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Archaeological Survey &  
Investigation

# Worlebury hillfort and the linear earthworks to its east, Weston-super-Mare, North Somerset

Mark Bowden

Discovery, Innovation and Science in the Historic Environment



WORLEBURY HILLFORT AND THE LINEAR  
EARTHWORKS TO ITS EAST  
WESTON-SUPER-MARE  
NORTH SOMERSET

Archaeological Survey Report

Mark Bowden

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## SUMMARY

Worlebury hillfort occupies the western end of a wooded east-west ridge, Worle Hill, on the northern edge of Weston-super-Mare. It is a partly multi-vallate hillfort with stone-built ramparts. Excavations in the 19th century revealed structural details of the ramparts and numerous storage pits in the interior. The site is overgrown and has suffered recently from neglect and vandalism. Following a condition survey in 2017-18 an analytical earthwork survey was requested and undertaken by Historic England's Archaeological Survey & Investigation team in 2018-19. This survey also included the currently un-Designated linear earthworks to the east of the hillfort. The survey has elucidated some evidence about the use of the hillfort and its subsequent history but much remains obscure.

## CONTRIBUTORS

This work was requested by John Etté and Alessandra Perrone of Historic England's South West Region. Survey and investigation was undertaken by the author with Olaf Bayer, Edward Carpenter and Rebecca Lane, who all commented on a draft of this report and contributed to it. The plan was digitised by Olaf Bayer and drawn for publication by Sharon Soutar (Figs 2 to 6); Olaf Bayer also prepared the location map (Fig 1). Other drawings are by the author. All photographs are by the Investigators.

## ACKNOWLEDGEMENTS

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## ARCHIVE LOCATION

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## DATE OF SURVEY

After initial visits in the summer of 2018, survey was undertaken between December 2018 and March 2019 with a further field visit in July 2019.

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‘The task of the writer who would fain rehabilitate the Worlebury of the past, and trace its long and eventful story, may aptly be likened to that of the Israelites in Egypt, when required to make bricks without straw’

Dymond 1902, 87



*Frontispiece: Worle Hill from Brean Down, February 2019; both these headlands are very prominent when seen from the sea, bracketing Weston Bay*

*Cover image: The eastern main rampart (j) of the hillfort; January 2019*

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## INTRODUCTION

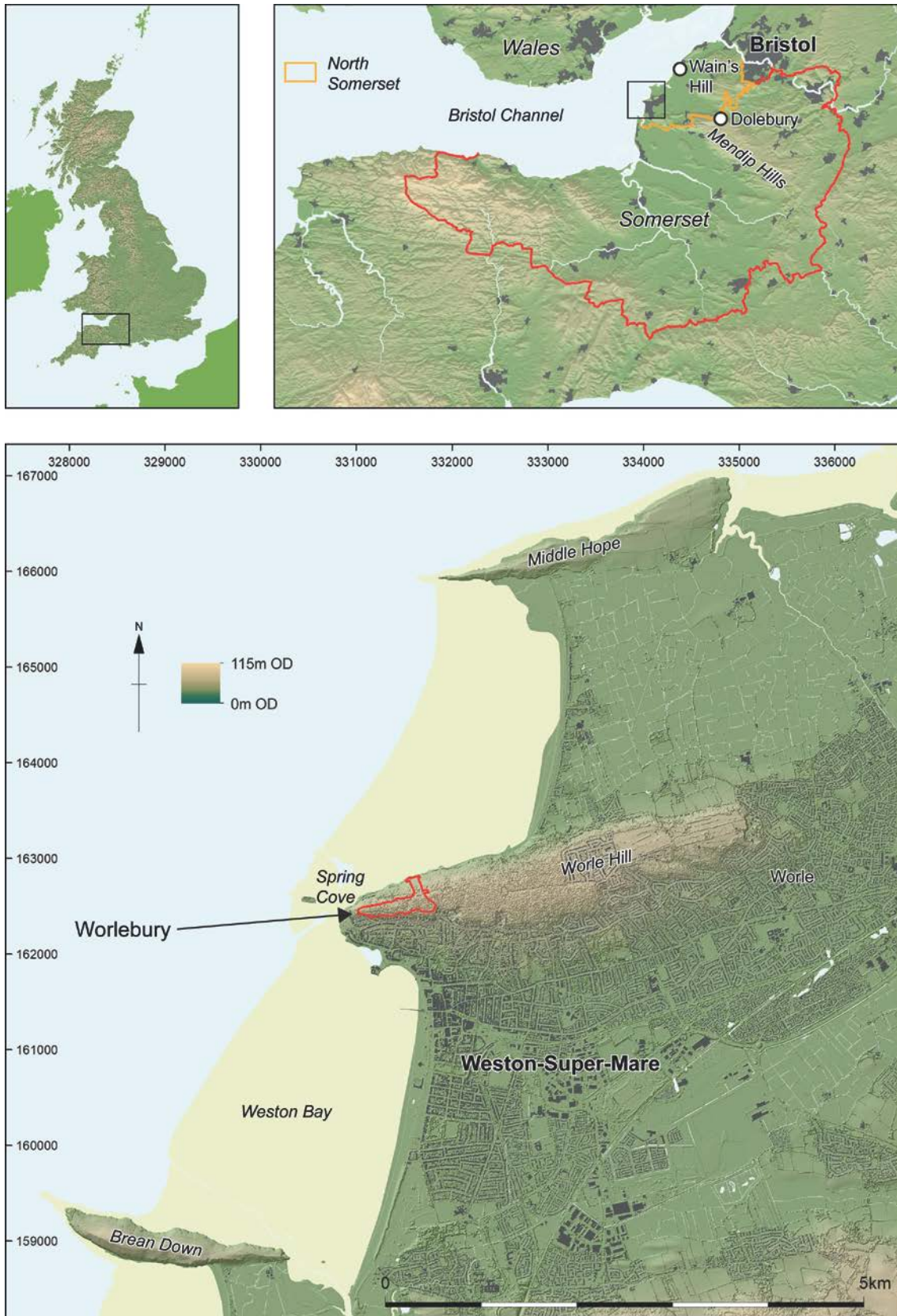
Worlebury hillfort occupies the western end of a wooded east-west aligned ridge, Worle Hill, on the northern edge of Weston-super-Mare (Fig 1). The western end of Worle Hill is in effect a coastal promontory, one of three (with Brean Down to the south and Middle Hope or Sand Point to the north) thrusting into the Bristol Channel. The hillfort was well known to generations of antiquaries and was extensively investigated in the 19th century but has had less archaeological attention recently. It is included in the NRHE as 192721 and is a Scheduled Monument (1011260). Earthwork banks and ditches to the east of the hillfort (NRHE 192801) are currently excluded from the Scheduled area. Concerns about the deteriorating state of the monument through neglect, vandalism and the encroachment of ever-denser vegetation prompted the addition of the site to the Heritage at Risk Register in 2017. A condition survey was undertaken by Cotswold Archaeology in the winter of 2017-18 (Robinson and Morton 2018). At the same time the South West Region of Historic England (HE) requested a Level 3 analytical survey of the hillfort and the earthworks to the east from HE's central Archaeological Survey & Investigation team; this was carried out over the winter of 2018-19 (Figs 2 to 6, inside rear cover).

### Geology, topography and land use

Worle Hill is an outlier of the Mendip Hills, formed of Carboniferous Limestones with an intrusion of Basalt. The hillfort itself lies mainly on Clifton Down and High Tor Limestones with overlying Goblin Combe Oolite on its southern flank, the Spring Cove Basalt forming the cliffs along its northern edge. The limestone contains deposits of lead and calamine. The calamine has been extensively exploited by mining from the 16th century and the lead possibly from an earlier date; mining continued until the middle of the 19th century (Evans 1980, 19; Bateman and Russett 1999, 31, map D). Worle Hill is a steep-sided ridge which rises from the top of low coastal cliffs to a height of about 115m OD, though the hillfort itself is at no more than 95m OD. The western end of the hill is surrounded by the tidal waters of the Bristol Channel to the south-west, west and north. At some time in the past the sea extended further to the east in Weston Bay, rendering Worle Hill a more protruberant promontory, and the town of Weston-super-Mare is largely built on blown sand and marine alluvium. Formerly pasture, the hill was planted with timber trees in the 1820s (Brodie *et al* 2019, 10). The timber was harvested during the First World War and re-planted. The woodland was well managed for many years but has been somewhat neglected recently. The southern slope of the hill, overlooking the town of Weston-super-Mare, was built up in the 19th century with villas and other residential housing (Brodie *et al* 2019) and is now largely occupied by the gardens of these dwellings.

One area of the hillfort's interior has been cleared of woodland and is known as The Glade. A regular programme of scrub control at The Glade and the eastern ramparts is carried out by North Somerset Council every January. Volunteers from the Worlebury Hill Fort Group carry out vegetation clearance on The Glade throughout the year and have begun to extend their efforts to other parts of the hillfort. There is

a long term plan to clear the hillfort of woodland entirely (with the exception of some rare specimen trees) and return it to open pasture.



*Fig 1 (previous page): Location map. Topography derived from 90m SRTM data courtesy of CGIAR <http://srtm.csi.cgiar.org>; and 2m photogrammetry ©Airbus Defence and Space Ltd; Bluesky International Ltd; Getmapping PLC. All other mapping derived from OS data © Crown copyright and database right 2019*

### **Previous archaeological research**

Apart from some brief mentions in the 18th century the hillfort was first described by Rutter (1829, 44-7). He saw it before it was planted and was able to appreciate the views afforded by its position. He describes the ramparts, a 'square excavation, about five feet deep and seven feet square' with sides of loose stone and 'several curious circles, difficult to explain, about 28 or 30 feet in diameter' mostly towards the western end but with one near the centre 'composed of separate stones, surrounded by a slight shallow excavation or ditch'. It is not now clear what he was seeing but the 'curious circles' may have been hut circles (*see below*). He also noted the existence of the 'subterranean passage from the top, through the rock to the lower part of the hill' on the north side of the fort. The Rev J Skinner had previously noted 'small circles cut in the rock' and excavated some of them but found nothing (Evans 1980, 4); whether these were the same circles seen by Rutter is unclear. In 1833 a small hoard of Roman coins is supposed to have been found in the hillfort (Dymond 1902, 81; Bateman and Russett 1999, 20, map B). At some time before 1845 MH Bloxam cleared some loose stones from the ramparts to expose the wall face – 'a regular surface or flat facing of irregular-shaped stones put together without mortar ... the thickness of the walls thus constructed may be from eight to ten feet [2.4 to 3.0m]'; he also noted pits in the interior (1845, 309).

