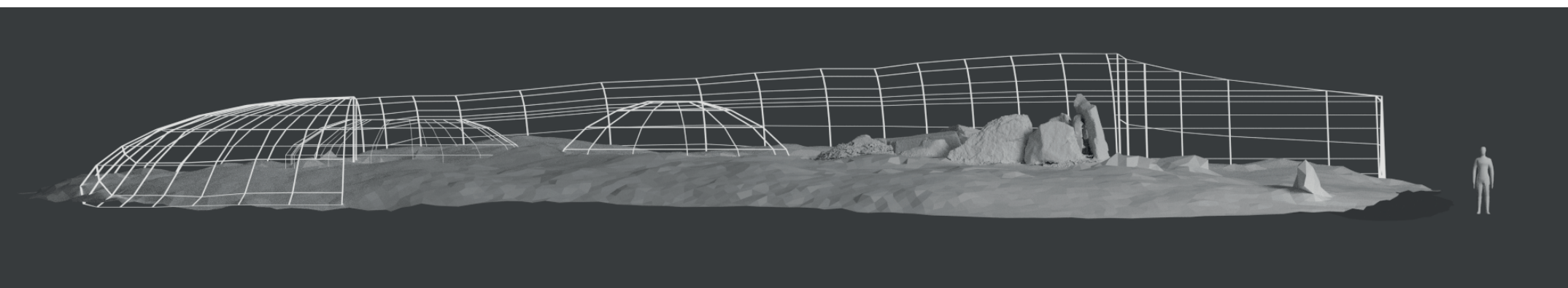
Possible 3 phase interpretation

An alternative possible sequence for the construction of Giants Graves 1 is that of a central round cairn (1), followed by a small Clyde cairn (2) with a forecourt to the south, which are both then encased by a larger Clyde cairn (3) with forecourt to north.



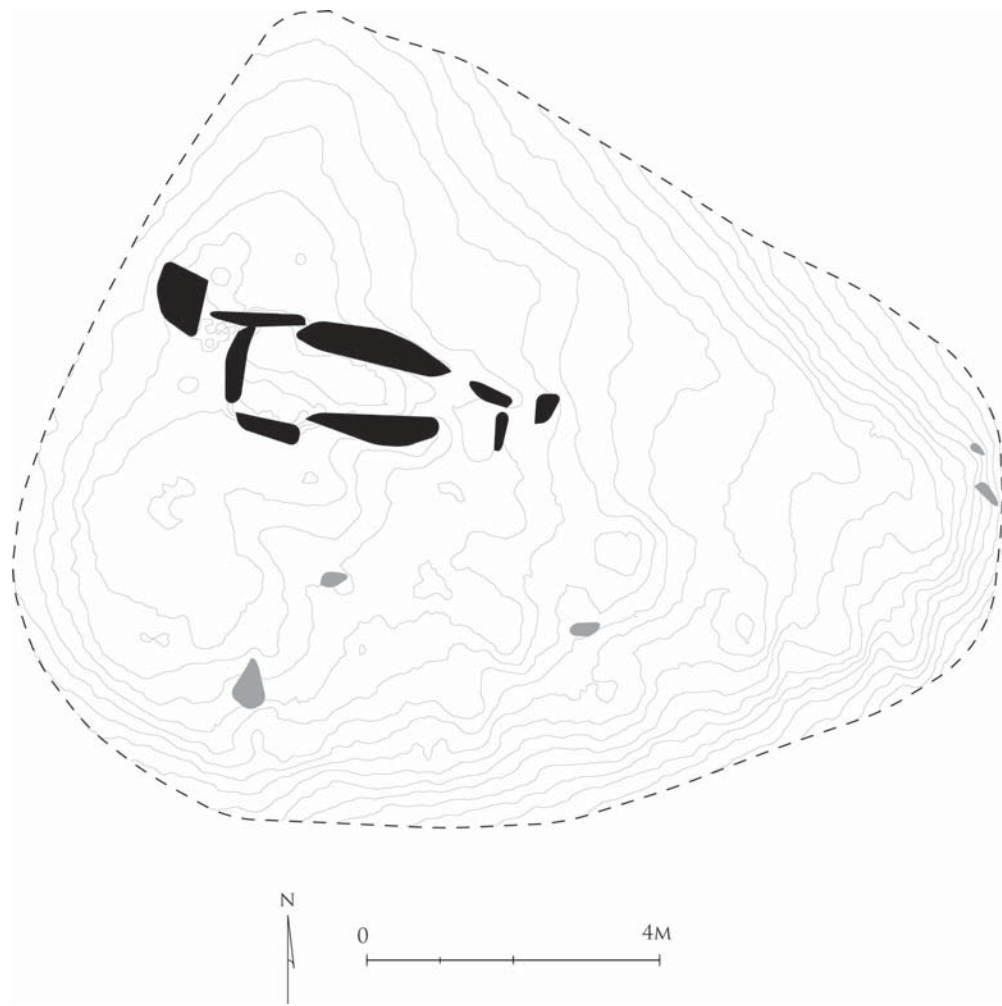
Captions (clockwise from top left):

Isometric view of meshed scan data and modelled hypothetical reconstruction of three phases of cairn construction; Survey plan with hypothetical three phases of construction; east-facing elevation of meshed scan data with wireframe hypothetical three-phase construction.



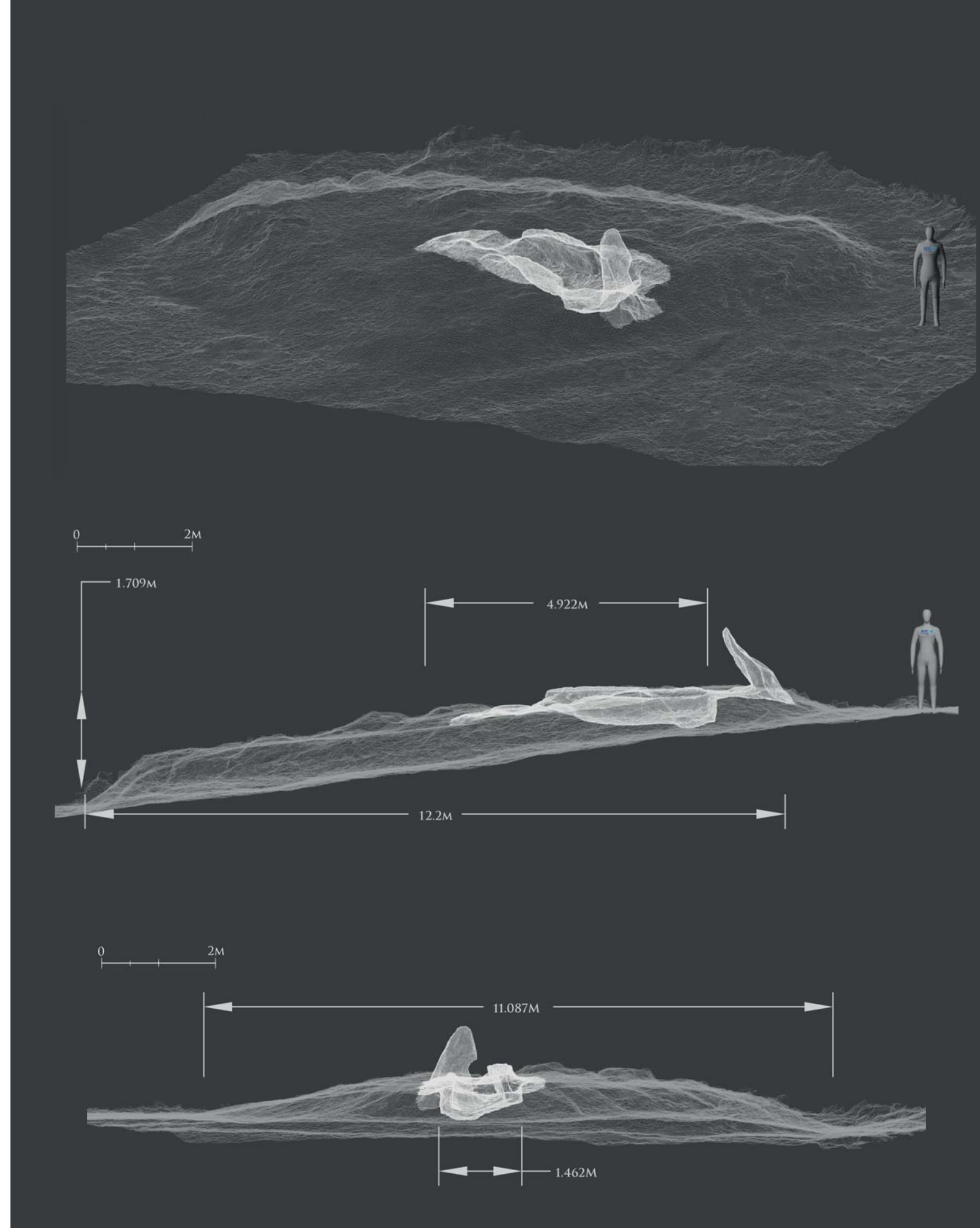
Giant's Graves

Site 2 (South): NMRS No: NS20SW 3
NGR: NS04312 24637



Giants Graves 2 measures 10.7m by 7.4m across the facade, on the northwest side. The cairn body stands to c.1m in height in the southeast but is reduced to c.0.5m in the north corner. A single orthostat of the facade remains in situ, standing to 1.3m above the cairn body. The chamber sides are composed of two large blocks, up to 2m by 0.45m by 0.5m and a further two slabs c. 1.2m by 0.18m by 0.7m. The chamber entrance is blocked by a cross slab 1.25m across, just inside the facade stones. The cairn is clearly aligned to give the sea view as a backdrop, rather than with a view over the sea, and it seems probable that the chamber is aligned on the prominent knoll overlooking the site.

Meshing the laser scanned pointcloud creates a surface model of the surviving cairn with the chamber shown with a high-resolution mesh within the cairn body. Giants Graves 2 illustrates the vestigial nature of the surviving remains of the Arran cairns: nothing survives of the probable corbelled and lintelled capping of the chamber, and the cairn body is heavily robbed. The use of a human scale conveys the size of the monument, and illustrates the contrast with Giants Graves North.



Captions:

Contour plan of Giants Graves South (above left); surface mesh of the cairn showing the disposition of the chamber (right, top); NE-facing elevation of the cairn (right, centre); NW facing elevation of the cairn (right, bottom).

Torr An Loisgte

NMRS No: NS02SW 15
NGR: NS 04008 24822



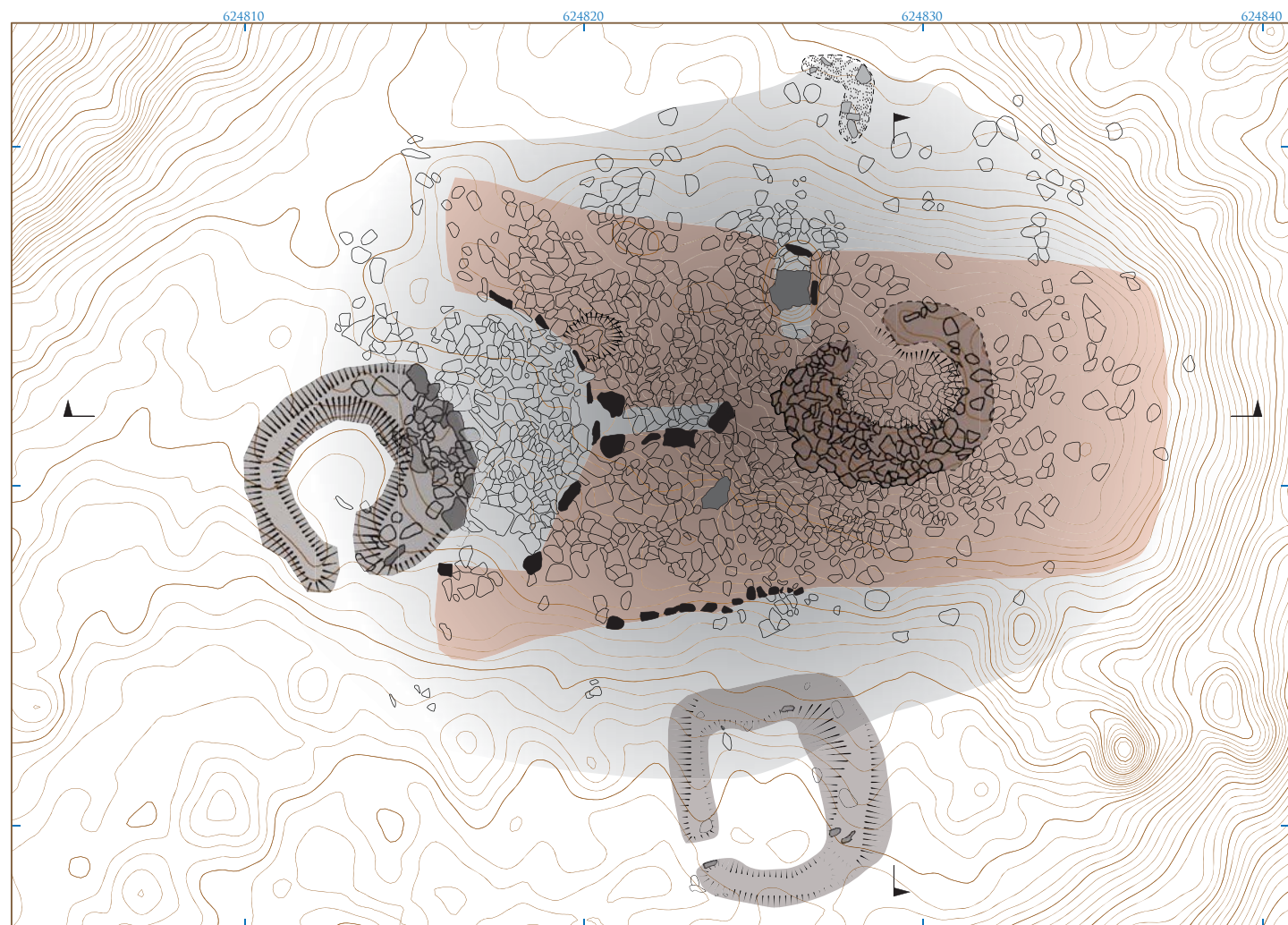
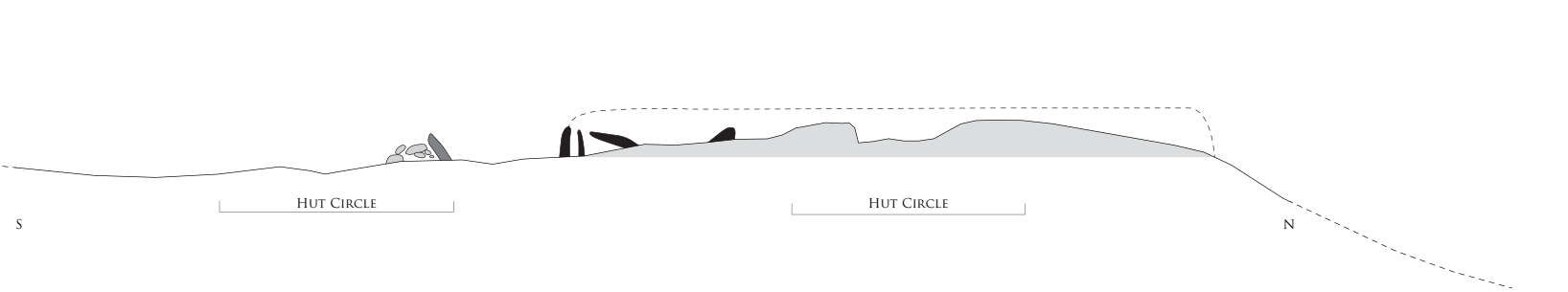
Torr An Loisgte from the south with later hut circle and shooting butt in foreground.



