

***Aerial investigation and mapping of the
Newgrange landscape, Brú na Bóinne, Co. Meath***



**The Archaeology of the Brú na Bóinne World Heritage Site
Interim Report, December 2018**



**An Roinn Cultúir,
Oidhreachta agus Gaeltachta**
Department of Culture,
Heritage and the Gaeltacht

This interim report has been prepared to make available the results of ongoing analysis, interpretation and mapping work in advance of full publication.

The report has been produced for use on the internet. As such, the high-resolution imagery has been compressed to optimise downloading speeds.

Interpretation and opinion expressed in the interim report are those of the authors. Printed copies of the report will be made available as soon as is practicable following the release of this digital version. Adjustments may be made to the final publication text subject to the availability of information at that time.

NOTE

Virtually all of the sites featured in this report are located on private land. These are working farms with both crops and livestock. There is no entry onto these lands without the express permission of the landowners. Furthermore, the sites are mostly subsurface and can only be seen as cropmarks. There are extensive views across the floodplain from Newgrange Passage Tomb, which can be accessed via the OPW Brú na Bóinne Visitor Centre. Details of on-line booking for the Brú na Bóinne Visitor Centre and guided tour of Newgrange are available at:

<http://www.heritageireland.ie/en/midlands-eastcoast/brunaboinnevisitorcentre/>

Cover image: View across the Geometric Henge, looking north towards Newgrange Farm.

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Introduction

This interim report presents details of archaeological discoveries that were made in the course of aerial survey carried out at the UNESCO World Heritage Site of Brú na Bóinne in July and August 2018.

The near-drought conditions in June and July 2018 created a rare opportunity to record and analyse evidence for subsurface archaeological remains that were not previously known or suspected. The conditions also revealed previously undetected detail of various monuments which were already in the archaeological record.



Fig. 1—The floodplain at Newgrange, viewed from the south-west. DSC09528

Initial discoveries of cropmark enclosures at Newgrange and in the vicinity of the River Boyne were reported by drone pilots Anthony Murphy and Ken Williams in July. Following those reports, the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht carried out a programme of aerial reconnaissance to survey and record in detail the archaeological features.

As a first step in the analysis, a comprehensive record has been created of the transient cropmark features that were brought to light during the unusual climatic conditions in the summer of 2018. This has brought us into close contact with the sophistication of Neolithic communities—the people who gathered at Brú na Bóinne and who expressed their religious

beliefs in the landscape dominated by the great passage tombs of Newgrange, Knowth and Dowth.

This interim report presents an overview of the aerial survey analysis, illustrated with examples of the monuments and structures that have been identified. **Part 1** briefly provides some background context to these discoveries and the archaeological landscape. **Part 2** presents an overview of a particular field on the floodplain terraces (the Cropmarks Field) where the cropmarks provide evidence of spectacular monuments as well as details of sites and features that do not normally appear on aerial photographs—or, indeed, in the archaeological record in Ireland. **Part 3** presents preliminary information on sites identified in the central and eastern areas of the Newgrange floodplain.

A Geographic Information System (GIS) has been used to organise views of the landscape across maps, photographs and drawings of the cropmarks that have been identified to date. The locations of the newly identified sites were also visited in the field to enable a better understanding of the topographical locations and the physical and visual relationships between the sites.

We will continue the work of analysing the aerial images, mapping the features and interpreting their significance within the context of the World Heritage Site. This process also involves a review of other aerial photographs available to us and a review of the archaeological literature for Brú na Bóinne—which is considerable, given the wealth of research that has been carried out there by so many. We have also availed of historic imagery to supplement our research and provide background imagery for our presentation, as well as more recent aerial coverage of the Brú na Bóinne landscape in June 2018 provided by Bluesky International Ltd.

In time, further analysis will be carried out on other important sites within and in the environs of the UNESCO Brú na Bóinne World Heritage Site. It is our intention in 2019 to convene a meeting of stakeholders with interest in the archaeology of Brú na Bóinne and to coordinate a fresh approach to the future research which these sites demand in consultation with the landowners involved. These discoveries are on private land and are published here with the agreement of the landowners, whose careful custodianship of the landscape will continue and for which we are very grateful.

Michael MacDonagh

Chief Archaeologist

National Monuments Service

Department of Culture, Heritage and the Gaeltacht

December 2018

Part 1

Background



Fig. 2—Newgrange Passage Tomb.

Brú na Bóinne—settlement and ritual

Brú na Bóinne, or the 'Archaeological Ensemble of the Bend of the Boyne', was inscribed on the UNESCO World Heritage List in 1993 and refers to the complex of archaeological monuments located in a distinct U-shaped bend formed by the River Boyne. The World Heritage Site is characterised by a number of distinct topographical zones and some of the most prestigious prehistoric monuments in the country.

The prehistoric landscape of Brú na Bóinne is dominated by the three large passage tomb cemeteries of Newgrange, Knowth and Dowth. The Bend of the Boyne, between Slane and Drogheda, provided a stage where Neolithic communities expressed their beliefs in the form of monuments and structures associated with the disposal of the dead, and other monuments that suggest ceremonial gatherings of large numbers of people.

The international significance of Brú na Bóinne has been revealed over a long time, through a process of archaeological discovery and research which began over 300 years ago. Archaeological excavations at Knowth and Newgrange Passage Tombs in the 1960s and 1970s provided insights into the origins and development of Brú na Bóinne as an important landscape throughout the Neolithic period (c. 4000–2500 BC).

Although the archaeological evidence for the earliest human activity at Brú na Bóinne is meagre, there is no doubt that the mobile and transient communities of the later Mesolithic would have been attracted to this location to exploit the rich woodlands that would have presumably existed there and the natural resources of the River Boyne. The river itself has the potential to contain significant archaeological remains, as it was a major focal point throughout all periods and was used in a variety of different ways, including religious veneration, ritual deposition of artefacts, possible deposition of cremated human remains, travel, transport of goods, fishing and general exploitation of the resources of the river. The scientific confirmation earlier this year that a logboat discovered in 2016 in the river at Oldbridge was in use during the Neolithic period between 3300 and 2900 BC is evidence of the important role the river played in the lives of the Neolithic communities.

Excavations at Knowth uncovered evidence for rectangular wooden houses that were constructed in advance of the construction of the passage tombs there. It would appear that by around 3500 BC farming communities were well established, taking advantage of the agricultural benefits of well-drained soils on the floodplain of the River Boyne.

The archaeological evidence tells us that the settlement of the Brú na Bóinne area was successful and would have seen the coalescence of families and kin groups who turned their attention to building the numerous passage tombs for which the area is now renowned. Around 3300 BC the construction of impressive funerary monuments began in earnest with the construction of the great passage tombs. The use of megalithic stones, the movement of vast quantities of earth and the intriguing art inscribed throughout indicate a controlling religious system with considerable resources to initiate the construction and use of the tombs.



Fig. 3—View of passage and corbelled roof at Newgrange from rear chamber.

More than 5,000 years after its construction the Great Passage Tomb at Newgrange still creates a sense of wonder and captures the imagination. Its renowned roof-box feature captures the rising winter solstice sunlight each December, directing the beam of light into the burial chamber within the mound. This phenomenon provides an intriguing insight into aspects of the religious foundations

that underlay the belief system of the passage tomb's builders, their knowledge of the calendar and their appreciation of the movements of 'heavenly bodies'.

The architecture of the passage tombs, built from earth and stone, testifies to the efforts of the Neolithic communities to create permanent monuments and to memorialise their ancestors and gods. The increase in scale of the monuments through the construction of the 'great passage tombs' at Newgrange, Knowth and Dowth would have served to transform the landscape to an even greater degree. This sense of wonder is further increased by the 'galleries' of megalithic art within the tombs and on the surrounding kerbstones.

By the Late Neolithic period (3000–2500 BC), the archaeological evidence indicates a significant change in the ritual architecture. The further building of permanent stone monuments such as the passage tombs appears to have been abandoned. Instead of permanent stone monuments, the surrounding landscape became the venue for the construction of other types of buildings and structures used for ritual and ceremonial purposes and built primarily of timber.



Fig. 4—The ridge at Newgrange, looking north-east.

The very construction of the timber sites and the associated earthworks was a ritual activity in its own right, as evidenced by the deposition of fragmentary cremated bones accompanied by a pottery type known as 'Grooved Ware' in the post-holes of timber circles such as the one excavated close to the entrance to the eastern tomb at Knowth.

Archaeological excavations in recent times have identified other previously unknown sites in the immediate vicinity of Newgrange. A pit and timber circle and a smaller timber circle were excavated by P. David Sweetman in the 1980s. The sites were identified in close proximity to the Newgrange Passage Tomb during improvements to visitor facilities there.

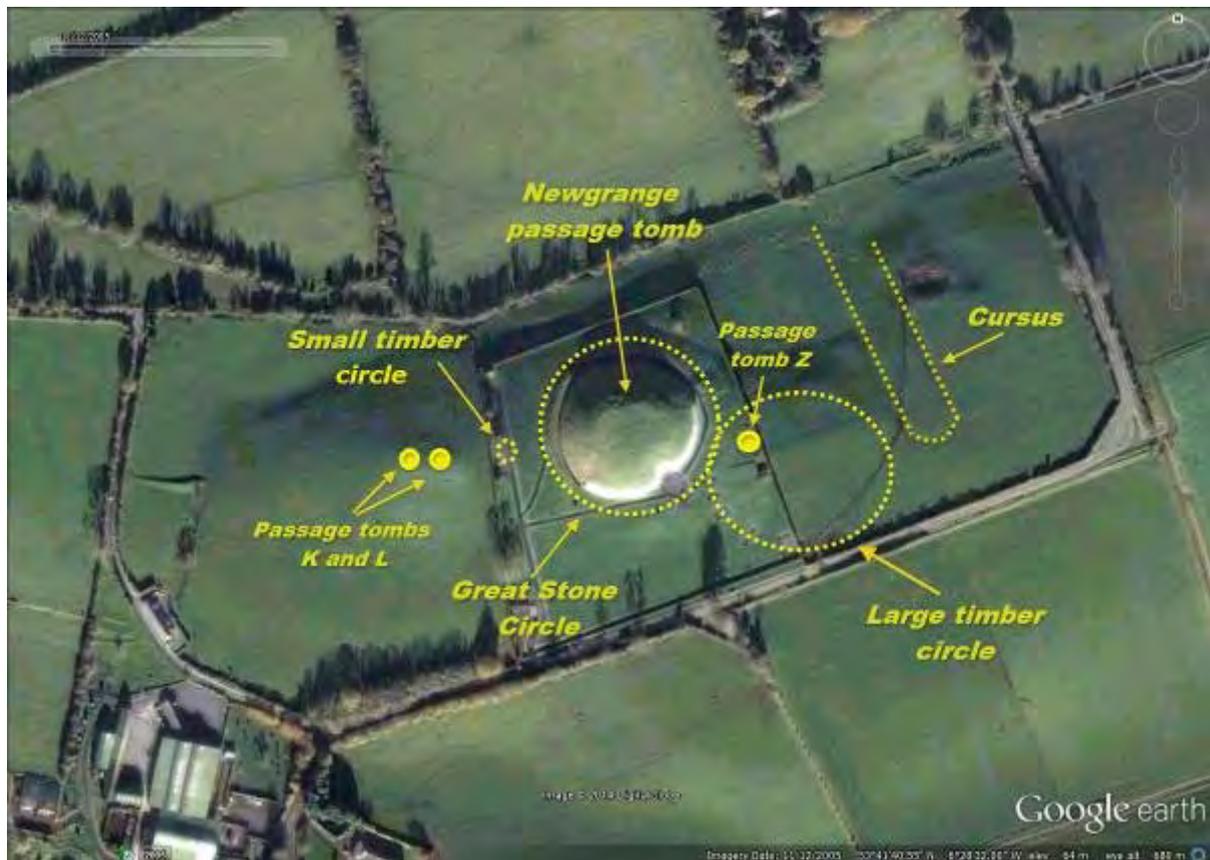


Fig. 5—Vertical aerial view from Google Earth showing sites close to Newgrange Passage Tomb (Condit *et al.* 2014).

While the exact nature of Late Neolithic ritual and ceremonies is unknown, the later timber circles and henges and the cursus monuments indicate that Newgrange remained a primary location and a focal point for gathering, for veneration and for religious ceremony long after the construction of the great passage tomb.

By the Bronze Age period, the construction of large ceremonial monuments on the floodplain at Newgrange had ceased. The religious beliefs that fuelled the use and maintenance of the ritual landscape at Newgrange appear to have come to an end. However, the monuments themselves remain, rediscovered, impressing today's generation as much as they would have impressed those who built and used them.

The floodplain at Newgrange

This interim report on the aerial surveys carried out in the summer of 2018 is focused on previously unidentified archaeological detail of monuments in the floodplain at Newgrange, an area that could be described as lying at the heart of Brú na Bóinne.

The River Boyne and the floodplain at Newgrange are the result of complex fluvial geomorphology over geological time. The so-called Bend of the Boyne at this location creates what has been termed ‘a geomorphological island’ where the various alluvial terraces above the river to the north would have provided agricultural and environmental diversity for the earliest settlers in the region.

Looking south from the entrance of the Great Passage Tomb, located on the summit of an east/west-running ridge at a height of just over 200ft (c. 61m), there are extensive views across the entire floodplain and its terraces. The extent of the Newgrange floodplain area is defined by the townland boundary on the east and by the rising terraces on the west. To the south the area is defined by the River Boyne, while the Newgrange ridge marks the northern limit.

This area was previously surveyed by Prof. M.J. O’Kelly and Claire O’Kelly during the Newgrange excavations that took place between 1962 and 1975. Combining information that had been gathered from various editions of Ordnance Survey maps, antiquarian sources and aerial photographs available to them, Claire O’Kelly produced a map showing the distribution of known sites in what was then known as the ‘Boyne Valley passage-grave cemetery’. This map was published in her *Illustrated guide to Newgrange* (1978). O’Kelly maintained the system of referencing the sites with letters of the alphabet.

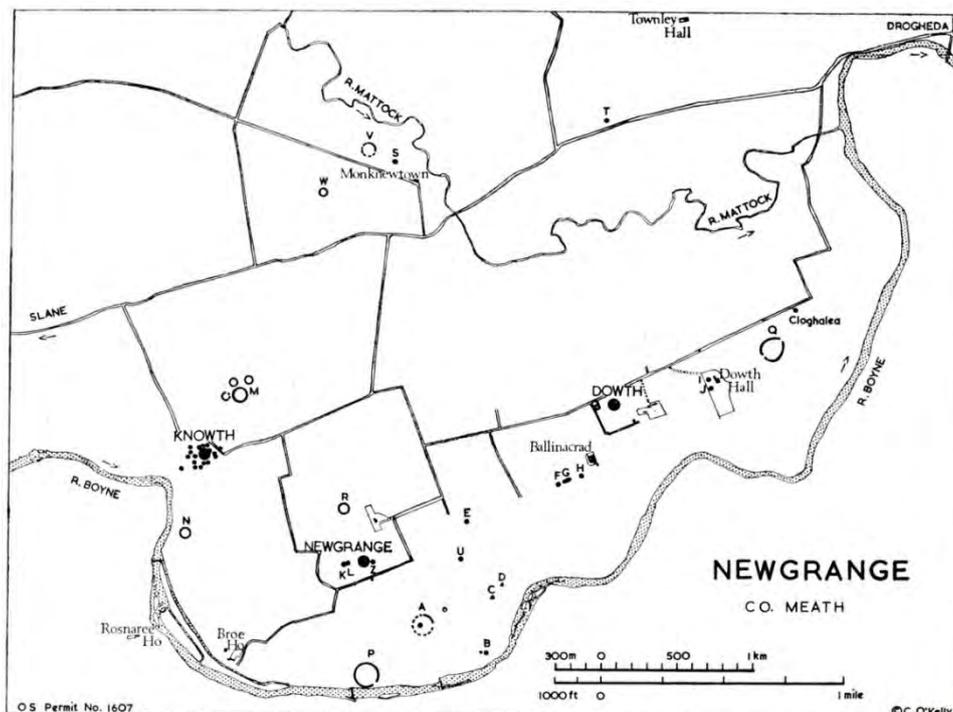
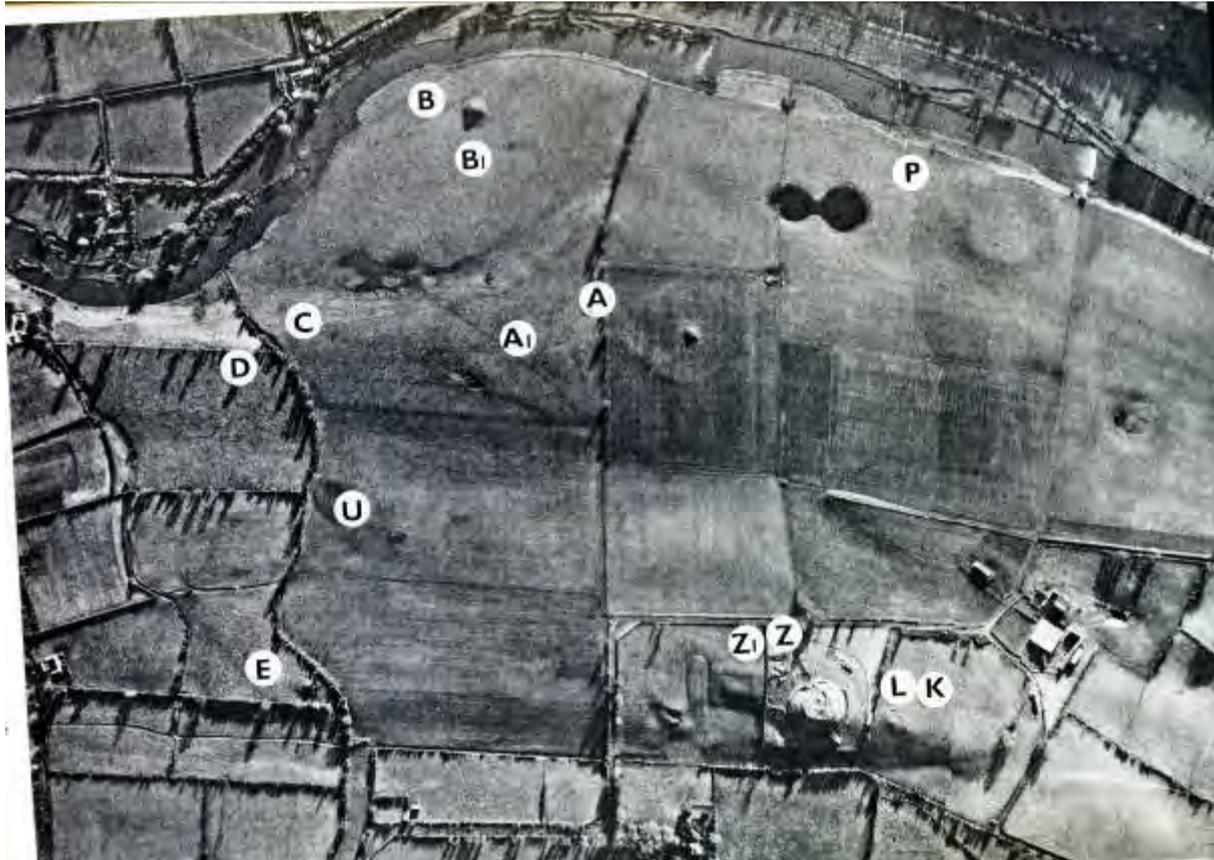


Fig. 6—Map of the ‘Boyne passage-grave cemetery’ (Claire O’Kelly 1978).

On the floodplain directly south of Newgrange Passage Tomb a variety of sites were recorded during those early surveys, including two henge monuments (Site P and Site A), two mounds considered likely to cover passage tombs (Site A and Site B), various small and ploughed-out mounds (Site A1 and Site B1), a possible passage tomb (Site U) and a standing stone (Site C).

Close to the Great Passage Tomb of Newgrange a number of passage tombs were recorded, of which three were excavated or partially excavated (Site K, Site L, Site Z). Another possible site, labelled Z1, was also identified.



**Fig. 7—Claire O’Kelly’s annotated aerial photograph of the Newgrange floodplain (1978).
North is at bottom of image.**

A geophysical survey conducted as part of a research project in the field to the east of Newgrange Passage Tomb—the Cursus Field—highlighted in 2000 the continuation of a large timber and pit circle and an unusual arrangement of pits and linear features, as well as further detail of the prehistoric cursus earthwork. Further geophysical survey conducted around the passage tomb and in the field to the south in 2015 by Joanna Leigh highlighted the presence of a large, enigmatic rectangular enclosure defining a series of pit alignments on its interior. This work again was carried out in connection with the potential improvements to visitor facilities in the area, and the large rectangular site was subject to an exploratory excavation carried out this year under the auspices of the Royal Irish Academy by Dr Geraldine Stout.

Other surveys have been carried out by Dr Steve Davis, Kevin Barton and Joe Fenwick in recent years. The combination of LiDAR imagery and various geophysical techniques deployed by these researchers is producing significant additions to the archaeological record. Some of the sites that were revealed this year through cropmarks had been partially recognised in these prior surveys, but the differential crop and vegetation growth arising from the exceptionally dry summer and the aerial view of them afforded us has allowed the full detail of these sites to be appreciated for the first time in all their glory.

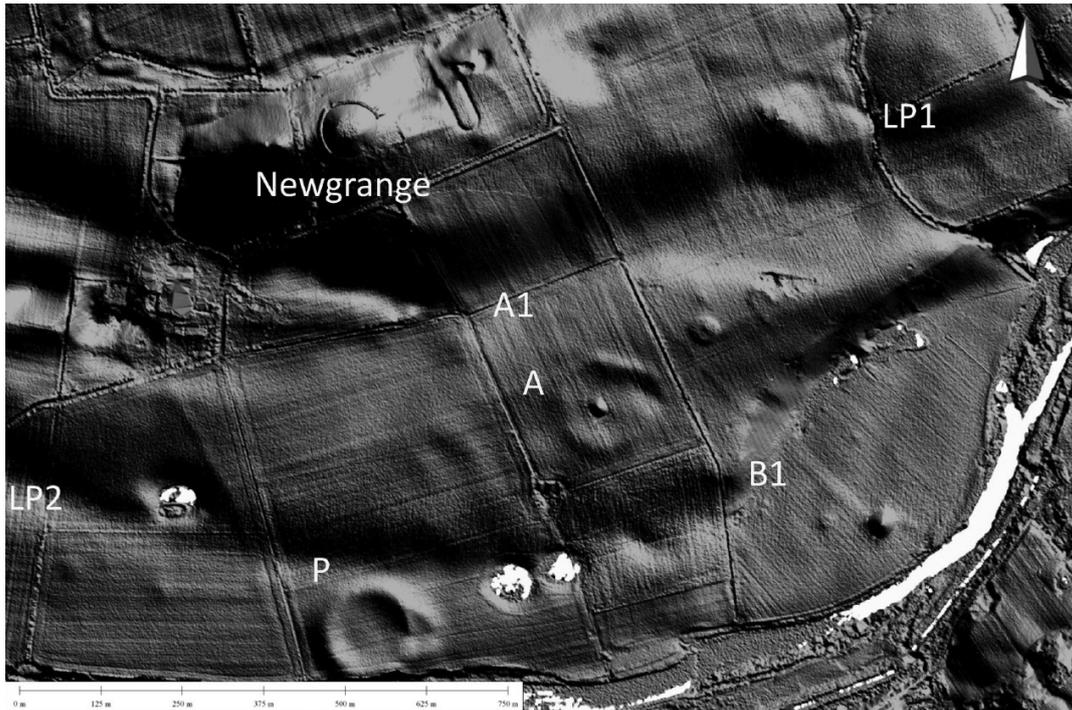


Fig. 8—Shadow-casting on LiDAR model, highlighting locations of henges (after O’Sullivan *et al.* 2012).

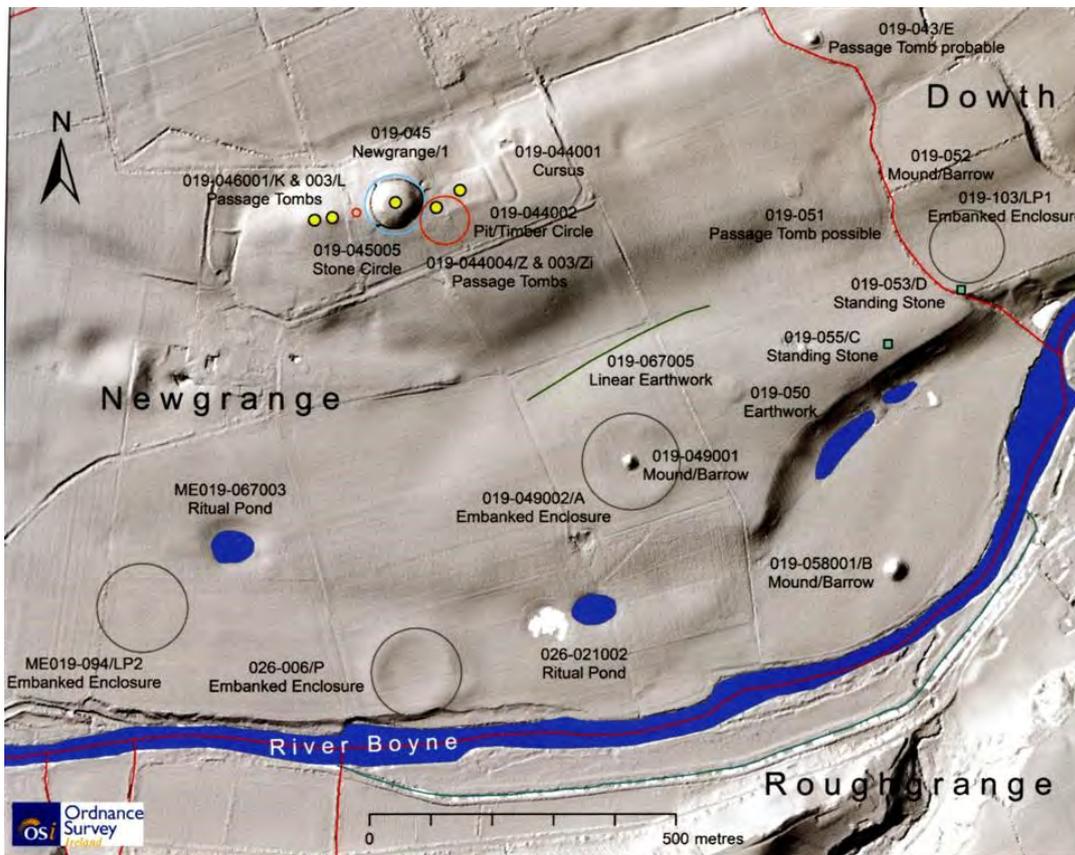


Fig. 9—Distribution of the floodplain monuments overlaid on LiDAR base map (Fenwick 2015).