In 1851 a group of local antiquaries led by the Rev Francis Warre undertook some excavations. They dug a square hollow and emptied 93 pits, finding objects including prehistoric and Romano-British artefacts, animal bones and 18 human skeletons. Warre described his excavations in narrative form but gave only the briefest descriptions and no indication of which pits yielded which finds, though his original account was accompanied by a plan surveyed by Edwin Martin Atkins (Warre 1852; 1853; *see Fig 16*). Some of the finds were not in the pits but in the topsoil (Dymond 1902, 81-2). The surviving finds from these excavations are in Weston-super-Mare Museum.

CW Dymond drew together all the existing information about the site in about 1880. He then re-excavated some of the pits, finding nothing significant, and cut sections through the ramparts and cross ditch. He also undertook a new survey of the site with tape and prismatic compass, incorporating some information from Atkins' survey of the 1850s. Dymond published his work with his collaborator, the Rev HG Tomkins, in 1886; the revised edition (Dymond 1902) is used in this report. The scale of Dymond's excavations is difficult to gauge because for the most part he gives no figures for the number of trenches or the sizes of individual trenches. Meanwhile a number of other Iron Age burials had been found during construction work on the southern slopes of Worle Hill below the fort (Davies 1905; Evans 1980, 16; Bateman and Russett 1999, 13-18, map A; Broomhead 2007).



One of these burials has been radiocarbon-dated to 385-197BC (Aston *et al* 2013, 163).

The linear earthworks to the east of the hillfort had been mapped by the Ordnance Survey and noted by antiquaries, though for reasons that are unclear they were deleted from later, post-Second World War, OS editions. In the late 1980s, while a Manpower Services Commission Scheme was clearing vegetation from the hillfort (CBA Group 13 *Newsletter* **106**, 13 and **107**, 20), Andrew Fitzpatrick and Victoria Pirie cut two sections across these ditches. An interim report on the excavation through the more westerly ditch concludes that it was infilled before the late Roman period (Fitzpatrick and Pirie 1987); the second excavation, on the eastern ditch, was not conclusive though Iron Age sherds were recovered (Pirie 1988, 19).

As part of the research into the heritage of Weston-super-Mare's Heritage Action Zone (HAZ) a comprehensive study of the historic aerial photography of the town, including Worle Hill, was undertaken in early 2018 (Carpenter 2018). Chance finds from the hillfort and its immediate surroundings include flint arrowheads and axes, bronze axes and a bronze collar fragment (Lawson 1976), the stone head of a Romano-Celtic goddess and a coin of Vespasian (Bateman and Russett 1999, 10, 11, 20, 21, maps A and B). However, the claimed findspots of some of these objects are uncertain or should be regarded as doubtful.

## DESCRIPTION

### The Hillfort

Worlebury occupies what is in effect a promontory and this is reflected in the form of the ramparts which are multivallate to the east and bivallate along part of the southern side; at the western end they appear to be rudimentary (though an unknown portion has been lost to erosion and damage); along much of the northern side high cliffs seem to have rendered any serious rampart building unnecessary. There is one undoubted original entrance, to the south-east, though its passage is choked by rubble and its original form difficult to appreciate. Other entrances are probably relatively recent, though a path through the north-eastern ramparts has been seen as an original entrance by previous commentators, and there was possibly a western entrance. The hillfort interior is divided into two unequal parts by a rock-cut ditch. The remains of numerous pits excavated in the 19th century are clearly visible and there are some other features of potential interest in the interior. The ramparts and entrance(s) will be described first, followed by the interior features. Letters refer to the plan (Figs 3 and 4, inside rear cover).



*Fig 7: The array of rock-cut ditches fronting the main ramparts at the east end of the hillfort, with the modern path cutting across the middle of them; January 2019*

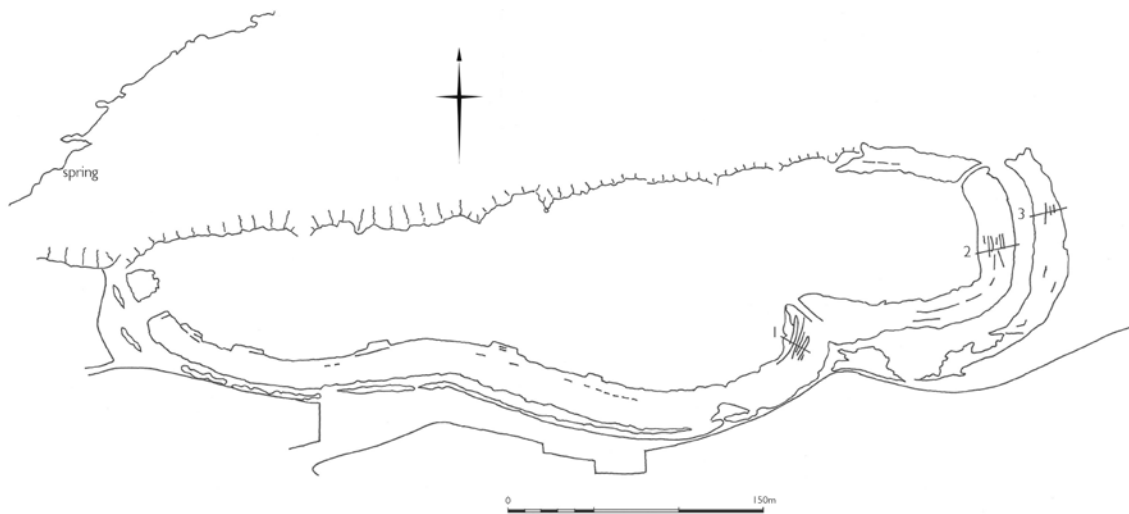
### *Ramparts and ditches*

The eastern approach to Worlebury presents the visitor with an extraordinary range of up to five rock-cut ditches in advance of the two main stone-built ramparts. All of

these elements are overlain near their central axis by a modern path, now the main entrance to the fort, which has smoothed their profiles (Fig 7). The outermost ditch (a) consists just of three short isolated lengths. The second (b) is more continuous but has a single causeway towards its northern end. The third (c) is continuous but ends in a curious terminal at its north end. The fourth, (d) is longer than the others, wrapping around the northern and southern flanks; to the north it is just a ledge but to the south it runs for a considerable distance as a well-defined ditch. The fifth (e) is longer still to the north, though again it only survives here as a ledge at its extreme end; to the south it loses its form on the natural slope but also survives as a ledge and a break of slope for a considerable distance. These ditches are no more than 4m to 6m wide and up to 1.6m deep; though they are not large they represent an impressive investment of labour and resource. There is not much evidence of material on the relatively narrow ledges between these multiple outer ditches and it is probable that much of the rock derived from them has been used to enhance the two main ramparts, both of which are very substantial and possibly contain more material than can have been derived from their own ditch, wide though it is. This main ditch (f) is broad but does not appear now to be very deep and may never have been so. Dymond's excavations do not throw very much light on this, though he excavated the ditches at 'every critical point – clearing out the material with which they were choked' (1902, 37-8). He seems to have paid more attention to the outer ditch (e) and the ditch along the southern side of the fort (g). His section drawings of these (1902, pl V fig 5, pl VI figs 3, 4, 5, 6 and 7) suggest that these ditches are slight and irregular, as they appear now; ditch (g) appears as no more than a ledge for most of its length. The outer of the two main ramparts (h) is perhaps best described as a counterscarp, though it is very large; behind it is the main ditch and then the main or inner rampart (j), another very large mass of stone (see cover image).

The three outer ditches occupy the relatively narrow top of the ridge and do not descend very far down the slope on the northern side and not at all on the southern side. The main ramparts and ditches turn back westwards on both sides of the ridge. On the north side they do not extend very far, neatly filling an available triangular space to link up with the cliff which forms most of the northern side of the hillfort, as noted by Carpenter (2018, 81-2). The inner rampart (j) can be traced on the north just as far as the cross-ditch, though its terminal is currently obscured by dense vegetation. Towards the western end of the hillfort, however, slight traces of a bank (k, k) up to 0.4m high can be seen on top of the cliff, suggesting that a vestigial rampart did originally extend all the way along the north side. Dymond made much of the 'talus' of loose stone below the cliffs along the northern edge of the fort and even cut three sections through it (1902, 43-5, 120, pl III 33, 34 and 35, pl VI fig 15), though he was apparently convinced of its natural origin. It was not examined closely during the current survey. On the southern side of the fort, where the natural slopes are somewhat shallower (though still steep) the main ramparts extend further, the inner one (j) along almost the whole length of the fort; their configuration is somewhat complex, though they now appear superficially as mounds of bare stone with very little soil cover. Dymond's excavations revealed that the inner rampart consisted of a massive central wall of rubble with battered drystone faces and revetted on both sides by continual buttresses of rubble, also faced in drystone (Figs 8 and 9); he referred to these as 'compound walls' (1902,