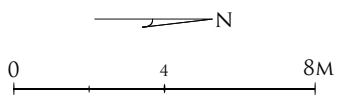
View into lateral chamber showing large capping slab and corbelled upper walling, from west.



Rubble filled forecourt and orthostat facade to cairn, with blocking stone sealing entrance behind ranging rod, from southeast.



- STONE ASSOCIATED WITH SHOOTING BUTT
- POSSIBLE HUT CIRCLES
- ORTHOSTAT
- ORTHOSTAT ASSOCIATED LATER STRUCTURE
- 0.5M CONTOUR
- 0.1M CONTOUR
- APPROXIMATE EXTENT OF CAIRN
- EXTENT OF RUBBLE



Torr An Loisgte



Later structure constructed within the body of the cairn of Torr An Loisgte, with orthostat facade in background and lateral chamber marked by large capping slab on right, from north.

The Chambered Tomb of Torran Loisgte is located around 450m to the south of the Glenashdale Burn on the east coast of Arran to the south of Whiting Bay. The cairn occupies a prominent shoulder at 143m OD on a steep northeast facing hillside overlooking panoramic views towards Holy Isle.

The Clyde type cairn forms a trapezoidal mound oriented north to south. The forecourt of the cairn is clearly visible on the south side behind rubble collapse, with at least seven vertical orthostats still in-situ, forming a concave facade 8m across. Short lengths of horizontal coursing are visible between some of the orthostats on the west horn. The chamber is accessed in the centre of the facade, though the entrance is blocked with a probable fallen capstone. The chamber is rectangular and 4.5m in length and 0.6m in width. Horizontal coursing rising to begin a corbel is visible on the west side of the chamber. A single capstone is approximately in-situ at the north end of the chamber; other large flat slabs immediately to the east are probably other displaced lintels.

A second chamber is accessible from the west side through a gap in the capping lintels. The entrance is blocked, but the chamber extends over 2.5m into the cairn. The sides are formed by orthostats up to 1.2m in length, with horizontal corbelling rising 0.5m above these. The chamber floor is rubble choked but must be c. 1m below the capping lintel.

Extending for 6m along the east side of the cairn a single course of dry-stone walling can be seen that may have formed either a kerb or a facing course to the cairn. The cairn survives to its greatest height of c. 2m at the edge of the slope to the north.



The cairn is aligned north south, with the backdrop of Holy Isle to east and Goat-fell to north. Principle views are over farmland to north and to sea to the west. Although only c. 350m to the southeast, the cairns at Giants Graves are not visible.



View of large orthostat blocking stone sealing chamber entrance with traces of corbelled upper walling behind and eastern portal stone to right, from southeast

At least three later structures have been constructed both within and around the cairn. Immediately to the northeast of the smaller chamber, within the body of the cairn, lies a structure c. 6m in diameter with a clear exterior wall face on the southern and eastern sides. The interior of the structure is marked by a hollow in the cairn body 3.5m in diameter and c. 0.5m deep; no clear interior wall face can be discerned, however. There is no clear entrance to the structure but it probably lay in the southwest.

Another probable structure lies within the forecourt area of the cairn. This structure comprises a sub-circular stony bank 1.5m wide, up to 0.3m high and 6.8m in exterior diameter. The northern exterior wall face is formed of at least five large orthostats up to 1.8m by 0.5m by 0.6m that have probably been pulled from the facade of the cairn. A possible entrance 0.5m wide lies on the east side of this structure. Constructed around the orthostats is a small circular dry-stone structure 2m in diameter, probably a shooting butt or twinning pen, of recent date.

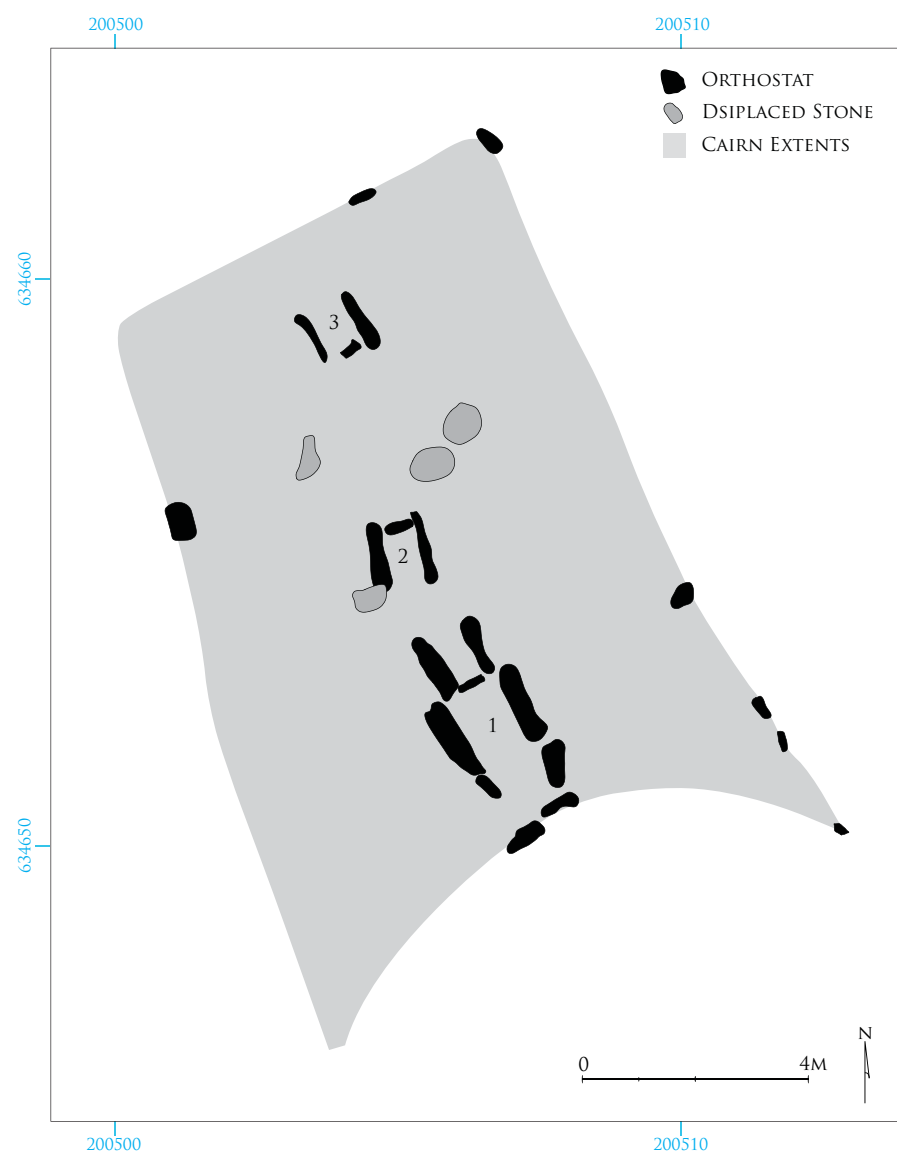
Around three metres to the east of the cairn lies a sub-rectangular building comprising a stony bank up to 2m wide and 0.3m high and measuring 6.3m by 6.4m externally. A possible entrance 0.6m wide lies at the southeast corner of this structure.

A fragment of earth and stone bank 0.8m wide and 0.3m high forming an L-shape measuring 2.5m by 2.2m lay 2.5m to the west of the cairn, these may be the remains of a very poorly preserved structure.



Glenrickard

NMRS No: NS03SW 9
NGR: NS00507 34655



Description

The cairn of Glenrickard lies on the southern slopes of Glen Cloy at a height of 94m OD, on a slight terrace above a steep slope leading down to the river valley, and is around 70m to the southeast of the abandoned cottage of Glenrickard. This roughly trapezoidal Clyde cairn is in a densely bracken covered clearing surrounded on three sides by recently felled commercial forestry and by mixed scrubby woodland to the northwest.

The cairn material has been virtually completely lost and remaining features are obscured by vegetation, making its overall size and shape difficult to determine. There are slight traces of a shallow forecourt at the south-east, where two stones protrude just above the ground surface. There are similarly slight traces of a kerb along the northeast side of the cairn

The main chamber is entered from the south east through a narrow (0.2m) gap between two facade stones. This chamber is at least 4.5m in length and c.1.2m wide with six (three per side) orthostatic side slabs forming the body of the chamber. The stones are a mixture of conglomerate sandstone and sandstone.

Around 1m to the northwest of the main chamber is a second feature that may be a continuation of the main chamber or a separate, second chamber (photo, bottom centre). This chamber is on a slightly different alignment (NNW-SSE), and measures 1.2m by 0.8m by 0.4m deep; it is formed of four orthostatic slabs of conglomerate and sandstone.

Further to the northwest is a third chamber (photo, bottom right), accessed from the northwest. This chamber is constructed of at least three orthostatic slabs of conglomerate and sandstone and measures 1.1m by 0.7m by 0.4m deep.

Condition

The cairn is overgrown with foliage including bracken and rough grass. Natural scrub woodland is encroaching onto the cairn at the northwest and northeast corners of the monument and several large bushes are growing around the other sides of the cairn, but the conifer plantation has not disturbed the monument. The extents are almost impossible to determine fully due to the lack of cairn material visible on site.

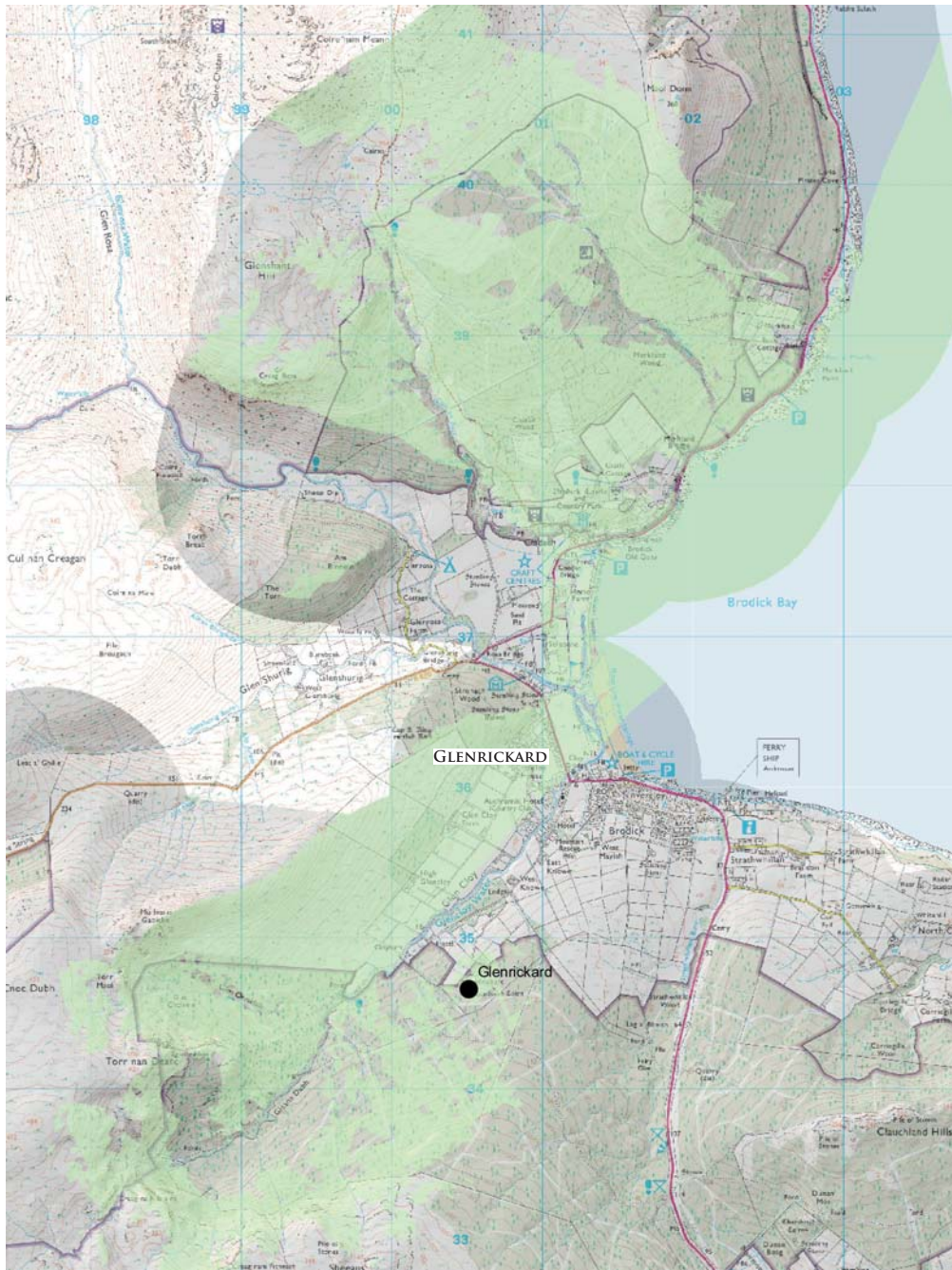
Previous archaeological work

The chambers of Glenrickard have been cleared out but it is not known by whom. Bryce visited the cairn in 1902 but as it had been previously disturbed he simply planned the visible remains.



Captions (anticlockwise from top):

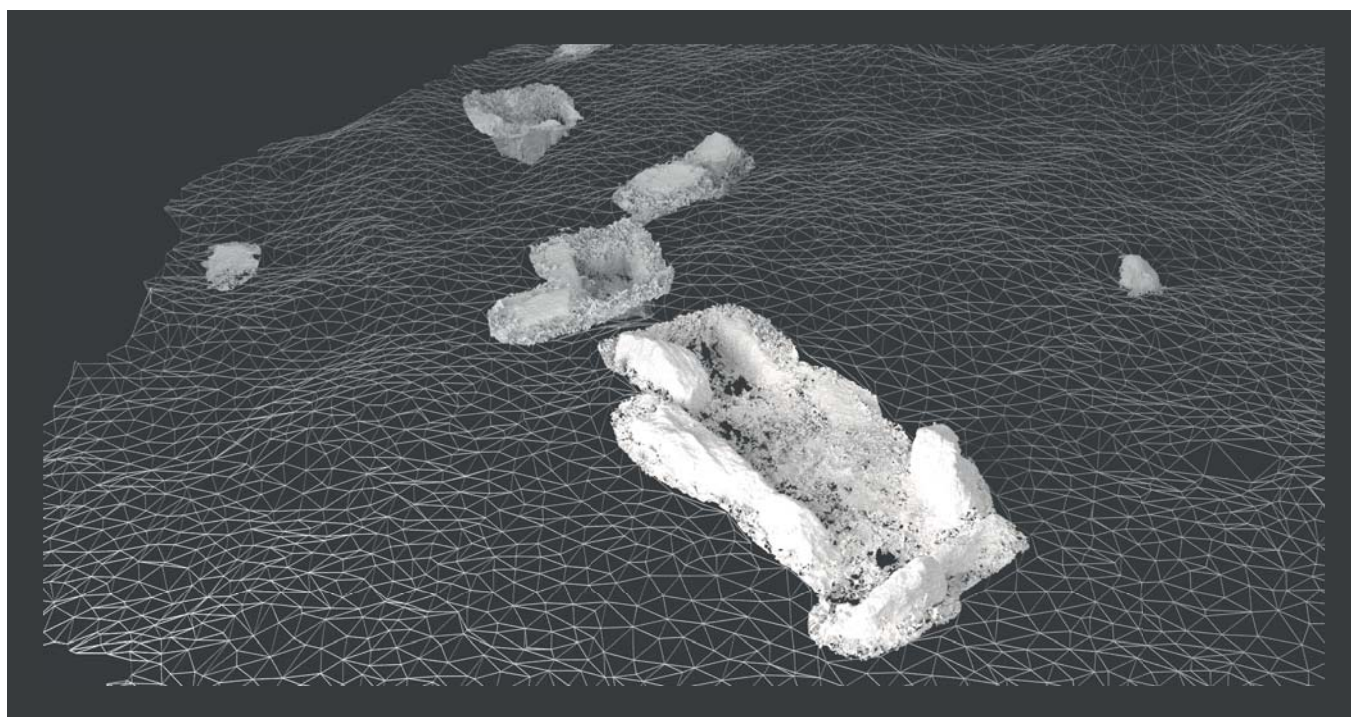
Location map of Glenrickard; Survey plan of Glenrickard; Photograph of chamber 1 from the southeast; Photograph of chamber 2 from the north; Photograph of chamber 3 from the northwest



Glenrickard

Visibility

Although now obscured by forestry and vegetation, Glenrickard typifies the Arran cairns in its situation in an area commanding significant views over lower ground. The cairn commands a view of much of upper Glenclay and northwards to Brodick Bay.