Aerial archaeological survey

Aerial photography has been used for archaeological purposes in Britain and Ireland for over 100 years. Some of the earliest aerial photographs of archaeological sites in Ireland were taken by the Army Air Corps in the early 1920s, when the Hill of Tara was surveyed from the air. We know that Newgrange Passage Tomb and its environs were the subject of a similar survey in 1924; while much of the imagery is lost, one print was rediscovered.



Fig. 10—Vertical aerial photograph of Newgrange Farm (Army Air Corps, 13 November 1924), showing the area where some of the most spectacular cropmarks were recorded this year.

An aerial view allows an appreciation of the landscape that is not available at ground level. One can appreciate the position of ancient remains, allowing the ready study of the distribution of archaeological sites, their relationship to one another and their relationship to the topography and natural features of their environs.



Fig. 11—Previously unknown complex of prehistoric and early historic enclosures and ancient field ditches showing as cropmarks at Stalleen townland overlooking the River Boyne. DSC09130

One of the most notable contributions of aerial survey to the discipline of archaeology is that of discovery. Previously unknown and unsuspected sites can be identified. Low-visibility sites that are barely perceptible at ground level can be identified in low sunlight. Furthermore, sites that exist beneath the ground surface can be highlighted through soil marks and cropmarks.

Cropmarks

‘Cropmark’ is the term commonly used by archaeologists to refer to patterns in the surface of a growing crop where the differential growth allows the shape and form of banks, ditches and walls to be identified. Cropmarks can occur at any stage in the growth of crops, but they are particularly noticeable and bold at times when low moisture content in the ground coincides with a particular stage of crop development.

The classic example of a cropmark site is when a ditch dug centuries or even millennia ago is abandoned. The ditch silts up and is filled with slippage from the loose material of an associated bank and organic windblown material. The ditch is gradually filled up and perhaps levelled by agricultural ploughing. Long-rooted crops such as wheat or barley can reach downwards to the organic, moisture-retentive ditch fill. As a result, when the remainder of the crop is slowed down by the absence of moisture, the crop directly over the buried ditches grows taller and takes a longer time to ripen.

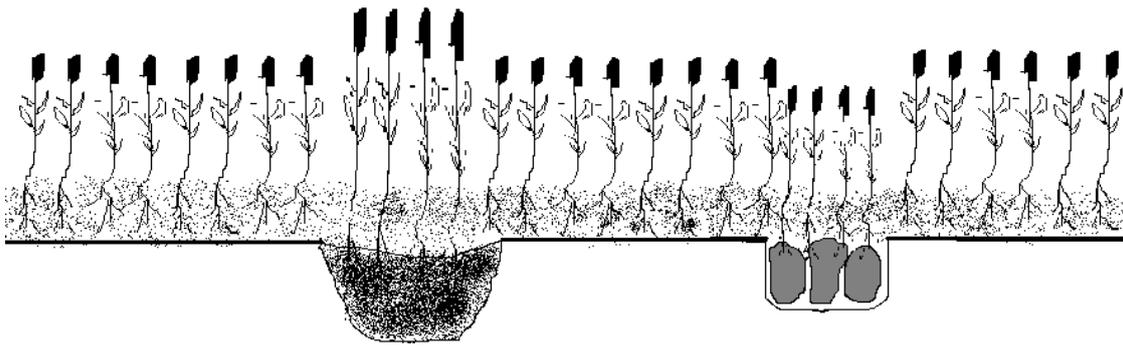


Fig. 12—Diagram showing positive crop growth over buried ditch (left) and stunted crop growth over stone wall foundations (right).

Such cropmarks are known as *positive* cropmarks. Across the surface of the crop the differential growth can be seen as contrasts in colour and height and can cast a slight shadow visible from the air. The patterns formed provide the outline of the shape of the archaeological site buried beneath the ground surface.

Cropmarks where growth is stunted through lack of moisture and the crops ripen early in contrast to the surrounding crop are known as *negative* cropmarks. These occur in particular above stone-built walls or ancient banks comprised of impermeable clay. Such parching occurs particularly when there is a severe drought. Like the cropmarks, the parching of grass and surface vegetation relies on the availability of subsurface moisture at a point in time.

2018 aerial reconnaissance over Brú na Bóinne

The programme of aerial reconnaissance by the National Monuments Service over the UNESCO World Heritage Site of Brú na Bóinne took place in July and August 2018.

The catalyst for the reconnaissance sorties was the discovery in July of a large, complex henge monument manifesting itself as a series of cropmarks in a wheat field just south of Newgrange Farm. This discovery was made by Anthony Murphy and Ken Williams using drone technology and its unique pattern attracted the attention of the public and media across the world.

The National Monuments Service carried out a number of follow-up aerial reconnaissance sorties in July with the assistance of the Irish Air Corps. The prime objective of these surveys was to record the nature and extent of the cropmarks, particularly sites or features in the vicinity of the Great Passage Tomb of Newgrange.



**Fig. 13—View from east across the parched floodplain at Newgrange (13 July 2018).
Newgrange Passage Tomb is at centre right. STW 9086**

The aerial photographs yielded stunning results, both in terms of the individual sites and features recorded and their collective impact on our state of knowledge of the World Heritage Site landscape.

While the archaeological potential of the floodplain would have been regarded as considerable by many archaeologists, the nature and extent of the results of the aerial reconnaissance are genuinely surprising and will be of interest to all.

GIS, mapping, recording, illustrating and archiving

The information gathered will inform many aspects of the role of the National Monuments Service in relation to the management of the World Heritage Site, the monitoring of conservation issues, the identification of previously unrecognised sites, the integration of surveys from other sources and the dissemination of information for stakeholders, the academic community and the public.

The imagery from the NMS aerial survey is currently being catalogued and is subject to ongoing analysis. This process involves the accurate mapping of the results onto a Geographic Information System (GIS), allowing the sites to be described (many of them for the first time), interpreted and illustrated.

Currently the GIS is being used to compare information across various layers of available mapping, including Ordnance Survey and Digital Terrain Models based on LiDAR surveys. Furthermore, the availability of ortho-photographs supplied by Bluesky International taken in late June 2018 is assisting in the identification and geo-referencing of cropmarks recorded during the July aerial surveys.

The GIS has also facilitated mapping of sites and features from oblique aerial photographs which have recorded unique cropmarks at a particular moment in time. The position and location of the cropmarks and the measurement of features can be determined with a high degree of accuracy. Once mapped, the cropmarks can be further analysed using 3D visualisation software which integrates the mapped features, the aerial photography and available LiDAR data to create 3D scaled representations of the area.

To gather more information about the exact local terrain in which the cropmarks are located it was necessary to inspect the mapped sites on the ground. The data from the GIS process can be transferred to a mobile GPS receiver which can show the users their exact position in relation to the mapped cropmarks. This has allowed each cropmark to be located accurately in the local terrain, giving valuable insights into how the monuments have developed over time

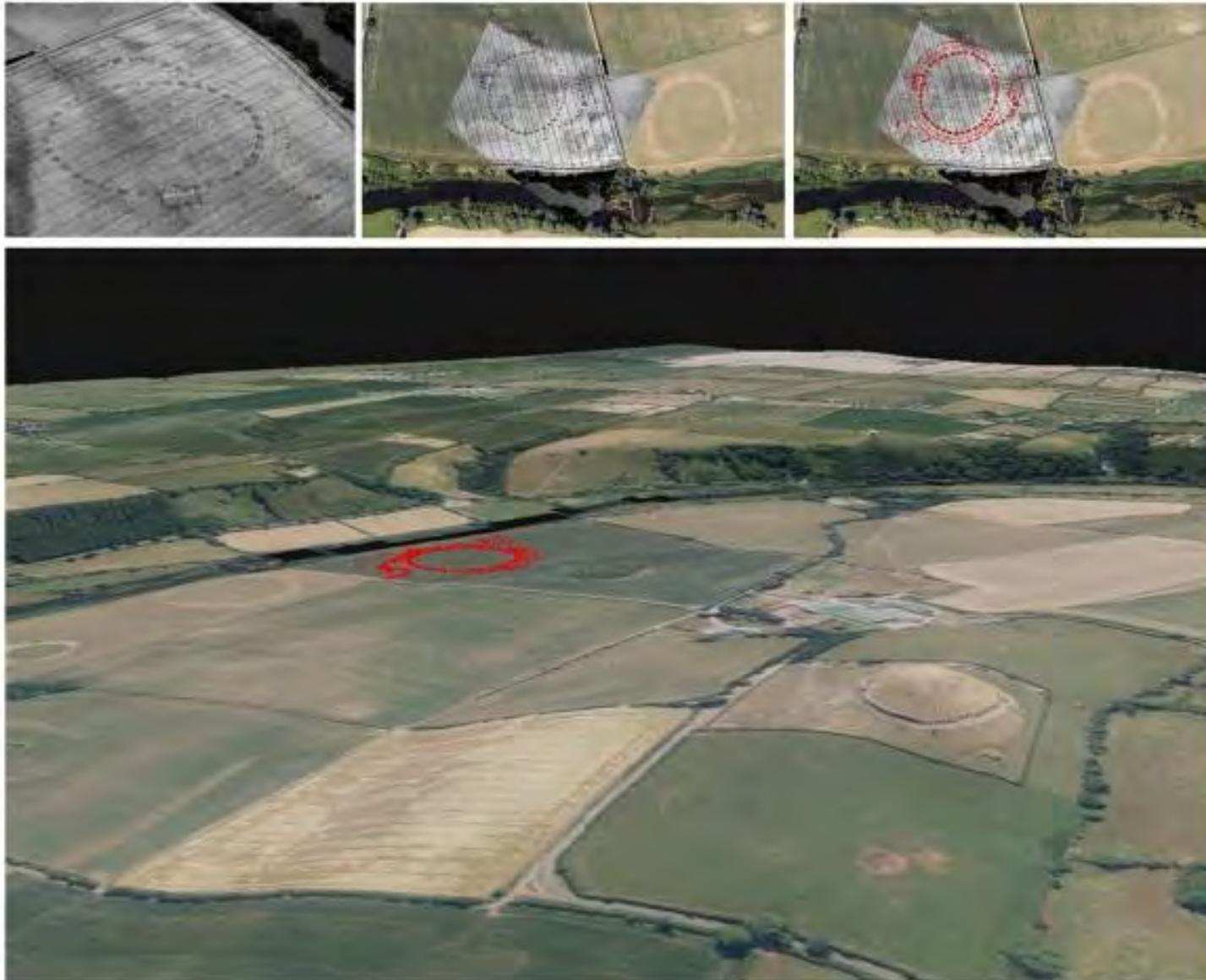


Fig. 14—A GIS-generated terrain model showing the position of the Geometric Henge in relation to the floodplain and Newgrange Passage Tomb at the the summit of the ridge overlooking it.

Above image © DCHG; base image © Bluesky International Ltd; open source LiDAR data from <https://dcenr.maps.arcgis.com>

Newgrange floodplain location map



Fig. 15—Map showing sites numbered in this report.

- Site No. 1**—The Four-Poster enclosure
- Site No. 2**—The Four-Poster outer enclosure
- Site No. 3**—The Great Palisade
- Site No. 4**—The Univallate Henge
- Site No. 5**—The Geometric Henge
- Site No. 6**—The Hidden Henge
- Site No. 7**—The Hook Enclosure
- Site No. 8**—The Double Dumbbell feature
- Site No. 9**—The Cropmarks Field, miscellaneous features
- Site No. 10**—Site P, henge
- Site No. 11**—Site A, henge
- Site No. 12**—Site A1, enclosure
- Site No. 13**—The oblong enclosure
- Sites No. 14**—Miscellaneous features
- Site No. 15**—Linear Feature 1
- Site No. 16**—The Great Rectangular Palisade Enclosure
- Site No. 17**—Linear Feature 2
- Site No. 18**—The Cursus Field
- Sites No. 19**—Miscellaneous cropmarks
- Site No. 20**—Site B, the Small Enclosure
- Site No. 21**—Site B, the Small Henge
- Site No. 22**—Site B, the Riverside Henge

Part 2

The Cropmarks Field



Fig. 16—The Cropmarks Field from the south, looking towards Newgrange Farm.

The Cropmarks Field

This field contains the cropmarks that stimulated global media interest during the summer drought of 2018. Approximately 16 hectares in extent and trapezoidal in shape, it lies immediately south of the main farm buildings at Newgrange Farm and is defined by four modern boundaries. There are farm tracks outside the hedgerows on the north-east and south. To the south, the field slopes gently down to the banks of the River Boyne. Traces of palaeochannels can be clearly seen. The most prominent palaeochannel, in which a large pond is located, can be seen running north-west/south-east across the northern part of the field.



Fig. 17—Location of the Cropmarks Field in relation to the river and the floodplain.

At the time of the NMS aerial survey the field had a standing crop of wheat. The combination of the extreme arid weather, alluvial gravels, the crop type and the degree of Soil Moisture Deficit gave rise to differential crop growth, appearing as cropmarks, which highlighted the presence of widespread subsurface archaeological remains. The cropmarks in this field distinguish themselves not only for the quantity of archaeological features but also for the types of sites identified and the incredibly fine details that can be observed.

The cropmarks indicate subsurface evidence for a suite of prehistoric monuments in close proximity to one another. There are henges, mortuary enclosures and palisade enclosures, monuments we would date to the Late Neolithic period. From the nature of the cropmark evidence and the use of

timber posts and palisades it can be inferred that many of these structures are likely to be contemporary.

Numerous pits appear as cropmarks throughout the field. Some are isolated features and some form distinct arrangements, while others appear to outline enclosures or structures whose function is not readily understood. Some represent the remains of post-holes that would have held upright timbers, while others are likely to be the remains of pits in which burial and/or ritual deposition took place. The large pond is also considered to be of archaeological interest, as the layout of the archaeological sites appears to 'reference' its existence.



Fig. 18—Aerial photograph showing the principal sites readily visible in the Cropmarks Field and the names applied to them throughout this report.



Fig. 19—High-contrast image of the Cropmarks Field, viewed from the south-west. DSC09045



Fig. 20—High-contrast image of the Cropmarks Field, viewed from the north. DSC9068

Site No. 1: The Four-Poster enclosure—palisade mortuary enclosure

The Four-Poster enclosure, so called after the four large post-holes located within it, manifested itself in great detail on the aerial photographs. The location of this site had been identified from high-altitude aerial photographs taken in 1991 and it was classified as a ring-ditch on the Sites and Monuments Record (SMR ME019-067002-). The architectural layout of the site bears strong similarities to other such known sites that have been interpreted as Late Neolithic mortuary enclosures where excarnation rituals took place. A similar site was excavated close to the entrance of the Eastern Passage Tomb at Knowth, while another example was excavated near the Giant's Ring at Ballynahatty, Co. Down.



Fig. 21—View of the Four-Poster enclosure and associated entrance features, looking south-west.
STW 8734

The Four-Poster enclosure is located close to the north-east corner of the field, immediately to the south of Newgrange Farm, c. 460m south-west of Newgrange Passage Tomb. It is sited on level ground on one of the upper alluvial terraces overlooking sloping ground, the palaeochannel and pond to the south. The details of this site show up with a high degree of clarity on the NMS aerial photographs.

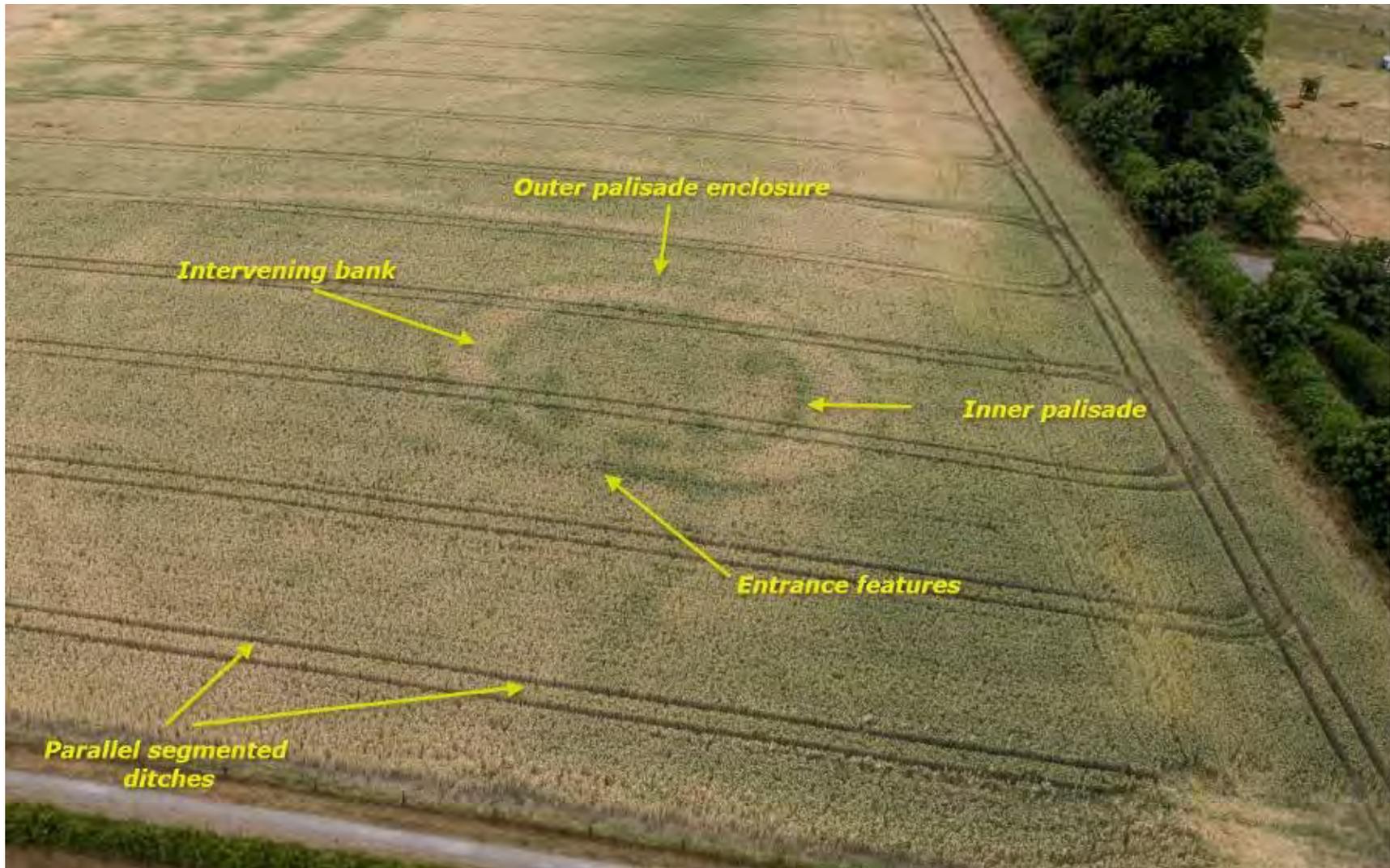


Fig. 22—Annotated view of the Four-Poster enclosure, looking west. STW 8730

The enclosure is defined by two rings of palisades, 5.1–5.8m apart. The inner ring defines a circular area c. 22m in diameter. The outer palisade is elliptical in plan, measuring 32m north–south and 28m east–west.



Fig. 23—The Four-Poster enclosure viewed from the north-west. JPW 1887

The lighter-toned cropmarks (negative cropmarks) between the two palisaded enclosures most likely indicate the presence of a bank. An entrance, c. 3.2m wide, can clearly be seen on the east-south-eastern perimeter of the enclosure, providing access through both palisades.

The cropmarks indicate that the entrance is structurally emphasised, with a thickening of both palisades on either side of the gap.

There is evidence within the interior for the presence of four large pits, each roughly circular in plan, arranged to form a rectangle measuring 11.3m x 12.3m. Each pit measures c. 2.5–3.5m across.

Outside the enclosure and on the same axis as the entrance there are traces of two parallel lines of post-holes, most likely forming an 'avenue' leading to the enclosure. The lines of post-holes are 19.2m apart and are traceable for a distance of c. 31m. Each of the parallel lines appears to be on an axis that is tangential to the perimeter of the inner palisade enclosure.



Fig. 24—GIS plan of the Four-Poster enclosure. STW 9026

While the Four-Poster enclosure is consistent with the plans and layout of other ‘four-poster’ sites known from Ireland, it does stand out in terms of scale, being around twice the size of the next largest example at Ballynahatty, Co. Down (Hartwell 1998). This conforms to an observation that the scale of monuments in the vicinity of Newgrange is increased, perhaps to reflect the relative importance of the Brú na Bóinne monumental landscape. The doubling of the palisade enclosure suggests that the design of the structure was not purely symbolic but may have been intended to prevent penetration by natural predators that might otherwise have spoiled or sullied the ritual of exposure and excarnation of the remains of the deceased.

Site No. 2: The Four-Poster—outer double palisade enclosure

This large subcircular enclosure comprises a bank with an internal double palisade. The visibility of how it relates to the Four-Poster enclosure and its associated avenue is obscured by modern features. This site bears some similarities to a large enclosure at Ballynahatty, Co. Down, that also controls access to an internal mortuary enclosure.



Fig. 25—View of double palisade enclosure from the south-east. DSC09355

The Four-Poster mortuary enclosure is located within a larger subcircular enclosure measuring 92m north–south and 95m east–west. This outer enclosure comprises a closely set double palisade ring most likely constructed on a bank, which shows up clearly on the aerial photographs.

Approximately three-quarters of the course of the perimeter of this enclosure can be seen. It is clearly traceable from the east-south-east to the north. The remaining arc is obscured by the modern field fences. Field inspection shows that some of the course of the enclosure was determined by the slight ridge in the natural contour of the ground sloping southwards towards the river.

Measurements can be made of the double palisade and the bank on which it is constructed at various points along its perimeter. The bank is c. 3.5–4m wide, while the palisades along the bank are c. 2m apart.

On the east the modern field fence and farm track conceal the area where the avenue leading to the Four-Poster would have crossed the line of the outer palisaded enclosure. It cannot be determined with certainty whether this outer enclosure was constructed to deliberately contain the Four-Poster mortuary enclosure. If so, it would have been part of a single architectural concept.

Alternatively, it might be that the central mortuary enclosure was an unrelated structure, earlier or later than the outer enclosure.

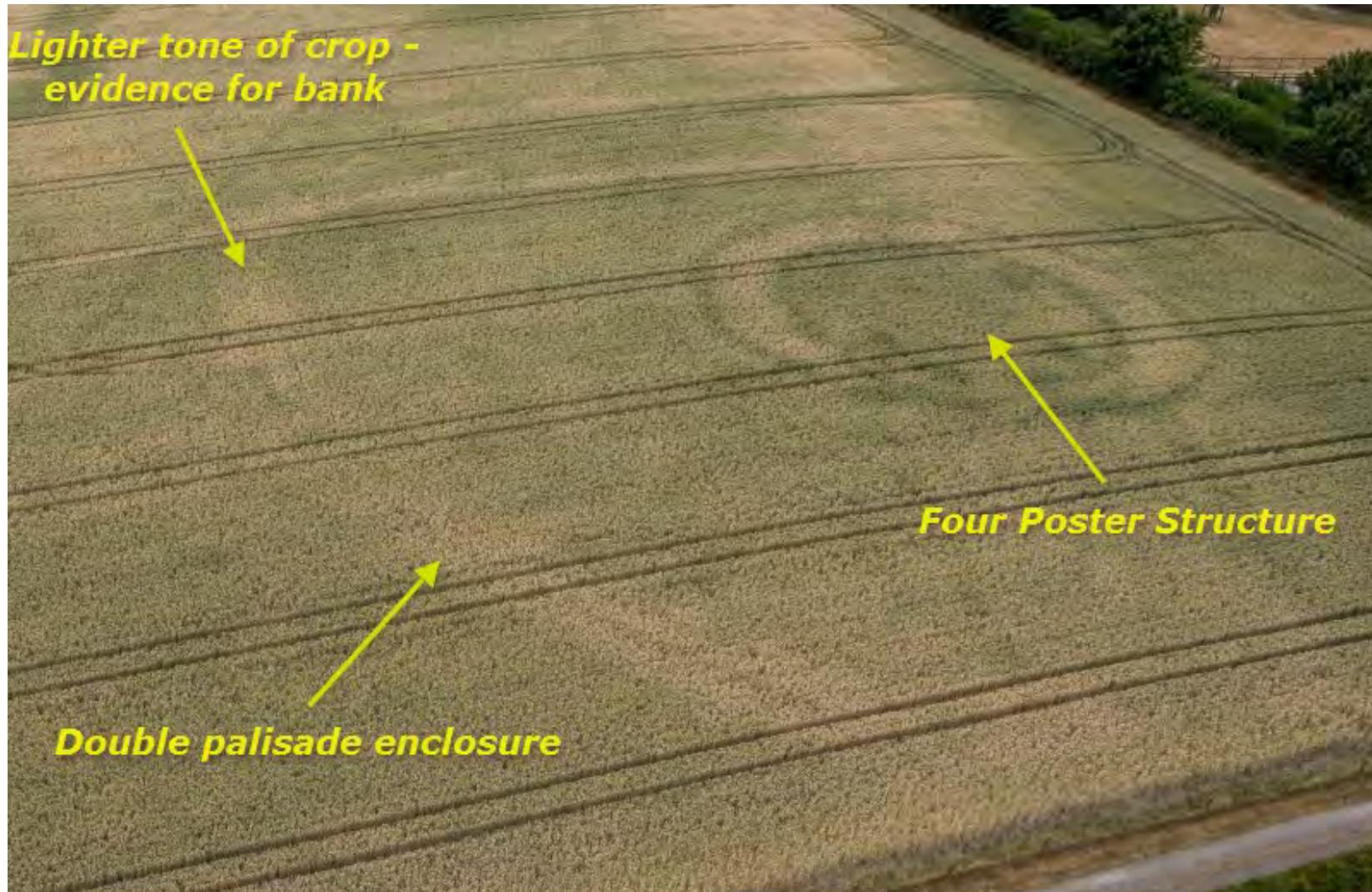


Fig. 26—Aerial image indicating the course of the outer enclosure, comprising a double palisade and evidence for a bank.