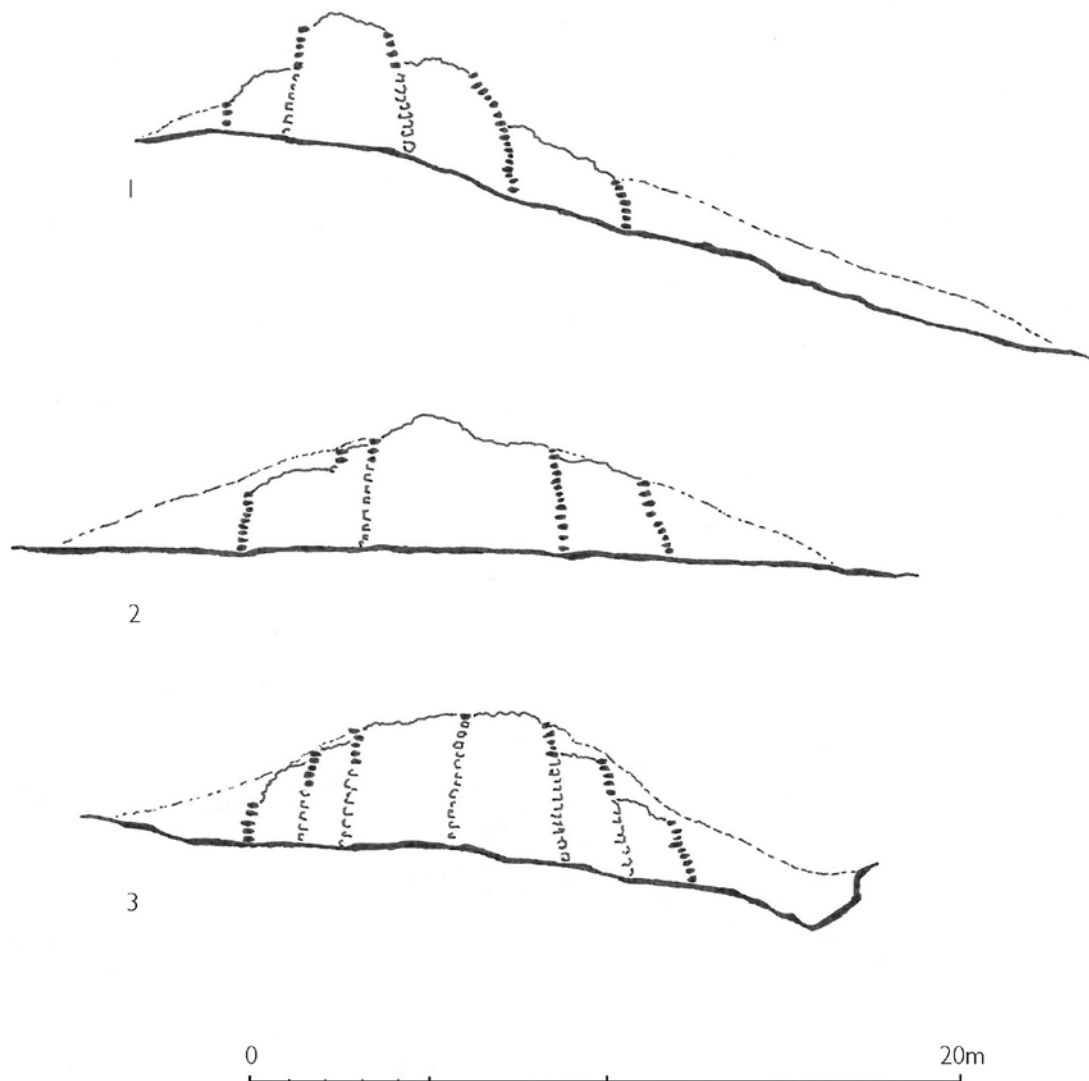
22). The only place where any trace of this structure is now visible is immediately to the south of the south-eastern entrance (**m**) where short lengths of the drystone facings protrude slightly from the mass of tumbled material (Fig 10).



*Fig 8: Plan showing locations of the structural elements found by Dymond within the ramparts; sections 1-3 are shown in Fig 9. The location of the spring below the western end of the hillfort is also shown. (Re-drawn from Dymond 1902, pl III)*

At the east end of the fort the inner rampart (**j**) stands as much as 2.5m above the interior. However, this diminishes towards the west and at the western end of the fort the rampart is flush with the interior ground surface. At one point about 30m to the south of entrance (**m**) there is an abrupt drop in the rampart top; to the west of this the back of the rampart is a vestigial feature at best. Towards the western end of the site there are spreads of bare stone behind the rampart in some places (**n, n, n**). These seem to correspond to three of the four platforms noted by Dymond and discussed by him (1902, 26, 118-19, pl III 17-20, pl VI figs 1 and 2). Dymond found 'passages' between these structures and the back of the rampart wall. He assumed that they were part of the original design but was unable to assign a definite purpose to them. They are now only visible as spreads of stone and it is not possible to say whether they are part of the rampart or later additions.

The outer or counterscarp rampart (**h**) also consists now largely of a tumbled mass of stone. Dymond found structure within it similar to that of the main rampart (1902, 118, pl V fig 5) but none is now visible. At another point he noted 'a low breastwork in front of an earthen *berme* ... with an earthen ramp at the back, and closed at its east end by a short low traverse' (1902, 25). This is near the eastern end of the site, to the east of the main entrance (ibid, 119, pl III 27, pl VI figs 12, 13 and 14). Unfortunately neither Dymond's description nor drawings convey a very clear picture of this structure; it was obscured by undergrowth at the time of survey and is in an area of considerable recent disturbance.



*Fig 9: Sections recorded by Dymond; the locations are shown on Fig 8. The facing stones shown in solid black 'were actually traced on the ground'; Dymond had no doubt that those shown in outline 'are similarly founded, although they have not been traced below the black portions' (Dymond 1902, 118). Dymond seems to have assumed that these structures were all of one phase (1902, 22-3). (Re-drawn from Dymond 1902, pl V, figs 2, 4 and 5)*

At many places around the circuit there are disturbances to the tops and slopes of the ramparts; these are impossible to date and many of them must be relatively modern – a mass of loose stone such as is presented by the ramparts at Worlebury is always prone to interference, whether casual or more deliberate. The degree of recent modification is perhaps indicated by Dymond's statement that at intervals, 'over the whole extent, remains of the ancient face-work may yet be seen' (1902, 21) whereas now, as mentioned above, these can only be seen in one restricted area. The western end of the fort is very difficult to interpret. Dymond and other early commentators were certain that there was an original west entrance where there is now a modern flight of steps (p). Dymond's description of this area is somewhat

confused (1902, 23); even in his day the evidence must have been slight and now it is severely eroded. The main inner rampart is a tumbled mass of bare stone on the slope to the south but the extreme western tip of the plateau is largely eroded to bedrock, while other areas are obscured by vegetation. The ‘oblong sheet of stones’ and ‘spindle-shaped’ stone-patch which Dymond discusses (1902, 23, 120, pl VI figs 16, 17 and 18) are not now identifiable. The stones in the ‘spindle-shaped’ patch apparently filled a ditch up to 0.9m deep. Dymond quotes Rutter’s remarks about outworks to the west which by his day had ‘almost entirely disappeared’ (1902, 20) and which now lie under modern developments.



*Fig 10: Detail of exposed rampart structure to the south of the south-eastern gateway (m); February 2019*

Early commentators noted ‘triangular platforms’ on the outer faces of the ramparts, which were sometimes interpreted as stances for slingers defending the hillfort, though Dymond was sceptical (1902, 41-3). Only one or two possible examples of such ‘platforms’ were noted during the current survey (q, q). These ‘platforms’ seem to have been in the tumbled masses of loose stone of the collapsed ramparts, so they cannot be original structural features. In such loose stone, always prone to disturbance, apparent platforms are likely to be fortuitous or the result of relatively recent activity.

### ***Entrances***

There are numerous gaps in the ramparts but most are modern, or at least not original, entrances. The only convincing original entrance occupies a re-entrant angle in the ramparts on the south-eastern side of the fort (m) above a slight natural combe in the southern slope of the hill. Because of the re-entrant, the ramparts on either side of the entrance are at a right angle to each other. The entrance is

approached by what now appears to be a very steep slope but its original configuration is difficult to ascertain as there is a large but unknown quantity of tumbled stone filling it (Fig 11). This also obscures the form of the rampart terminals; there are no visible ditches at this point and the natural slopes preclude their existence. Nevertheless, close to the southern side of the entrance is the clearest evidence of the rampart revetment uncovered by Dymond (*see above*). Dymond's description of this entrance, which was clearly better preserved in his day, is useful. He says that on the northern side 'the gateway was bounded by a wall of very bold material ... with a semi-circular wing, or shoulder, at its inner end, inclosing the northern flanking work. The wall forming the southern side of the gateway still in part stands about 6 feet [1.8m] above the ground ..... The superficial width of this gateway is 13ft 6ins [4.1m], except where a concavity on each side increases it to 15ft 6ins [4.7m]. A slight batter of the walls would, perhaps, make the width at the ground-level six inches [0.15m] less' (1902, 35). Generally by 'bold' Dymond seems to mean well-built. By 'concavity' he means a very general concave shape to the entrance passage walls; this is shown on the detailed plan of the south side of the gateway (pl V, fig 1); there is no equivalent detailed plan of the north side. Dymond calculated the gradient of the road through the gateway as being 1:6 (1902, 118, pl IV fig 7).



*Fig 11: Looking up into the south-eastern entrance (m), barely recognisable as a hillfort gateway: the figure with the ranging rod marks the approximate centre of the roadway; to the right is the rampart forming the north side of the gate passage, to the left the pale stones are the remains of the dismantled modern cairn that was built over the southern side of the gate passage; February 2019*

Dymond was convinced that the path through the north-eastern corner of the ramparts (**r**) was an original entrance, describing a 'flanking wall' on one side and large kerb stones on the other defining an 11 foot [3.3m] wide (maximum) curving passage (1902, 36, 120, pl III 22, pl VI figs 19 and 20). Now this has the appearance of a later breach cutting through the inner rampart at a point where it diminishes in height on the shoulder of the ridge. This seems to be confirmed by the slightly wandering line of the approach path through the outer earthworks. Such a narrow, curving entrance would be an unusual feature in an Iron Age fort. The western entrance (**p**) has been mentioned above but nothing further can be said about it as any evidence has been eroded away. Dymond expressed some uncertainty about it (1902, 36-7, 120, pl III 16, pl VI fig 21) but nevertheless seems to have regarded it as a genuine original entrance.

A slight gap near the extreme western end of the cliff (**s**) is the head of a path which leads directly down the precipitous slope to a lower cliff and thence down to the modern road. Immediately to the west of this path is what appears to be a fragment of detached bank (**t**), up to 0.7m high to the east and 0.4m to the west. Whether this has any connection with the hillfort or is a later feature is uncertain. The path itself descends to Spring Cove and early commentators assigned it a key role in supplying the fort with water (e.g. Dymond 1902, 49). The spring may indeed have been significant for this purpose but the direct and extremely steep ascent from it was possibly not the route of choice for anyone carrying any quantity of water; a more indirect approach via the western entrance might have been preferred.

There are other gaps in the cliffs on the north side, including a substantial hole (now choked) through the cliff (**u**). This was regarded by early commentators as a 'sally port' or 'secret way' (Dymond 1902, 35, pl III 12) but is almost certainly either natural or the result of later mining activity.