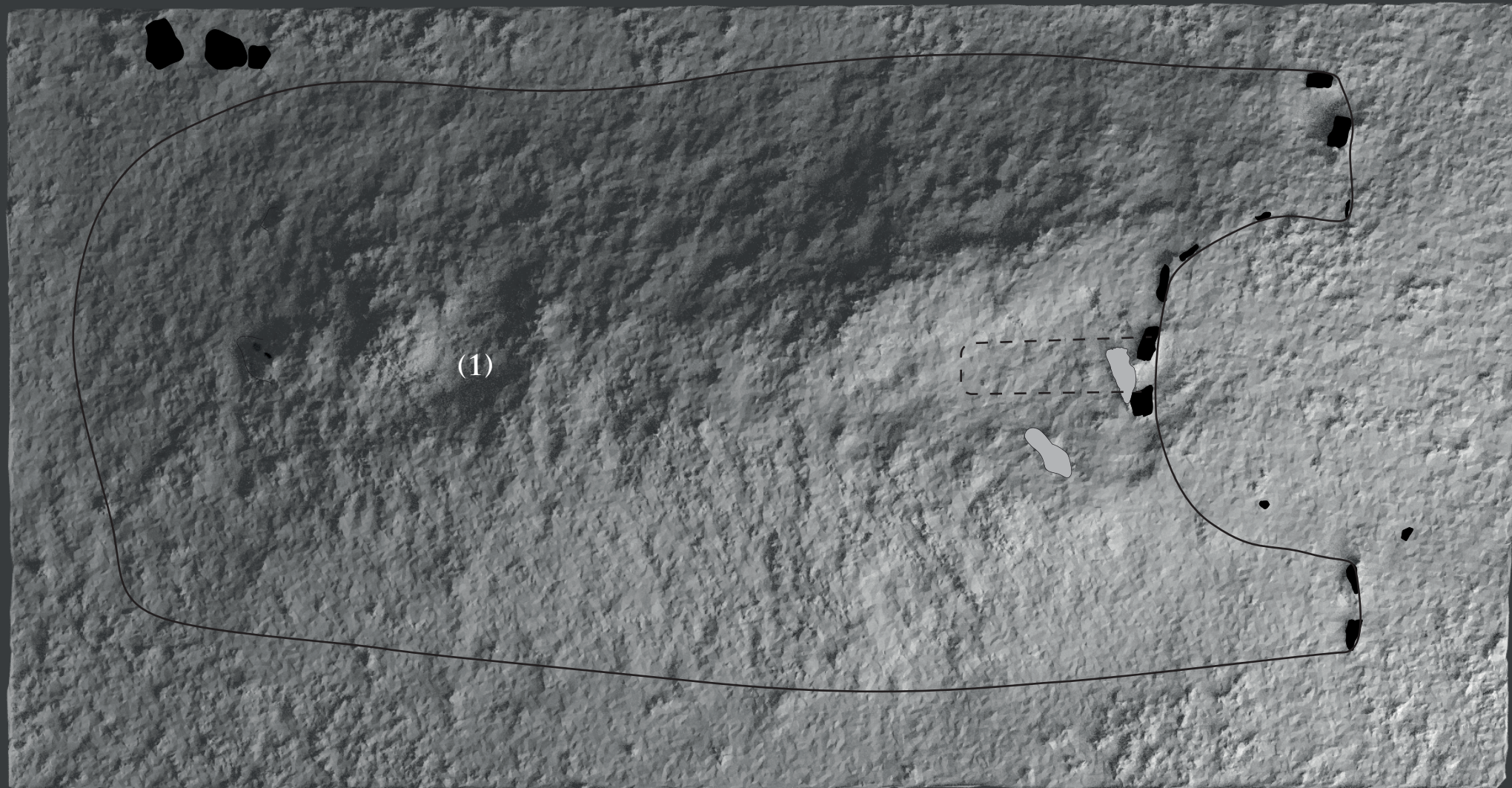


Survey approach

The poor condition of Glenrickard makes it unsuited to 3D recording, and there is little to be gained in 3D depiction of the denuded remains. With the foliage cropped from the laser scan data, a geometric mesh (bottom right) highlights what little remains of the cairn. Glenrickard illustrates an instance of a site where a traditional 2D plan and photographs form the most effective depiction.

Captions (clockwise from bottom left):

Perspective view of Glenrickard, solid geometric mesh from the south; Viewshed analysis of visibility from Glenrickard cairn; Location map of Glenrickard; Photograph of Glenrickard from the southeast, general view; Photograph of Glenrickard chamber 1 from the northeast; Photograph of possible kerb stones at the northeast corner of the cairn.



The large cairn of Carn Ban (survey plan, left) is located in a valley near the Head of the Allt an t-Sluice, a tributary of the Kilmory Water. It projects out from a slight terrace on a steep southwest facing slope at a height of c. 270m OD.

The cairn is a Trapezoidal Clyde-cairn, oriented northeast to southwest, with an orthostat defined forecourt at its northeast end. The forecourt is level and the cairn body rises to the southwest as the slope drops away. The cairn is roughly rectangular in shape measuring 40m by 20m across the forecourt and up to 4m high. The forecourt is defined by at least six earth-set upright orthostats which form a semi-circular area measuring 10m wide by 6m deep. The orthostatic slabs protrude between 0.1m and 0.5m above the ground surface but the forecourt is filled with an accumulation of colluvial material so the orthostats are much larger than they appear. The horns to either side of the forecourt are square ended and are both defined by two orthostats on the southeast and northwest. The entrance to the chamber is 0.9m wide which is defined by two large slabs situated in the centre of the forecourt. The chamber is in-filled following excavations by Bryce in 1902 and its location marked by a depression in the top of the cairn 8.4m in length. Two possible displaced capstones lie on top of the cairn, one immediately behind the entrance and one to the northwest of the chamber. A second possible chamber lies at the southwest end of the cairn. This has an in-situ lintel slab with a 0.2m deep void below. The interior of the chamber is filled with rubble.

At the west corner of the northwest horn there is an orthostat facing along the side of the cairn suggesting a kerb, however no further kerb stones are visible along either side. Within the body of the cairn material there are possible wall faces, formed of courses of dry-stone walling that suggest the body of the cairn may have had a stepped profile.

A second depression (1) southwest of the centre of the cairn may be a later circular structure dug into the cairn body.

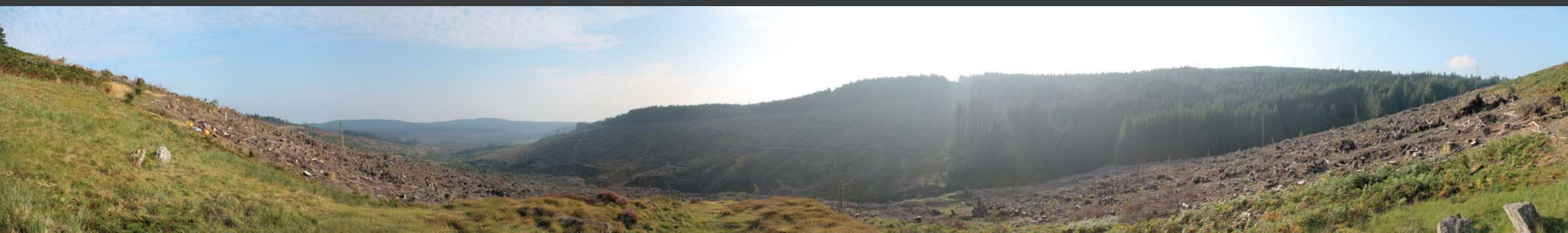
The views from Carn Ban look down the river valley (bottom panorama) in which the cairn sits as far as the ridge of Torr a' Bhennan. This view is mainly of upland moorland areas apart with small areas of lower lying farm land.

Carn Ban

NMRS No: NR92NE 1
NGR: NR 99100 26200

Captions:

Hillshade plan view of Carn Ban with overlain surveyed features (top); Panoramic photograph of views from Carn Ban looking to the east and south (bottom left); Location map of Carn Ban on the Isle of Arran (bottom right).



Carn Ban



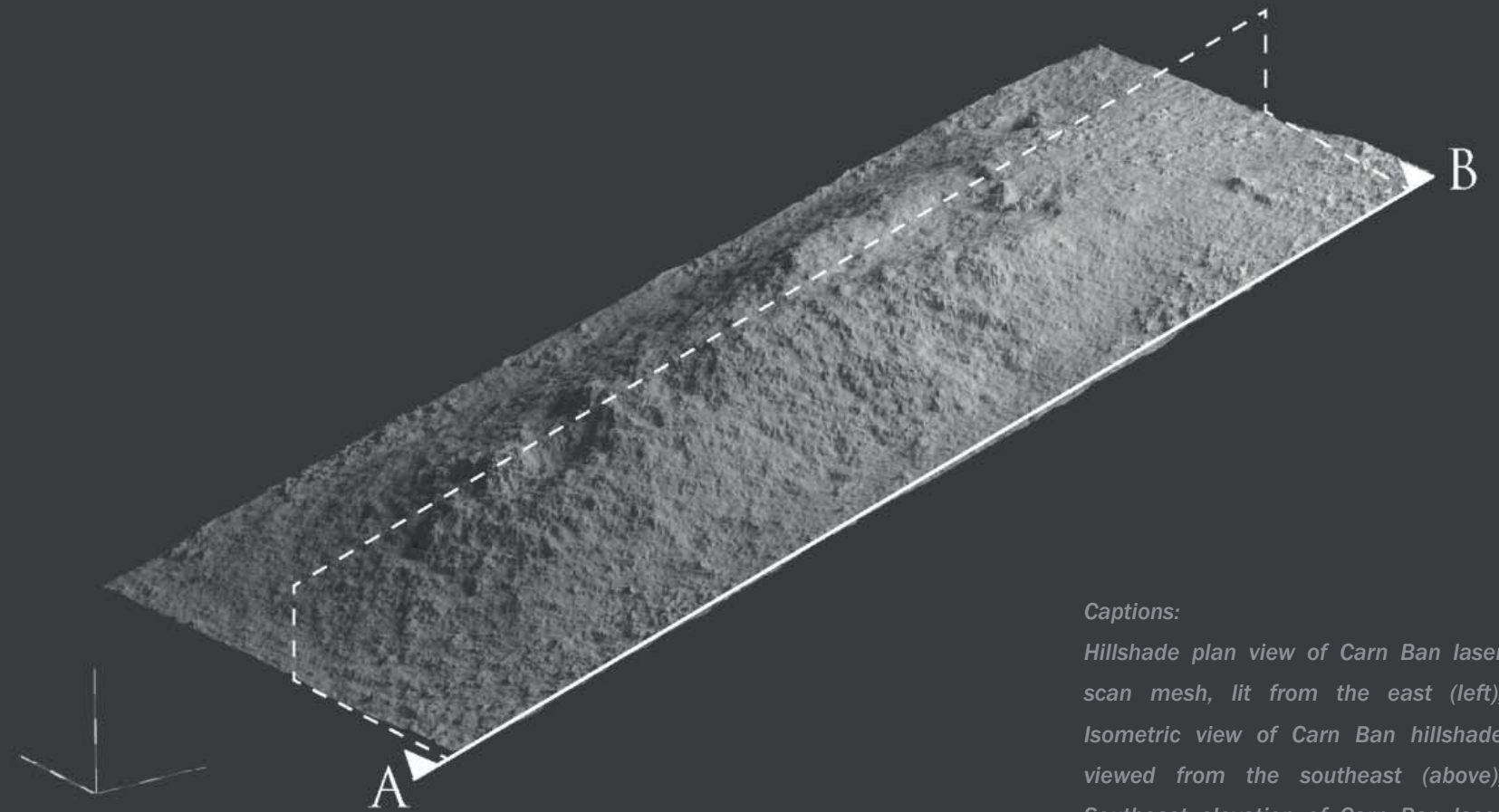
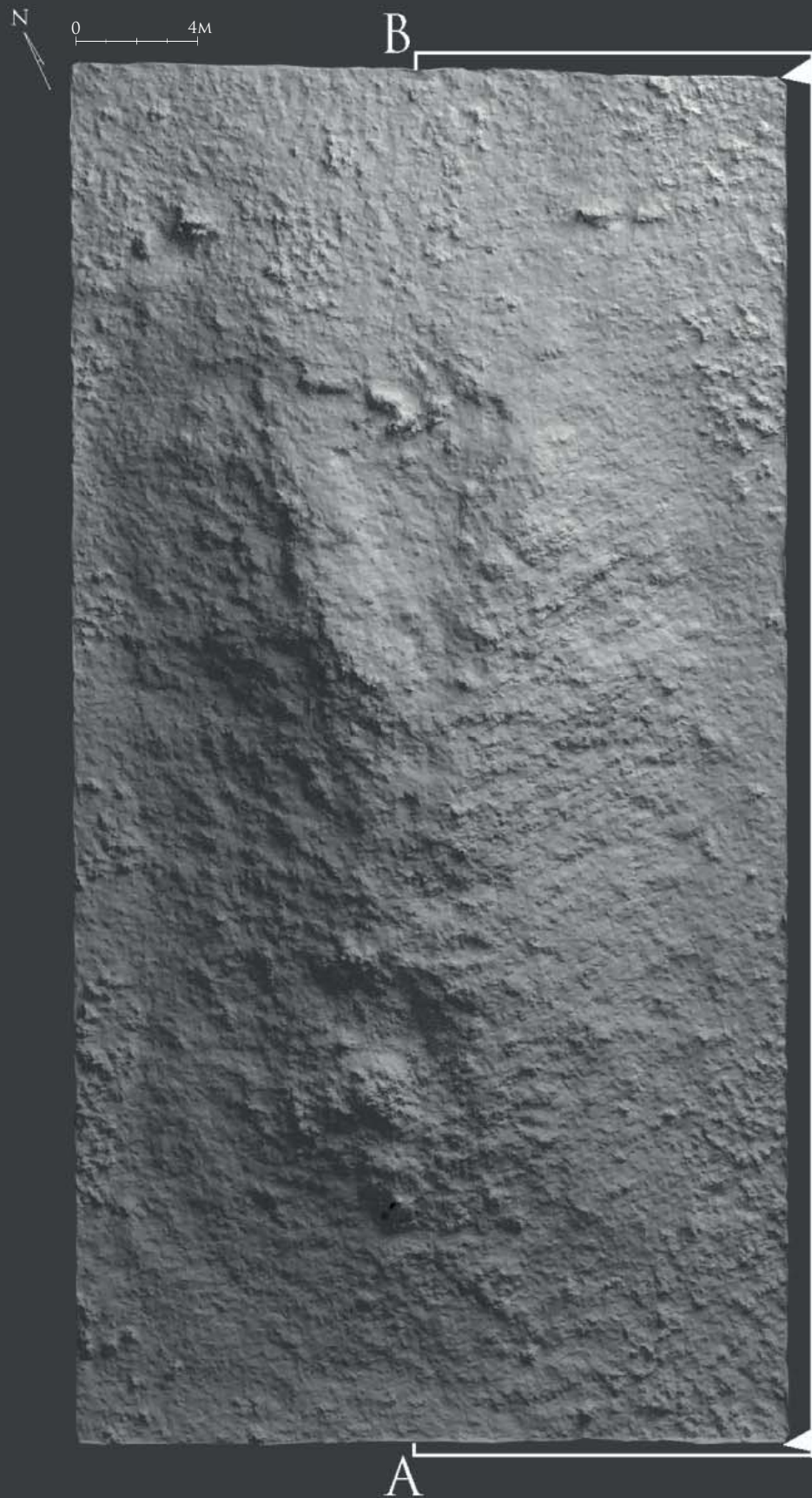
Captions:

Photograph of Carn Ban northwest elevation, from the west (top); Photograph of Carn Ban forecourt from the northeast (bottom left); Photograph of possible hut circle on Carn Ban's southern end, from the south (bottom middle); Photograph of possible stepped construction on the west side of Carn Ban, from the south (bottom right).