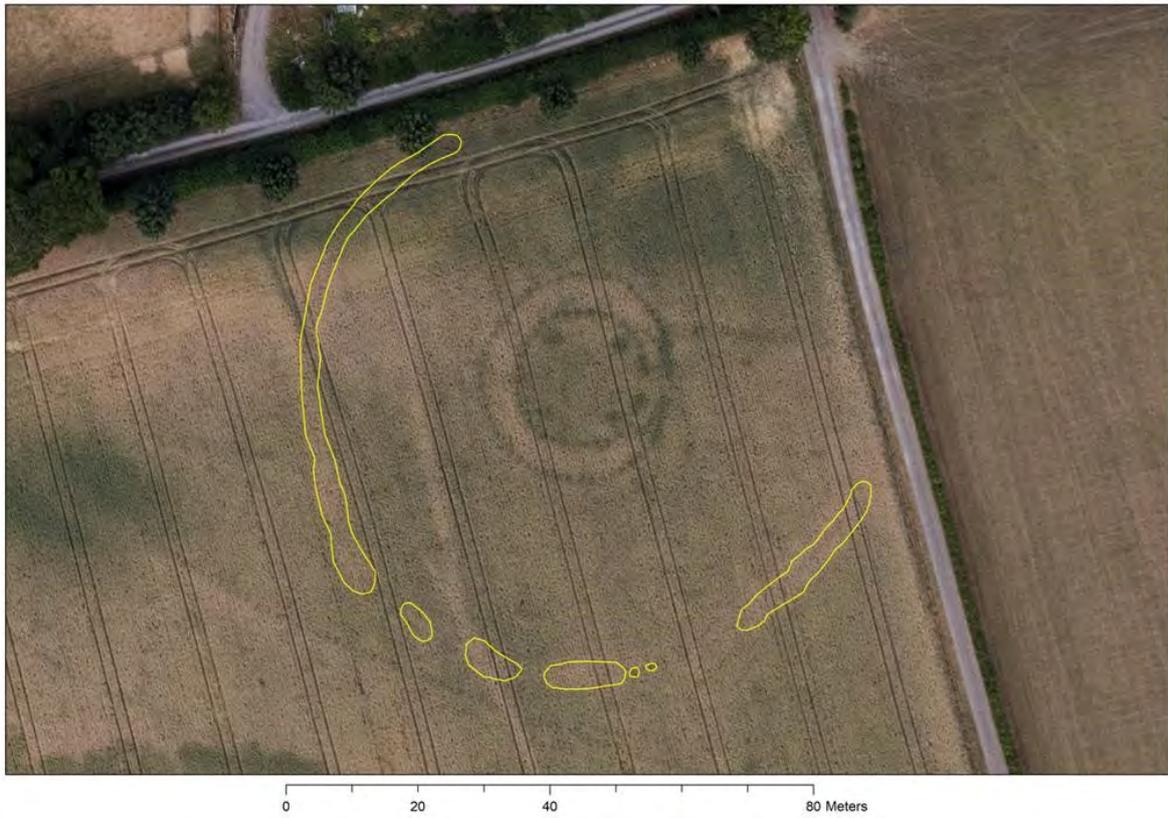


Fig. 27—GIS plan showing large outer enclosure surrounding the Four-Poster enclosure and its avenue. The exact course of the outer enclosure cannot be stated with certainty.

Site No. 3: The Great Palisade

The Great Palisade comprises a triple palisade arrangement. It shows up best in the Cropmarks Field, though it is traceable further to the east in adjoining fields. The complexity of its design raises questions about its function or functions. Its position relative to the outer enclosure of the Four-Poster mortuary site would suggest that it was constructed later. The section featured here is only a small portion of what appears to be a massive construction that might have divided separate ritual zones within the floodplain. Large palisade enclosures are known at other locations but none appear to emulate the complexity and scale of this new example from Newgrange.



Fig. 28—Triple palisade arrangement, viewed from the south-east. STW 8067

Cropmarks to the south and east of the Four-Poster enclosure clearly show the outline and course of three parallel palisades. All three can be traced as forming a distinct arc c. 200m long in the north-east corner of the Cropmarks Field, and it is obvious that the arc would have continued beyond the current field boundaries.

The intensity of the cropmarks of the three palisades varies in strength and scale from north to south. The innermost line is the best defined and is more complicated than the two outer palisades.

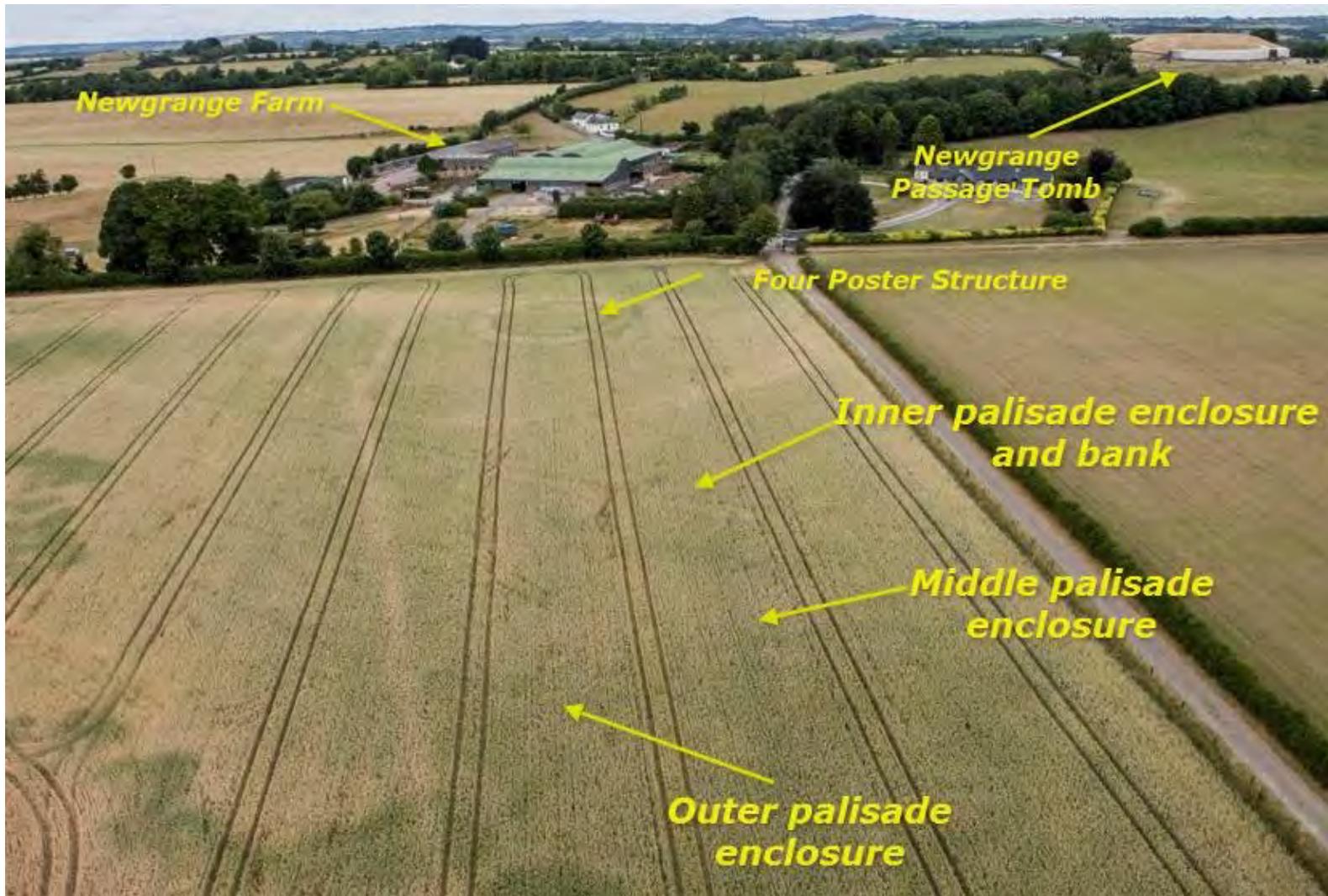


Fig. 29—Triple palisade enclosure, viewed from the south. STW 8722

It comprises two lines of closely set post-holes, c. 2.5m apart. A band of lighter-coloured crop between them appears to indicate the presence of a bank of earth. This is the innermost of the three palisades.

Outside this and parallel to it is another line of closely set post-holes running continuously without interruption. It appears clearly as a single palisade line, maintaining a consistent distance of c. 30m.

Outside this again is evidence for yet another palisade at a further distance of c. 15m. This outer line does not appear to be continuous, as it arcs inwards on encountering the upper edges of the palaeochannel.

Overall, these three parallel features would appear to define a triple palisade similar to the layout and architecture of earthen ramparts found in the design of some hillforts in Ireland. Given the nature of the arc that is formed, and without knowing its exact course, this triple palisade could describe an enclosure c. 900m across and would be analogous with palisade enclosures discovered in Britain, where they are closely associated with henge monuments.

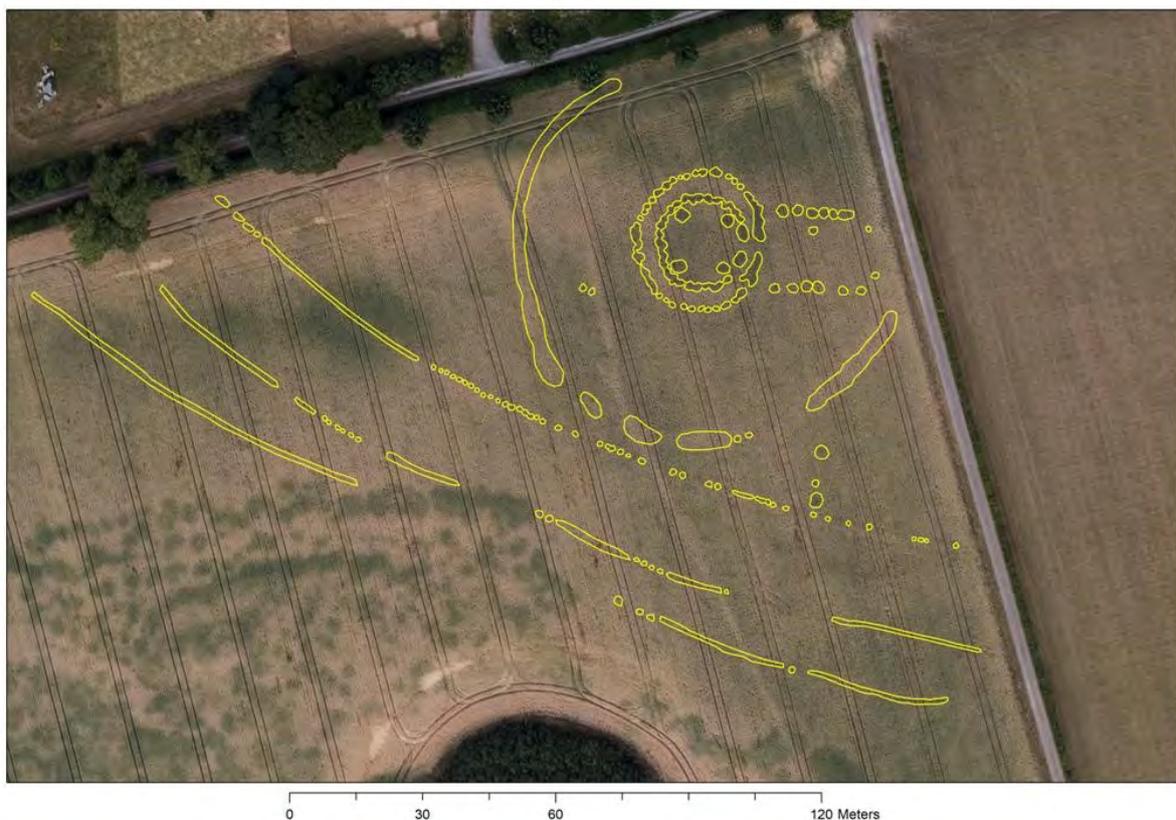


Fig. 30—Plan of the triple palisade, showing how it sweeps around the Four-Poster structure and its outer palisade enclosure. STW 9026

Site No. 4: The Univallate Henge

This site is referred to here as the Univallate Henge to distinguish it from the more complex Geometric Henge nearby. The henge is located in a field immediately south of Newgrange Farm on the floodplain c. 116m north of the banks of the River Boyne. Newgrange Passage Tomb lies c. 720m to the north-east. The cropmarks have revealed features that are unparalleled in other known henges and seem to indicate a very specific ritual design linked to the central mound and the structure within it.



Fig. 31—The Univallate Henge, viewed from the south-west. JPW 1905

This henge was originally identified by Dr Steven Davis and geophysicist Kevin Barton (Davis *et al.* 2010). The outline of the enclosure defining the site was identified from LiDAR imagery and was subsequently subjected to geophysical survey by Kevin Barton. The results of these surveys allowed partial recognition of some of the features of the site.



Fig. 32—High-contrast image showing details of the Univallate Henge and its proximity to the Geometric Henge. STW 8176

The 2018 NMS aerial photographic survey has significantly improved our understanding of the architecture of the henge and its associated features. The henge comprises an external enclosing bank with an internal segmented ditch surrounding a central feature that survives today as a low, barely perceptible circular mound. The enclosure is subcircular in plan, with overall external

dimensions of 128m north–south and c. 117m east–west. The enclosed area is a similar shape in plan, measuring 114m north–south and 103m east–west.

Enclosing bank

Most of the course of the enclosing bank and internal ditches is visible from the air, although a portion of the western perimeter is concealed by a field fence and adjoining farm track. The outer bank, visible on the aerial photographs as a lighter tone in the crop, is c. 7.5m wide.

Segmented ditch

A distinguishing feature of this henge is the segmented form of the internal ditch, whose layout can be compared to a ‘string of sausages’—a term sometimes applied to the segmented ditches of causewayed enclosures, an Early Neolithic site type. By contrast with causewayed enclosures, the segmented ditches of the Univallate Henge are remarkably regular.

The 24 segments of the ditch are visible as cropmarks on the aerial photographs. It is estimated that an additional nine or ten have been obscured by the field boundary. Each segment is slightly crescent-shaped in plan, with the terminal ends pointing towards the interior of the henge. The segments range between 6.2m and 7.3m in length and are c. 1.5m wide. The gaps between them vary from 4.9m to 5.3m.

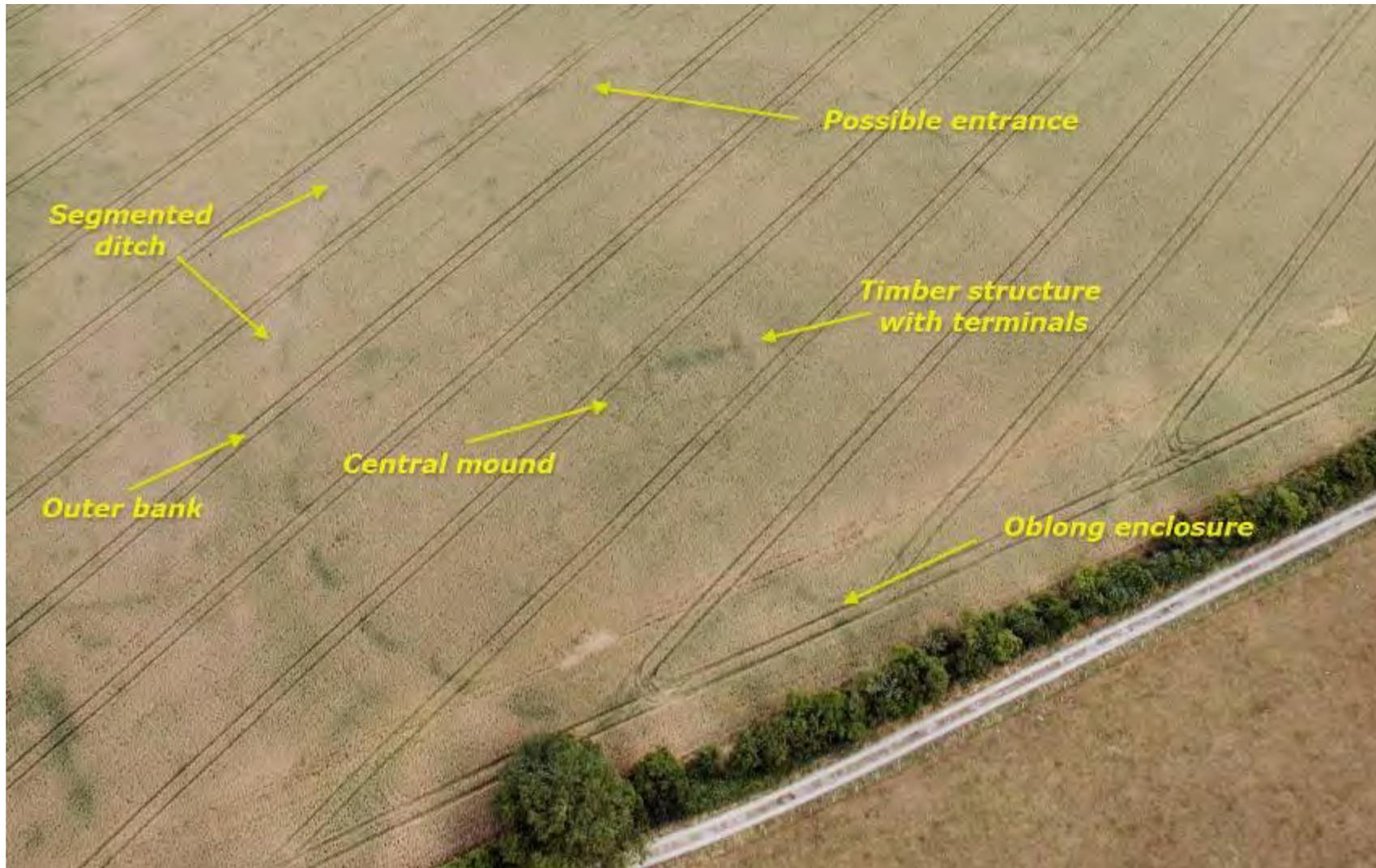


Fig. 33—Annotated aerial photograph indicating principal features of the Univallate Henge. STW 8085

Possible entrance

A potential entrance gap is located on the south-eastern perimeter, where there is an apparent absence of the outer bank and a wider-than-average spacing between the segmented ditches inside the bank.

Central mound

Centrally placed within the henge enclosure is a low mound, c. 0.2m high (Davis and Barton). Its base is defined by traces of a narrow ditch, circular in plan and 24.5m in diameter. Within the mound is a line of four large pits, each measuring c. 2.2m in diameter, running north-north-east/south-south-west. At both ends of the line of pits are terminal features consisting of ditches c. 7.2m long, with a slight V-shape in plan, projecting outwards. Together the pits and ditches form a dumbbell-shaped feature, 11.5m in length.

Oblong enclosure

The cropmarks show evidence for the presence of an oblong enclosure along the north-eastern perimeter of the henge enclosure. The feature is obscured by the modern field fence at this point.

If complete, the feature would comprise two parallel ditches, each 2.5m wide, with rounded terminals, forming a 'capsule-shaped' enclosure aligned north-north-west/south-south-east. Only the eastern side of the enclosure, its southern terminal and a small portion of the northern terminal are visible. It extends for a length of 32.8m and measures 15.2m across.

Internal features

The aerial photographs indicate a number of features within the enclosed area of the Univallate Henge that are likely to be associated with its use. Cropmarks forming an arc can be seen inside the northern perimeter. This arc, apparently formed by a segmented ditch, is concentric with the enclosing bank, the segmented ditch and the central mound. There are also numerous pits of various shapes and sizes, particularly in the eastern half of the enclosed area.



Fig. 34—High-contrast image of the Univallate Henge, viewed from the north. STW 8703



Fig. 35—GIS plan of the Univallate Henge. STW 8984



Fig. 36—High-contrast image of the Univallate Henge, showing the oblong enclosure in the foreground, from the north-west. STW 8707



Fig. 37—High-contrast image of the Univallate Henge, highlighting the nature of the central mound and enclosed structure, viewed from the south-west. STW 8459

Site No. 5: The Geometric Henge

This site, which was identified by drone pilots Anthony Murphy and Ken Williams in early July 2018, is referred to here as the Geometric Henge on account of the concentricity and radial layout of the enclosing elements. It is located in the southern portion of the field immediately south of the complex of buildings at Newgrange Farm, on the lowest alluvial terrace at that point, c. 48m north of the banks of the River Boyne. The entrance to Newgrange Passage Tomb lies c. 655m north-east of the henge.



Fig. 38—The Geometric Henge, viewed from the south-east. STW 8097

The Geometric Henge comprises a series of subcircular enclosing elements, with overall dimensions of 154m north–south and 143m east–west. In plan the course of the enclosing elements flattens along the western perimeter, where a large rectangular enclosure is incorporated. On the south-east the enclosure is augmented by the addition of an annexe feature similar to the projections that occur at Site A and Site B.

The henge enclosure consists of three elements: an outer ring of post-holes, a middle ring of post-holes and an inner enclosure defined by double segmented ditches. All three elements appear to be concentric, suggesting contemporaneity, and are most likely the product of a single architectural concept.

Along the eastern perimeter there is an outer extension to the enclosing elements—an annexe—evidenced by a series of ditch segments arcing outwards from the perimeter of the inner circle. This annexe appears to incorporate features that are likely to form an entrance leading to the interior of the henge.



Fig. 39—The Geometric Henge in relation to Site P, viewed from the north-west. STW 8172

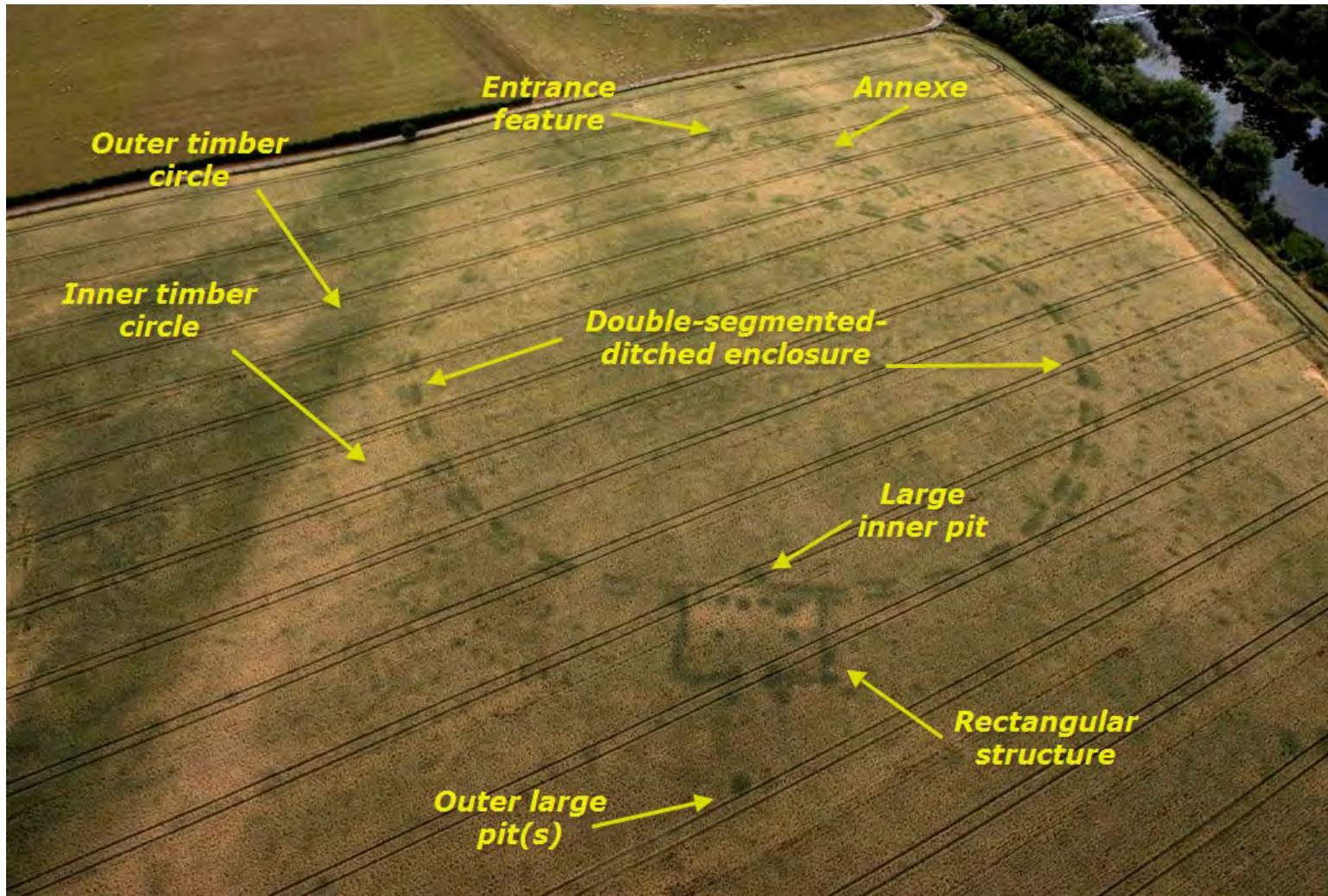


Fig. 40—The Geometric Henge viewed from the north-west, with principal features indicated. STW 8686

The timber circles

The cropmark evidence indicates two outer rings of pits that give rise to the surface discolouration in the photograph. Many of the pits show a projection that is consistent with evidence for a post-pit ramp, indicating the likelihood that they are the remains of pits which once held upright timber posts.

The inner ring of posts, subcircular in plan, has dimensions of 140m north–south by 127m east–west, while the outer ring describes the outermost extent of the enclosure and measures 154m north–south by c. 143m east–west.



Fig. 41—Close-up of the timber circles and the double segmented ditches. STW 8124



Fig. 42—Close-up of radial layout of post-holes. The elongated outlines of some of the post-holes are likely to reflect the presence of ramps. Note also other post-holes and features in the intervening spaces between the enclosures. STW 8776

The double-segmented-ditched enclosure

Centrally placed within the double ring of post-holes is what is best described as a double-segmented-ditched enclosure, which describes a subcircular space measuring 120m north–south by 107m east–west.

The cropmarks show clearly a pattern of closely set double segmented ditches, which give a distinct impression of equidistance and design. The consistent rectangular shape of the cropmarks most likely indicates evenly constructed subsurface pits that may have been timber-lined (thus preserving their shape).

Each segment appears like an ‘equals’ sign, rectangular in plan and ranging in length from 4.4m to 5.9m. The distance between each ‘bar’ of the ‘equals’ sign is c. 1.2–1.3m. Each rectangular pit measures c. 5.5m x 1.9m. Close examination of the aerial photographs highlights slight variations in the appearance of some of the ditch segments.