There are numerous gaps and paths across the ramparts on the south side of the fort, including the flight of steps from Trinity Road, but all are recent (19th-century and later) creations. Dymond recorded some of those that had been recently made in his day for the convenience of neighbouring householders and showed them on his site plan (e.g. 1902, 32-3, pl III).

## *Interior*

### *Cross ditch*

The open pits are the most striking aspect of the interior of this hillfort but the largest single feature is the rock-cut ditch (**v**) that bisects the site from north to south near the eastern end. This ditch is on average about 8m wide and up to a maximum 1.4m deep (Fig 12). It is aligned north-north-west to south-south-east for most of its length but a kink 15m from its southern terminal means that its southernmost length runs due north and south. Its southern end is above the slight natural combe on the hillside occupied by the south-eastern entrance of the fort (Carpenter 2018, 82). This ditch has caused much debate, principally because its terminals are unclear and have no definite relationship with the hillfort ramparts. At



the southern end it appears to be overlain by the main rampart but this is by no means certain. Dymond was clearly perplexed by this terminal (1902, 37-8, 120, pl VI figs 24, 25, 26 and 27). At the northern end it is currently obscured by dense vegetation but it is notable that it joins the main inner hillfort rampart (j) at its terminal point. There are vestigial traces of a bank on the western side of ditch (v). This bank is no more than 5m wide and 0.3m high but it indicates that the earthwork is a defence against an approach from the east, like all the other earthworks on this ridge, which goes against the traditional and currently accepted idea that the ditch defines a 'citadel' or 'keep' at the eastern end of the fort (see e.g. Dymond 1902, 19). It seems likely that it is an early element of the site and has been superseded by the massive defences to its east, as suggested by Burrow (1981, 216) and Carpenter (2018, 80, fig 94).



*Fig 12: Exposed bedrock in the west side of the cross ditch (v), in the deeper part close to its southern terminal; February 2019*

### ***Pits***

The pits are an extraordinary feature of Worlebury (Fig 13). Those that were excavated in the mid-19th century remain as vertical-sided, rock-cut pits. Many of them have modest spoilheaps up to 0.4m in maximum height, in some cases forming complete halos, the result of the 19th-century excavations (Fig 14). We have not measured the depth of each individual excavated pit for this survey but the minimum is about 1.0m and the maximum about 1.8m. There are a number of

slight circular or sub-circular hollows (e.g. **w**, **w**, **w**), up to about 0.3m deep, which may be similar pits that have not been excavated.



*Fig 13: One of the smaller excavated pits; February 2019*



*Fig 14: Excavated pit with a halo of spoil; February 2019*

Dymond discusses some of the 93 excavated pits (1902, 45-7, 120-1, pl III 8, 9 and 13, pl VII) but unfortunately there is little information to be gleaned. Many objects were found in the pits in the 1851 excavations but relatively few of them were assigned to a specific pit or context. Only nine pits were described and the location of only one of these is known (**x**). This is the 'steened', or stone-lined, pit, marked as 9 on Dymond's index plan (ibid, pl III) and illustrated (ibid, pl VII), in which were found charred wood and grain, beach pebbles, ochre and three human skeletons, one of which had a wound in the skull (ibid 77-9, pl XI). The 'steened' pit is 1.6m deep (Fig 15).



*Fig 15: The 'steened' pit (x); February 2019*

Though some finds from the pits are attributable to the Iron Age there are earlier objects, including flint flakes and a barbed-and-tanged arrowhead. What is not clear is whether some of the objects found might be of later date; some of the illustrated artefacts – iron tools, a wooden object with drilled holes, bronze ornaments (Dymond pls IX and X) – look as if they might be (*see Discussion below*). When he re-excavated some of the pits Dymond found a cast iron winch handle (1902, 79), but that could of course have got there after the earlier excavations. Human remains were found in several pits and the gateway, as well as animal bones of unknown provenance (Dymond 1902, 123-4, pl XI). The discovery of complete human skeletons in pits, such as the 'steened' pit, does demonstrate that there were at least some undisturbed Iron Age deposits.

So it has been assumed that all the pits within the hillfort are more or less coeval with each other and the hillfort. This is probably correct but some caution must be exercised (*see Discussion*). One pit is cut into the cross ditch (v); however, this need not be an issue if the cross ditch itself was dug, as seems likely, in an early phase of the hillfort's life or even earlier.

#### ***Possible round house stances***

There is great confusion in early accounts of Worlebury between the pits and possible hut circles. Dymond believed that any traces of huts which might have existed had been levelled by his time (e.g. 1902, 46). However, there are some large

semi-circular scoops (**y, y, y**), mostly in the lee of the ramparts, which might be stances for round houses. These measure between about 7.0m and 11.5m in diameter and are up to 0.4 or 0.5m deep. In two cases (**z, z**) these are not just negative features but have apparent built-up platforms or aprons, up to 0.3m high, on their downslope side; these examples at least should be considered as candidates for round house stances.

### *Other interior features*

There are several other features within the hillfort, almost certainly of later date. One prominent feature is a square hollow (**aa**), 6.5m across and up to 1.5m deep, just behind the southern ramparts. It is flat-bottomed and therefore shallower to the south because of the natural slope. There is a shallow ramp in the south-eastern corner, suggesting an entrance, and a spoilheap along its southern edge. Dymond described and illustrated it (1902, 29, 120, pl III 6, pl VI figs 22 and 23, pl VIII figs 1 and 2), showing that it was at least partly walled, not just cut into bedrock; some of this walling, on the east side, is still visible. This is certainly post Iron Age and possibly a relatively late feature but its purpose is obscure. The spoilheap is probably the result of 19th-century excavation.

At the east end of the site is a rough tumbled masonry wall (**bb**), no more than 0.6m high, extending at a right-angle from the back of the inner rampart. Dymond described this feature (1902, 26-7) which in his day had a return to the south from its western end; whether this still exists is uncertain as it is now obscured by dense vegetation. Dymond's informants led him to suppose that this was the remains of a shepherd's hut, which seems a likely explanation.

There are other rough stone-built structures within the fort (**cc, cc**). These were not apparently noted by Dymond or other early commentators and have presumably been built since the beginning of the 20th century, though they are now vegetation-covered and have an appearance of antiquity. They are of crude dry-stone construction, sub-rectangular or sub-oval and consisting of tumbled walls up to 0.5m high. They might have provided some shelter for woodmen or be clandestine constructions by casual visitors.

There are some other linear scarps up to about 0.5m high within the fort (e.g. **dd, dd, dd**) which are almost certainly of geological rather than archaeological origin, though in some cases they are more-or-less coincident with possible house stances. In other cases, as at (**ee**), where the face is up to 1m high, they might have been modified by quarrying. There are a number of other irregular hollows (e.g. **ff, ff, ff**) within and around the fort that are probably the result of mining or quarrying.

### **The linear ditches**

Two linear earthworks, often referred to in the Worlebury literature as '*valla*', run broadly from north to south across the ridge immediately to the east of the hillfort (Figs 2, 5 and 6, inside rear cover). Each consists of a rock-cut ditch and each is accompanied by a bank on its western side. In a few places there are faint signs of a

counterscarp bank to the east. They are similar to each other but the western earthwork is perhaps slightly larger than its eastern counterpart and more consistent. The western ditch is mainly up to 1.2m deep but up to 1.6m deep for short stretches near its northern end. The bank is 0.4 to 0.5m high. Where it exists the counterscarp is generally 0.2 to 0.3m high but up to 0.4m high for a short stretch near the northern end. The eastern earthwork is more variable in scale; at its northern end the ditch is relatively slight, 1m deep to the west but only 0.3m to the east, the bank 0.3 to 0.4m high and there is no counterscarp; immediately to the north of the bridleway the ditch is 0.8m deep, the bank 0.4m high; to the south of the bridleway the ditch is 1.2m deep and the bank 0.5m high; on the plateau the ditch is 0.7m deep and the bank generally 0.2 to 0.3m high but up to 0.4m high in places.

Both earthworks run to the top of the sea cliffs on the northern side of the hill, though their course is interrupted in places, sometimes by later constructions, such as the Toll Road along the coast, and sometimes by the steepness of the slope (as at **gg**) which seems to have defeated the ditch diggers or perhaps rendered the earthworks unnecessary. On this north-facing slope there is a substantial natural combe between the ditches (Carpenter 2018, 83, fig 97A). The eastern earthwork runs along the lip of this combe in its upper reaches.

On the ridge top the eastern earthwork bows to the east. This brings it very close to the lip of a combe on the southern slope (Carpenter 2018, fig 97B) but on the southern shoulder of the ridge this earthwork turns sharply to the west. In this south-facing section it is only partly ditched, for much of the length appearing more as a south-facing lynchet, up to 1m high. It has been enhanced in places by the dumping of domestic waste from the properties to the south. This, like the western earthwork, is cut by the Victorian garden wall which defines the private properties on this side of the hill. Some commentators have assumed that the two earthworks were joined near this point, forming an enclosure on the ridge top, but this seems unlikely as both were constructed to face east with their banks to the west. Historic map evidence (OS 1:2500 1<sup>st</sup> edition) suggests that the western earthwork continued down the southern slope of the hill within a narrow combe. Limited observation of the eastern earthwork beyond the Victorian wall, through a convenient gate, suggests that it turned south to run parallel to the western earthwork and very close to it, within the same combe (*see* Carpenter 2018, fig 97C). Here it is a recognisable ditch with a faint trace of the bank to its west.

### **Mine pits, quarries and other features on Worle Hill**

There are a number of excavations from lead and calamine mining on Worle Hill. Several of these are close to the hillfort and within the area occupied by the linear earthworks to the east; one of them is cut through the western linear ditch (at **hh**). The hole through the cliff (**u**) on the northern edge of the hillfort is possibly due to mining. Some mine pits very close to the linear earthworks were included in the survey (**jj**); others have been added to the plan from existing mapping. Those surveyed include individual pits, up to 1m deep, and more extensive workings or conjoined pits; some of those not surveyed are much larger and deeper excavations

undoubtedly connecting with more extensive underground workings. There are a number of small quarries, some of them probably dug to provide material for the Victorian wall (as at **kk**). There are also two very large quarries on the south side of the western end of Worle Hill beyond the surveyed area; one is the massive ‘Town Quarry’ (Brodie *et al* 2019, 74, 139, fig 57); the other is shown on Martin Atkins’ plan of the hillfort, associated with limekilns, and now lying within private properties immediately to the south of the hillfort (Fig 16). Mine pits and a quarry at the east end of Worle Hill have been mapped from aerial photographs (Crowther and Dickson 2008, 179, fig 9.49). There are a number of other earthworks and stone structures of potential archaeological interest along the hill (Morrissey 2014; Carpenter 2018, 85; Bill Frayer pers comm) but more research is required to gauge their significance.