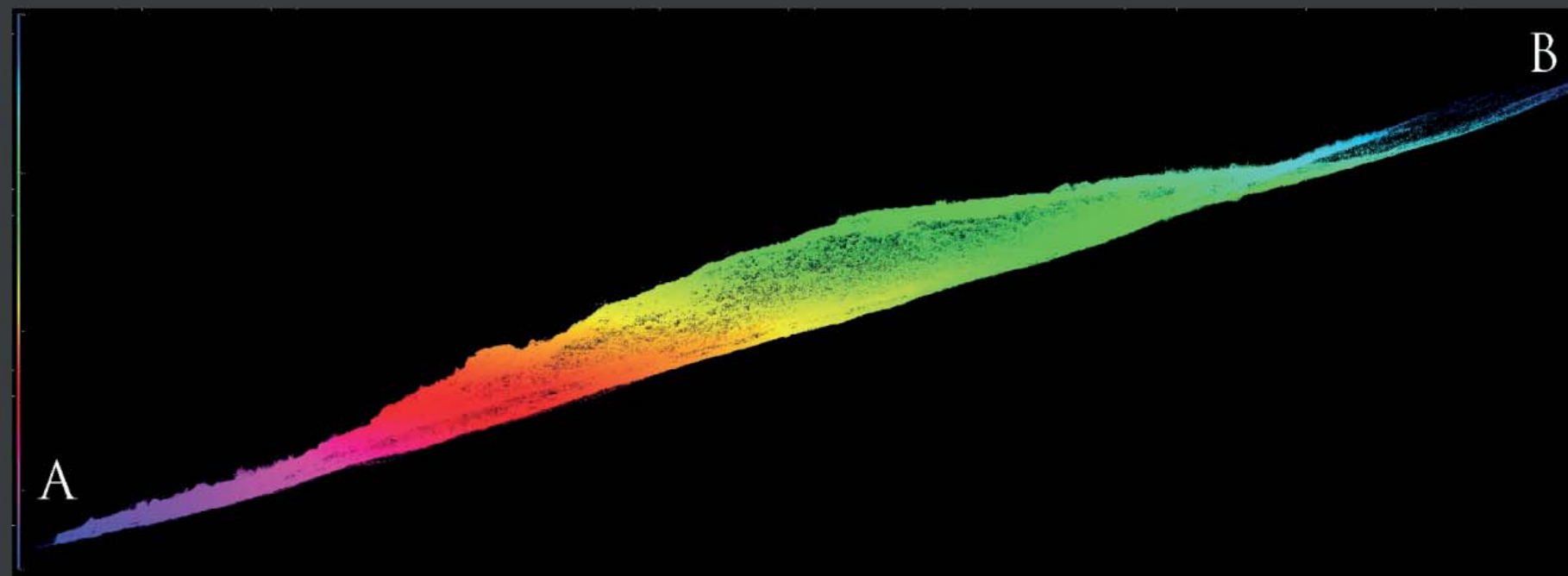
Carn Ban

The meshed laser scan clearly shows the depression around the chamber of Carn Ban when viewed from above and the huge slope that the cairn so prominently sits on when viewed in elevation from the southeast.



Captions:

Hillshade plan view of Carn Ban laser scan mesh, lit from the east (left);
Isometric view of Carn Ban hillshade viewed from the southeast (above);
Southeast elevation of Carn Ban laser scan pointcloud, filtered by height (below).

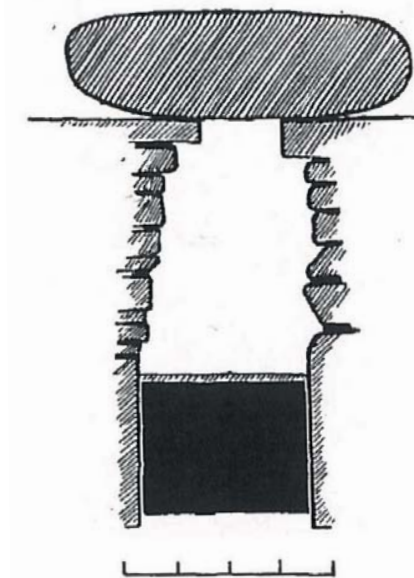


Carn Ban



Captions:

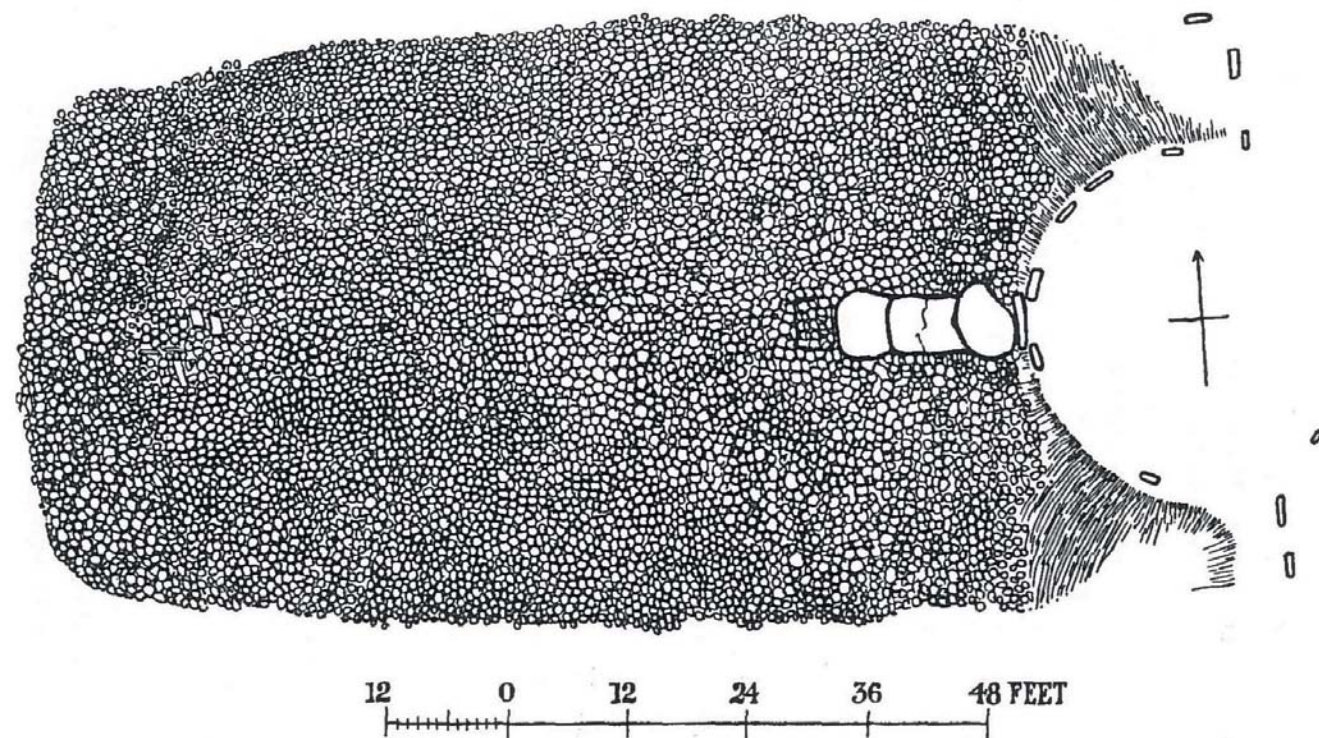
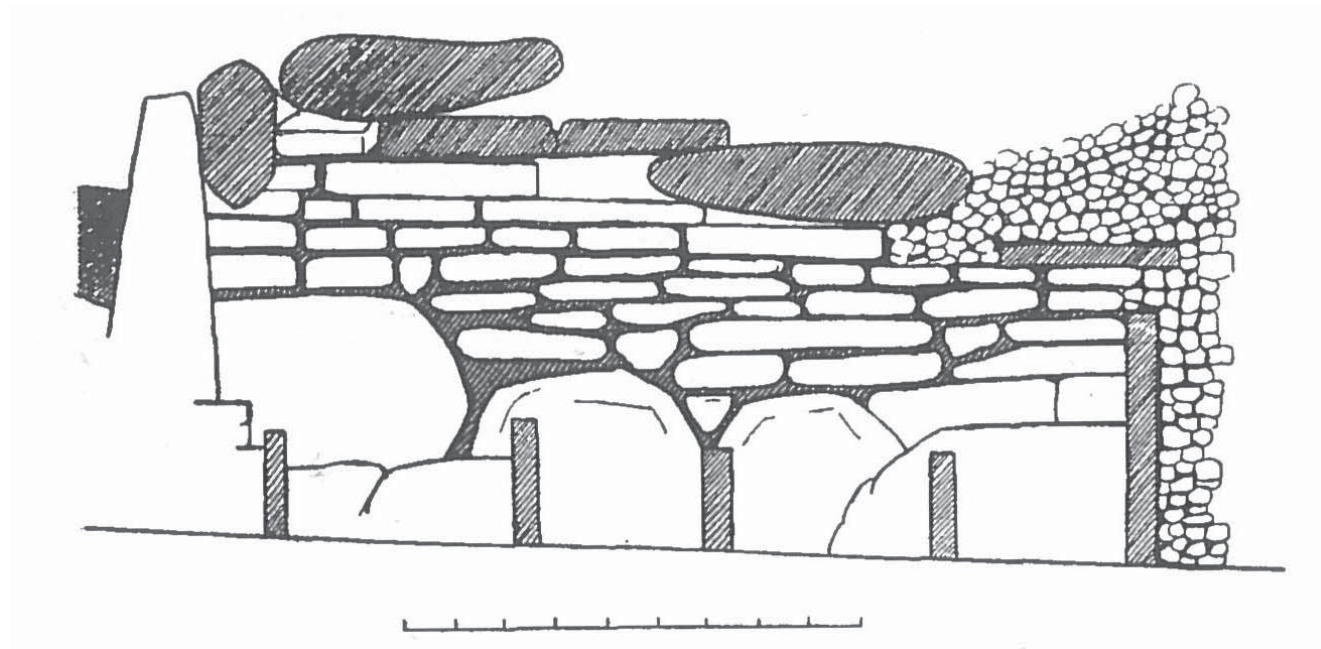
Illustrations from Bryce's excavation report (Bryce, 1903) including: Photograph of Carn Ban from the north (top); Section through the chamber (right); Survey plan of Carn Ban (bottom left); Elevation of southwest internal chamber wall (top left).



Previous archaeological work

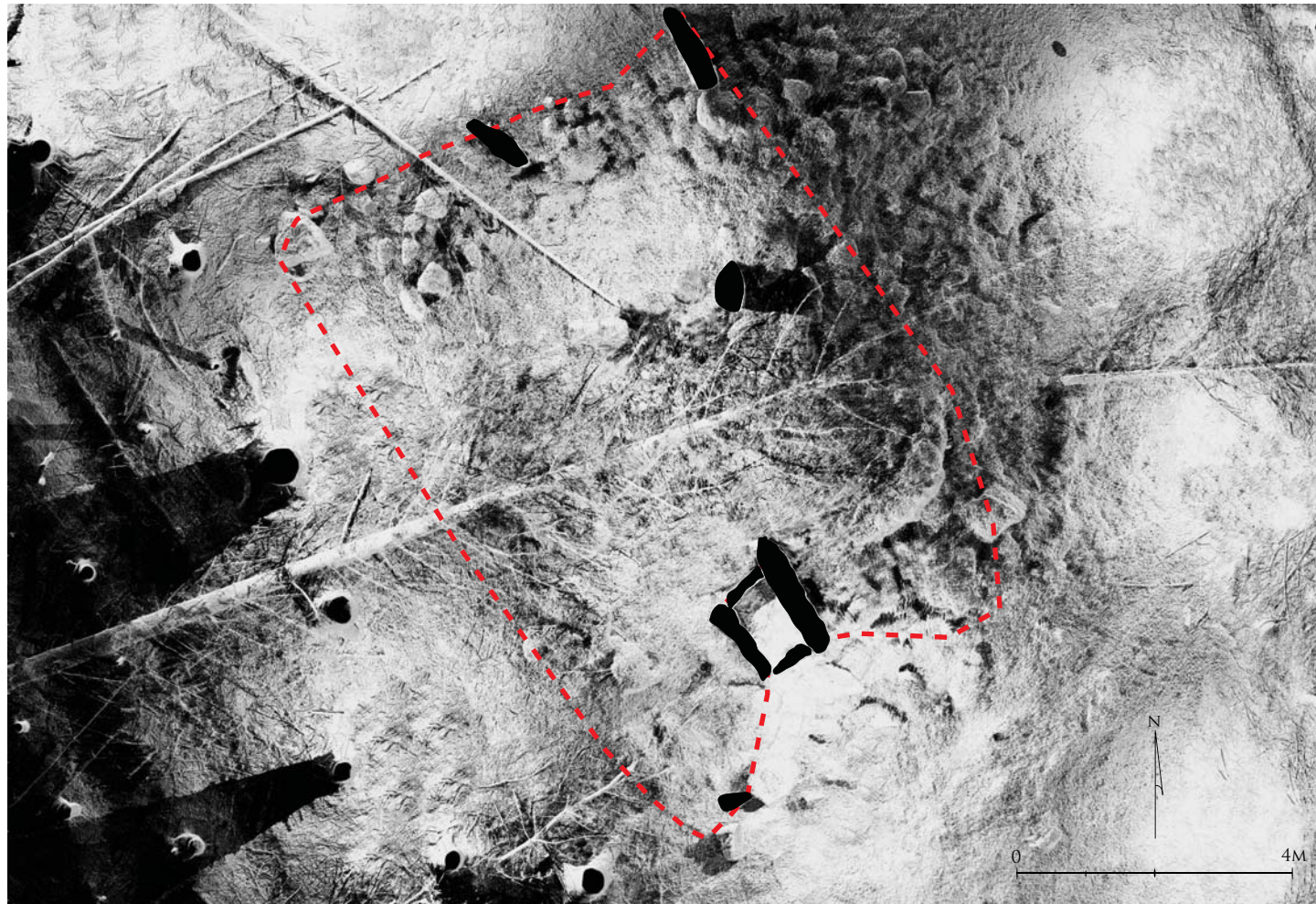
The chamber of Carn Ban was excavated by Bryce in 1902, showing that the chamber was 18ft 8in long (5.6m) and divided into four compartments by septal slabs. The lower walls of the chamber were constructed of four pairs of large, irregular slabs set on edge. The slabs of the two front compartments were set so that they overlap the pair behind, while those of the rear compartments abutted. The upper 3 or 4ft (0.9-1.2m) of the chamber was constructed of corbelled slabs capped by a large sandstone slab. The septal slabs were lower than the side slabs, so that a gap of 4ft to 6ft (1.2m to 1.8m) was left between these and the roof. The chamber was filled with loose earth and stones with charcoal being found at all levels and the bottom of each compartment being covered by a layer of charcoal 2" (0.05m) thick.