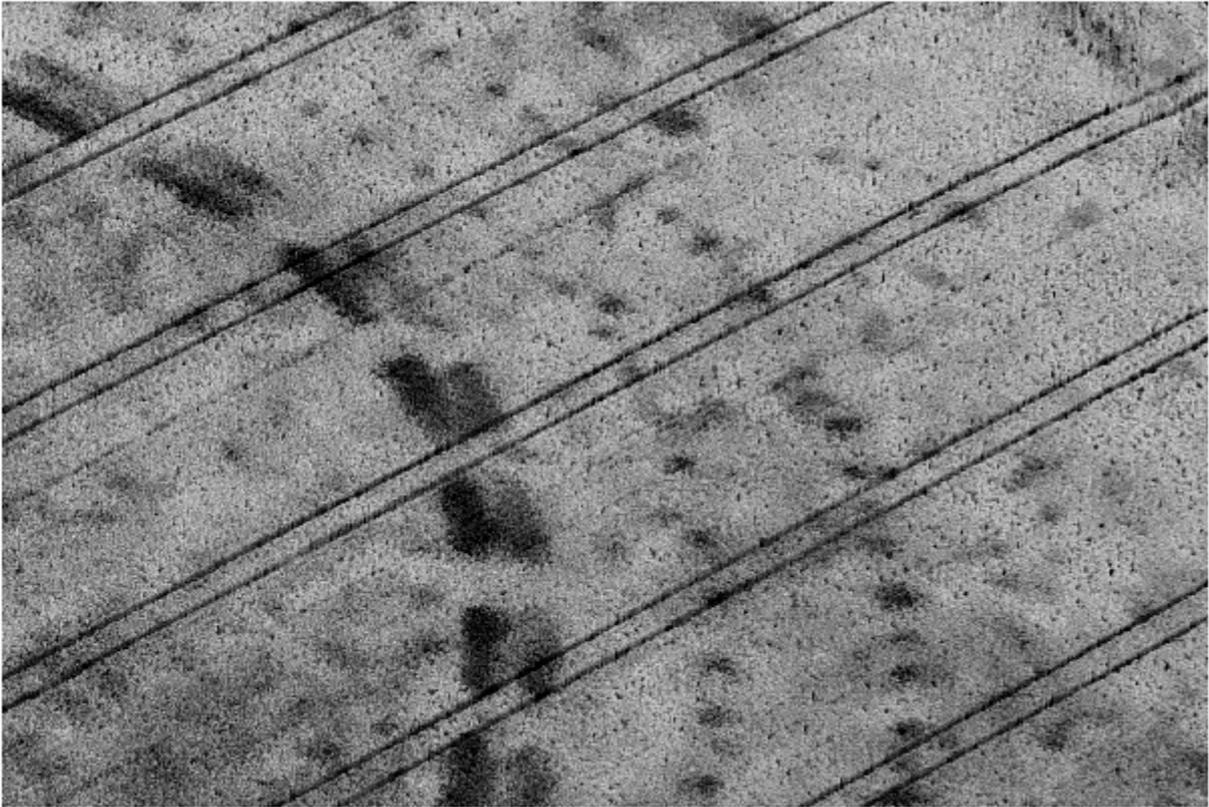


Fig. 43—High-contrast image showing close-up of the double segmented ditch.
Note the differential crop growth over the rectangular segments of the inner and outer ditches.
STW 1891

At the east-south-east there is a likely entrance feature, showing as a gap c. 4.2m wide. Here there is a further variation in the appearance of the segmented ditches and a clear alignment with what appears to be a more obvious entrance through the annexe feature along the south-eastern perimeter.



Fig. 44—Close-up of one of the double ditch segments, showing two other short sections of ditches running perpendicular to the ends. The significance or potential significance of this feature is currently unclear. STW 8692

Annexe feature

An annexe feature is visible as an arc of double segmented ditches stretching from the eastern perimeter to the south-eastern perimeter of the enclosure elements.



Fig. 45—Close-up of splayed entrance feature and its relationship to the segmented ditches of the annexe, viewed from the south-east. STW 8698

Two box-like cropmarks splaying outwards to the east seem to form a formal entrance feature with an internal width of 4.5m and an outer width of 6.6m.

Five double segmented ditch features arc in a south-westerly direction, while a further five can be seen to the north of the entrance (two are somewhat vague).

The length of the chord of the arc of the annexe is 79m.

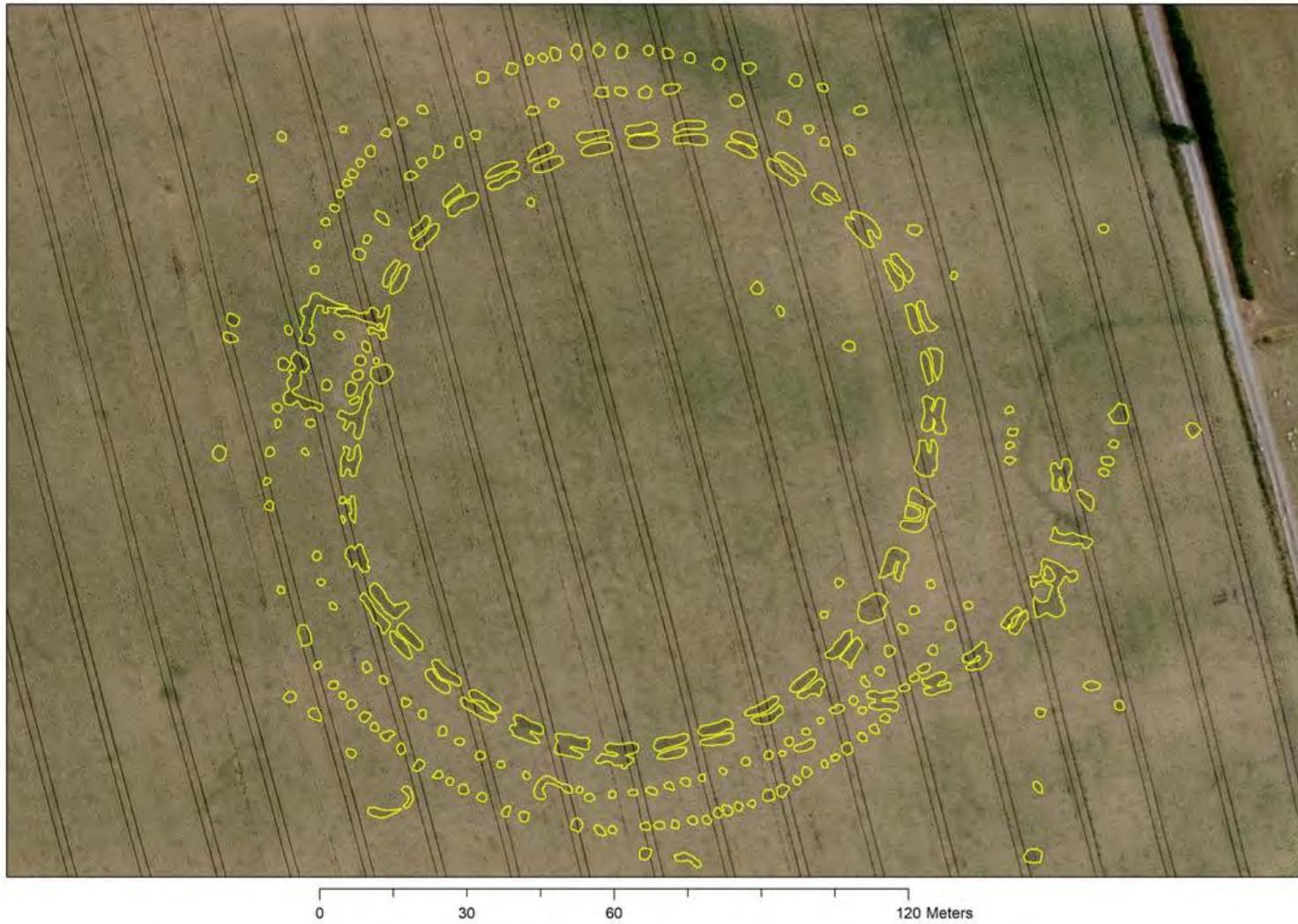


Fig. 46—GIS plan of the Geometric Henge. STW 8984



Fig. 47—Close-up of the annexe ditches where they encounter the timber circles at the south-eastern perimeter of the Geometric Henge. STW 8176

Rectangular structure

A rectangular structure can be clearly seen on the west-north-western perimeter of the double-segmented-ditched enclosure, occupying most of the space between the enclosure and the two rings of timber posts.

The rectangular structure measures 22m x 16m externally (18m x 11m internally). On close inspection the cropmarks appear to reflect subsurface ditches with irregular edges, suggesting a series of large timber posts set into oblong trenches.

The long axis of the rectangular structure is orientated north-north-east/south-south-west. On the north the enclosure appears to be defined by two linear ditches which on close inspection appear to be slightly misaligned. The eastern line of the enclosure appears to comprise a palisade trench along the course of the inner rectangular components of the segmented ditch. A more even ditch with a singular gap and at least one large post-hole forms the enclosure on the south. On the west the enclosure is defined by a trench with large post-holes in it. An entrance feature is visible along its course.

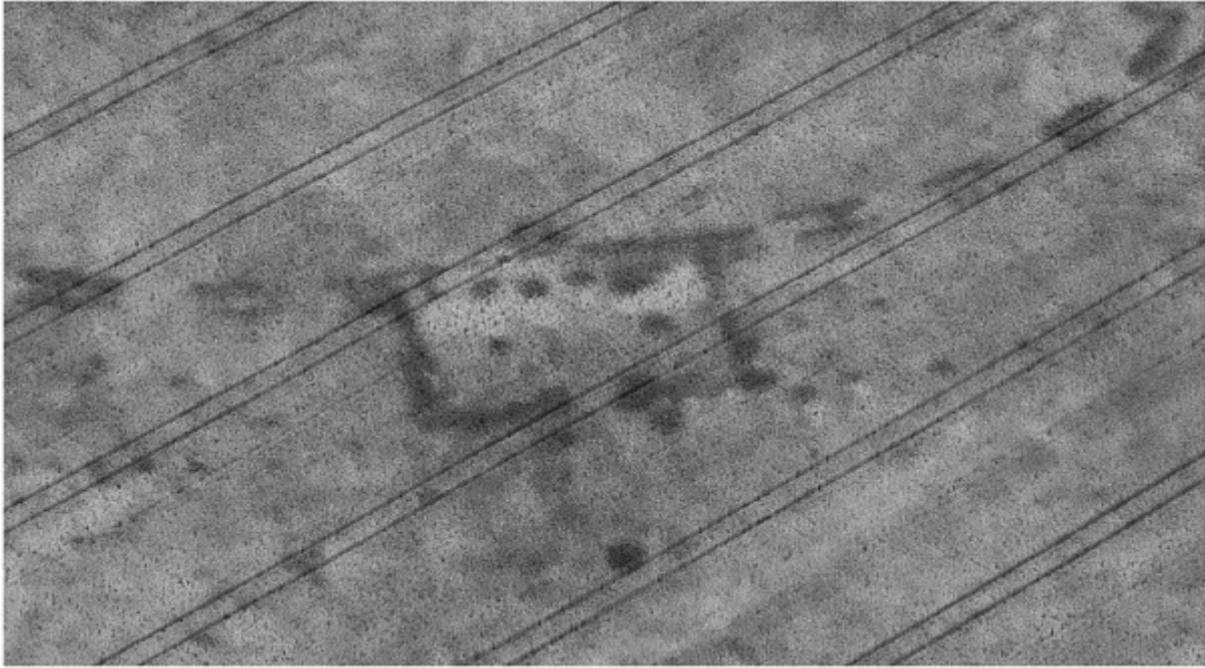


Fig. 48—Rectangular structure viewed from the north-east. STW 1891

Just less than half of the internal space shows up as a lighter-toned crop colour, most likely indicating the presence of a bank. This area coincides with a small mounded area visible on LiDAR imagery. At the western edge of the lighter-toned crop/bank and contiguous with it there are two large post-holes marking the approximate line of the central long axis of the rectangular structure. The post-holes, circular in plan (northern post-hole 1.1m in diameter, southern post-hole 2.2m in diameter), are c. 9.2m apart and symmetrically laid out in relation to the entrance feature at the west.

Centrally placed along the exterior of the east side of the rectangular enclosure and along the edge of the interior space defined by the henge enclosure is a noticeably large pit/post-hole, roughly circular in plan (c. 5.6m in diameter). This post-hole aligns perfectly with the axis of the entrance feature on the west side of the rectangular enclosure.

The traces of the double segmented ditch can be seen converging with the north-east and south-east corners of the rectangular structure.

The course of the outer component of the double segmented ditch does not appear to continue into the interior of the rectangular structure. However, four large post-holes (1.7–2m in diameter), in a near-linear arrangement, can be seen along the projected course of the segmented ditch, and two linear features can be seen projecting inwards across the width of the double segmented ditch. These inwardly projecting ditches are located at a distance of 1.6m and 2m from the enclosing elements of the rectangular enclosure on the north and south respectively.

An obvious entrance feature, a gap c. 2.8m wide, is located on the western façade of the structure. Both sides of the entrance appear to be enhanced by a double arrangement of large posts. On the outside of the entrance feature to the west two large post-holes can be clearly seen, aligned roughly on the axis of the entrance. These post-holes are at a distance of 1–1.5m from the projecting post-holes at the sides of the entrance.



Fig. 49—High-contrast image of rectangular structure and the arrangement of the post-holes of the timber circles. STW 8176

There is also evidence for another possible entrance feature on the southern side of the rectangular enclosure. This appears as a gap, 1.7m wide, in the ditch that forms the enclosure on its southern side.

A large pit/post-hole, rectilinear in plan, is located at a distance of 13m from the entrance to the west-north-west. There are traces of another possible post-hole, a less well-defined feature, to the south of this post-hole.

Internal features

A number of features can be seen within the enclosed area. An initial observation would be that features such as pits or post-holes, arcs of ditches, linear features or small enclosures are not as well defined as the enclosing elements of the Geometric Henge itself.

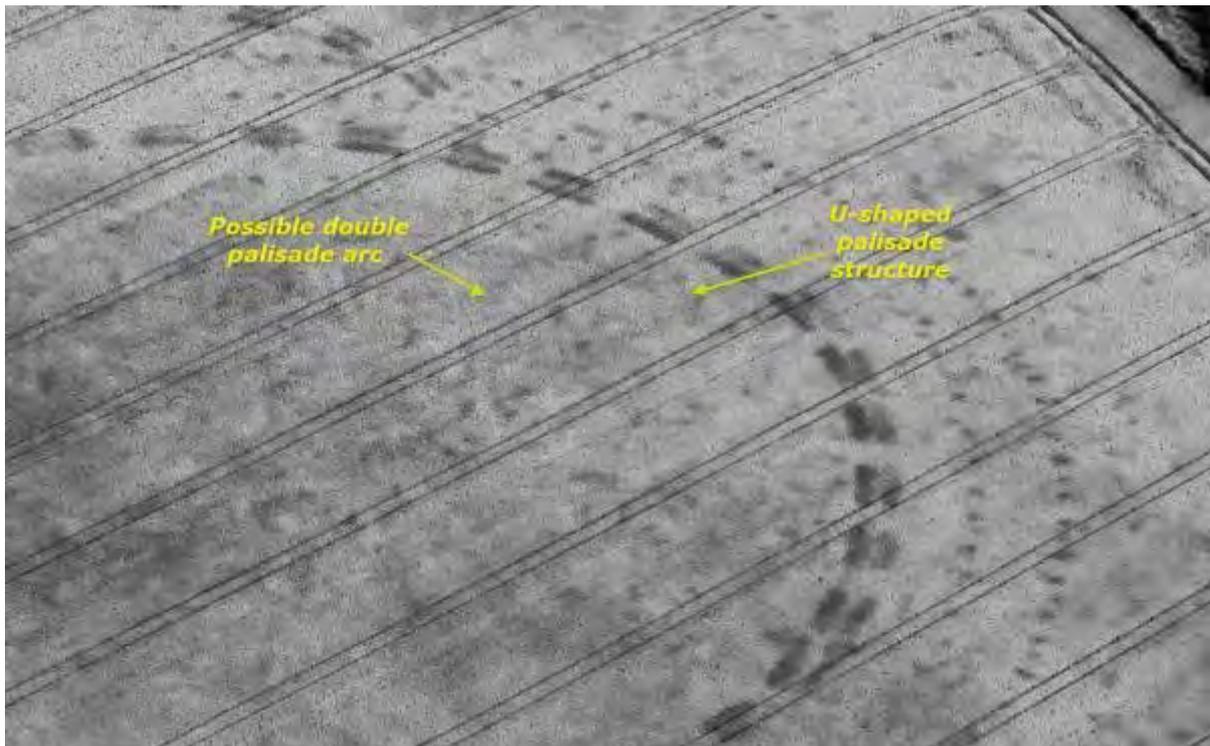


Fig. 50—High-contrast image showing the location of the U-shaped palisade structure and associated palisade arc. STW 1891

U-shaped palisade and ditch: On the southern perimeter of the segmented-ditched enclosure a U-shaped ditch can be seen projecting inwards towards the centre of the enclosed area. The appearance of the differential cropmarks indicates that the feature is formed of pits/post-holes and linear ditches. It seems to be bounded by the ditches on the open southern end but is not contiguous with the ditches.

Palisade arc: A distinct arc of post-holes seems to overlap the eastern portion of the U-shaped feature. It appears to comprise a curvilinear arrangement of a double palisade extending northwards before curving to the west.



Fig. 51—The position of the ring-ditch feature within the Geometric Henge, viewed from the south-west. DSC09338

Ring-ditch: A circular enclosure defined by a band of darker crop growth, c. 12m in diameter, is located in the northern half of the enclosed area in the north-west quadrant and c. 20m from the inner segmented ditches.

There are numerous crescent-shaped pits throughout the interior and some rectangular pits similar in shape to the enclosing segmented ditches.

Site No. 6: The Hidden Henge

The aerial photographs show patterns that are likely to indicate the presence of yet another henge located between the Univallate Henge and the Geometric Henge. We have called it the Hidden Henge because it is not as obvious as other sites and features. The site can be identified on various photographs taken at different angles.



Fig. 52—High-contrast image of the Cropmarks Field. The Hidden Henge is at centre right.
STW 8176

The henge enclosure

The evidence for this possible henge can best be traced along its western perimeter, where an arc—apparent as pits and, in other places, as a linear ditch—can be seen. On the north-western perimeter a series of pits and a thin ditch provide evidence for the enclosure. The perimeter of the enclosure along the south-western quadrant suggests a double arrangement of pits.

The eastern perimeter of the enclosure is less distinct, but it may be related to a line of four circular pits (post-holes?) similar in appearance to the timber circle post-holes that form the outer enclosures at the Geometric Henge. On the interior two rectangular pits may be associated with a possible entrance feature or the line of four pits.



Fig. 53—Aerial photograph showing features that may constitute the Hidden Henge.

Interestingly, the henge enclosure, c. 98m across, appears to be contiguous with the outer edge of the bank that forms the Univallate Henge to the north-west and would be contiguous with the outer timber circle of the Geometric Henge to the east.

Possible rectangular structure

At the west-north-west the enclosing circular feature appears to be aligned on a rectangular feature that may be the fragmentary remains of a structure similar to the rectangular structure, 18.7m x 11m, on the western perimeter of the Geometric Henge. A ditch c. 2m wide, most likely comprising a trench with irregular edges, delimits an area of lighter-toned crop indicating a subsurface bank. The long axis of this rectangular enclosure appears to have a similar orientation to that of the Geometric Henge.

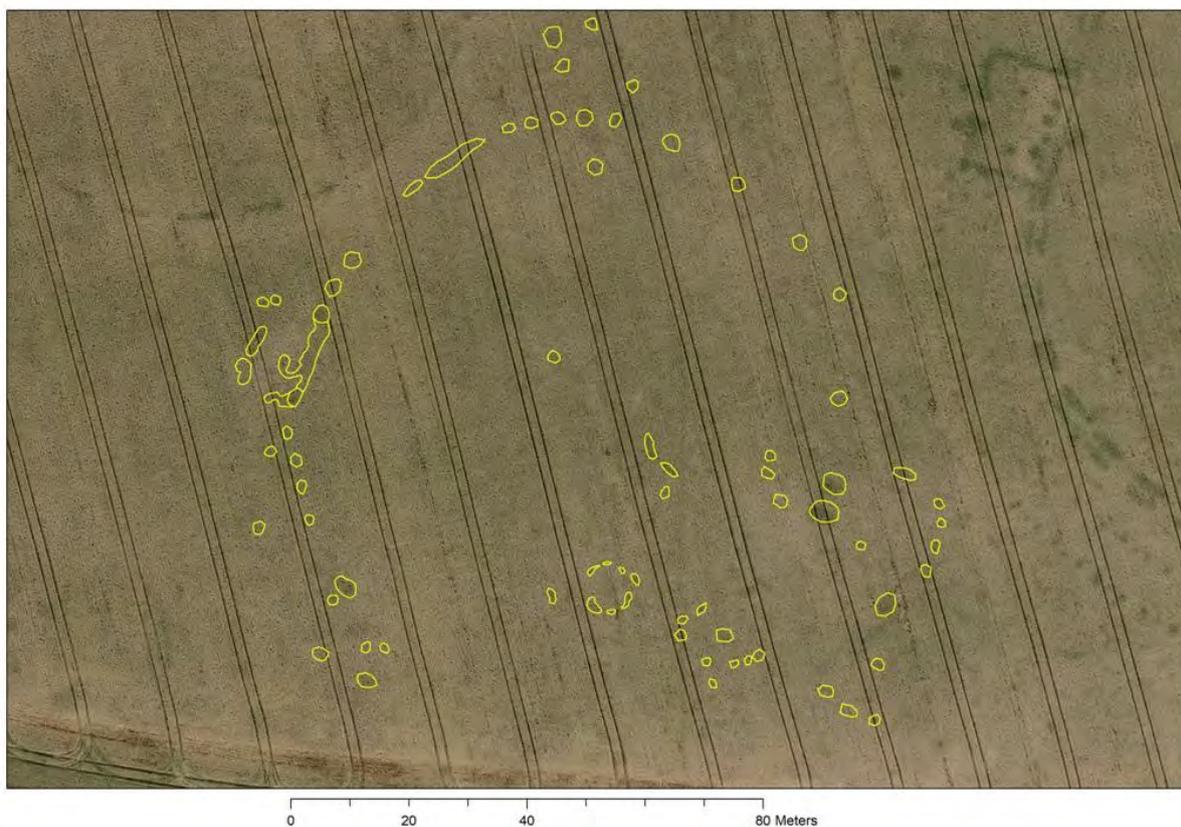


Fig. 54—GIS plan of the Hidden Henge. STW 8984



Fig. 55—High-contrast image showing the outline of the Hidden Henge. STW 8172



Fig. 56—The Hidden Henge outlined in red.

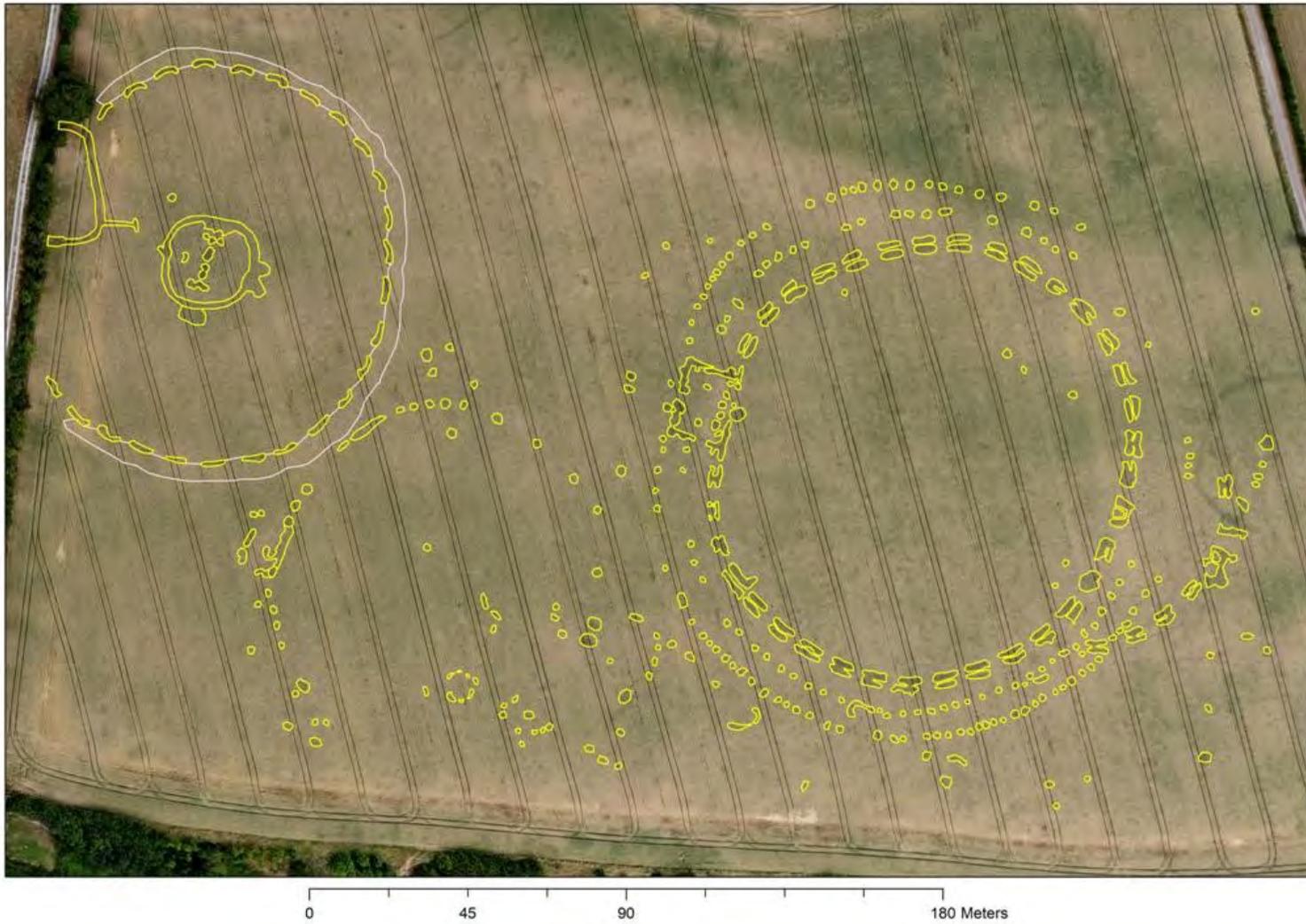


Fig. 57—GIS plan of the henges in the Cropmarks Field.

Site No. 7: The Hook Enclosure

This ditched feature, named 'the Hook' on account of its shape, appears to be the remains of an enclosure, most likely of a date later than the Geometric Henge, on which it is partially superimposed. The cropmark evidence suggests that it may possibly be the remains of a site that was initiated but not completed. On the western side the course of the ditch appears to respect the outer timber circle of the Geometric Henge.



Fig. 58—View of the incomplete enclosure from the south-east, showing the ditched enclosure in relation to the annexe, its entrance and timber circle features.

This site appears to be an unfinished or incomplete enclosure. It is located on the eastern perimeter of the Geometric Henge, overlying a portion of the annexe immediately to the north of the entrance through the annexe.

The site comprises a curvilinear ditch. The cropmarks do not indicate the presence of an associated bank. On the north-east the curving course of the ditch (35.5m long) is not traceable beyond the field fence and farm track forming the modern field division.

On the west the enclosure is defined by a ditch of similar proportions but laid out in a straight line (25.5m long). While this section of the ditch appears to overlie a portion of the entrance feature of the annexe to the Geometric Henge, it does seem to have been designed to avoid the posts that formed the outer enclosure of the Geometric Henge within the annexe.

A gap in the ditch (c. 3m wide) on the north-west appears to be original.

At the south-west the ditch is curvilinear and appears to be symmetrical with the northern portion, but it is traceable only for a distance of c. 24.5m and the cropmarks do not indicate any continuation of the feature beyond this point.