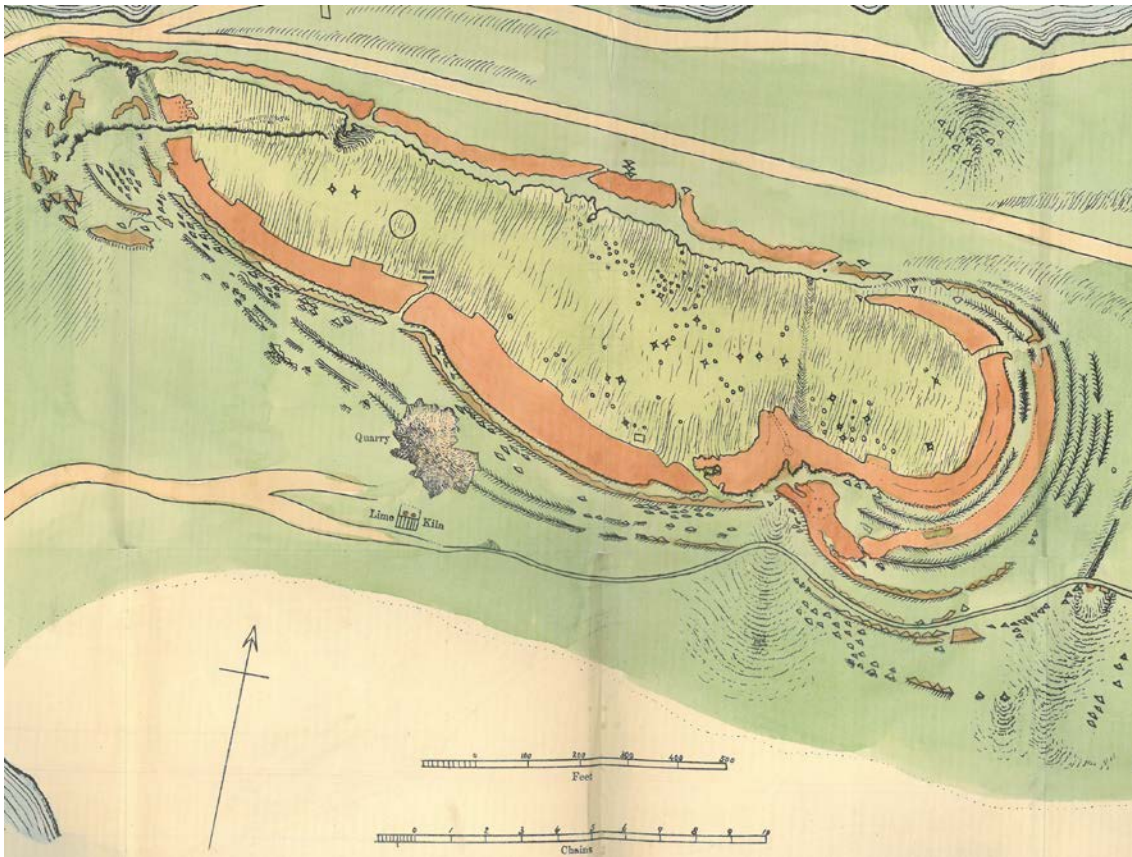


Fig 16: Extract from Edwin Martin Atkins’ survey of Worlebury, 1852 (Warre 1852, facing p64)

## DISCUSSION

### The hillfort: location

Although Worlebury is on a coastal promontory the *Atlas of Hillforts* rightly does not include it in its list of 36 coastal promontory hillforts in England (and 73 in Wales). (Wain's Hill (NRHE 192815) at Clevedon, 7 miles north-east of Worlebury, is the nearest promontory fort.) The vast majority of the English coastal promontory forts are in Cornwall (Brown 2019, 36, fig 3.7); Worlebury is clearly a very different type of monument to those generally small, exposed Cornish 'cliff castles'. In its fully developed state at least, it is more accurately described as 'a hillfort on a promontory' than as a 'promontory fort' because its ramparts surround more than half of its perimeter, rather than just cutting across the neck of the promontory.

Worle Hill, like Brean Down, is very prominent when viewed from the sea, suggesting the possible significance of the hillfort in overseeing the passage of people and goods up and down this part of the Bristol Channel. But the hillfort presents its most formidable defences on the landward side, to defend itself but also to impress or overawe those approaching along the ridge from the east.



*Fig 17: The only visible remains of the rampart structure, south of south-eastern entrance (m); July 2018*

### The hillfort: ramparts and entrances

The ramparts of Worlebury are highly unusual, if not unique (Fig 17). Dymond assumed that his 'compound' walls were of single-phase construction; this is by no means certain but until further intrusive research is undertaken it cannot be disproved. Stone-walled hillforts are, unsurprisingly, largely confined to the western hard geology zones of Britain; the *Atlas of Hillforts* lists 289 examples in England and 286 in Wales (Brown 2019, 41, fig 3.13). The few possible parallels for Worlebury appear to be mainly amongst Welsh hillforts. These include Tre'r Ceiri, Castell Caer Seion and Pen y Gaer but at all of these the stone walls are recorded as between 3.0m and 4.9m thick (Brown 2009, 47ff); the stone-built rampart of Nesscliffe hillfort, Shropshire, was up to 8m thick (Gary Lock pers comm); at Worlebury, if Dymond's evidence is accepted, they are up to 11.6m [38ft] thick (1902, pl V, fig 4). Similarly, at the other sites, though there is some evidence of facings and wall walks (at Caer y Twr and Caer Drewyn also), nowhere is there unequivocal evidence of the 'compound' walls seen by Dymond at Worlebury. Dymond himself accepted that there was some evidence for 'compound' walls only at Pen y Gaer and Caer Drewyn (MSS notes by CW Dymond, dated 1914, inserted into the Society of Antiquaries copy of Dymond 1902). Nevertheless, the entirely different scale of the walls at Worlebury, more than twice as thick as any other 'compound' walls yet recorded, seems to put them in a class of their own (Fig 18). That is not to say, of course, that future researches may not reveal other 'compound' walled hillforts built on the same scale as Worlebury; it is not impossible, for instance, that the ramparts of the neighbouring Dolebury are concealing similarly constructed walls; Dymond recorded fragments of wall face there that are no longer visible (Dymond 1883, 108-9; Bowden 2009, 5). Such a thickness of wall is exceptional in a stone-built hillfort rampart but would not be so unusual in an earth or earth-and-timber built rampart.

Forde-Johnston included Worlebury amongst his 'Group 4 defence systems', those with more than three ditches or banks (1976, 163-70). There are only 24 sites in this group and they are extremely varied in size and topographical position, having little in common other than the multiplication of defences; none of them particularly resembles Worlebury.

It seems probable that Worlebury had two entrances, at the south-eastern re-entrant (**m**) and at the west (**p**). It would therefore conform to the 'normal' arrangement of the larger southern British hillforts of having east- and west-facing entrances. However, it is noteworthy that the positioning of the south-eastern entrance places it at the head of a steep slope, whereas an entrance at the eastern extremity of the fort would have faced an almost level approach. No trace of the western entrance seems to survive and the south-eastern entrance is masked by disturbed and tumbled stone, so nothing can be said about their conformation, structure or arrangements beyond what Dymond noted (*see above*, Description). However, the change in height of the inner rampart just to the south of the main entrance (**m**) is notable; this conforms to a pattern seen elsewhere in southern British hillforts where the ramparts seem to have been enhanced either side of the entrances, presumably to create an impressive facade.



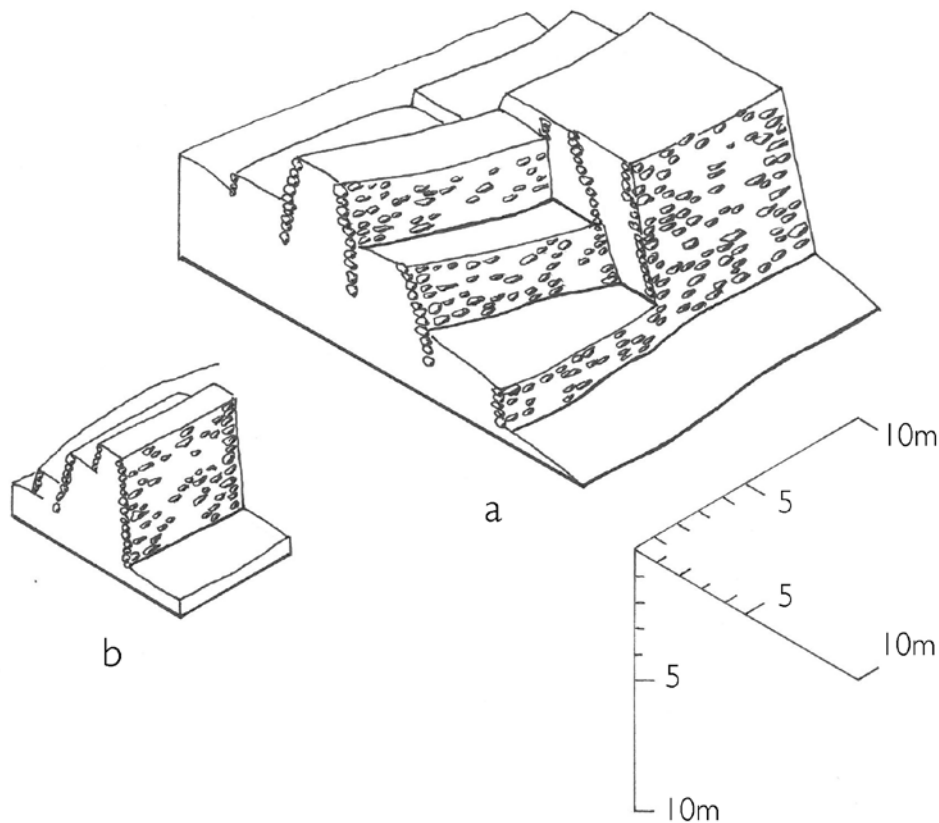


Fig 18: (a) The main rampart of Worlebury: the left portion shows the rampart as recorded by Dymond, the right portion shows a possible reconstruction of its original form by AHA Hogg; (b) reconstruction of the ramparts of Tre'r Ceiri at the same scale, emphasising the massive proportions of the ramparts at Worlebury. It is interesting that Hogg has reconstructed Worlebury's ramparts without a parapet. (Re-drawn from an isometric diagram by Dylan Roberts, which was based on an original draft by AHA Hogg (Hogg 1984, fig 4))