There were few artefacts from the excavations. Only a flake of flint, a flake of pitchstone, a fragment of unburnt human bone and a fragment of possibly human burnt bone were found.

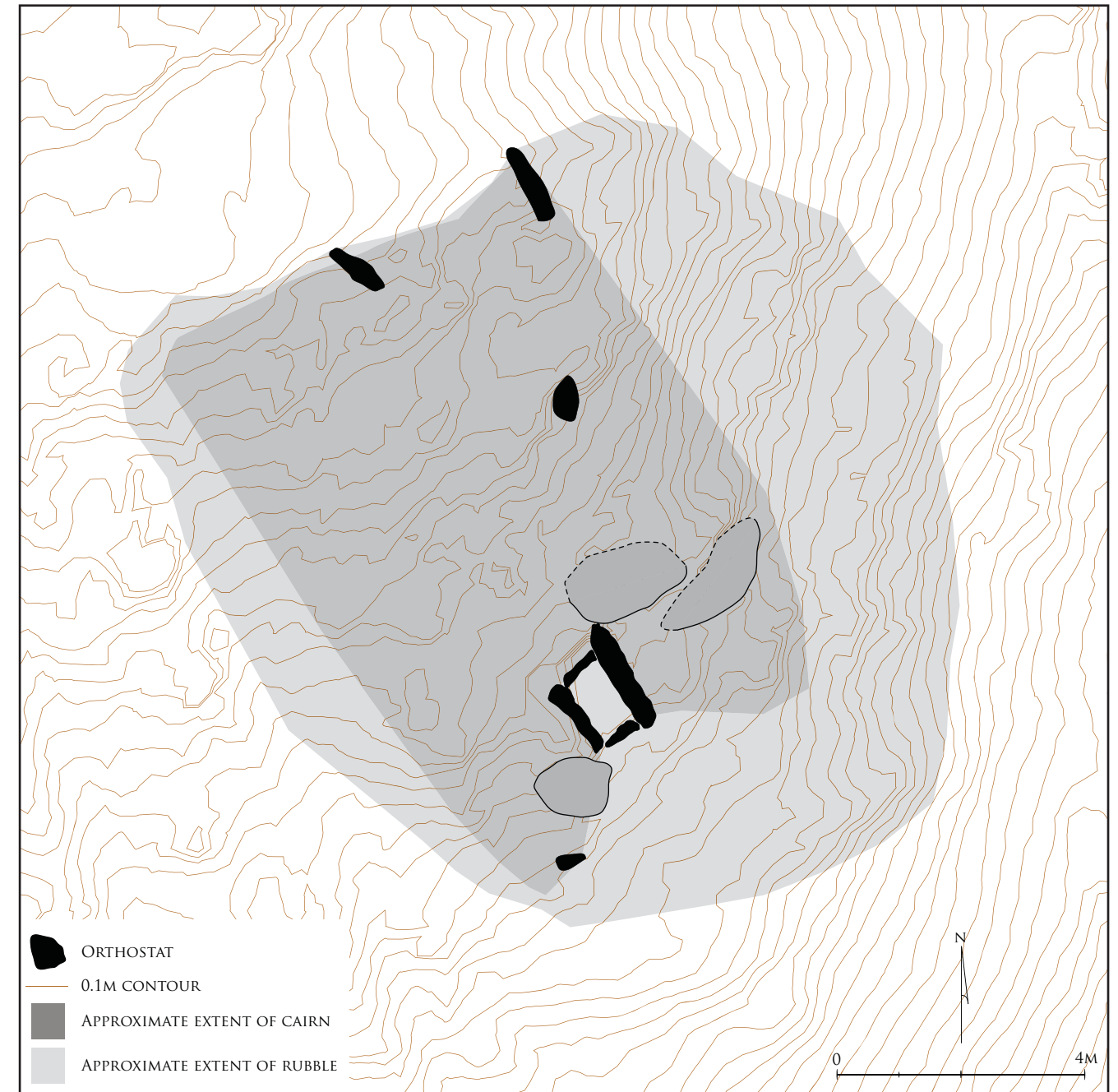


North Sannox

NMRS No: NS04NW 25
NGR: NS 01110 46760



Vertical isometric view of North Sannox chambered cairn showing poor condition and preservation of the site, which has limited the benefits to laser scanning the site over tradition survey techniques.



The chambered cairn of North Sannox lies 270m north of the North Sannox Burn in the north east of the island. The site makes use of a stepped outcrop at c. 70m OD on the southeast facing slope overlooking Sannox Bay.

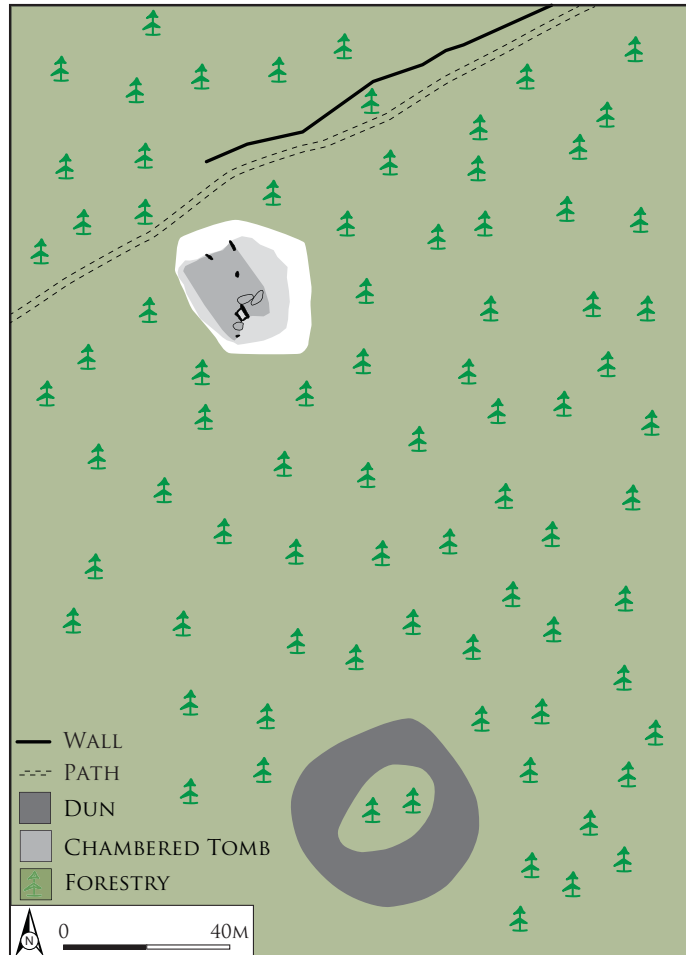
The much reduced remains of this chambered cairn are located in a small clearing in a mature conifer plantation. The cairn body has been reduced by robbing, but several large conglomerate blocks may mark the outer edges of the original cairn on the eastern and southern sides. The main chamber is open and visible, comprised of two large conglomerate blocks oriented north south, forming a compartment 1.4m by 0.7m internally. The facade is ruinous, but a single probable facing stone on the south side indicates that the passage was probably in the region of 2.9m in length. No conclusive evidence for further chambers is visible, but large blocks protruding from the northern part of the cairn may indicate the presence of these. From the putative facade to the northern most part of the cairn, the mound measures c.10m; from the east to west the cairn measures c.6m.



North Sannox cairn with chamber in left foreground, from southeast.

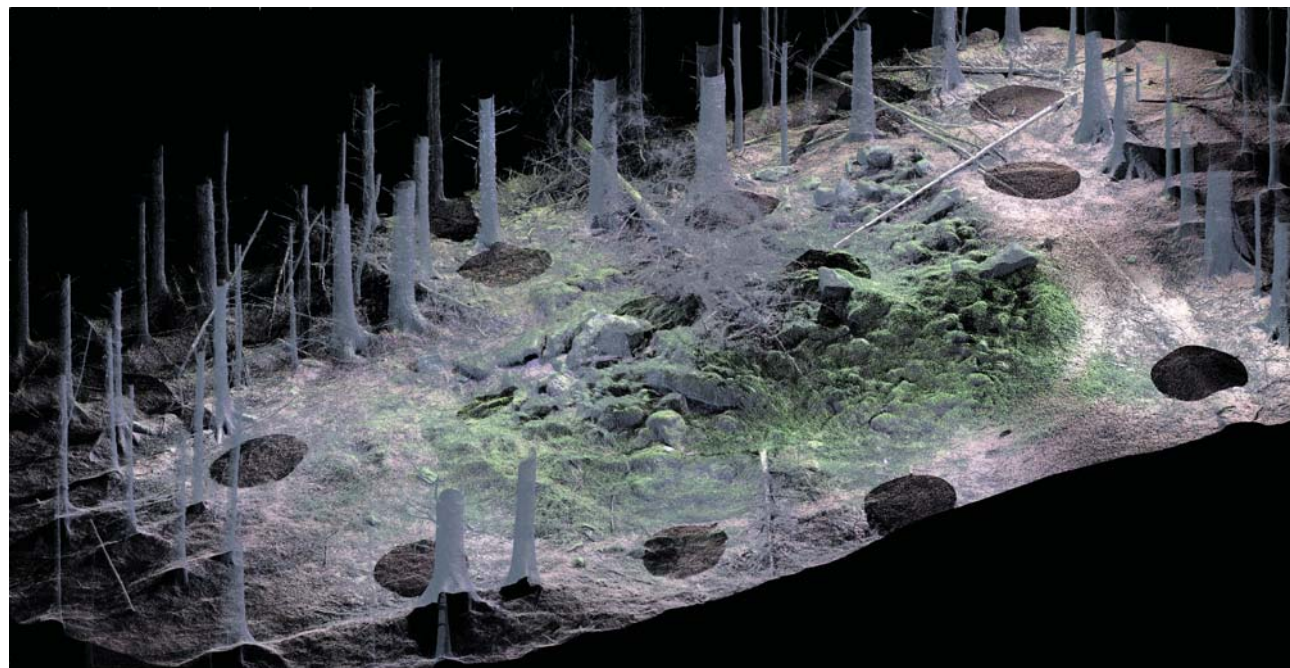


North Sannox



Around 50m to the south of the cairn are the remains of a dun covered by forestry plantation. The dun is sub-circular in plan, measuring 22m in external diameter. The walls of the dun have been reduced to grass, moss and tree covered mounds of stone between 3m and 7m thick.

The cairn is much robbed probably as the source of stone for the dun to the south of the cairn and for a substantial forestry dyke running east to west immediately to the north of the cairn. The stones of the cairn are overgrown with thick sphagnum moss and two fallen trees overlay the cairn at the time of the survey. The encroachment of forestry on the west side of the site has partly damaged the cairn mound but it is not currently at threat from further tree damage.



Isometric view of 3D point cloud, North Sannox cairn, from southeast.



View of dun to south of the chambered cairn of North Sannox showing the northwestern dun wall reduced to a rubble spread. Forestry has covered the walls and interior of the structure.



The chamber of North Sannox cairn, from south.



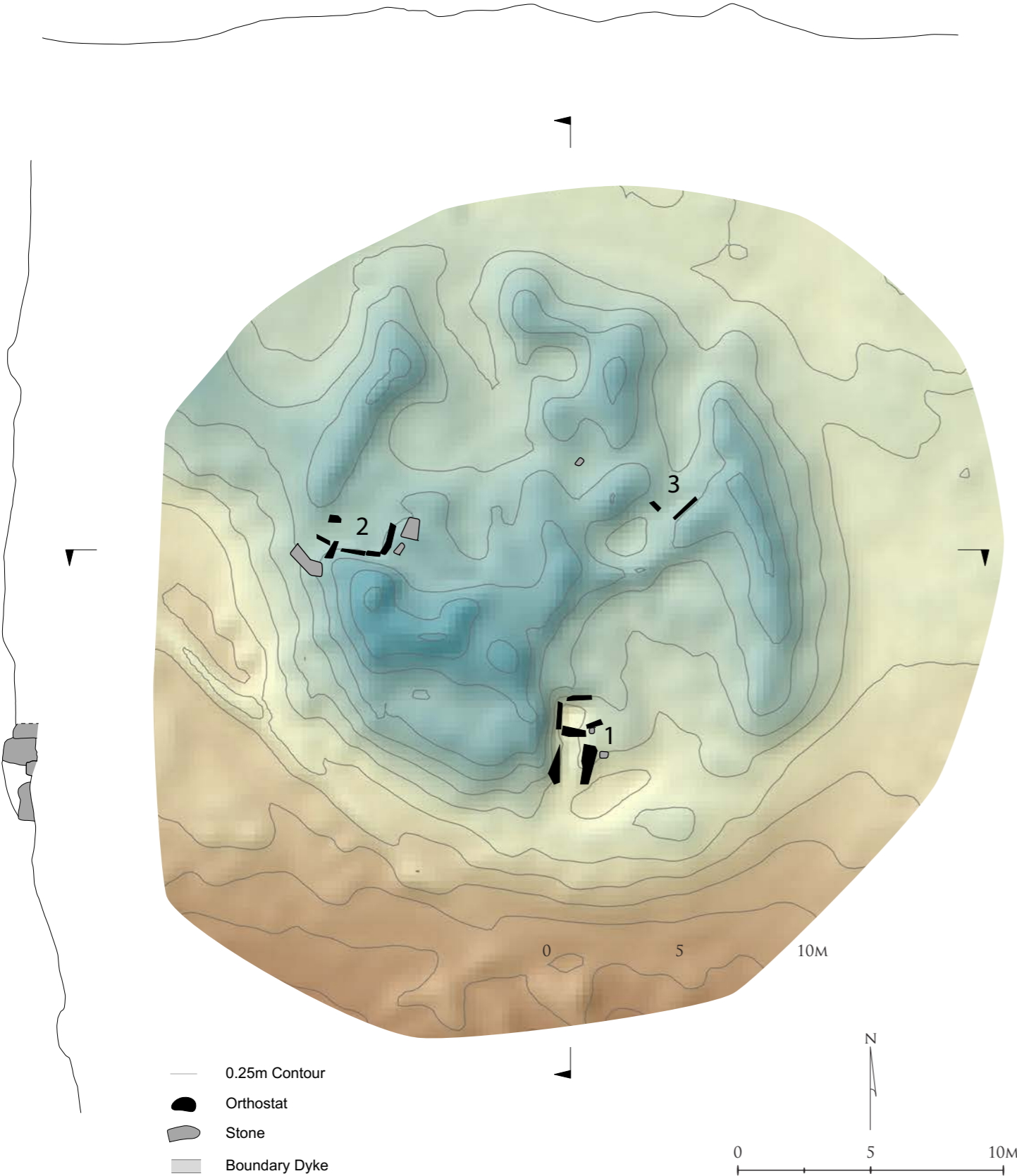
Possible second chamber in northwestern uphill end



While the dense forestry obscured the views commanded by the site is possible due to the dense forestry. The location suggests that the site would have a good view to the sea to the southeast with a more enclosed view to the uphill northwest.

Dunan Mor

NMRS No: NS03SW 7
NGR: NS0280 3315



Description

Dunan Mor (NGR: NS 0280 3315; NMRS: NS03SW 7) comprises a round cairn of Clyde type, located in a forestry clearing on the southern edge of a terrace in the south facing slope above Whiting Bay. Immediately below the cairn the ground drops steeply away, the trapezoidal cairn of Dunan Beag lies 190m to the south-east. The round cairn, measures 24.6m north to south by 24.0m east to west. The cairn which is now much robbed, has well defined edges although no signs of a kerb are visible. There are three chambers in the cairn, to the south, west and north-east of the cairn.