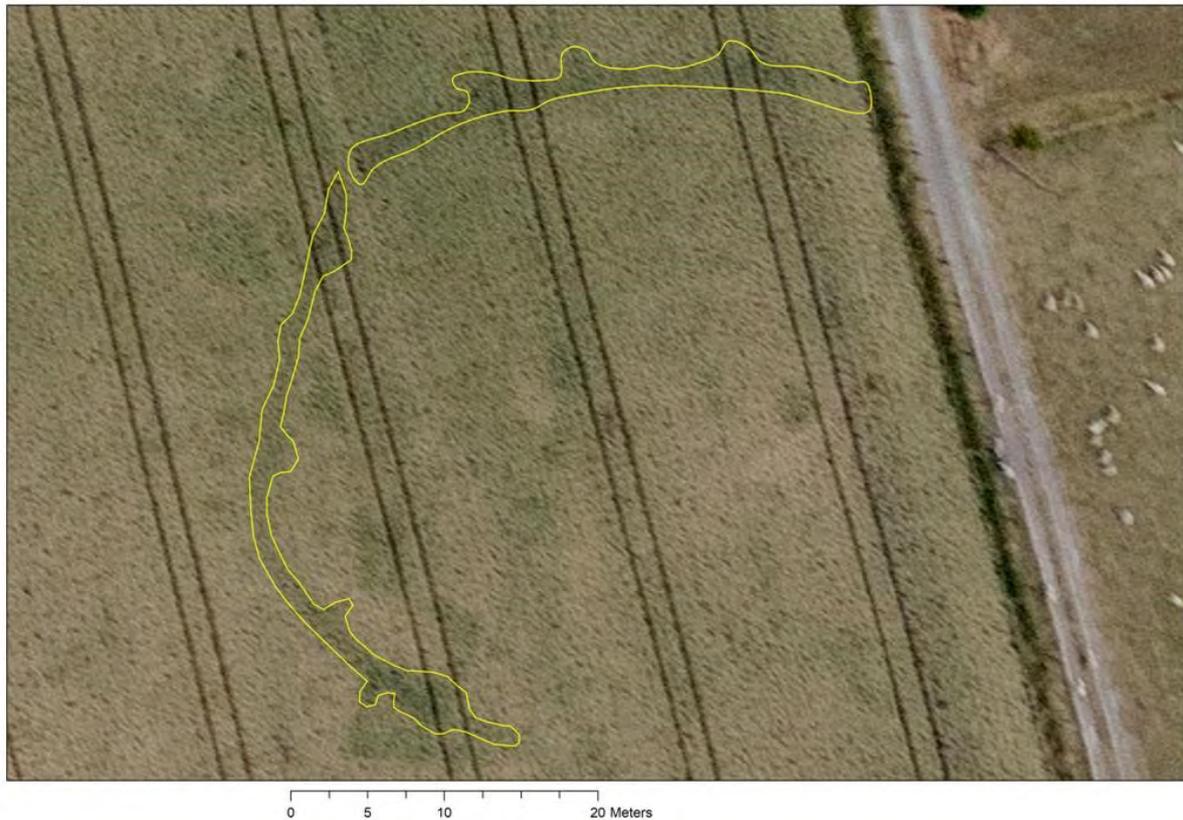


Fig. 59—GIS plan of the Hook Enclosure.

Site No. 8: Double Dumbbell feature

This appears to be a discrete structure located in the south-eastern corner of the Cropmarks Field, c. 805m from the entrance to the Newgrange Passage Tomb and south of the gap between the Geometric Henge and the Site P henge. Two of the features bear strong similarities to the timber structure at the centre of the mound within the Univallate Henge. These, in turn, are associated with lines of post-holes running towards the riverbank on the south.



Fig. 60—Aerial photograph showing location of structure at the top of the riverbank overlooking the weir at this point in the river. DSC09476

Located immediately north of the break in slope of the riverbank, just west of the dam across the Boyne, the site comprises two parallel rows of pits/post-holes and two linear features that bear some resemblance to the 'dumbbell feature' that forms part of the central mound feature in the Univallate Henge.

The cropmarks seem to indicate that the linear features result from large upright posts erected within a continuous trench. Each linear feature has terminals that splay outwards at each end. The eastern feature is 12.5m long, while the western example is 11.4m long. The terminals are c. 3m wide. The gap between the two linear features is 7.5m wide.

Three rows of circular pits, likely to be post-holes, can be seen running at right angles to the linear features. Each post-hole is c. 1.9m in diameter and they are c. 1m apart. Two of the rows are aligned with the terminals that form the gap, while a pair of pits share the same orientation as the first two but are at right angles to the mid-point of the western linear feature.

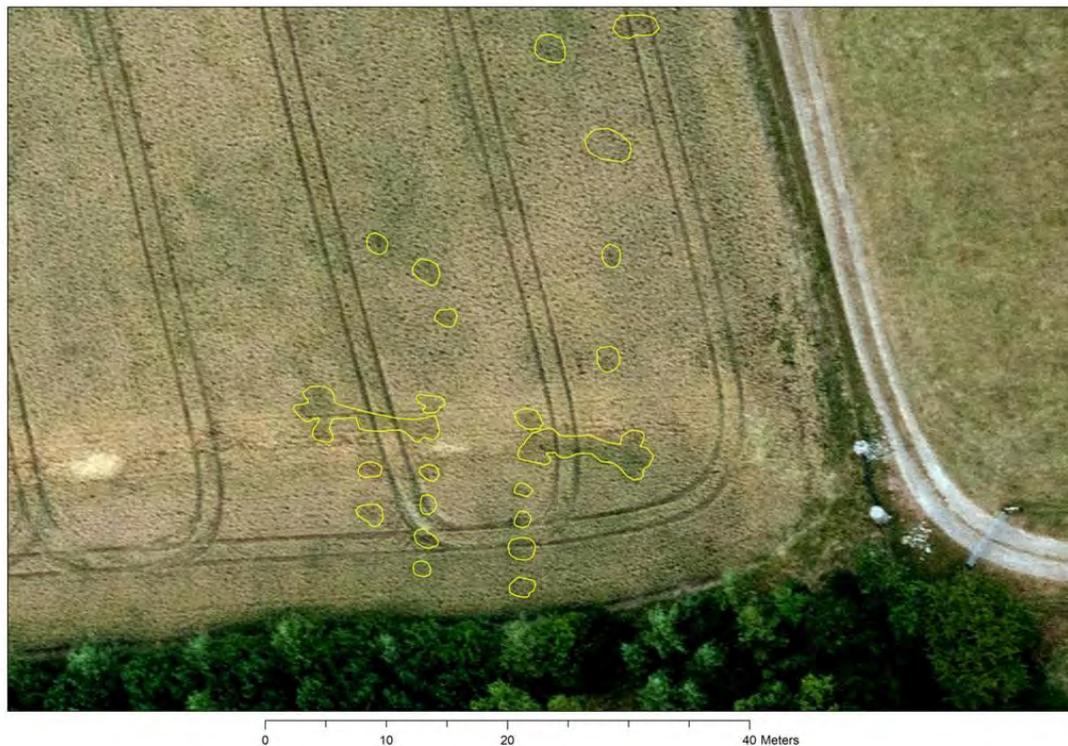


Fig. 61—GIS plan of the Double Dumbbell feature.

The linear features run roughly north-west/south-east, sharing the general orientation of the entrances to the henges and the rectangular feature along the western perimeter of the Geometric Henge.

The gap between the rows of post-holes and between the terminals is 7.5m. The features appear to define a routeway orientated in a north-easterly direction.



Fig. 62—Riverbank feature viewed from the north-west.



Fig. 63—Close-up of the Double Dumbbell feature. DSC09476

Site Nos 9a–9d: The Cropmarks Field—miscellaneous features

This section highlights a selection of features within the Cropmarks Field that are currently being mapped and analysed. Some of them appear to form discrete structures, while others may represent the partial appearance of subsurface structures. It is possible that other arrangements may indicate the subsurface alignments of pits or post-holes.

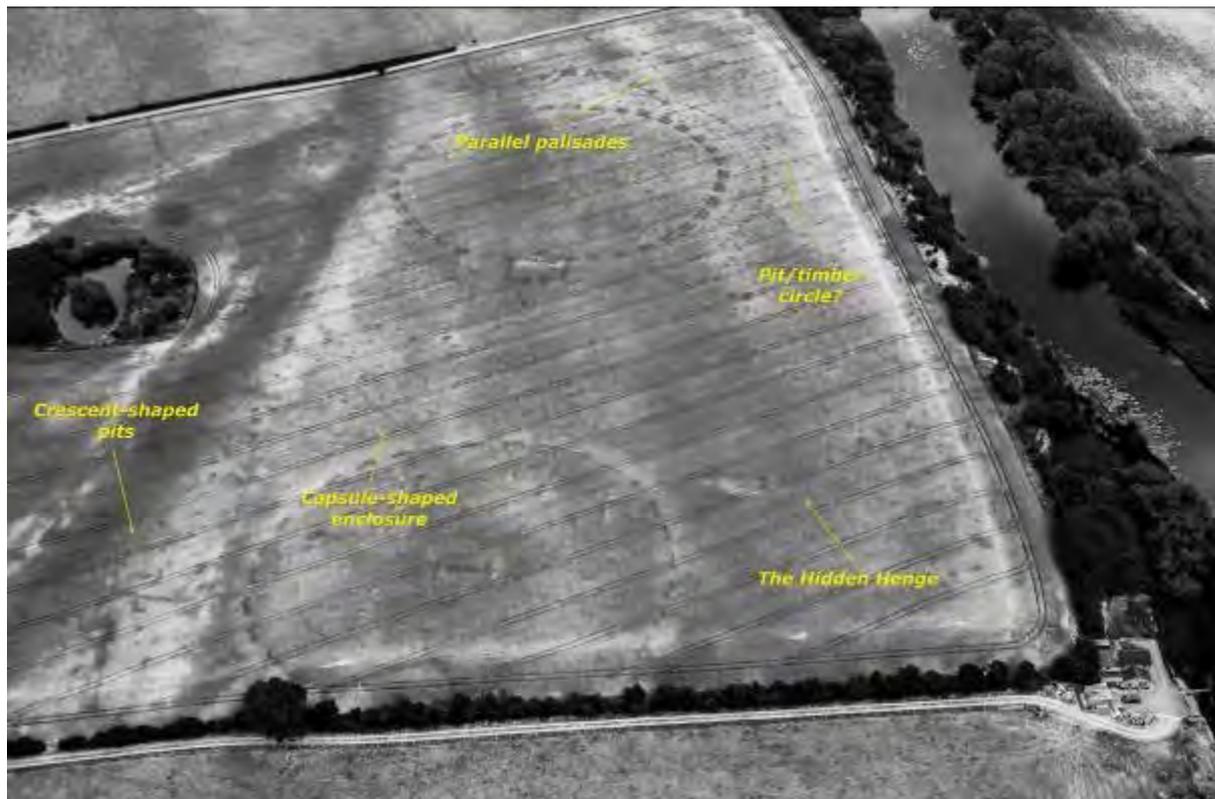


Fig. 64—Portion of the Cropmarks Field, viewed from the west, showing features described in this section. STW 8176



Fig. 65—Site No. 9a: Pit/timber circle. On the southern perimeter of the Geometric Henge the remains of a pit/timber circle can be seen. The circular arrangement, c. 17m in diameter, appears to pre-date the outer timber circle of the Geometric Henge itself. STW 8997



Fig. 66—Site No. 9b: Capsule-shaped enclosure. Close to the eastern perimeter of the Univallate Henge there is an arrangement of post-holes most likely forming a palisade. Orientated north-east/south-west, the pattern formed is consistent with an enclosure that is 'capsule-shaped' in plan, the north-eastern terminal being curvilinear in shape. The visible portion of this structure is c. 35m long and c. 15m wide. The cropmarks fade out at the south-east. STW 8172



Fig. 67—Site No. 9c: Crescent-shaped pits. Excerpt from colour image showing selection of crescent-shaped pits and circular pits. Located on the 'banks' of the palaeochannel, the crescent-shaped pits are slightly smaller than the ditch segments within the Univallate Henge. STW 8083



Fig. 68—Site No. 9d: Parallel palisades. South-east of the annexe of the Geometric Henge a pair of parallel palisade ditches can be seen. The image shows a narrow ditch with distinct post-holes at locations along the course. The lines are c. 19.5m apart and can be traced for a distance of c. 116m. On the east their visibility is cut off by the modern field fence. On the west there is no indication of a structural terminal. STW 8172

Part 3

The central and eastern floodplain



Fig. 69—View across the Newgrange floodplain from the east.

Site No. 3: The continuation of the Great Palisade

The arc of the triple palisade within the Cropmarks Field is clear and distinctive. In this section of the interim report we outline the extent of this remarkable feature as far as it can be traced from the 2018 reconnaissance images and other available aerial photographs.



Fig. 70—High-contrast image showing the triple palisade and its course in the neighbouring field, looking south-east.

Within the Cropmarks Field there was definitive evidence for the existence of a triple arrangement of palisades, whose curving arc could be seen over a distance of c. 200m, ending abruptly at the northern and eastern field boundaries.

It is obvious that the feature must continue both to the north and to the east. On the north, however, its course is obscured by the land uses around the Newgrange Farm complex. On the east the fields were for the most part under grass at the time of our aerial reconnaissance.

The aerial photographs provide indications of the actual course of the triple palisade. Analysis of other aerial images has assisted in tracing the significant evidence that allows us to map the course of the triple palisade with a high degree of certitude.

As described in Part 2 (Site No. 3), the innermost is a double palisade constructed on a bank, while the outer two appear to be single lines of palisade fences. The aerial photographic evidence indicates that the triple palisade continues to curve to the east and then straightens out before arcing around to follow a course that is likely to run to the east of the ridge on which Newgrange Passage Tomb is located.

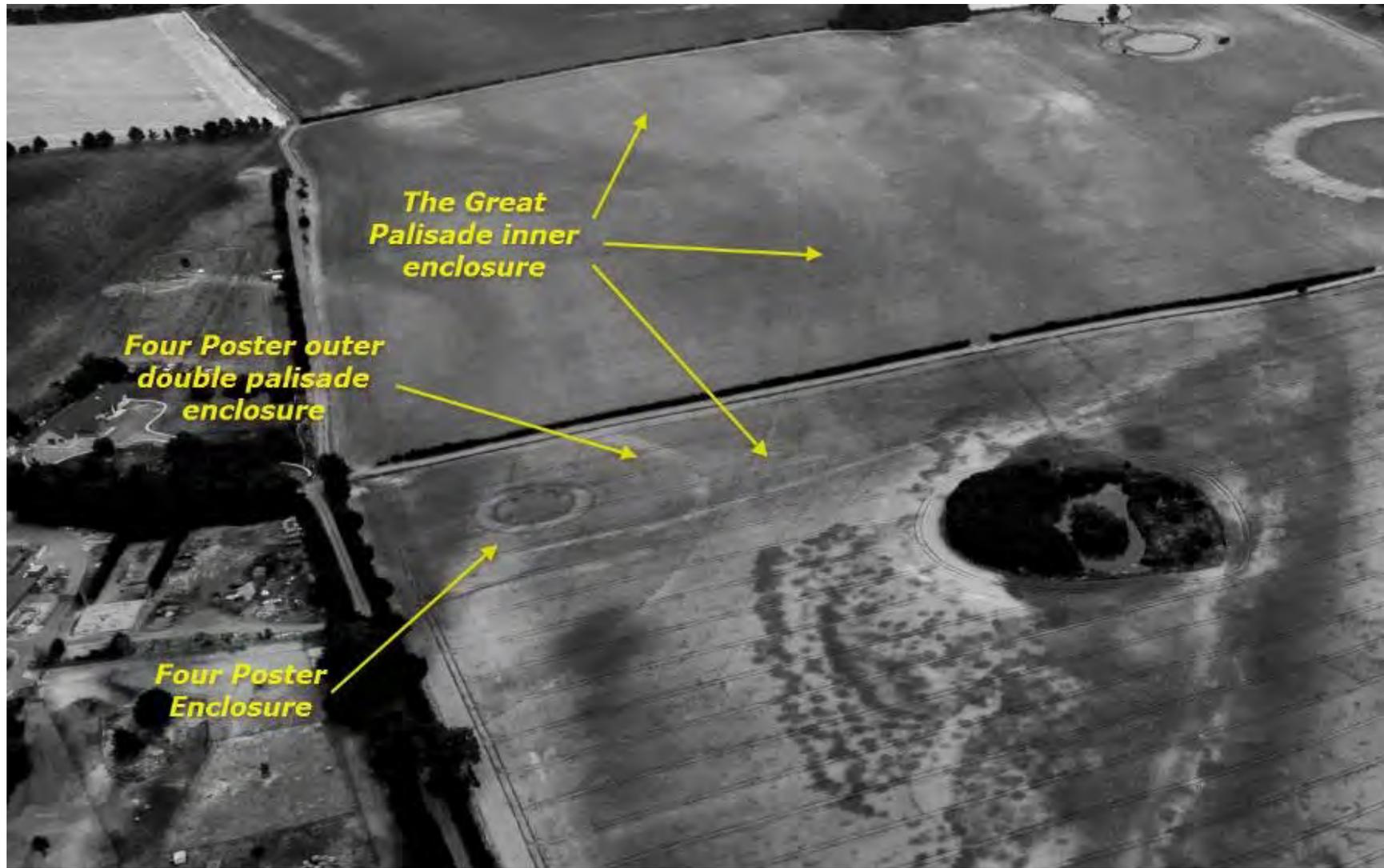


Fig. 71—Annotated image showing view of triple palisade, looking south-east.



Fig. 72—Digital terrain model (DTM) showing the Great Palisade in relation to other sites on the Newgrange floodplain.
(Aerial image © Bluesky International Ltd)

The course of the triple palisade can be traced for a distance of *c.* 900m. It is likely that it may have an irregular curvilinear shape. It is tempting to think that it may enclose the Newgrange Passage Tomb and the entire ridge.

Such palisade enclosures are known from Neolithic complexes in Britain, as at Hindwell, Mount Pleasant and West Kennet, but the triple arrangement at Newgrange appears to be unique. The planning and construction of such a large, complex palisade feature must have required massive resources.

Even with our currently limited knowledge of the northern portion of the triple palisade it is clear that it would have functioned as a significant division of the ritual landscape of the Newgrange floodplain. We can see already that the large, discrete henge monuments lie outside the triple palisade feature, while other monuments would have been contained within it.

Site No. 10: Site P—henge

Site P is the easternmost element of Henge Complex 1, located immediately to the north-east of the weirs and shoals in the river and contiguous with the top of the riverbank at that point. This site is listed in the Record of Monuments and Places as an embanked enclosure (RMP No. ME026-006----). The 2018 aerial survey has provided significant new insights into the architecture of this henge and the constructional techniques employed.

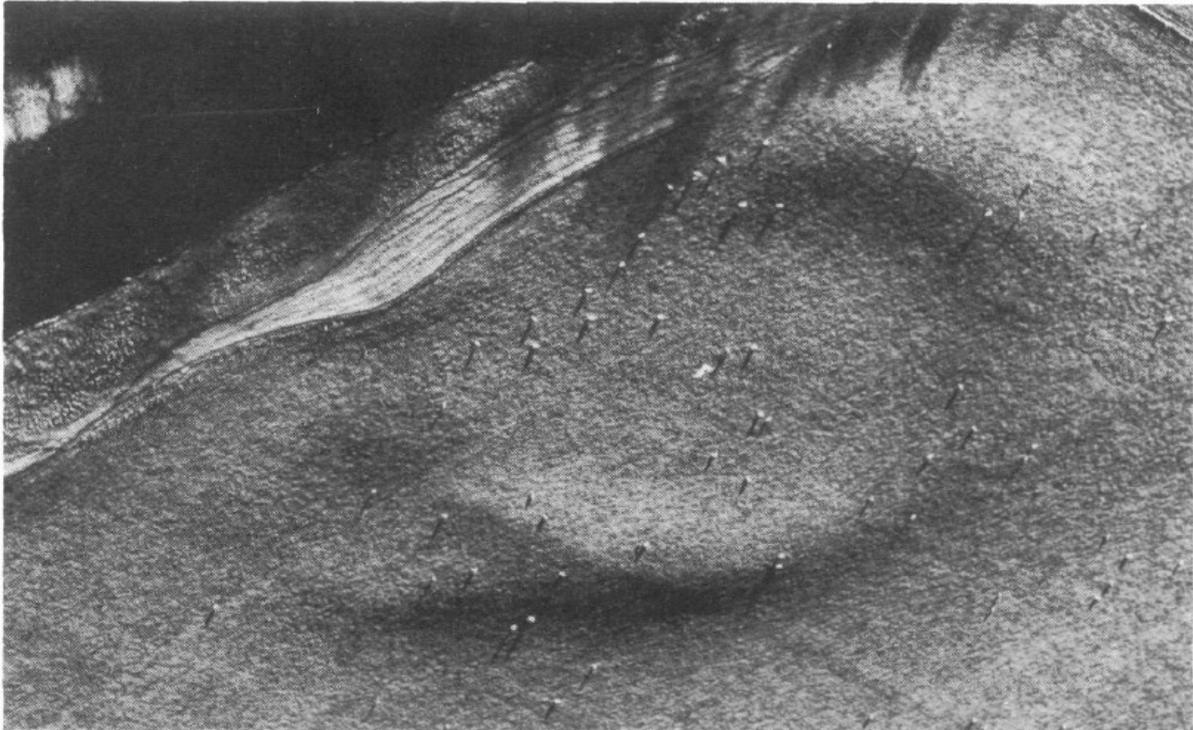


Fig. 73—Site P as photographed by Leo Swan.

This henge was first identified from aerial photographs taken in 1953 by Captain Harrison of the Irish Army Air Corps. It was identified as an ‘earthen embanked enclosure’ and subsequently published by S.P. Ó Ríordáin the following year (Ó Ríordáin 1953). Originally the site was designated ‘Site O’ but was changed to Site P in O’Kelly’s listing of the site.

Dr Geraldine Stout planned and described the site in her catalogue of such sites in the Boyne Valley region. Her survey showed the site to comprise a roughly circular ‘saucer-shaped area’ defined by a low bank. The overall dimensions of the site were 175m east–west and 125m north–south. In the past the site had been under the plough, but in recent decades it has been maintained as grazing land.

The 2018 aerial photographs show the appearance of the site under the unusual drought conditions. The banks and earthworks that form the enclosure are entirely parched and exposed, providing insights into some of the more enigmatic features of the henge.

The principal observations are:

- The presence of an internal ditch immediately inside the bank.
- The presence of a small outer bank (interpretation difficult).
- The interpretation of an additional bank forming an annexe feature, similar to that associated with the Geometric Henge, located outside the south-eastern perimeter of the site.
- Features within the banks that appear to relate to how they were constructed.
- The identification of two gaps through the bank, only one of which is likely to be an original entrance feature.

Description

Site P, subcircular in plan, has dimensions of 152m north–south and 148m east–west, with a maximum measurement of 181m east–west if the annexe is included. The circularity of the enclosure noticeably flattens along its western perimeter.

Enclosing banks

The main enclosing bank is well defined both internally and externally, appearing as a sharply defined line around the internal and external perimeter. It measures between 14.5m and 17m in width.

There are traces of a small bank, c. 8m wide, surrounding the perimeter of the main bank and also enclosing the annexe on the east. This feature survives best on the northern perimeter and is more fragmentary on the western perimeter.

The enclosed dished area in the interior measures 117m north–south by 112m east–west.

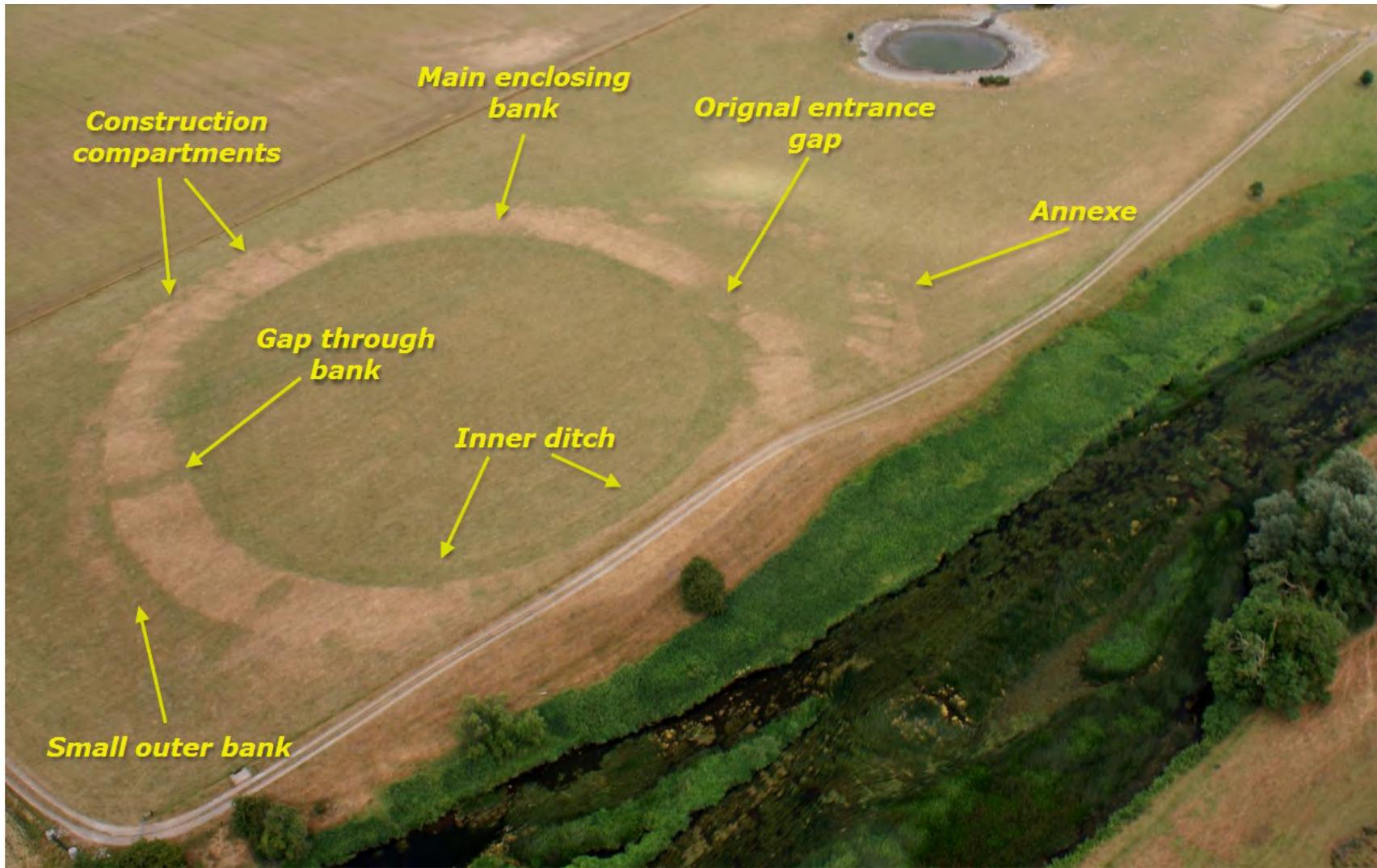


Fig. 74—Annotated image of the Site P henge with principal features indicated, viewed from the south-east. STW 8050



Fig. 75—The Site P henge, viewed from the north.