### The hillfort: pits, burials and round houses

As noted, the main south-eastern entrance of Worlebury opens onto a steep slope but it is covered by a scree of fallen stone and dense vegetation. Aitken mapped a road along the southern slope below the ramparts (see Fig 16) which Dymond was prepared to accept as 'ancient' (1902, 34, pl III) but there is no reason to suppose that this is related to the hillfort. Another notable aspect of the archaeology of Worle Hill is the number of Iron Age burials that have been found along the southern slopes of the hill, mainly during late 19th-century and early 20th-century development (Davies 1905; Evans 1980, 16; Bateman and Russett 1999, 13-18, map A; Broomhead 2007; Aston *et al* 2013, 163). This is an unusual grouping and being almost certainly contemporary with the hillfort must be considered as potentially relevant to it; it would perhaps be reasonable to assume that the

individuals buried here are some of the inhabitants of the hillfort, though clearly burials took place within the hillfort as well. It may be that the pit burials outside the hillfort represent an unrecognised separate Iron Age settlement. Iron Age pit burials have been found widely in hillforts and settlements across Central Southern and Eastern England (Whimster 1981, 5, 8, fig 4).

The *Atlas of Hillforts* notes that pits within English hillforts, while restricted in distribution, are more widely found than was once thought (Brown 2019, 48, fig 3.20). At Worlebury, as at some other forts, pits are located across the interior (Fig 19), whereas at other sites pits are restricted to particular zones (ibid, 49). The number of pits at Worlebury seems to place it in the same category as well known developed Wessex hillforts such as Danebury, Hampshire, and Maiden Castle, Dorset, and also Conderton Camp, Worcestershire, with their hundreds of storage pits. (What these sites also have in common, of course, is that they have all been relatively extensively investigated by excavation.)



*Fig 19: An array of pits in The Glade; February 2019*

However, a question that could be asked at Worlebury is: what is the difference between the Iron Age pits within the hillfort and the mine pits elsewhere on the hill? The cynical answer might be that the Iron Age pits are inside the fort and the mine pits are outside, which is not very satisfactory, but in fact the open pits within the fort are the result of antiquarian excavation, before which they would have looked very different. A final resolution of this issue relies on the antiquarian finds and how far we can trust them. Wooden objects were found in some pits, also some iron

objects in apparently rather good condition. How could ancient wood and iron survive in such conditions? The only thing Dymond found was a cast iron winch handle 'such as might be used for winding the rack of a kitchen range' (1902, 79). However, human skeletons were found in four pits, Warre's numbers 6, 7, 8 and 9 (Dymond 1902, 76-9), showing that at least some of the pits contained undisturbed Iron Age deposits. Nevertheless, suspicion remains that some of the 'Iron Age' pits could actually be later, medieval or early post-medieval, abandoned mine workings. The 'steened' or stone-lined pit (**x**) is unusual but not unique; some storage pits at Maiden Castle, Dorset, were stone-lined where cut into loose material (Wheeler 1943, 51, pl cx), while others were clay-lined (Sharples 1991a, 90). At Conderton Camp, Worcestershire, over 36% of the excavated pits were stone-lined or patched, some had clay patching and some had been lined with wooden stakes and wickerwork; the excavator was unable to suggest a reason for the lining (Thomas 2005, 94-101). While there may have been practical purpose in walling a pit cut into loose material, as at Maiden Castle, there seems little obvious reason for providing a limestone lining for a pit cut into limestone at Conderton or Worlebury. Pits in Iron Age hillforts and settlement sites are generally understood to have been dug for storing grain, especially seed corn; after their initial period of use they were filled with a range of deposits, including sometimes human burials and other items of a special or ritual nature (Hill 1995).

It is noted that some of the large, shallow semi-circular hollows visible on site may be the sites of Iron Age round houses but this is a most tentative suggestion; these hollows could be no more than a reflection of the underlying geology and surface quarrying. All that can be said is that they fall within the expected size range for Iron Age round houses. Slightly more confidence is given by the two examples (**z**, **z**) where there appears to be positive as well as negative evidence for the levelling of a circular area but even here caution must be exercised. Even excavation might not satisfactorily resolve this issue. In these circumstances nothing further can be deduced about these features, in terms of possible doorway orientation for instance.

### **The hillfort: 'final massacre'**

Early commentators on Worlebury assumed that the demise of the hillfort was the result of a 'final massacre', presumably because of the number of human bones found, some of them with marks of violence, as well as some signs of burning. Dymond subscribed to this idea and even dated it to the campaign of Vespasian about AD47 (1902, 110-11, 115). Evans also accepted and described this 'grisly episode' (1980, 14), though she was doubtful about the dating. However, there is no reason to assume that the human remains are anything other than 'normal' Iron Age burials which may have been deposited at any time during the life of the site. The wounds on many of the skeletons are certainly evidence of violence but this does not mean that the violence was inflicted at the hillfort or as the result of a single episode. Skeletons displaying wounds inflicted by sharp weapons are not uncommonly found in Iron Age hillforts across southern Britain. It is probable that the hillfort was abandoned during the late Iron Age, as so many in southern Britain were, well before the Roman invasion. Other claims for Vespasianic 'war cemeteries' at hillforts, such as Maiden Castle and Spettisbury Rings, Dorset, have been

convincingly questioned (Sharples 1991b, 124-5; 1991c, 81-2; Stewart and Russell 2017, 158-66).

### **The hillfort: square hollow**

The square hollow (**aa**) is clearly later than the hillfort but how much later is doubtful. If it were not for the surrounding trees it would command a good view of Weston Bay to the south but if it was intended as a viewpoint or belvedere of post-medieval date it would possibly be a raised platform rather than a hollow. Another possibility must be considered – that it is a Romano-British shrine. This is not impossible; Roman temples and shrines, usually of mid- or later-4th-century date, are not uncommon additions to hillforts in southern Britain and the discovery of Roman coins at Worlebury adds circumstantial evidence that such a structure might be expected here. However, positive evidence supporting this idea is entirely lacking.

### **Linear ditches**

The date and purpose of the linear ditches to the east of the hillfort has been much debated but the available evidence is limited. The two ditches are very similar to one another and are therefore presumably of one date and purpose. They both run to the cliff top at the foot of the northern slope and may well have run to the foot of the slope on the southern side as well, thereby cutting off the whole promontory. They are associated with natural combes on both flanks of the hill but in different ways (Carpenter 2018, 82-3, fig 97); on the north the eastern earthwork runs along the lip of the combe which is behind it; on the southern side this earthwork touches the lip of a combe which is in front of it and then bends back sharply to run down a combe with its western counterpart. The significance of this relationship with natural combes, if any, is uncertain. In terms of morphology these earthworks do not strongly resemble established archaeological linear ditch ‘types’; they are somewhat similar to Late Bronze Age linear ditches of the Wessex Chalk but the doubling of the features and their topographical location would be unusual; they are also somewhat similar to medieval or early post-medieval woodland banks or warren banks but in that case also the doubling would need to be explained. In terms of relative date all that can be said is that they pre-date the Victorian wall and the toll road. However, excavation in 1987 demonstrated that the western ditch had been back-filled before the late Roman period (Fitzpatrick and Pirie 1987). This is important evidence because it rules out the woodland or warren bank idea. These earthworks also need to be considered in relation to the cross ditch within the hillfort, another relatively weak east-facing earthwork crossing the ridge; they differ in constructional detail but could be similar in date and purpose and it is perhaps significant that the cross ditch also relates to a natural combe on the south side of the hill (Carpenter 2018, 82-3).

### **The archaeology of Worle Hill: current issues and relevance**

Worlebury was declared a site of Heritage at Risk in 2017 because of concerns over its deteriorating condition through neglect and vandalism. It had become a marginal place, characterised by 'anti-social' activities, leading to the commissioning of a condition survey (Robinson and Morton 2018). During our own work on the hill we were very aware of another issue: we had never before encountered homeless people rough-sleeping within an area that we were surveying. Simultaneously, a different experience was provided by the work of the Worlebury Hillfort Volunteers and the genuine interest of many members of the public. There is a tension here: presumably to the homeless people sleeping there the site is a haven in its current state; clearing the vegetation and re-establishing limestone grassland will remove this safe place for the homeless, possibly forcing them to move on without solving their problem (Downie 2018; Winn 2019, 134, 236). However, North Somerset Council, working with local charities, is addressing this issue ([n-somerset.gov.uk/my-services/housing](http://n-somerset.gov.uk/my-services/housing)).

Some of the vandalism – lighting fires, spray painting rocks and trees – might be described as casual but some required more effort. The creation of an enormous cairn on the southern rampart terminal of the south-eastern gateway (Robinson and Morton, fig 13, photo 3) was not only hugely damaging to the monument but also very purposeful. The vandalism continues. More fireplaces have been constructed and fires lit, and some damage has been done to the linear earthworks, apparently by mountain bikers, since our fieldwork was completed in March 2019. This is despite the appearance of notices threatening large fines for damaging a Scheduled Monument. The more effective long-term solution to this problem must lie in revealing the site, in explaining and sharing its significance and value, and nurturing respect for it.

While Worlebury lies outside the area of Weston-super-Mare designated as a HAZ it is directly relevant to it. The idea of *heterotopia* has been applied to the Ramsgate HAZ 'as a useful term for places within and around the built, urban realm that are real and relevant but invisible or hidden' (Last 2019, 1). Worle Hill and its monumental archaeological features have been hidden and become all-but-invisible due to the encroaching vegetation and the perceived anti-social activities that it has engendered – it is 'hidden in plain sight'. The hillfort and linear ditches were shrouded by the growing trees planted in the 1820s as the resort of Weston-super-Mare was developing through the 19th century.