The chamber to the south (1) is the clearest being 3.1m long and is composed of three large orthostatic slabs, divided by a septal slab into two compartments. The western chamber (2) extends for 2.2m and comprises a single side slab to the south and an end or septal slab. To the exterior of this chamber an orthostat lies perpendicular to the chamber and may be a facade stone. The north-eastern chamber (3), is defined by a hollow 4.1m in length, on the south-east side of which an upright slab is visible, a possible septal stone lies within the hollow at the south-west end of this slab. All three of the chambers are now partially filled with rubble and overgrown with grass and heather.

The interior of the cairn is much robbed and is now reduced to an uneven grass and heather covered mound with many hollows. Immediately to the south of the cairn is a field dyke of which much of the cairn body may have been robbed to construct.

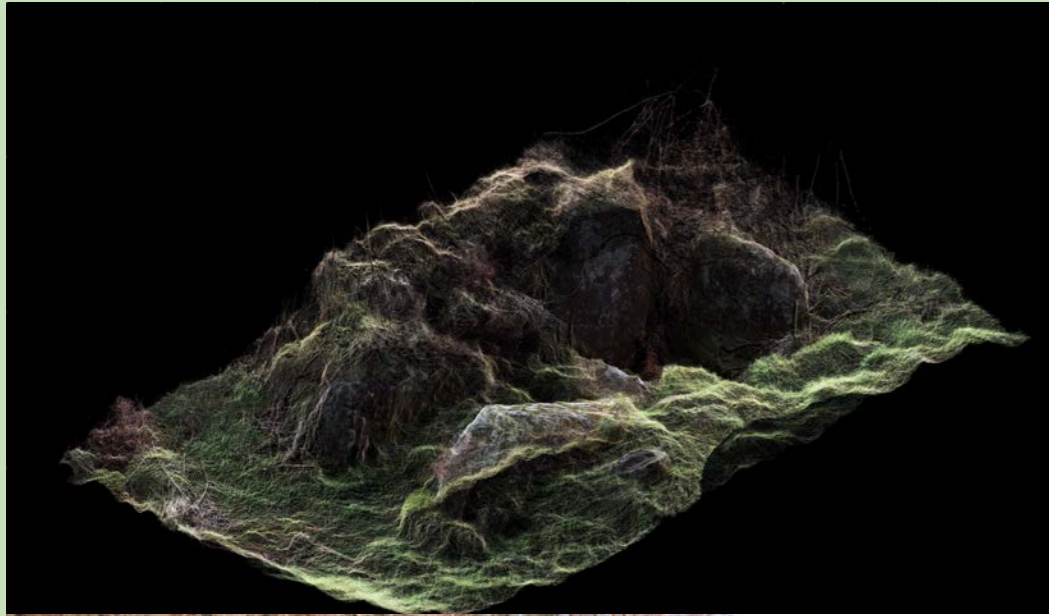
Condition

Although the body of the cairn is now much robbed a substantial volume of the cairn body remains. Only the southern chamber is clearly visible in the undulating cairn surface. The cairn lies within a clearing in the forestry and no significant threats to the integrity of the monument were observed at the time of the survey.



Captions (clockwise from above):
Location map of Dunan Mor;
Photograph of chamber 1 from the southeast;
Survey plan of Dunan Mor;

Dunan Mor

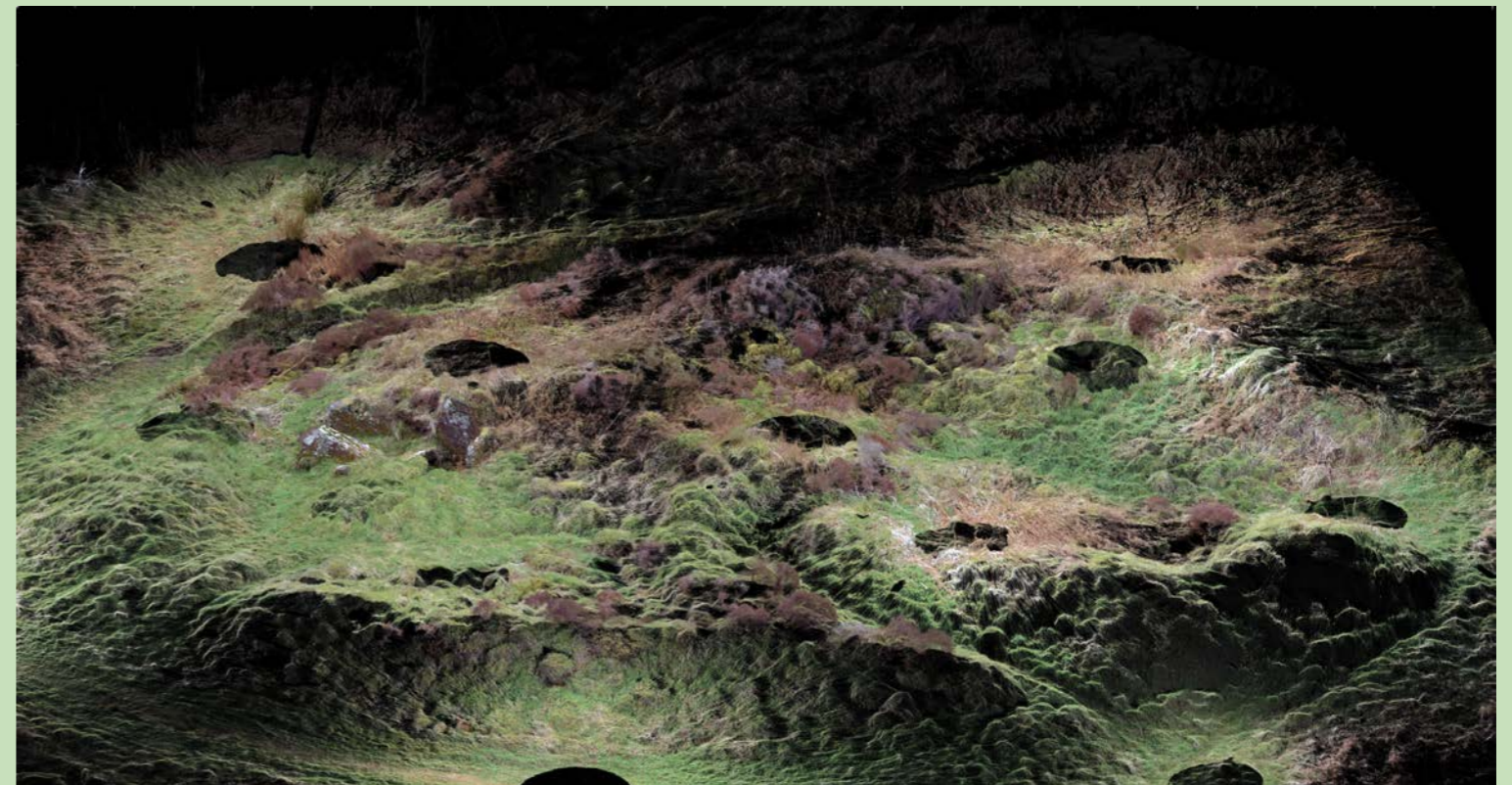


Visibility

Currently there is limited visibility from Dunan Mor due to dense forestry, from the limited views available however it is clear that Dunan Mor commands impressive views over Whiting bay and surrounding low lying ground, as well as out over the Firth of Clyde to Holy Isle and further.

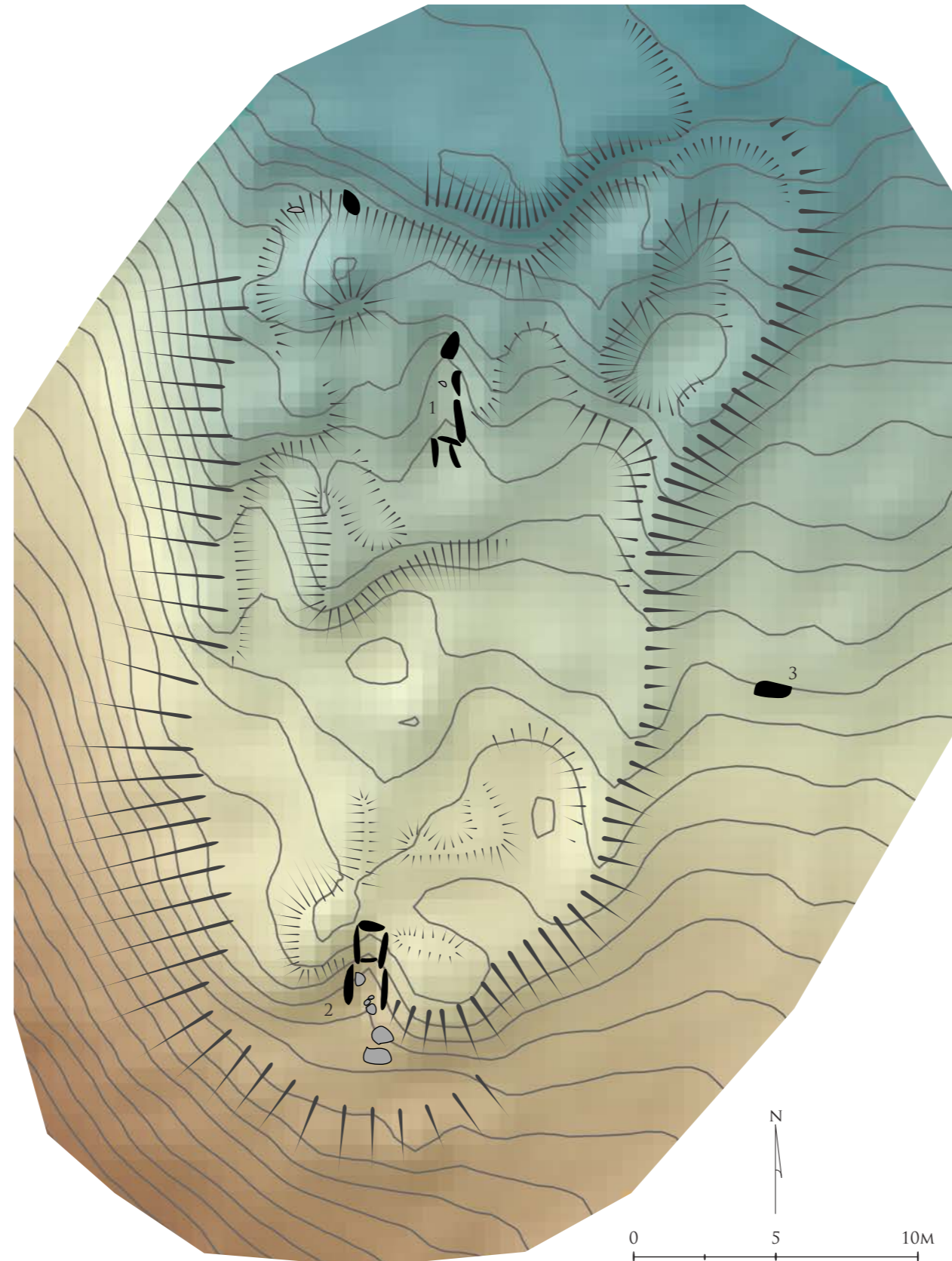


Captions (clockwise from bottom right):
 Orthographic view of Dunan Mor from north-east;
 Photograph of chamber 2 from north;
 Photograph of chamber 2 from north-west;
 Orthographic view of chamber 1 from south-east;
 Orthographic view of chamber 1 east facing elevation (centre)



Dunan Beag

NMRS No: NS03SW 8
NGR: NS 0267 3299



— 0.25M CONTOUR  STONE  ORTHOSTAT

Description

Dunan Beag (NGR: NS 0267 3299; NMRS: NS03SW 8) this trapezoidal horned cairn of Clyde type occupies a clearing in dense forestry on a south facing slope above Whiting Bay. Dunan Beag lies immediately 190m downslope from the round cairn of Dunan Mor. The cairn is oriented north-east to south west and two chambers are visible within the cairn. A solitary standing stone lies to the immediate east of the cairn.

Little detail can be discerned about the structure of the cairn, however it is clear that a concave forecourt formed the northern end of the cairn, with the north-eastern horn the most visible element. When visited by Pennant in 1772 this end of the cairn was 'large, oblong composed of round stones, with several great stones at the end, some extending beyond the cairn', suggesting a large orthostat defined forecourt forming the north end of the cairn. To the south the cairn merges with the hillside. The cairn is much reduced by stone robbing to a low mound of rubble with numerous humps and hollows.

The northern (1) of the two chambers is poorly preserved being defined by three upright slabs to the east with a solitary slab surviving on the western side. The southern chamber (2) is 2.9m long and comprises five upright slabs, divided into two compartments by a septal slab. Large stones to the south of this chamber may be displaced side slabs or capping stones.

A prominent standing stone (3) lies to the east of the cairn (NMRS: NS03SW 11), this stone is 1.2m broad, 0.5m thick and 2.2m high.

Condition

The cairn is much robbed and covered in grass and heather with the cairn surface being covered in mounds and hollows. The cairn lies in a forestry clearing and while with the trees lie close to the monument, neither they nor anything else are presenting a significant threat to its integrity.

Captions (left to right):

Scanning the southern chamber (2) at Dunan Beag;

Survey paln of Dunan Beag;

Location map of Dunan Beag.

Dunan Beag



Captions (clockwise from top left):

The southern (2) chamber at Dunan Beag from the south;

The northern chamber (1) of Dunan Beag from the south-west;

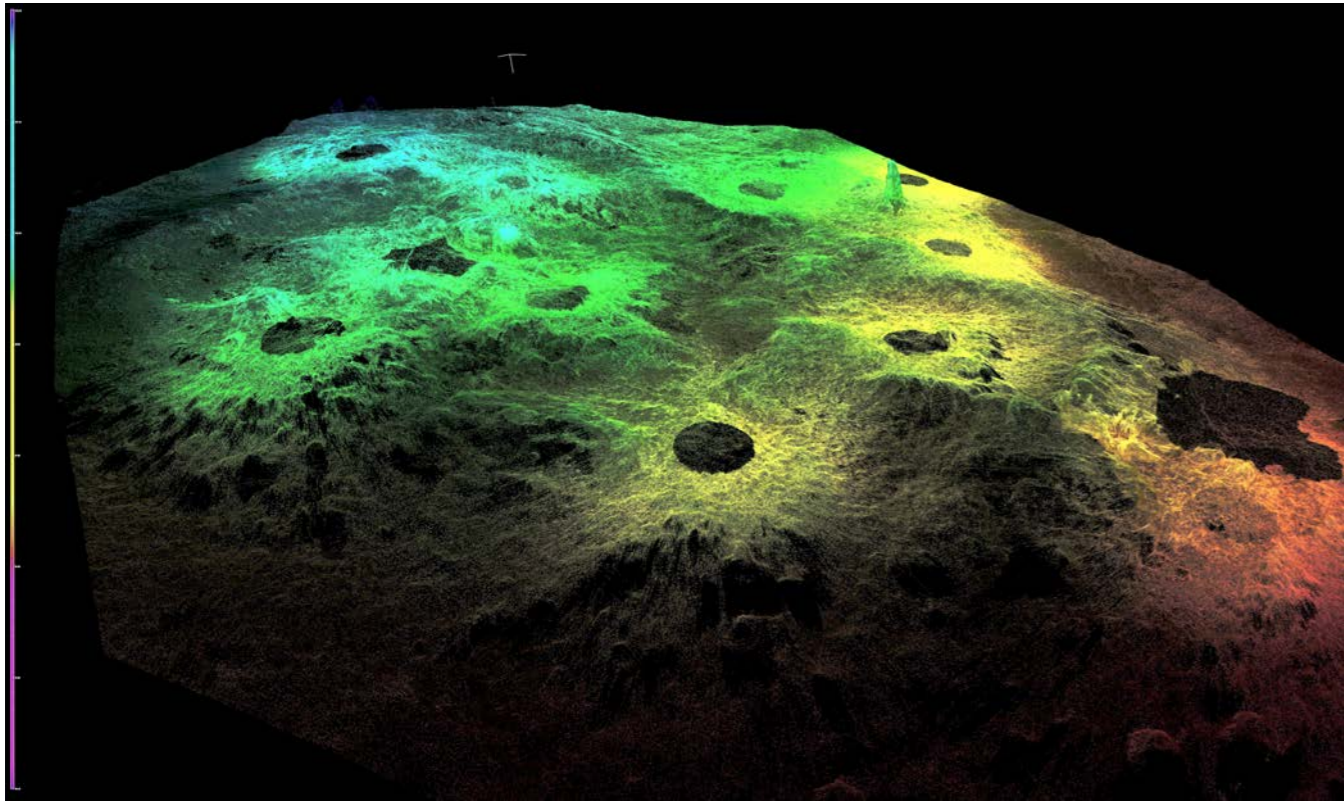
The southern chamber (2) of Dunan Beag from south-east;

The northern chamber at Dunan Beag from west;

Standing stone (3) to the east of Dunan Beag from south.