Ditch

A dark band visible at the foot of the bank on the interior reflects the presence of an enclosing ditch that is clearly visible for most of the perimeter. The ditch is not defined at the east-south-east, where the original entrance gap, c. 11m wide, is located, leading to the annexe at that location.

On the west there is a well-defined gap (6.1m wide) through the main bank, but there is no corresponding gap through the smaller outer bank and no evidence for a causeway across the ditch on the interior.

Annexe

On the eastern perimeter of the enclosure an annexe, a curvilinear projection, can be clearly identified. It appears to mimic the architecture of the main bank in that it seems to be accompanied by a smaller outer bank. The main annexe bank is c. 11m wide, while the traces of the outer annexe bank which can be seen on the northern and southern arcs are c. 6.3m across. The internal chord length is c. 75m, while the external measurement is c. 110m.

Given that the main enclosure bank continues within the area described by the annexe, it appears likely that the annexe feature is an architectural extension to the principal enclosure. Interestingly, the interior of the annexe appears to be dished, as if mimicking the interior of the enclosure.

Furthermore, the course of the annexe appears to 'meld' with the small exterior bank around the main bank. There are traces of a small outer bank around the exterior of the annexe.

Construction compartments

The enclosing elements of Site P, the main bank, the smaller outer bank and the annexe show evidence that construction of the enclosure was undertaken in organised sections. This evidence is provided by radial lines across the bank. These appear as green vegetation marks interrupting the course of the banks and are apparent to various degrees around the perimeter of the enclosing banks.

Within the bank of the annexe, for example, these appear as defined shapes, trapezoidal in plan, measuring c. 11m across and averaging 5m in width. Within the main bank, where they are not so pronounced but still discernible, they measure c. 16m with an average width of c. 7.5m.

Within the enclosed area distinct circular dark vegetation marks may indicate the location of post-holes or pits. At least five such pits seem to form an arrangement in the north-east quadrant.

Henge Complex 1

Henge monuments often occur in pairs or in groups and are located in areas where other Neolithic monuments are concentrated. The recently discovered henges at Brú na Bóinne demonstrate what must be a conscious design and layout of ceremonial enclosures on the lower alluvial terrace to the south-west of Newgrange Passage Tomb.



Fig. 76—The triple arrangement of henges, viewed from the north-west. STW 8175

Viewed from the west, three henges appear to be laid out in a linear arrangement. They share a similar aspect in that their entrances appear to be orientated in a north-west/south-east direction. They also share similar dimensions, the Univallate Henge 128m across, the Geometric Henge 154m across and Site P 152m across (excluding the annexes). The henges are each separated by a distance of c. 100m and are arranged in a line over a distance of c. 625m.

Both Site P and the Geometric Henge show clear evidence for an annexe feature on their south-eastern perimeter. The Univallate Henge clearly encloses a centrally placed mound. The alignment is also noteworthy on account of its proximity to the riverbank. The Univallate Henge is c. 96m from the bank and the Geometric Henge c. 42m, while the southern perimeter of Site P is contiguous with the top edge of the riverbank and is adjacent to the weir/fording point at that location.

The axis on which the henges are laid out appears to take its cue from the direction of the palaeochannel, which is clearly visible in the Cropmarks Field. Other sites in the complex also share a

south-easterly orientation. It is to be noted that the entrances in the annexe features of the Geometric Henge and Site P are aligned in slightly different directions.

The potential role of the Hidden Henge in this layout is interesting in that its southern perimeter may have been contiguous with the top of the riverbank and it may account for the relative distances of the Univallate Henge and the Geometric Henge from each other and from the edge of the riverbank if it already existed when they were built.

It is noticeable that all of the henge monuments in Complex 1 show a distinct flattening of the circularity along their western perimeters. In the case of the Geometric Henge this may be a consequence of incorporating the rectangular structure. While the western perimeter of the Univallate Henge is obscured by the field boundary, the angles of the segmented ditches that can be seen suggest that the perimeter would have likewise straightened out. At Site P the same phenomenon can be seen and is particularly noticeable in the course of the internal ditch.

The pattern of this henge complex is reminiscent of two well-known henge complexes in England—the Thornborough group and the group known as the Priddy circles.

Henge Complex 1 at Newgrange shares some similarities with both the Thornborough and Priddy complexes but also displays significant variations in the apparent pattern. The three Newgrange henges are closely set compared to the Thornborough henges and, unlike both the Thornborough group and the Priddy circles, they have contrasting architecture and individual designs.



Fig. 77—The triple arrangement of henges, viewed from the south-east. STW 8494

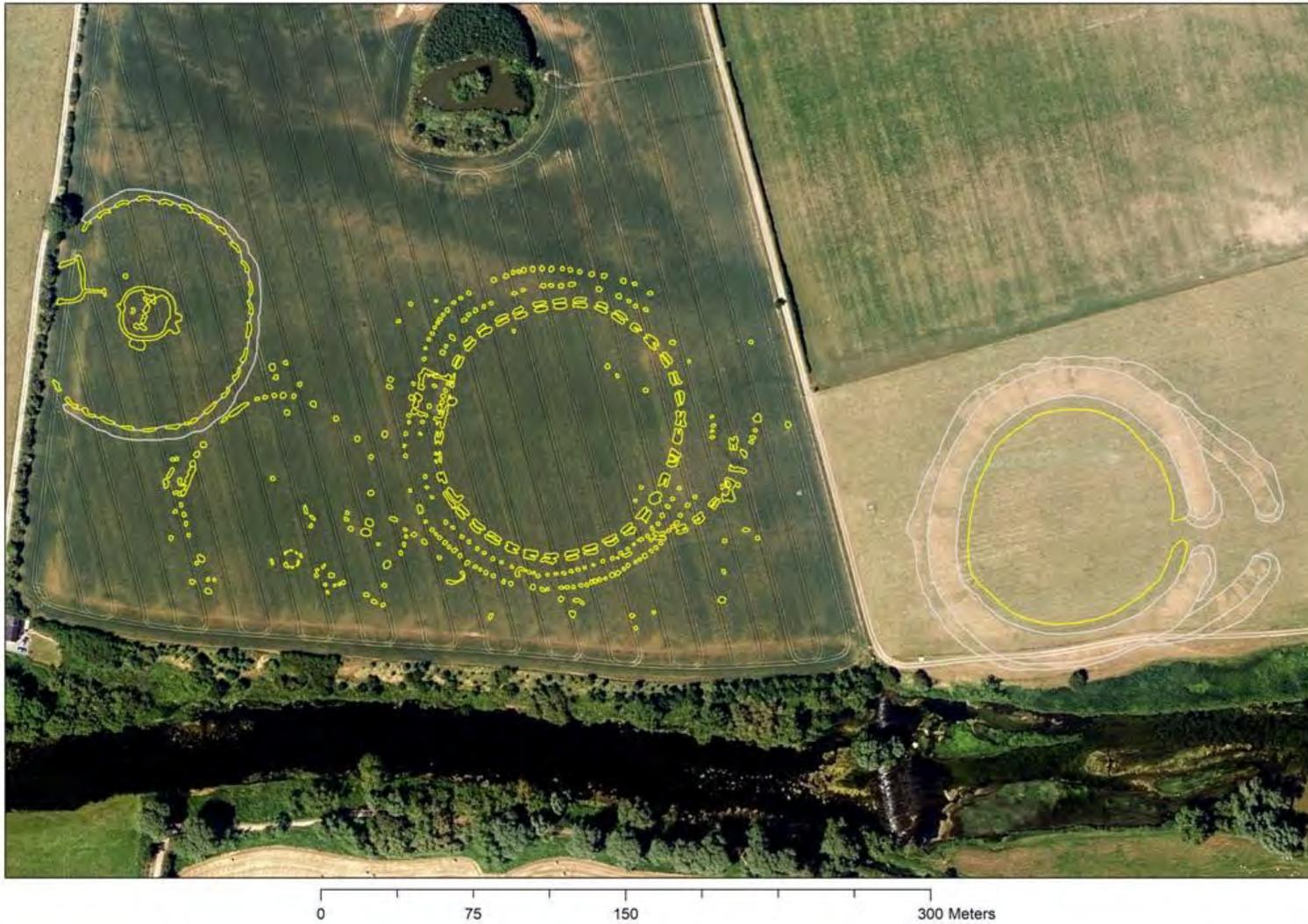


Fig. 78—Henge Complex 1: GIS-derived plans showing the relative locations and layout of the henges.

Site No. 11: Site A—henge

This site is located on an alluvial terrace c. 475m south-east of the Newgrange Passage Tomb. It comprises two principal components: a subcircular enclosure and a large mound roughly at its centre. Both the enclosure and the mound are listed in the Record of Monuments and Places as an embanked enclosure (RMP Nos ME026-049002- and ME026-049001- respectively). The site falls into the category of Ó Ríordáin's 'earthen embanked enclosures'.



Fig. 79—Site A under plough, showing central mound within saucer-shaped interior of enclosing bank. (Leo Swan)

The site was marked on the nineteenth-century first-edition OS map, where the enclosure was named 'Ring' and the mound was named 'Moat'. On the later edition of the OS map only a portion of the north-eastern perimeter of the enclosure is depicted. This indicates that the enclosure had been significantly levelled in the intervening period. O'Kelly notes that this extant portion of the enclosure was levelled in 1965 before it could be surveyed.

Claire O'Kelly pointed out that the mound, interpreted as a possible passage tomb, was not centrally placed within the enclosure, stating that 'nor is there any reason we should expect it to be as the likelihood is that the two features are unrelated'. The mound is circular in plan (25m in diameter) and stands c. 6m high. It has a rounded profile and casts a conical shadow in low sunlight (see Leo Swan's photograph above). Using the OS maps, an overall dimension of 140m was estimated for the

site. O’Kelly further pointed to the similarity with the Site P henge in terms of its appearance and similarity in size.

The site was subsequently planned and described by Dr Geraldine Stout, who noted the saucer-shaped interior and that it is likely that the interior of the site was scooped out to form the enclosing bank. The bank was in poor condition, standing 0.7m high at the north-west, where it was 24m wide. A gap 13m wide, interpreted as a ‘probable entrance’, was detected on the east.



Fig. 80—Site A (centre), viewed from the east, in relation to Site P (top left) and to the Newgrange Passage Tomb (top right). DSC09505

Description

The 2018 aerial survey photographs show the appearance of the site under the unusual drought conditions this year. The banks and earthworks that form the enclosure are entirely parched and exposed, providing insights into some of the more enigmatic features of the henge. As O’Kelly had pointed out, there are striking similarities between Site A and Site P.

The principal new observations are as follows:

- the presence of a small outer bank;
- the interpretation of an additional bank forming an annexe feature, similar to that at Site P and similar in plan to that associated with the Geometric Henge, located outside the south-eastern perimeter of the site;
- features within the banks that appear to relate to how they were constructed.

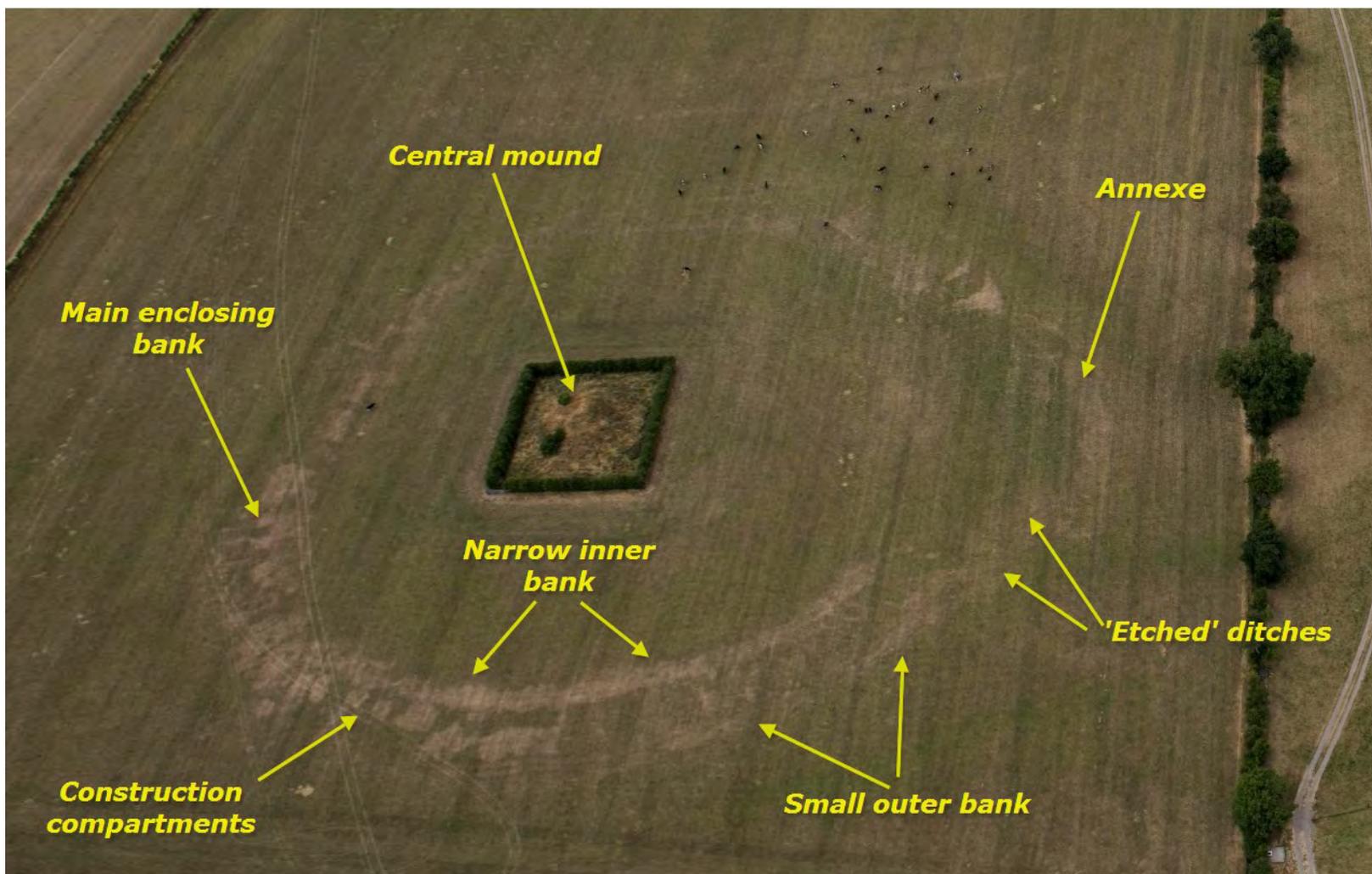


Fig. 81—The parched and fragmentary remains of Site A, viewed from the south, showing features highlighted in description. STW 8136

The overall dimensions of the enclosure are 153m north-east/south-west and 146m north-north-west/south-south-east. Inclusive of the annexe, the site measures 162m east-north-east/west-south-west. From the north around the perimeter to the south-west the enclosure is distinctively curved, but along the western perimeter, where its appearance is fragmentary, it appears more linear in plan.

Where the main enclosing bank shows best, along the southern perimeter, it measures c. 25m across.

There is no indication of a ditch surrounding the enclosed area inside the main bank. Furthermore, the aerial evidence does not suggest any features that may conform with an original entrance feature.

Along the eastern perimeter, where the annexe is located, there is little evidence that the bank continued across the area defined by the arc of the annexe itself. The annexe appears to have completed the enclosure at this point.

As at Site P, there is evidence for a discrete outer bank close to the outside edge of the main banks. Interestingly, the aerial evidence indicates that a small, narrow, inner bank may have been located around the base of the main bank on the interior. This bank is particularly noticeable along the southern perimeter.

Annexe

The annexe is a crescent-shaped projection in plan. Its bank, c. 9m across at its widest, narrows significantly to c. 6m where it approaches and is contiguous with the main bank.

The NMS imagery and the Bluesky International vertical coverage show evidence for two narrow ditches that appear to describe the inner and outer edges of the annexe feature. This suggests that the plan for the annexe bank was 'etched' into the ground in advance of the construction of the bank itself.

There is no obvious evidence for a gap through the annexe bank.

Construction compartments

Similar to Site P, there is evidence for the vestiges of construction compartments around the perimeter of the main bank. These are trapezoidal in plan, measuring an average of c. 7m across.



Fig. 82—GIS plan of the Site A henge.

Site No. 12: Site A1—enclosure

This site, originally recorded by Claire O’Kelly (1978, 50), was first described as a circular ploughed-out mound visible on aerial photographs that was clearly traceable on the ground as a slight rise ‘when one knows where to look’. It was designated as Site A1 and recorded as an earthwork in the Sites and Monuments Record, where it was described as a raised circular area (c. 30m in diameter) defined by a slight scarp.



Fig. 83—Site A1 viewed from the north, looking towards Site B on the lower terraces. STW 8890

The drought conditions have allowed considerably more detail of this enigmatic site to be determined. The site is overlain by well-preserved cultivation ridges in a field now used for grazing. Classified as an earthwork, the site was previously recorded by Anthony Murphy, using drone imagery in low winter sunlight. It appeared to be a circular platform with a smaller circular mound in the interior at the north-east quadrant.

The aerial photographs taken in this year’s drought conditions show that the site comprises an outer bank and at least one other bank surrounding a circular platform on which the smaller mound sits.

On the edge of a ridge overlooking the steep slopes down to the alluvial terrace on the south, the enclosure, roughly circular in plan (38m north–south, 39m east–west), is defined by a narrow bank. A band of greener grass around the exterior of this bank suggests the likelihood of an outer ditch. Another bank, c. 29m in diameter, can be seen on the interior of the enclosed platform. The inner

bank is eccentrically located, with the widest gap between it and the outer bank occurring at the south-west.



Fig. 84—Site A1, viewed from the west. STW 8892



Fig. 85—Image showing mound in north-east quadrant of Site A1. (Anthony Murphy)

<https://www.mythicalireland.com/MI/blog/ancient-sites/archaeologists-call-it-me019-050-but-they-dont-yet-know-what-it-is/>

Site No. 13: Oblong enclosure—mortuary enclosure

This cropmark enclosure is one of the exciting new additions to the Brú na Bóinne archaeological landscape. It is located c. 440m south-east of the Newgrange Passage Tomb and c. 36m north of the perimeter of the Site A henge. Its morphology is similar to sites that have been recorded from the air in analogous Neolithic landscapes in Britain. Such sites are interpreted as long mortuary enclosures, used for the ceremonial exposure of the dead on platforms erected in the interior.



Fig. 86—Dark outline of oblong enclosure, viewed from south. STW 9016

The enclosure is defined by a ‘capsule-shaped’ ditch, with two parallel ditches forming the long axis and curvilinear ditches forming terminals at either end. The western terminal is more curvilinear than the eastern terminal.

The long axis of the enclosure runs east-north-east/west-south-west. The enclosure itself is c. 62m long and c. 12m wide internally. The cropmarks indicate that the ditches are c. 2.2m wide. The southern enclosure ditch appears to be segmented, with seven gaps clearly visible.

There is some indication that the segments of the ditch are roughly equidistant, with the segments measuring between 5.2m and 5.5m in length. The gaps between them are c. 2.2m wide.

At least three large pits can be seen in the interior, laid roughly parallel to the northern line of the enclosure ditch.

On the north side of the enclosure there are cropmarks of the remains of an ancient field system that appear to curve around the capsule-shaped enclosure at a distance of c. 6.5–12.5m.

Immediately to the south of the enclosure are traces of the Great Palisade, which appears to curve around the eastern terminal and run parallel to the southern portion of the enclosure.



Fig. 87—Near-vertical view of the oblong enclosure. Immediately beside it on the left is the bank of the inner palisade of the Great Palisade, and further left is the Site A henge. The lighter band to the right is described here as a linear earthwork, possibly a road. STW 9017



Fig. 88—Bluesky International image showing oblong enclosure clearly. Note also curving ancient field boundaries and how the Great Palisade curves around the south-east corner of the enclosure.

Site Nos 14a and 14b: Miscellaneous features

There are two sites worth noting as part of this interim report. One of these was partially visible on the NMS images in the same field as the Site P henge, located just to the north of the ponds, where there are a series of enclosures. A cropmark enclosure can be seen in the neighbouring field to the east. At the time of the NMS aerial survey the crops in this field had been cut and no cropmarks were visible, but the 2014 image from the Ordnance Survey of Ireland shows a number of interesting features.

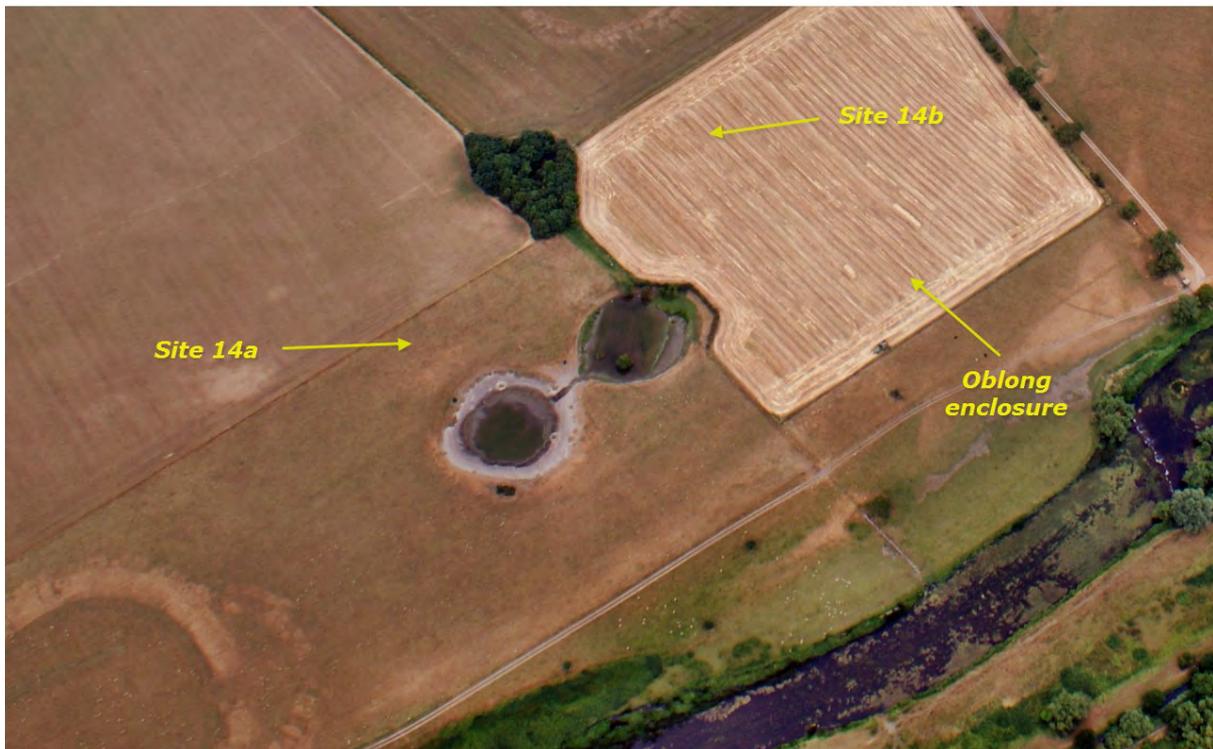


Fig. 89—Annotated image showing the locations of Sites 14a and 14b.

Site No. 14a: The NMS photographs are still being analysed but indicate that this enclosure is likely to be trapezoidal, possibly funnel-shaped, in plan. The visible portion of the site is a cropmark ditch, c. 4m wide. Two sides of the enclosure can be traced for a length of 12m, while the southern line of the ditch, 62m long, curves slightly to the south.

Along the centre of this portion of the ditch there is a gap c. 8m wide, presumably an entrance.

Within the northern half of the enclosure there is evidence for at least two circular enclosures.



Fig. 90—Colour image from 2014 showing enclosures, buried ‘figure-of-eight’ pond and small oblong enclosure. (Ordnance Survey of Ireland)

Site 14b: The remains of a buried ‘figure-of-eight’ pond can be seen at the bottom of the palaeochannel. Each conjoined pond is c. 26m in diameter.

The southern end of what may be a rectangular enclosure can be seen as a cropmark. The northern portion of the site cannot be seen, but its sides are traceable for a length of 36m. The southern ditch is c. 46m wide, with a gap visible roughly at its centre.

A small oblong enclosure, orientated north-east/south-west, with curved terminals can be seen to the south of the buried ponds. It is c. 21m long and c. 12m wide, with a possible internal division at its northern terminal.

There is also a widespread distribution of pits, important not only for their potential archaeological significance but also because they suggest that the pits visible in the Cropmarks Field may actually extend across the entire floodplain.

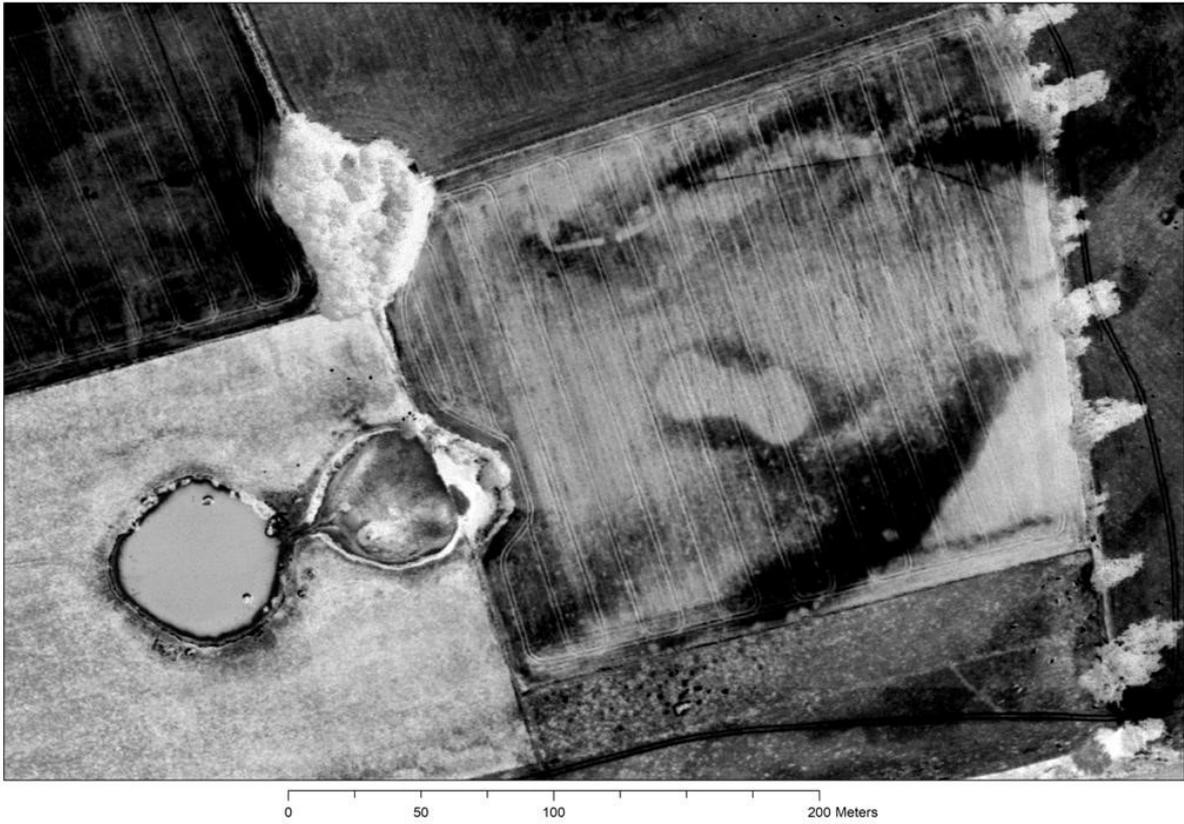


Fig. 91—Contrast-stretched image from 2014 showing enclosures, buried 'figure-of-eight' pond and small oblong enclosure. (Ordnance Survey of Ireland)

Site No. 15: Linear Feature 1

This feature is located c. 390m south-south-east of the entrance to the Newgrange Passage Tomb, in the field to the north of Site P. It appears as a long, linear feature highlighted as a dark-coloured surface in an area where the grass cover is parched. The feature is well defined and is interpreted here as the remains of an ancient road.