It may seem that there is little connection between the archaeological remains on Worle Hill and the modern town of Weston but in fact the pattern of archaeological discovery has been to a large extent driven by the development of the town, most obviously in the finds of Iron Age burials along the southern slope of the hill exposed as a direct result of house building, but also in the persons of the early antiquaries and archaeologists who explored Worlebury. CW Dymond was long resident at Weston, as were many of the others involved, among the respectable people of independent means that Victorian Weston attracted as residents (Brodie *et al* 2019, 81-3); others, such as Edwin Martin Atkins from Kingston Lisle, Berkshire, were visitors of the type who did not just look for leisure at seaside

resorts but were attracted to more intellectual pursuits (Last 2019, 23). The prehistoric narrative is a creation of the modern town (*see* Last 2019, 3).

The Iron Age burials, both within the hillfort and elsewhere on Worle Hill, have not been treated in detail here but they are clearly a significant part of that prehistoric narrative; further scientific work has the potential to enhance that narrative substantially. Current research at Cardiff University is already revealing further insights into the people buried at Worlebury (Cat Lodge pers comm). Human remains have the capacity to connect intimately with an audience that may be less immediately enthralled by earthworks or tumbled stone structures. They emphasise the differences and similarities between past lives and present lives, focussing on what we as humans all have in common – ‘each burial represents a person who had family, friends and a community that would have missed and mourned them’ (Last 2019, 13).

## RECOMMENDATIONS

Designation should be extended to include the linear earthworks to the east of the hillfort; they are clearly of some antiquity (Fitzpatrick and Pirie 1987) and as unusually well preserved features are of national significance.

The site should be re-surveyed when the woodland and undergrowth has been cleared and limestone grassland re-established. Continuing clearance has already revealed features which were not visible at the time of survey, in the relatively short time between the fieldwork and finalising of this report.

Sample excavation of an Iron Age pit not excavated in the 19th century, if one could be identified with confidence, could improve understanding of these features by recovering material for scientific dating and environmental analysis.

Excavation to uncover further details of the main ramparts and the south-eastern entrance would potentially yield interesting results, particularly in addressing the question of whether the ramparts are of single-phase or multi-phase construction. However, this would be a major logistical and technical challenge that is likely to be beyond the range of any archaeological organisation in the foreseeable future.

Any further developments on the southern slopes of Worle Hill below the hillfort should be closely monitored for any further signs of Iron Age activity or settlement.

## METHODOLOGY

Survey of the linear earthworks to the east of the hillfort utilised a combination of digital and analogue techniques. Four control points were established in open ground on the hillfort's eastern ramparts. These were located to within +/- 0.1 to 0.15m of the Ordnance Survey National Grid using a Trimble R8 survey grade differential Global Navigation Satellite System (GNSS) receiver (Historic England 2015), connected to the Ordnance Survey's correction network (OSNet) via the Trimble 'VRS Now' service (Fig 20). Referencing these control points, a Trimble S7 robotic total station theodolite (TST) was then used to create a closed traverse of survey stations surrounding the linear earthworks (Historic England 2016). Detailed survey was completed using standard tape-and-offset and plane tabling techniques (Historic England 2018), referencing these stations.



*Fig 20: GNSS receiver on the main outer rampart (h) at the east end of the hillfort; December 2018*

For the hillfort itself a novel approach was adopted, capitalising on the terrestrial laser scan undertaken by Cotswold Archaeology as part of their condition survey of the site (Robinson and Morton 2018). The data from this survey, kindly supplied by Cotswold Archaeology, was converted to multi-directional hillshade and slope models using Relief Visualisation Toolbox (RVT). RVT is free software developed by the Institute of Anthropological and Spatial Studies at the Research Centre of the Slovenian Academy of Sciences and Arts funded by Slovenian Research Agency ArchaeoLandscapes Europe project funded by European Commission's Culture programme (Kokalj and Hesse 2017). These models were then scaled in ESRI ArcGIS before being plotted out on drawing film at 1:500 scale, cut into manageable



sheets, taped to a portable drawing board and covered with blank film. These sheets were then taken on site and the archaeological detail checked and traced. For most of the major features this worked very well. Generally the slope model was more useful for this purpose, though for the cliffs along the north edge of the site the multi-directional light model showed more detail. However, some features had been missed by the laser scanner, largely because of dense vegetation. (False features were also noted, some also the result of vegetation though in other cases no explanation is obvious and they are presumably artefacts of the scanning process.) It was relatively easy to supply the missing features by taping between known points and offsetting; this was much assisted by standing trees and fallen tree trunks that had been picked up by the laser scanner and which formed ready-made control points. Only in one or two areas was the available control so sparse that a plane table, with Wild RK1 self-reducing alidade, had to be used to fill in gaps. It was felt that the increased speed achieved by undertaking the survey in this way compensated for a certain loss of confidence in the accuracy of a survey for which we had not supplied the control ourselves. The taping and plane tabling gave an independent check on the overall accuracy of the survey.

Digital survey data was processed and adjusted in Trimble Business Centre software before being exported to ESRI ArcGIS, and combined with digitised field drawings. Principle survey plans were then completed at a scale of 1:1000 using digital drawing techniques in Adobe Illustrator.

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Fig 2: Survey plan of hillfort and linear ditches, reduced to 1:2000 ©Historic England