Dunan Beag



Captions (clockwise from above):

Orthographic view of the point cloud showing a plan view of Dunan Mor;

The cairn from the east;

The cairn and standing stone from the northeast;

The cairn and standing stone from the southeast;

Perspective view of the point cloud, filtered by height, from the southwest .

Aucheleffan

NMRS No: NR92NE 2
NGR: NR97840 25050



Description

This four poster stone circle is located near the head of the Allt nan Tighean a tributary of the Kilmory Water. The site sits on a terrace at c.228mOD on a gentle southeast facing slope high above the south coast of Arran. The site sits in a clearing surrounded by recently felled commercial forestry.

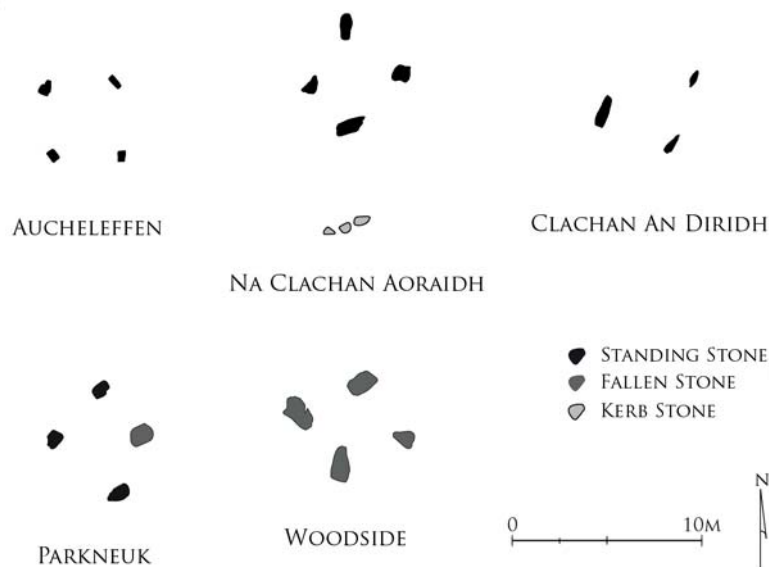
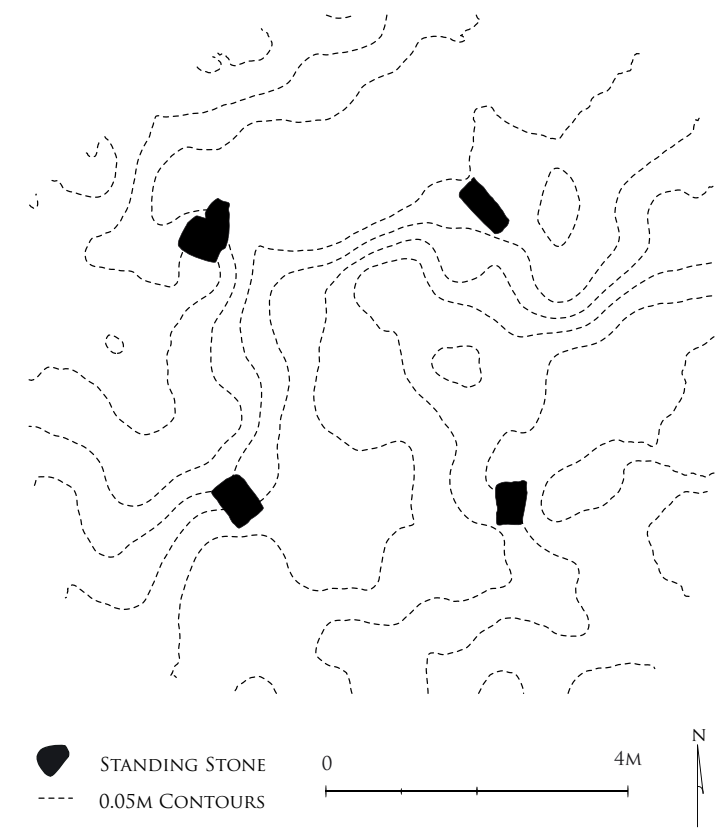
The stone circle is 6.1m in diameter with stones at the northeast, southeast, southwest and northwest points. The stones vary in height between 0.5m and 1.0m and are between 0.5m to 1.0m wide. To the northeast of the four poster there is a possible set stone that may be related to the stone circle.

Views

There is a limited view upslope and of the immediate vicinity down slope. There are, however, clear views in the middle distance to the peak of Torr Dubh Mhor and the ridge of Torr a' Bhennan

Previous archaeological work

The site was excavated by Bryce in 1902 who dug a central trench with spurs radiating off to the base of the four orthostats, which were embedded to around 2ft (0.6m). Bryce found nothing that he felt was of note. A slight hollow in the centre of the stone circle, visible in the contour plan to the right, may mark the site of Bryce's excavations



Comparable sites

Aucheleffan has a quadrilateral arrangement formed by four large orthostats. Similar four poster stone circles are particularly found in northern Perthshire such as Na Clachan Aoraidh, Clachan an Diridh, Parkneuk and Woodside (see left). Aucheleffan's stones are similar in size and shape to the Perthshire circles but the site's north/south orientation differs from the more common north-east/south-west alignment.

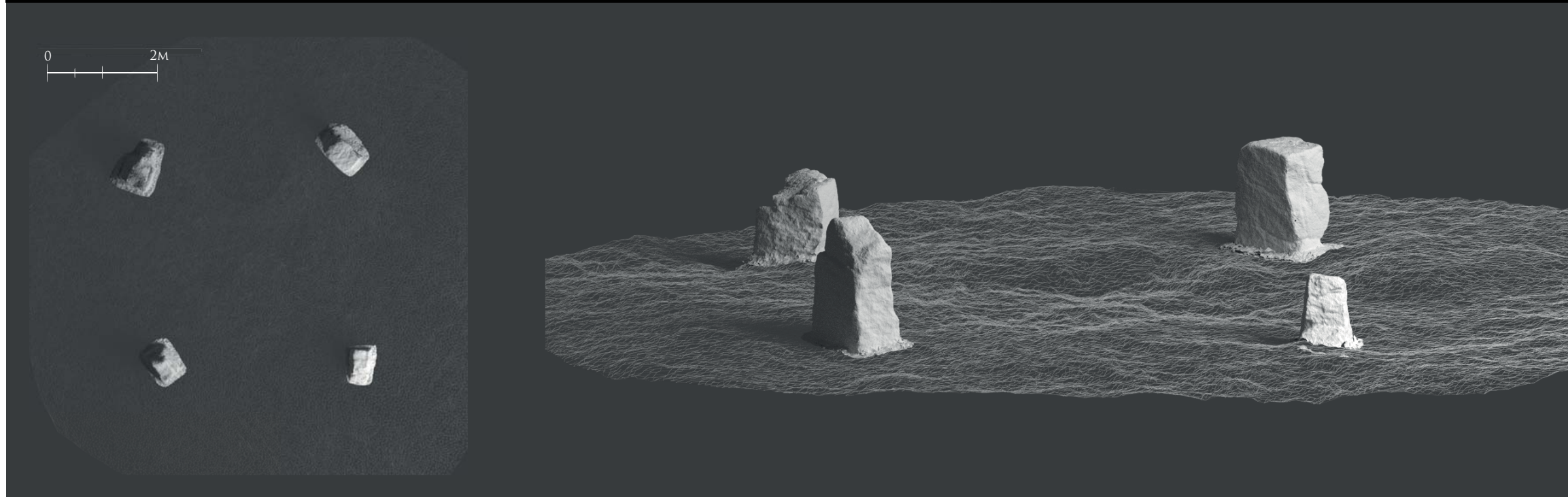
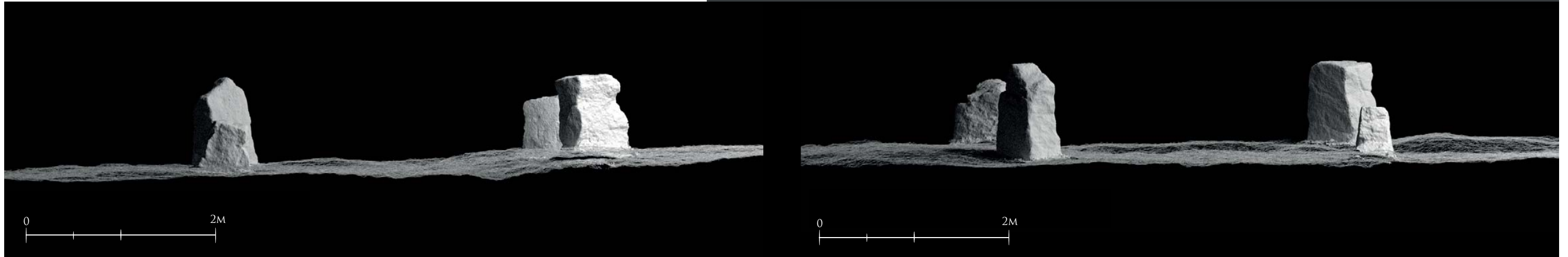
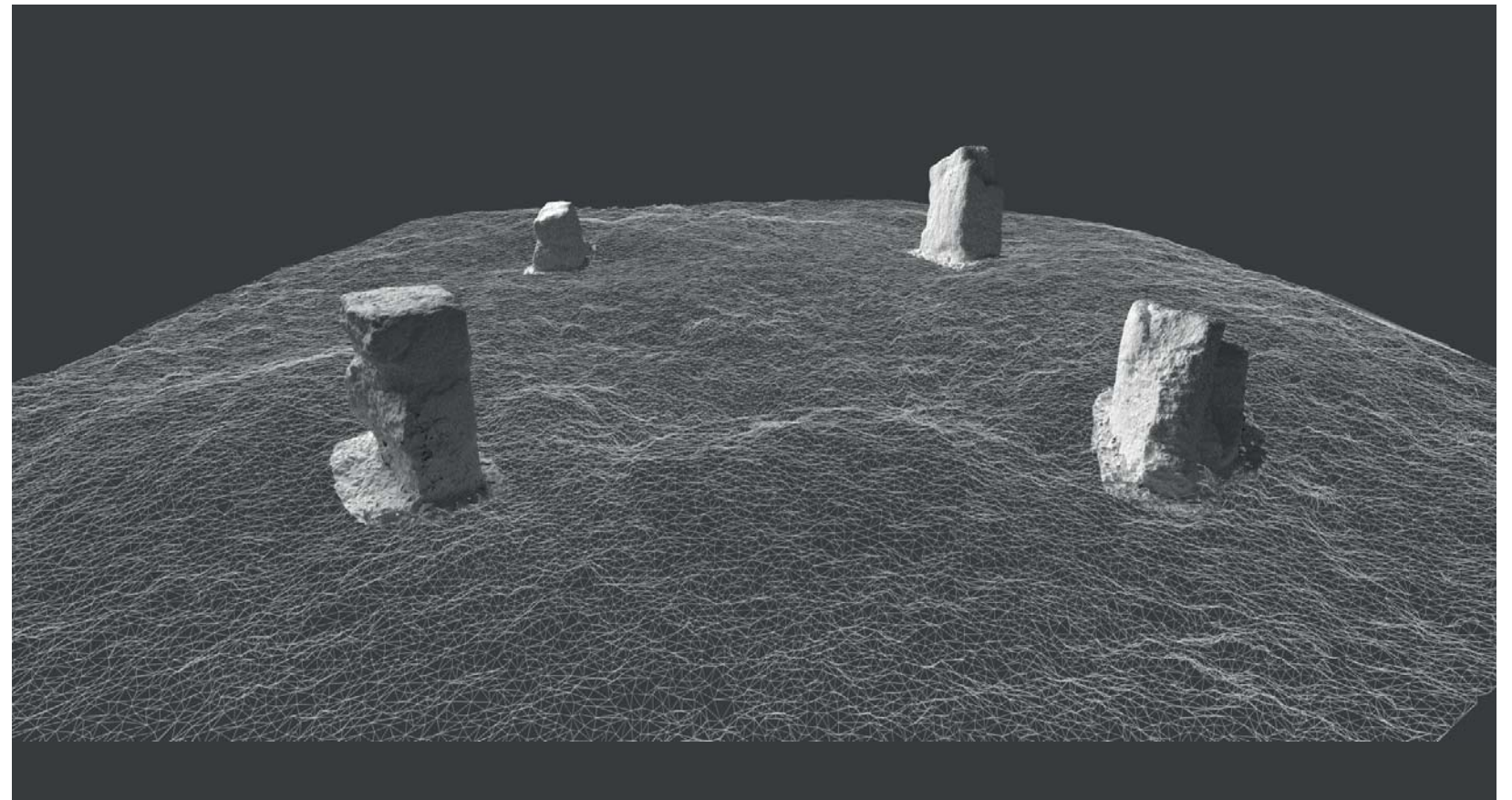
Captions (clockwise from top right):

Photograph of the site from the northeast; Site contour plan created from laser scan data; Comparable plans of four poster stone circles from Perthshire; Photograph of northwest stone from the southeast; Photograph of southwest stone from the northeast; Photograph of northeast stone from the southwest; Photograph of southeast stone from the west; Map of Arran showing location of Aucheleffan.



Aucheleffan

The survey of Auchelleffan demonstrates the value of 3D recording, allowing the visualisation of the site from a range of angles, both in orthographic and perspective views.