Fig. 92—View of Linear Feature 1 from the west. DSC09488

The feature can be traced clearly for a distance of c. 225m, running generally east-south-east/west-north-west. It is c. 10.7m wide and has straight sides. The shape narrows at its western extremity, its sides tapering inwards before it terminates at a distance of c. 48m from the avenue that leads to the Four-Poster feature. It is noted that it does not share the same orientation as the Four-Poster avenue.

At its eastern end the extent of the feature is obscured by more verdant grass growth. It may have continued to link up with the curvilinear road (Linear Feature 2) that can be traced running from the field to the east in an easterly direction.

Site No. 16: The Great Rectangular Palisade Enclosure

This site, located c. 150m south-west of the Newgrange Passage Tomb, stands out as one of the most remarkable features of the Newgrange ritual landscape. Its design and scale are unparalleled in the Irish archaeological record. The components of the site as it appears on the aerial photographs would suggest upright timbers, laid out along the long axis of the structure in a symmetrical pattern. As with the other newly identified sites (the palisades, mortuary enclosure and timber settings), the scale of this building is indicative of the massive resources required to construct it and suggests that, whatever its exact function, it could have accommodated a huge gathering. The function and exact above-ground architecture of the monument are unclear, as is the scale of any timber uprights which might have been deployed. The linearity of the site seems to fit with the processional movement associated with cursus monuments. It has similarities to the feature in the Cursus Field to the east of the Newgrange Passage Tomb.



Fig. 93—Oblique view of the Great Rectangular Palisade Enclosure, showing excavation in progress, viewed from the south. DSC09317

In 2015 geophysicist Joanna Leigh carried out a survey of the field to the south-west of the old Tourist Board Office at Newgrange on behalf of the OPW with the involvement of the National

Monuments Service under Detection Device Consent No. 15R0015. The work comprised the use of both gradiometer survey (magnetometry) and resistivity survey.

The summary of the survey was as follows:

The survey has successfully identified a series of responses suggesting multiple pits forming parallel alignments and extending at least 75m in length orientated east to west. The site is located c. 150m to the south-west of the old tourist office. The linear pit alignments appear to be enclosed by linear ditch features, with an entranceway at the eastern extent. The site appears to extend to the west, beyond the limits of the available survey area. It is speculated that this is a ritual site associated with Newgrange passage tomb. Further isolated responses in the north of the data may represent another pit alignment or possible circle of pit features.

Geophysical survey description

A portion of the large rectangular enclosure was revealed in the south-western part of the survey area.

The outline of the structure is defined by a parallel arrangement of large slot-trenches forming a continuous boundary. The eastern terminal is formed by a right-angled return. Here the interior slot appears to comprise a row of pits on the interior of the structure 'wall'. There is a further right-angled turn to form a portal through the east gable.

In the interior four rows of pits are laid out in a parallel arrangement. The outer two comprise remarkably large pits running parallel to the interior wall. The central axis of the enclosure is marked by two parallel arrangements of pits with a smaller diameter, forming a central aisle. These are aligned directly on the entrance portal, with the geophysical evidence indicating that the pits may be virtually contiguous with the east gable.

Field inspection indicates that the broad outline of the shape of the site can be determined on the ground. The entire enclosure is located on an oblong levelled area.

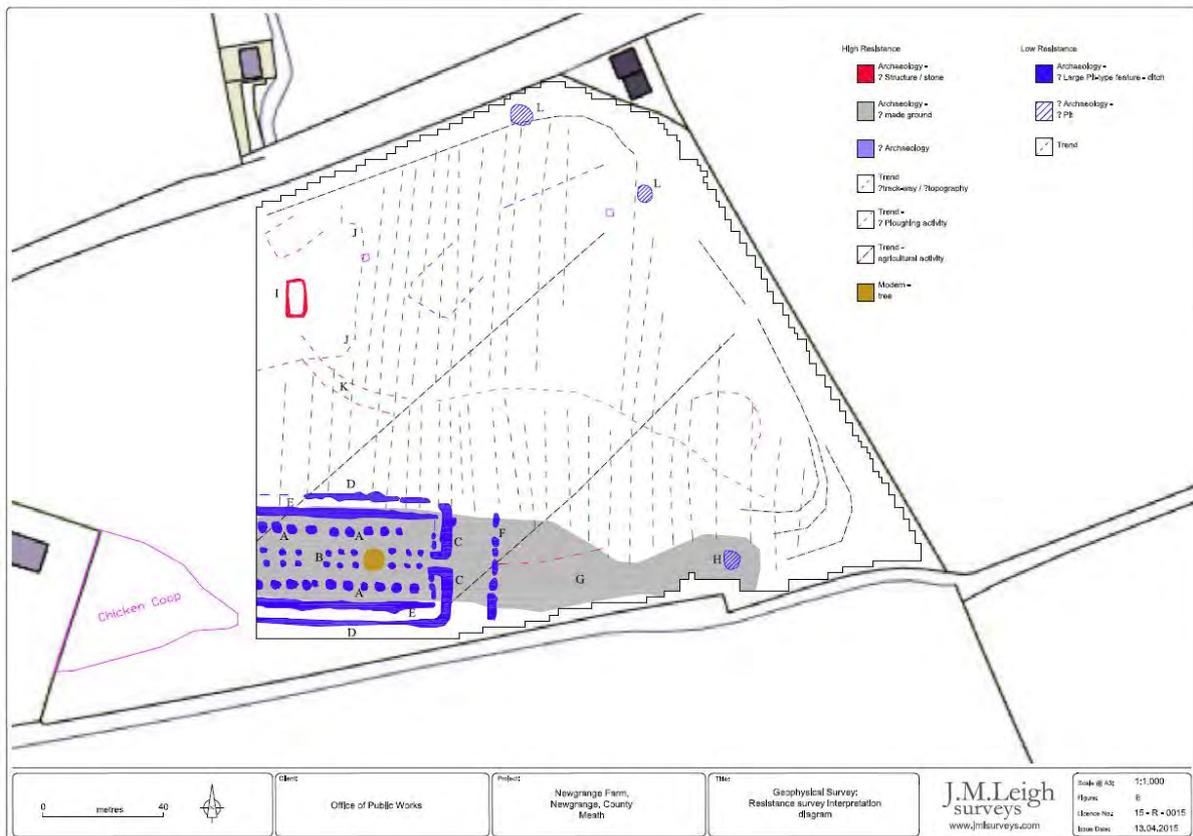


Fig. 94—Geophysical interpretation drawing (Joanna Leigh, 2015).

Excavation 2018

Exploratory excavations, directed by Dr Geraldine Stout (Excavation Licence No. 18E0369), were undertaken at the large rectangular feature in July of this year under the auspices of the Royal Irish Academy with the funding support of the Department. A transect close to its eastern edge identified the double enclosing features and sampled some of the pits on the interior. A sample of carbonised material from a charcoal-rich deposit in the basal layers of the inner ditch was submitted for radiocarbon analysis and yielded a Late Neolithic date of 2632–2472 cal. BC (95.4% probability).

Bearing in mind its scale and unusual plan, a working classification of ‘hybrid cursus’ has been applied to the site (Leigh *et al.* 2018). It has also been postulated that the orientation of the axis of the site, ‘defined by a parallel pit alignment and causewayed entrance, is aligned at 92 degrees (virtually due east), which correlates with the spring equinox’ (*ibid.*).

Aerial survey

The drought conditions have helped to elucidate more features of the site, revealing that it is even more impressive than was first thought. In spite of the site’s location in a field used for pasture, the NMS aerial survey has added significant additional details. The definition of this site in grassland is

likely to relate to groundwater evaporation from large, well-defined subsurface features. The site itself, located at the bottom of higher sloping ground, appears to have been constructed on ground that was levelled up to provide an even building platform.

As with other sites recorded in the course of the aerial survey, the details that can be seen on the aerial photographs are remarkable, not only adding to our knowledge of the extent of the site but also raising interesting questions of interpretation.



Fig. 95—High-contrast image of the Great Rectangular Palisade Enclosure, showing the outline of the enclosure and the enclosed 'pit alignments', viewed from the west.

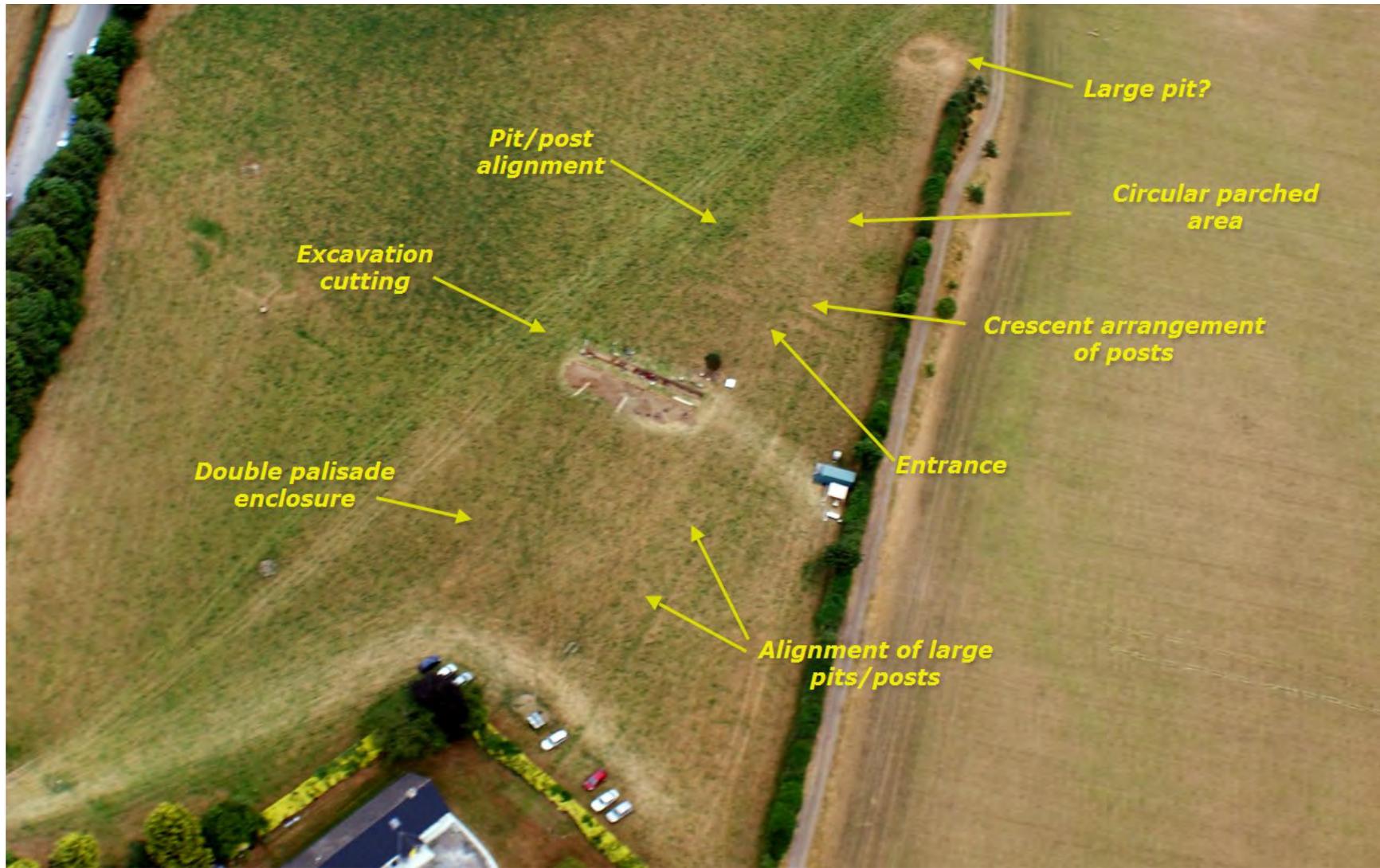


Fig. 96—Annotated image of the Great Rectangular Palisade Enclosure, indicating principal features.

Description

The aerial images show the integrated nature of the enclosing element of this rectangular structure. Some of the linear pit alignments in the interior show clearly as parch marks in the grass. More significantly, the aerial images show that the site is considerably bigger than the area subjected to geophysical survey in 2015.

Of particular interest are the double enclosing trenches that define the northern and southern boundaries of the rectangular plan. The 3.5m-wide entrance at the east gable is clear to be seen. The NMS aerial photographs show evidence that each of the twin trenches is composed of post-holes linked by slot-trenches. The double palisade is separated by a bank at the base of the palisades, somewhat similar to the arrangement in the Four-Poster structure 135m to the south-west.

The western extent cannot be fully determined, as it is obscured by farm buildings. The northern side of the palisade can be traced for a distance of c. 176m, however, while there are indications that the southern palisade enclosure can be traced potentially for a distance of c. 190m. In the neighbouring garden the post-holes for the palisade uprights are clearly exposed. Around eight post-holes can be seen and in plan they appear to be arranged in pairs, 0.8m apart.

The line of large pits, particularly those parallel to the southern palisade, can be traced for the entire length of the visible enclosure, while the northern line of large pits and the smaller central pit alignments can be seen intermittently. The test excavations have shown that one of the large pits intercepted by the test cutting was 4.8m across and 1.65m deep. The excavations further showed that the charcoal samples from the pits and ditches were almost entirely from the heartwood of oak trees.

At the entrance on the east an arc of five or six pits extends outwards in a crescent shape as if screening the entrance. There are also distinct traces of the alignment of pits (detected in the geophysical survey) running parallel to the east 'gable' of the enclosure. To the east of this pit alignment is a distinctly parched circular area with traces of pits of similar scale along its north-western perimeter. Further to the east and located within a roughly circular parched area is the large pit detected in the geophysical survey.

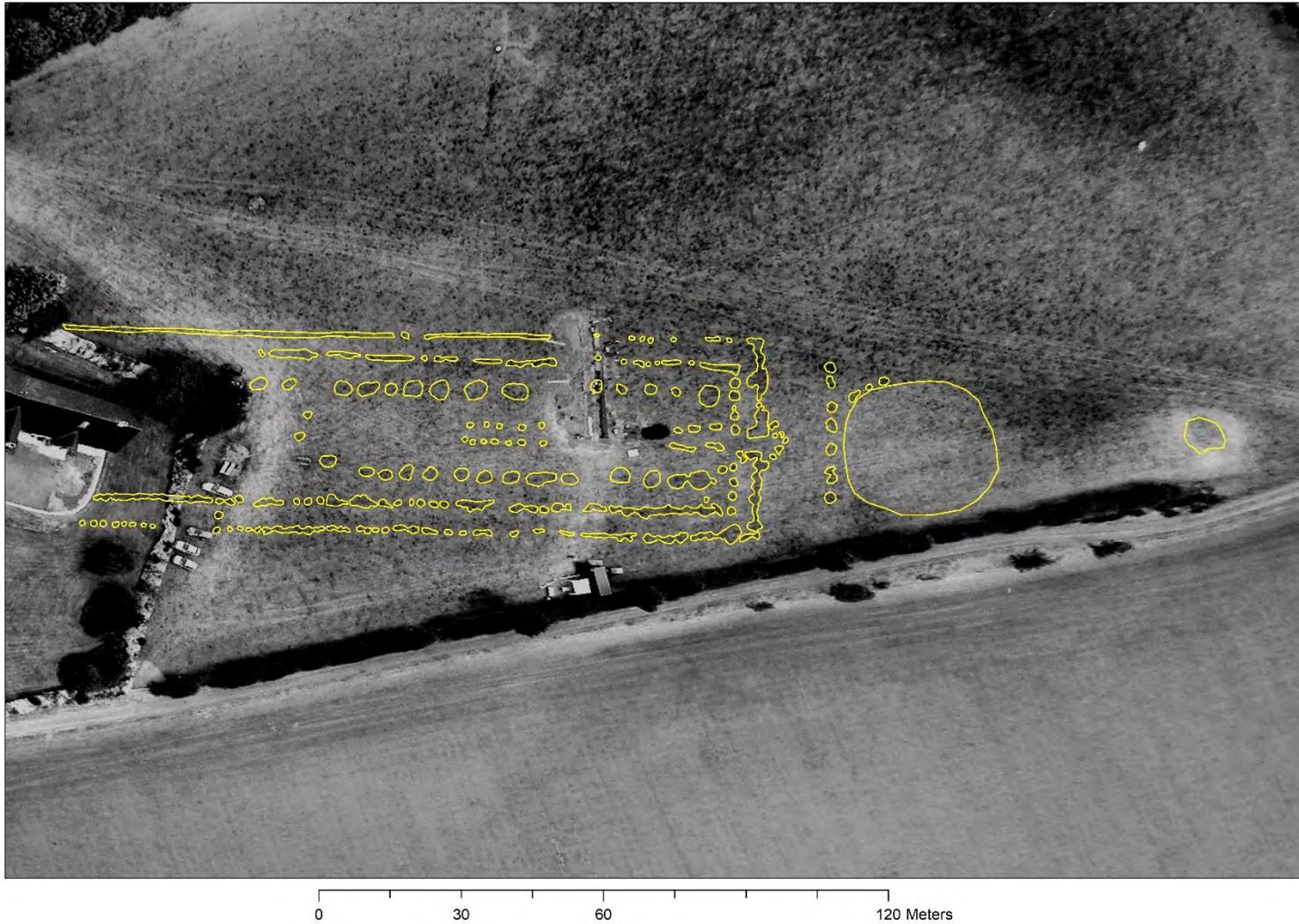


Fig. 97—GIS plan of the Great Rectangular Palisade Enclosure on rectified aerial photo.

Both the geophysical data and the aerial photographs show that the inner palisade walls on either side of the entrance feature are composed of larger post-holes and are clearly of a different constructional technique. For example, in the southern return four large post-holes can be clearly seen.

Along the south, at a distance of 100m from the south-east corner of the double palisade, a rectilinear pattern of small post-holes can be seen. These appear to be widely spaced. A section of them appears to traverse the double palisade wall at an angle. More analysis is required to plan these alignments but they would appear likely to be later than the double palisade and the intervening bank.

The linearity of the site seems to fit well with the processional movement associated with the archaeological interpretation of cursus monuments. It also has similarities to the geophysically detected feature in the Cursus Field, built on sloping ground.

Another possible interpretation is that the site is a linear version of a palisaded henge monument. However, the scale of the large pits and the central aisle of smaller pits along with the symmetry of their layout indicate that a structural function for the various components of the site is likely. With regard to the nature of the large pits, the excavation of the example that had been cut into redeposited gravels revealed evidence for burning, with a 'flue-like feature opening to the east'. This 'flue-like feature' could be the remains of a post-ramp to facilitate the erection of a large oak timber in the post-hole. It is also evident that the site had been carefully prepared in advance of construction. Field inspection at the time of geophysical survey showed that the site had been artificially raised to create a level platform.



Fig. 98—View of the Great Rectangular Palisade Enclosure from the north, with Four-Poster enclosure at top right.

Interesting questions arise as to the nature of the superstructure. The design of the double palisade enclosure with an intervening bank suggests architectural similarities to the Four-Poster structure, c. 150m to the south-west. There are informed speculative reconstructions for the analogous Four-Poster sites at both Knowth and Ballynahatty.

The layout of the alignments of large pits and the central alignments of smaller pits also raises the question of whether the structure, potentially c. 200m long, was roofed or partially roofed. The smaller central alignments of smaller pits (post-holes?) may have held taller timbers to help support a roof resembling a clerestory roof.

On current evidence it would appear that the entire structure may have been ritually destroyed by burning—a phenomenon known to occur in Neolithic houses and wooden structures in Ireland and Scotland.

We are only in the initial stages of understanding this site and that there will be much debate concerning its function and significance.



Fig. 99—Ground view of levelled ground on which the Great Rectangular Palisade Enclosure was built, looking eastwards. DSC0556



Fig. 100—High-contrast image of the Great Rectangular Palisade Enclosure, showing the traceable extent.

Site No. 17: Linear Feature 2

This feature is located c. 400m south-east of the entrance to the Newgrange Passage Tomb, in the field to the north of Site A. It continues eastwards into the fields east of Site A. It appears as a long, linear feature highlighted as a light-coloured surface in an area where the grass cover is parched. The feature is well defined and is interpreted here as the remains of an ancient road.



Fig. 101—Linear Feature 2 showing as a bright-coloured band of parched ground, viewed from the south-west. DSC09494

This linear feature is traceable over a distance of c. 500m and can clearly be seen in three different fields. In plan it is curvilinear, traversing the terrain in an east–west direction. It appears to be following the edges of a palaeochannel that divides the upper and lower alluvial terraces. The edges of the feature appear to be slightly more irregular than those of Linear Feature 1. It measures on average c. 11.5m wide.

The aerial photographs show the feature as a distinct line of parching along its course. Where it enters the wheat field to the north the crop can be seen to be particularly stressed and parched. It is here that there is clear evidence that the course of the Great Palisade traverses its path.

There is a series of small, shallow quarries, where gravels appear to have been extracted, close to its eastern extremity.

At the west its termination is obscured by agricultural machine tracks. It is possible that the feature curves towards a gate in the north-west corner of the field, or it may have continued westwards to link with Linear Feature 1.

Site No. 18: The Cursus Field

This field lies immediately to the east of the compound where the Newgrange Passage Tomb is located. 'Cursus' is the name applied to defined ancient processional routes usually found in complexes of ritual monuments. There are particularly well-known examples in the Stonehenge landscape.



Fig. 102—The Cursus Field, located to the right of the Newgrange Passage Tomb, viewed from the south. STW 8496

The Newgrange Cursus can be distinguished on aerial photographs as a north/south-running oblong enclosure with a U-shaped terminal at the southern end. It cannot be traced accurately to the north, but it is noticeable that the modern field system shares the same north–south axis.

The cursus, located c. 100m east of Newgrange, is defined by two parallel banks and ditches c. 20m apart and is traceable for a length of c. 100m. The surviving portion emanates from a small stream running east–west just to the north of the Newgrange ridge. The route of the cursus rises upslope before slightly dipping over the ridge to afford spectacular views of the monuments on the floodplain below.

Geophysical survey

A geophysical survey of the southern portion of the cursus and an area around it on the north was carried out in 1999 and 2000. The geophysics did not identify any significant anomalies within or relating to the cursus, apart from some random pits. The magnetic signature of the monument seems to indicate that the cursus was constructed of made ground at that location.

This survey also identified the presence of a large, rectangular palisade enclosure associated with an internal alignment of pits. This structure, laid out on a north-west/south-east axis, appears to be aligned on Site Z, a passage tomb that is enclosed within the pit and timber circle.

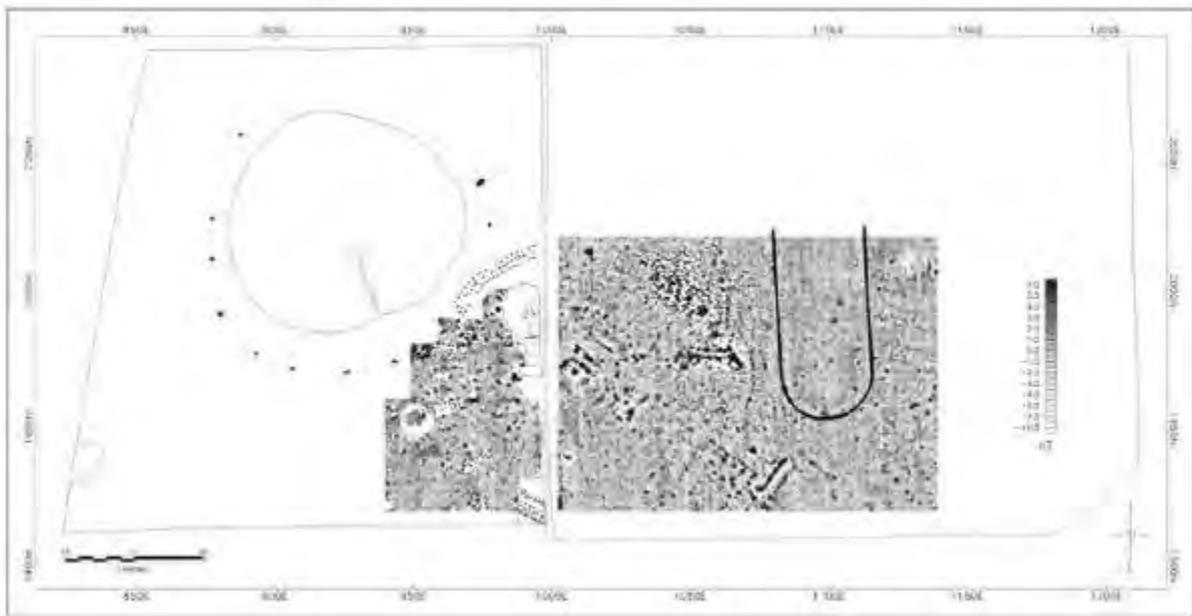


Fig. 103—Magnetic gradiometer survey map of the Cursus Field. (Courtesy of Kevin Barton)

Aerial survey

A number of features of archaeological interest were identified in the course of the NMS aerial survey. These show up as circular pits/post-holes and the parched outline of a rectangular structure.

At the northern end of the visible section of the cursus is a large rectangular enclosure (27.8m east–west, 7.5m north–south), showing up as the narrow outline of a rectangular building.

A line of six large post-holes can be seen within the ditch of the cursus in the northern portion along its west side. Another line of five large posts can be seen in a parched rectangular area running east–west across the cursus, north of the rectangular structure.