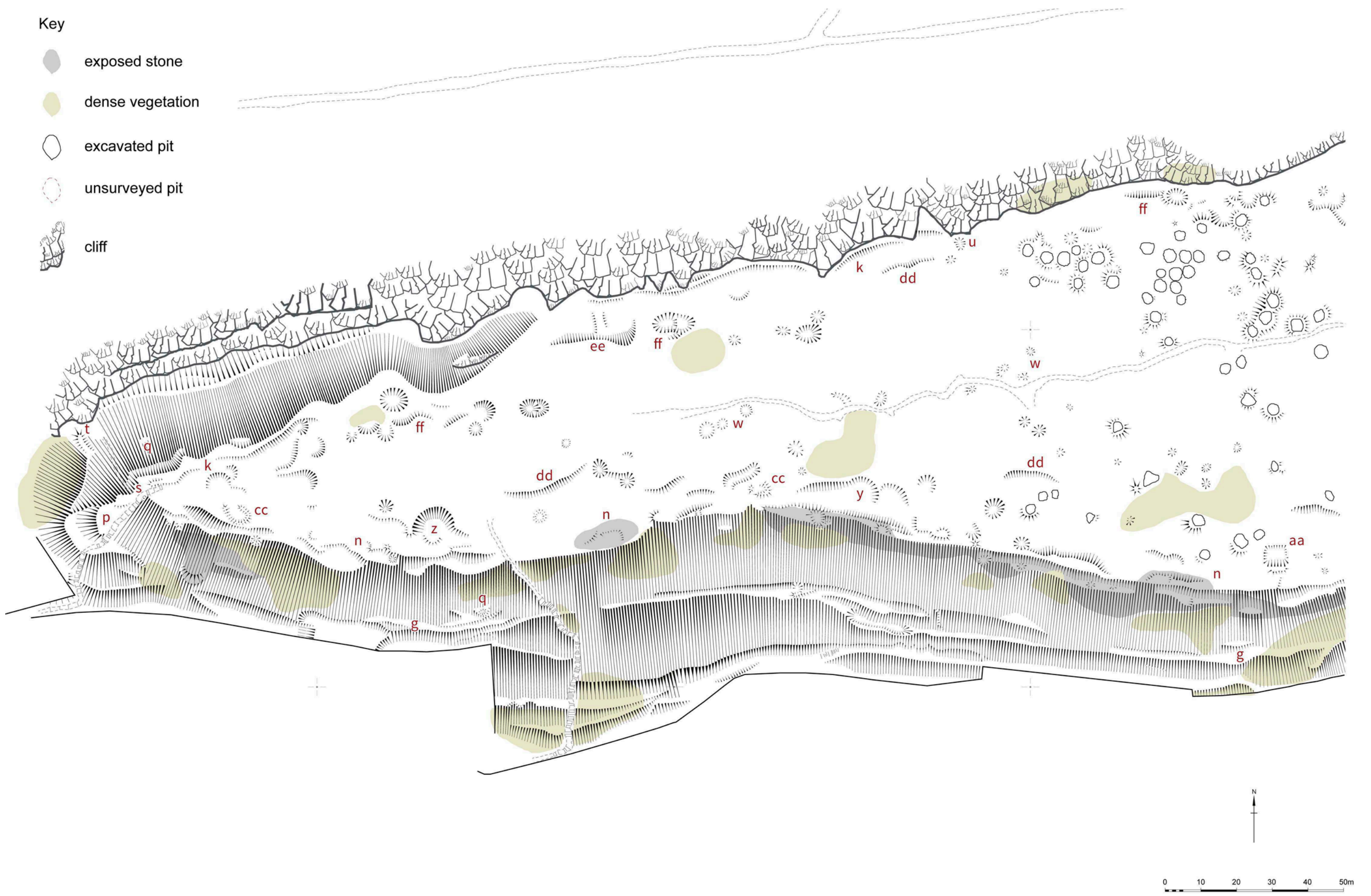


Fig 3: Survey plan of the hillfort, western part, 1:1000 ©Historic England

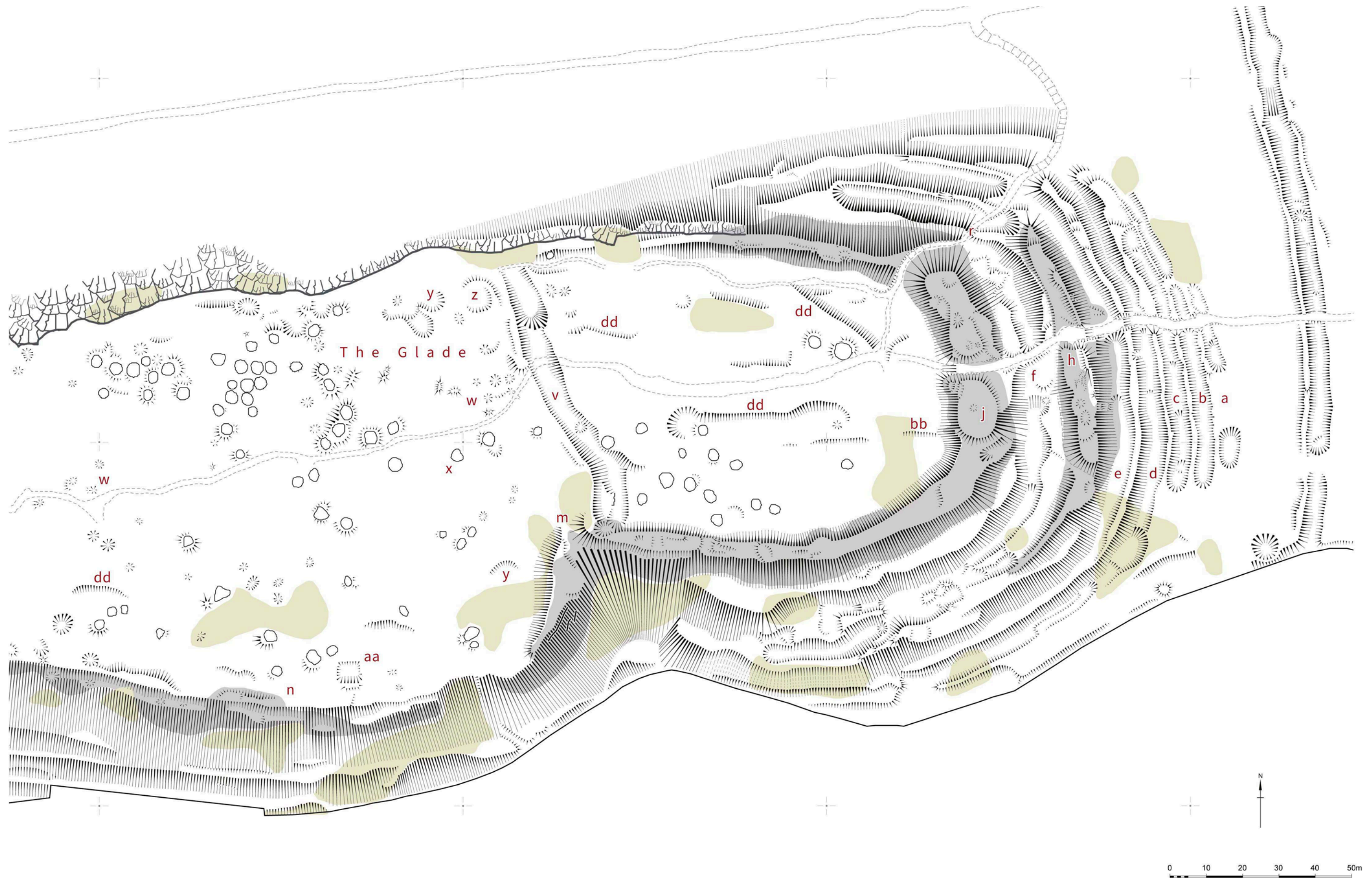


Fig 4: survey plan of the hillfort, eastern part, 1:1000. For key see Fig 3 ©Historic England

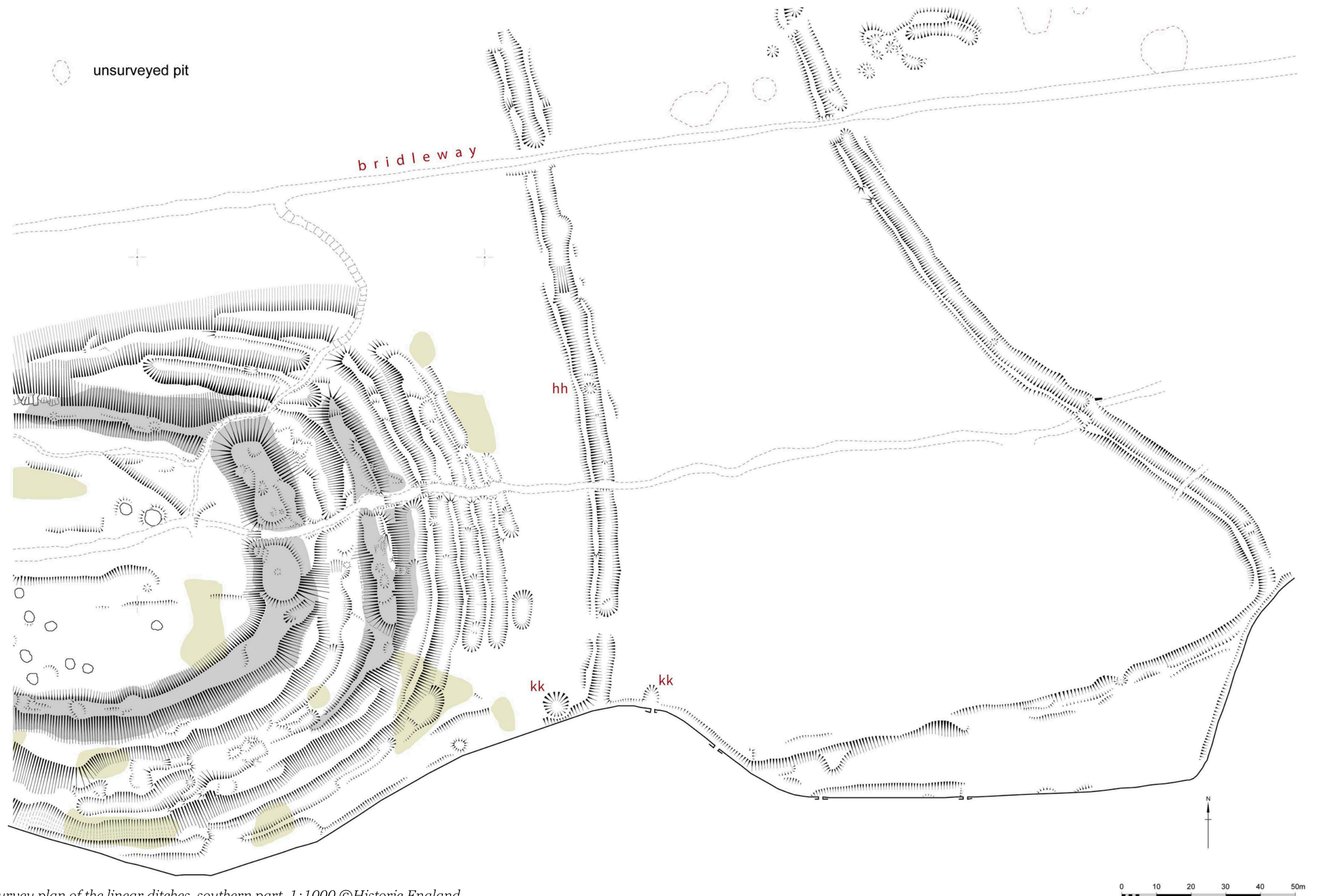


Fig 5: Survey plan of the linear ditches, southern part, 1:1000 ©Historic England

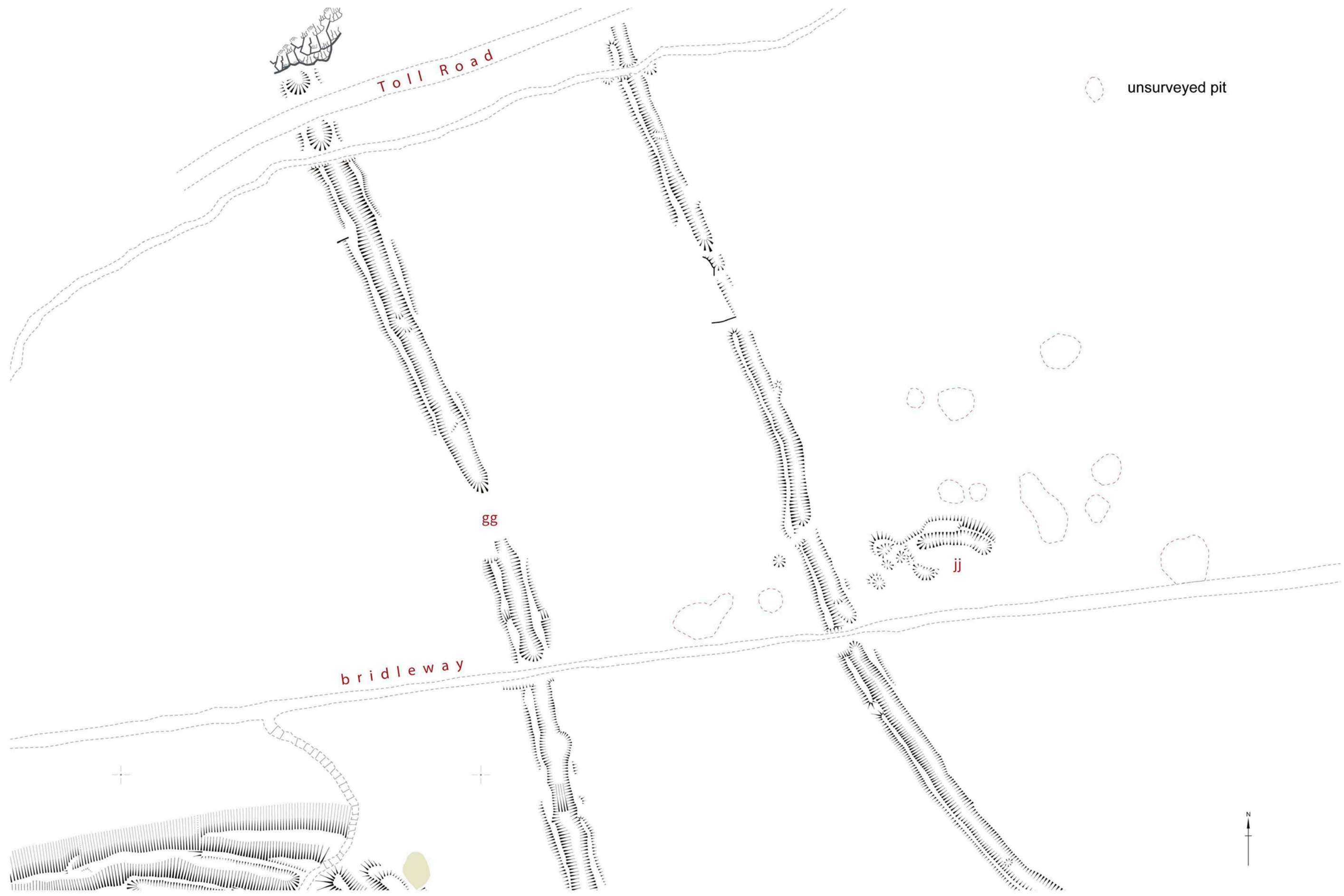


Fig 6: Survey plan of the linear ditches, northern part, 1:1000 ©Historic England





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