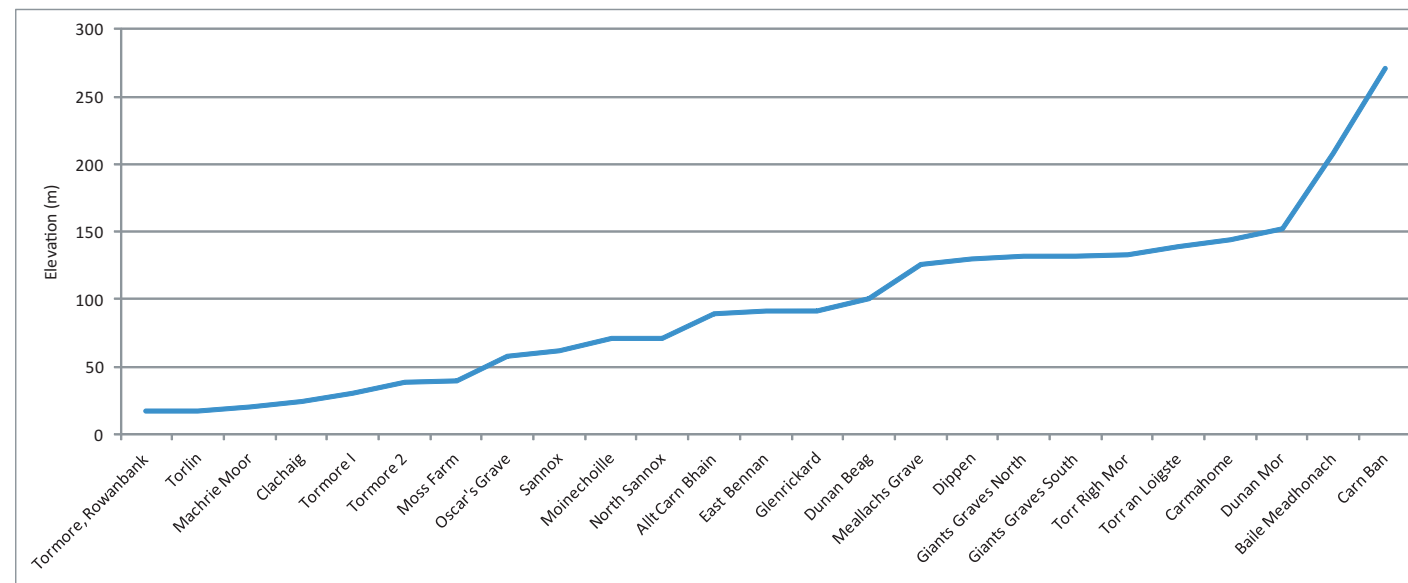


Captions:
Perspective view from north (top); south elevation, orthographic (middle, right), east elevation (middle, left); perspective view from south (bottom, right); orthographic plan (bottom, left).

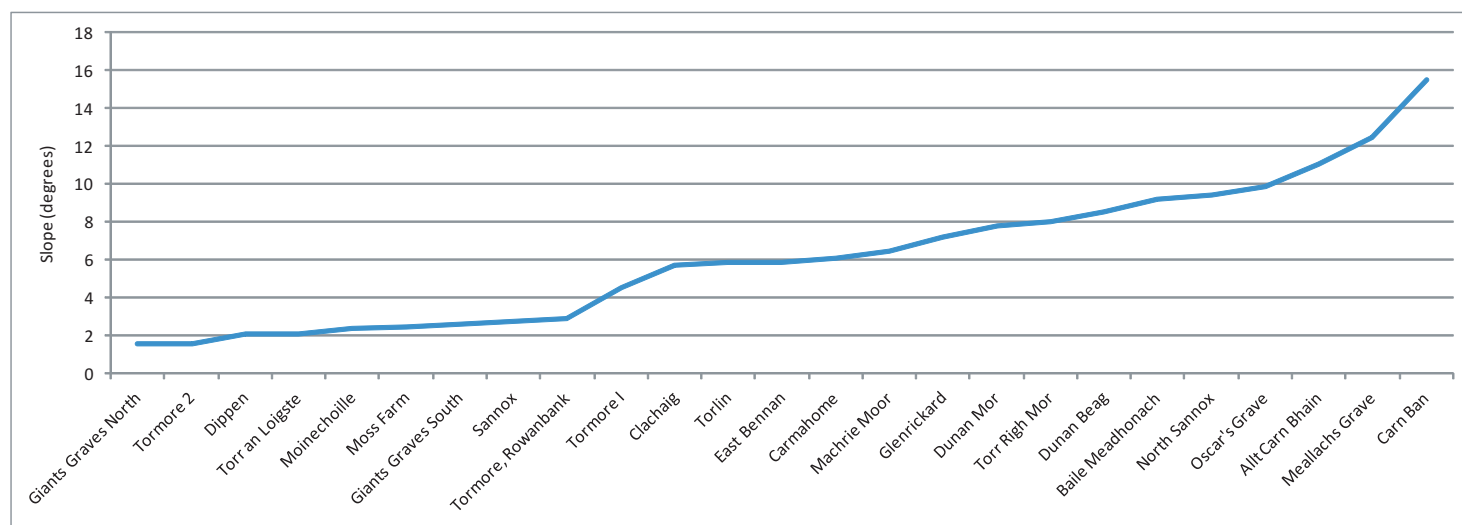
Topography and visibility

Topographic location is clearly a significant factor in the design and construction of chambered cairns on Arran. The choice of locations with good views is a recurrent theme, a characteristic that the cairns of Arran share with other such monuments throughout the British Isles. Elevated shoulders of terrain overlooking agricultural land are typical locations, though there are significant variations in the altitude and slope gradient selected for the construction of the cairn itself. 18 of the 26 chambered cairns on Arran are located between the 50m and 280m contours, with eleven of those located above 100m OD (graph 1).

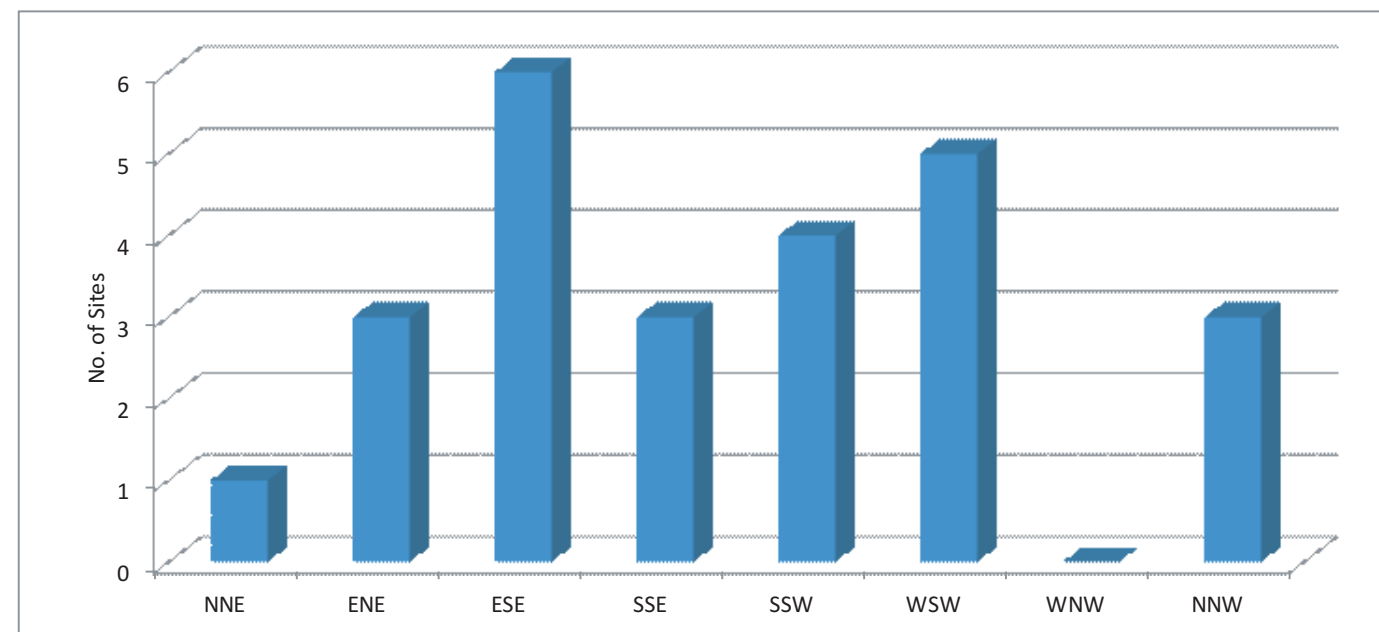
Slope aspect does not seem to have been a significant constraint, although there are a few more cairns located on SE and SW facing slopes than northerly directions (graph 2). It is, therefore, likely that the view commanded by a particular position was prevalent over the absolute orientation of the slope. Slope gradient is very variable: some cairns, such as Giants Graves North, were built on near-level terraces while some, like Meallach's Grave, Carn Ban and Allt Carn Bhain were built on slopes with gradients of up to 15 degrees (graph 3). On those examples where the cairn is built on a steep gradient, the facade is typically oriented upslope, suggesting that the view behind the cairn was important, perhaps providing a backdrop to the cairn and visible to onlookers located upslope.



Graph 1: Elevation distribution of chambered cairns on Arran.



Graph 3: Slope gradient distribution of chambered cairns on Arran.



Graph 2: Slope aspect distribution of chambered cairns on Arran.

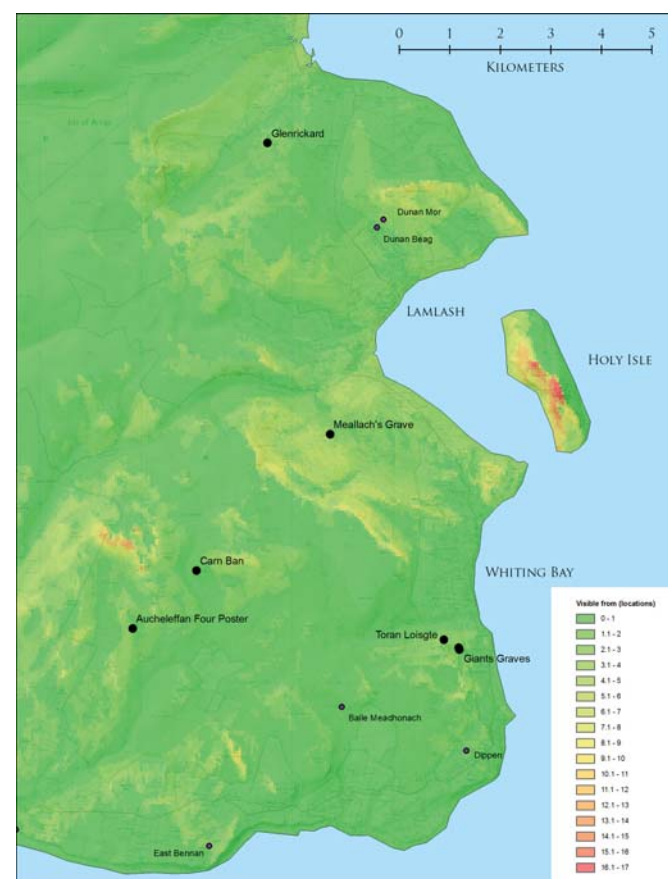


Panorama of the view towards Holy Island from Torr an Loigste

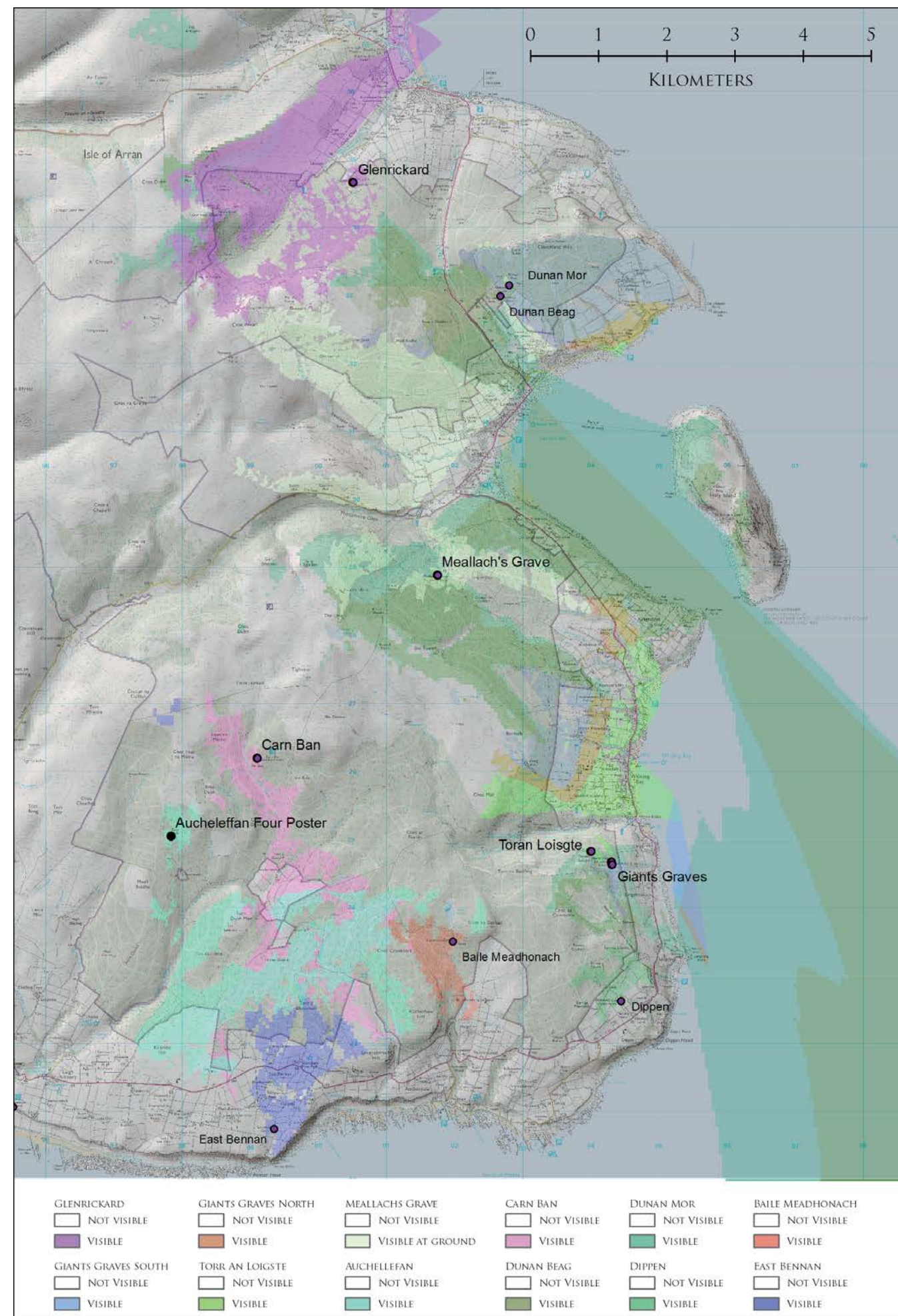
Topography and visibility

Viewshed analysis demonstrates that cairns were located in locations with views that typically did not overlap with the viewshed of neighbouring cairns (viewshed map 1). Most sites are not intervisible, with only one chambered cairn, at Dunan Mor, Ardenadam (NS03SW 7) visible from more than two other cairns. In order to test the significance of this distribution, cumulative viewshed analysis was carried out for 50 randomly generated locations in SE Arran, distributed in topographic positions constrained by the ranges within which cairns are found (i.e. between 50 and 270m OD and on slopes of 15 degrees or less). Although only a small population with which to assess significance, the results suggest that locations were selected that commanded views distinct from those of neighbouring cairns (see viewshed maps 2 and 3).

The viewshed from chambered cairns has been discussed in terms of its significance in connecting the communities who built them with a wider world (Cummings 2009: 161-2), with typical views from cairns on Arran, Jura and other western Scottish islands encompassing the sea and other communication routes. While this may be the case for some cairns, the distribution of cairns in southern Arran would suggest that command of unique views was the primary concern, so that issues of territory and land holding may be the overriding factors in the selection of location and view.



Viewshed map 2 (left): Areas of shared visibility between chambered cairns in SE Arran, demonstrating the typically mutually exclusive viewsheds. Viewshed map 3 (right): areas of shared visibility between 50 random locations in SE Arran, constrained by altitude and slope gradient on which cairns are found.



Viewshed map 1: Viewsheds from an observer 1.8m tall to ground level from the locations of chambered cairns in SE Arran, coloured by site.

Topography and visibility