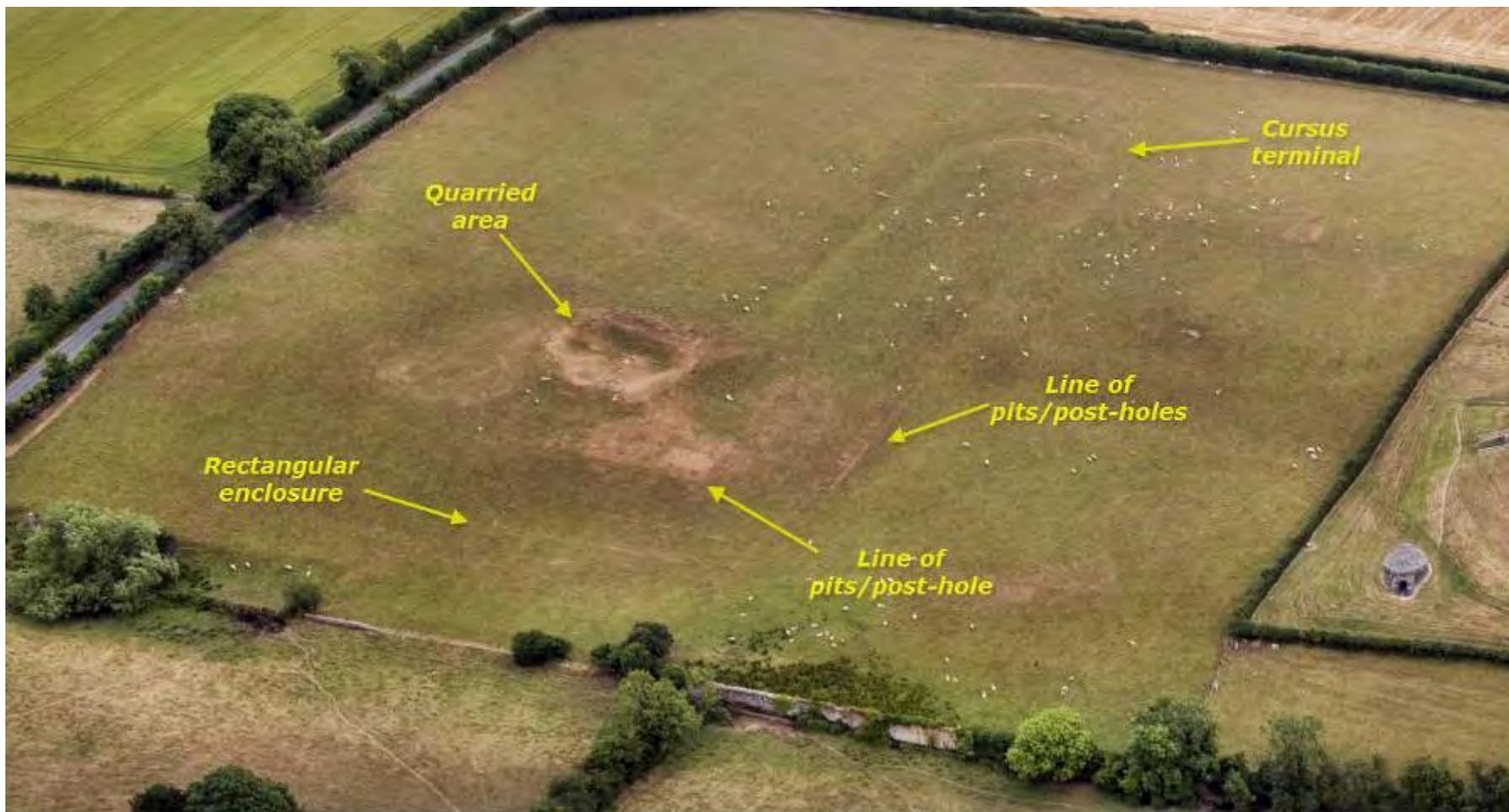


Fig. 104—View of the Cursus Field, looking south-east. STW 8447

Site Nos 19a–19f: Miscellaneous cropmarks

A number of sites can be identified to the east and south-east of the Newgrange Passage Tomb. Some of these can only be partially described and we are applying further analysis to them. Portions of these sites are also visible on available aerial photographs from previous years.



Fig. 105—View across the eastern upper alluvial terraces, looking west. The Newgrange Passage Tomb is also visible (top right). STW 9086

The character of this part of the floodplain contrasts with the western portion. The view from the likely passage tomb, Site U, overlooking the lower terraces is very impressive. From here the stepped nature of the alluvial terraces can be best appreciated. Only one field was under crop at the time of the aerial survey. The wheat in this field did not demonstrate the same sensitivities as the wheat crop in the field at Newgrange Farm.

The Great Palisade could be identified in the south-west corner of the field exactly where it crossed Linear Feature 2 (Site No. 17). The route of the palisade presumably continues upslope in a northerly direction, but there was no evidence in the crop at the time of our reconnaissance.

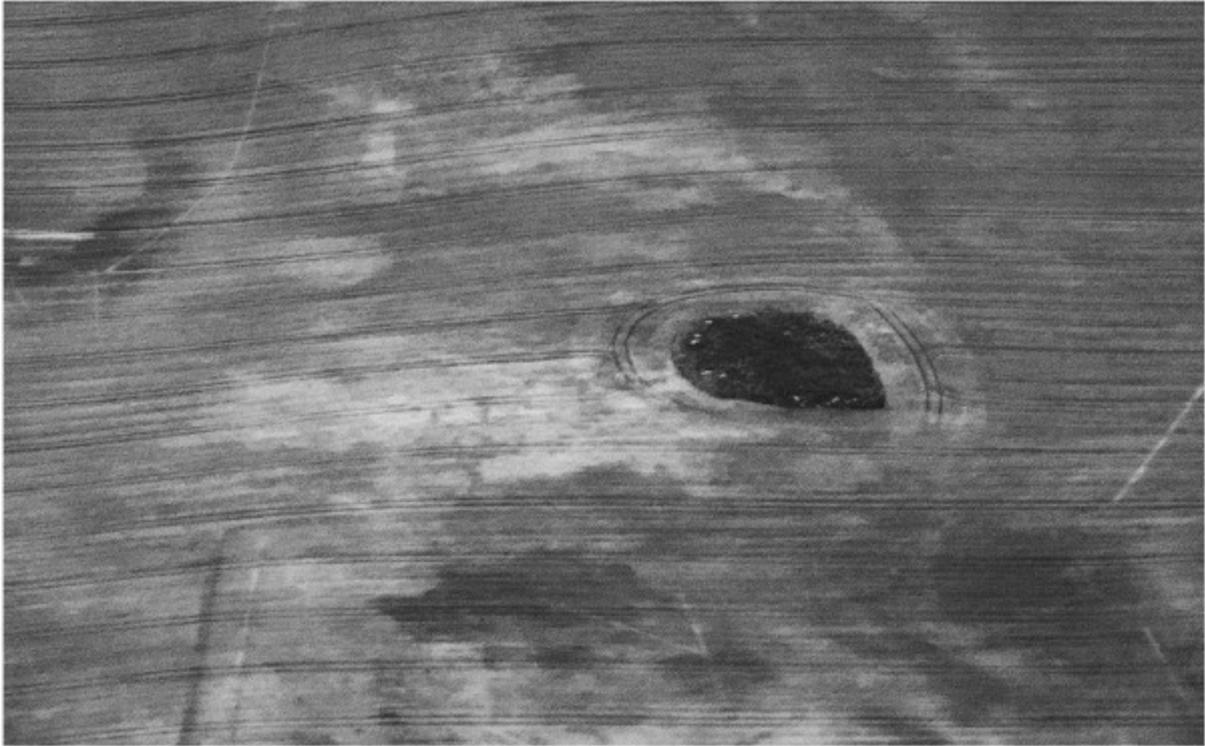


Fig. 106—Site 19a: View of truncated mound, Site U, showing rectilinear cropmarks in close proximity (centre left). STW 9084



Fig. 107—Sites 19b and 19c: Near-vertical image of large U-shaped cropmark, 95m long and 42m wide (centre bottom). There is also a complex of circular enclosures (some of which are possibly pit-defined) in the corner of the field to the right. STW 9060



Fig. 108—Sites 19d, 19e and 19f: A number of interesting sites are located to the east of Site A1. This high-contrast image shows the arc of a curving semicircular ditch (length of chord c.140m) located at the edge of the break in slope leading down to the lower terrace. Beside this there is a large circular pit, distinguished by its circularity. It may have been surrounded by a bank. On the north (to the right on photo) there is an irregular arc of a ditch that appears to be bound by a break in slope leading down to a shallow palaeochannel on the north. While this arc could possibly be of natural origin, its curvature suggests that it may be man-made.

Henge Complex 2

Henge Complex 2 is a spectacular newly identified group of henges south-east of the Newgrange Passage Tomb and in close proximity to the mound known as Site B. These sites appear as differential grass growth in fields that were being used for grazing when the aerial photographs were taken. The colour aerial images revealed the dark-coloured ditches of these henges. The high-contrast images highlighted the exact location of the henges and their details became obvious, portraying these sites in all their glory.



Fig. 109—Close-up view of the Site B mound from the south, showing the parched nature of the grass in its vicinity. STW 8207

On the lowest terrace of the floodplain south of the Newgrange Passage Tomb, a group of ritual enclosures are located close to a large conical-shaped mound which is considered likely to cover a passage tomb (Site B). The perimeter of this mound is known to be surrounded by water when the river is in spate.



Fig. 110—Colour image of Henge Complex 2, looking south, showing their exterior ditches. The mound known as Site B can be seen at centre left. Other linear ditches close to the riverbank appear to be the remains of abandoned field systems. STW 8252

Two of the sites are of a larger type and show features characteristic of the 'earthen embanked enclosure' type of henge. The aerial photographs indicate that they are defined by large, wide banks accompanied by an outer ditch and are separated by a distance of 12m at their closest point. Their appearance demonstrates a remarkable similarity in design and construction.



Fig. 111—High-contrast image showing view across Henge Complex 2 from the north-east. STW 8217

The henge closest to the river's edge is c. 160m across, while the smaller of the two, located to the north-east, is c. 120m across. They are both subcircular in shape and at first sight appear to lack the careful layout of the three henges in Henge Complex 1.

A smaller circular cropmark, c. 100m north-east of the smaller of the two large henges, describes a subcircular enclosure defined by a broad ditch with traces of an outer bank. The purpose of this site is unclear, but its proximity to Site B and the two large henges suggests that it may have had a ritual function.

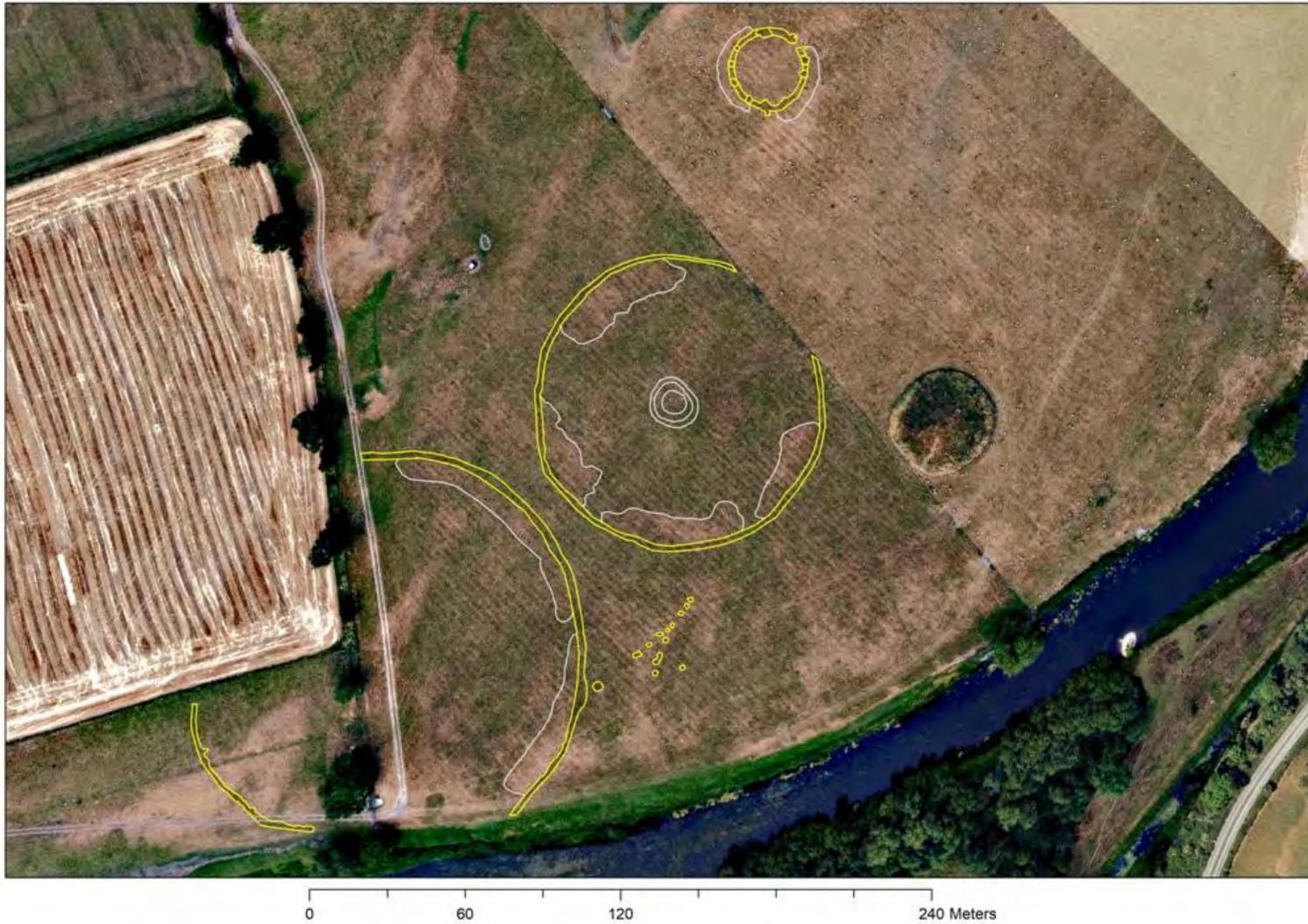


Fig. 112—GIS plan of Henge Complex 2.

Site No. 20: Site B—the Small Enclosure

This newly identified site is associated with Henge Complex 2, located c. 820m south-east of the entrance to the Newgrange Passage Tomb. The enclosure is c. 100m north-east of the Small Henge and c. 140m north of the mound known as Site B. Close analysis of the aerial photographs reveals that this site, an enclosure with a diameter of just under 40m, may be more complex than it would appear at first sight.



Fig. 113—The Small Enclosure, viewed from the east.

The site shows up as differential grass growth, reflecting a subsurface ditch. It is located to the south of a line of irregularly shaped ponds below an alluvial terrace.

Subcircular in plan, the enclosure is defined by the ditch and traces of an external bank (overall diameter 38.6m). The bank is c. 6m wide, while the ditch has an average width of c. 2.7m.

Close analysis of the images indicates that the ditch may contain post-holes spaced at regular intervals. There are two potential gaps through the ditch, at the north-east and to the south-west.



Fig. 114—High-contrast image showing proximity of enclosure to palaeochannel pond.

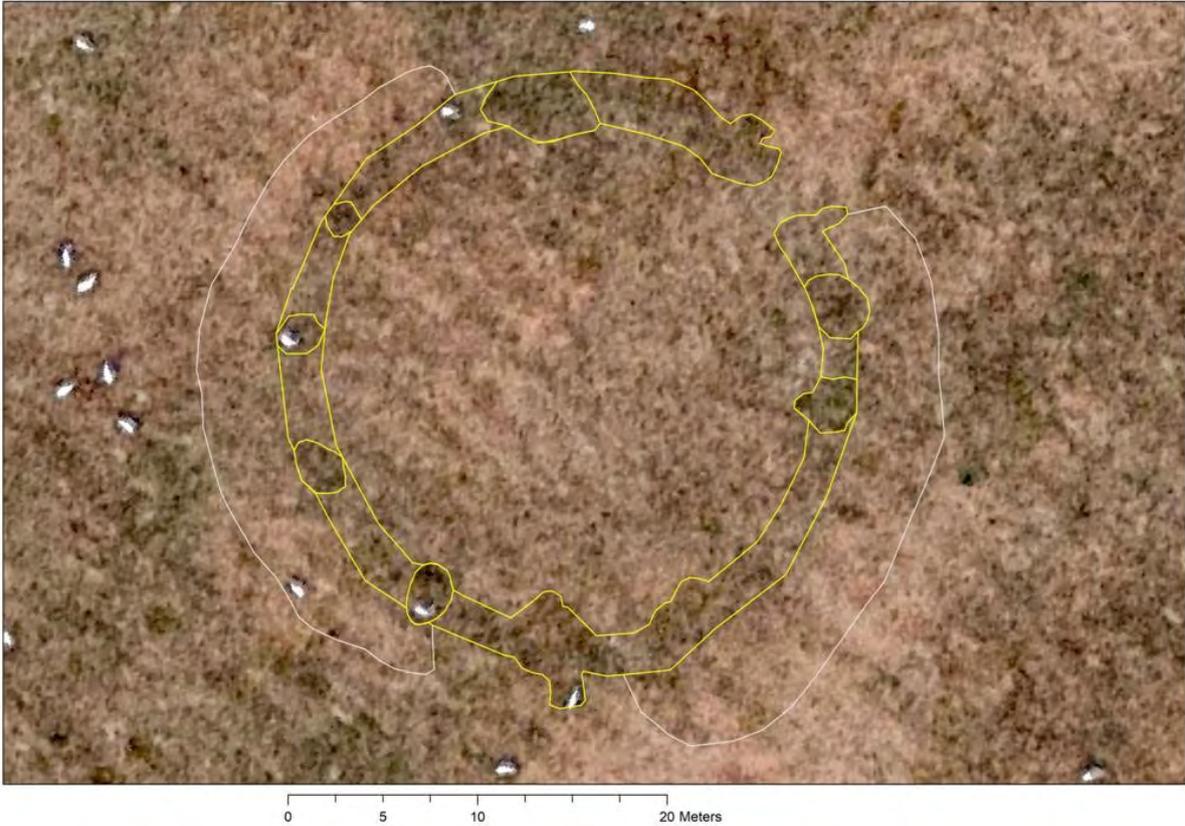


Fig. 115—GIS plan of the Small Enclosure.

Site No. 21: Site B—the Small Henge

Similar in appearance to the Riverside Henge, the Small Henge is located 25m north-west of the Site B mound and c. 820m south-south-east of the entrance to the Newgrange Passage Tomb.



Fig. 116—The Small Henge, viewed from the north.

This site is partially visible on LiDAR imagery processed by Dr Steve Davis. It appears as a circular dished area, consistent with the appearance of an ‘earthen embanked enclosure’. The aerial photographs provide further information on this site, which is located on the lowest of the alluvial terraces, c. 860m south-east of the entrance to the Newgrange Passage Tomb.

The site, similar in appearance to the larger Riverside Henge, is roughly circular in plan and is defined by a bank with an outer ditch. The bank can be clearly seen as a lighter tone in the grass growth and is 9–10m wide. Its outer edge is defined by a ditch c. 2m wide. The perimeter of the site is clearly visible from the south-east to the north-east. A field fence obscures the visibility of a section of the eastern perimeter, where it is likely that the course of the enclosure is either contiguous with the boundary or projected slightly to the eastern side of the fence.

There is no clear indication of an entrance feature, although there is a distinct possibility that such a gap exists on the south-east, where the aerial photographs show an abrupt termination of the inner bank.

There is evidence for a low-profile circular mound in the interior of the site. The mound is roughly circular in plan, with a diameter of c. 12.5m, and is located south-east of the centre of the enclosed area. Claire O’Kelly (1978) had noted this feature previously and named it B1. She stated that ‘stones which show through the turf at the centre may be part of a cist or other such structure’.



Fig. 117—The Small Henge, viewed from the south-east, showing the outline of the outer ditch and the inner bank. Traces of the enclosed mound can be seen at the centre of this image.

STW 8247

Site No. 22: Site B—the Riverside Henge

This large henge has been identified through the pattern of differential growth in fields used for pasture. It is located in close proximity to one of the Boyne weirs. It lies c. 820m south-south-east of the entrance to the Newgrange Passage Tomb and c. 150m west of the Site B mound.



Fig. 118—The Riverside Henge, viewed from the north-east. Differential parching of the grass and the pattern of cultivation ridges obscure much detail, but the course of the surrounding ditch can be clearly seen. STW 9015

The differential grass growth indicates that the henge is defined by a ditch located outside and at the bottom of a wide internal bank. The enclosure can be clearly traced for about three-quarters of its course. It is untraceable in a field that is superimposed on the perimeter of its north-west quadrant, where the crop had been cut at the time of our reconnaissance.

The dimensions of the subcircular enclosure are c. 157m north–south and c. 160m east–west. The width of the bank where it is clearly measurable is 9–10m. A modern field boundary runs north–south down the middle of the site. The southern portion of this field fence is a drystone wall. It is likely that farm buildings were once associated with this wall close to where it meets the riverbank.



Fig. 119—The Riverside Henge, viewed from the north-west. STW 9005

The visible evidence for the ditch indicates that it is just over 2m wide. It is likely that this site, by analogy with its smaller neighbour, was of the earthen embanked enclosure type of henge. Today, in the field, the interior is level and does not appear to register as a three-dimensional feature on LiDAR coverage.

There is a break in the ditch on the south-eastern perimeter of the enclosure that is likely to represent the original entrance into the interior of the henge. The orientation of this entrance is similar to those at Site P and the Geometric Henge.

A number of potential features can be seen in the interior of the site. A circular enclosure can be seen on STW 9005 in the north-east quadrant, close to the inner edge of the bank.



Fig. 120—Close-up of the enclosing ditch and entrance feature, viewed from the east. DOW 2364

Discussion and summary

The Newgrange ritual landscape

The following commentary is written on the basis of the interim results from the 2018 aerial surveys of the floodplain at Brú na Bóinne. In these initial stages of analysis, interpretation of use and chronology can be superficial but it provides a necessary starting point for discussion. The spatial relationship of sites and how they are located and shaped in relation to one another does inform us, even if their exact chronological relationship may be uncertain. Our priority over recent months has been to accurately map the principal features and to make them known so as to inform debate and a coordinated programme of future research which this World Heritage landscape demands.

The near-drought conditions of the summer of 2018 afforded us a remarkable insight into what is arguably Ireland's premier Neolithic ritual landscape. While the severe arid summer created significant difficulties for our present-day farming community, they provided the conditions that enabled us to see, many for the very first time, the evidence for sites and structures and monuments constructed and used around five thousand years ago by a society whose economy was also based on agricultural production.

Rarely has aerial archaeological research brought to our attention such a concentration of previously unknown and important sites within such a confined landscape, remarkable given the area has been subject to intense archaeological research and survey over many decades. The clarity of detail of previously unseen cropmarks is truly remarkable, providing us with much information on the architecture of new sites and of sites which had been previously identified. They show that some of the sites have features that are unparalleled in the archaeological record, while others are on a scale not previously thought to exist in Ireland.

Among the principal defining features for the development of the ritual landscape at Newgrange are its location and form: the Bend of the River Boyne, the morphology of the floodplain, its terraces and the views of the landscape from the Newgrange Passage Tomb. The transition from settlement sites to a phase of monument-building around 3200BC as evidenced by the proliferation of passage tombs across the Brú na Bóinne landscape is fascinating. The inferences that can be made from this transition in terms of societal and religious development and the growth of controlling authorities who could marshal the resources of an evolved and settled community are important.

The change in use of the landscape from agricultural production to ongoing tomb-building by the end of the fourth millennium BC is a dramatic illustration not only of the religious motivations of the tomb-builders but also of their technological and logistical abilities in transporting construction materials over long distances. Their architectural and organisational prowess in constructing these monuments have created a legacy that inspires us still.

The construction of the great passage tombs at Newgrange, Knowth and Dowth signals the crescendo of tomb building by the Neolithic communities at Brú na Bóinne, highlighting their compelling belief systems and the extensive resources at their disposal. It is this period of development that distinguishes Brú na Bóinne from all other ritual landscapes in Ireland and beyond. The passage tombs would have enhanced the natural, topographic and geographic features of the landscape, including the river, which may have been perceived to have possessed ritual significance in the first place. In so doing the phase of passage tomb construction not only monumentalised the tombs themselves but also in a way ‘sanctified’ the landscape for the generations that followed.

It is considered here that most of the new material deriving from the 2018 aerial reconnaissance belongs to the Late Neolithic period, several centuries after the construction of the stone-built passage tombs and the mounds that covered them. The posts and pits marked by cropmarks, tell of large timber constructions, of immense ceremonial enclosures, of gathering on a scale which is staggering. This switch to timber architecture in the later Neolithic is likely to indicate some change in the religious canon that lay behind the use and design of this ritual landscape.

On the Newgrange floodplain monuments of different types—cursus monuments, mortuary enclosures and the great ceremonial henge sites of the Late Neolithic—are found in close proximity to one another. While some of these monuments were known from previous research, the additional material from the aerial surveys has amplified in a dramatic fashion what some archaeologists would have broadly suspected but could never have imagined. It is early days yet in our understanding of the full suite of monuments we now know once stood on the floodplain in the shadow of the Great Passage Tomb. We look forward to working with others on answering the many questions which arise.

Timber architecture

Many of the monuments recorded during the 2018 aerial survey are classified as enclosures, defined by banks and ditches. In agricultural land it may be that only the in-filled ditches are visible on aerial photographs.

Many of the sites that appeared this summer as cropmarks and vegetation marks during the drought are evidently the remains of timber structures. The pattern of post-holes for upright timbers allows us to speculate on the nature of the monuments and any associated superstructure.

Such clarity of detail evidence for post-holes or palisades is rarely seen on aerial photographs in Ireland and allows us discuss the morphology and function of the sites. Our understanding of the chronological development of the new sites is of course necessarily speculative. At this stage of our analysis it would be premature to be dogmatic about the chronology of all the material that has been identified at Newgrange.

Oblong enclosures

Our understanding of the chronological development of the new sites is necessarily speculative. At this stage of our analysis it would be premature to be dogmatic about the chronology of all the material that has been identified at Newgrange. For example, the long mortuary enclosures, while known from ritual landscapes in Britain, are 'new' to the Irish archaeological landscape.

The presence of at least three potential examples in the Newgrange floodplain, two of a bank-and-ditch variety and one defined by an arrangement of post-holes, raises questions concerning their origins and influences from abroad in the Late Neolithic.

The Great Palisade

This site is one of the great surprises of the new discoveries. In many respects it bears some of the distinguishing characteristics of linear earthworks and hillforts: the multiplication of 'defences' and the long distances over which they are constructed. The example from Newgrange combines all of these characteristics with some additional features. The double palisade and bank form the innermost enclosure, while the two outer palisades, where visible, follow the same parallel course at even distances. It is tempting to conjecture that this palisade encircled the higher ground and the ridge on which the Newgrange Passage Tomb is located.

The Four-Poster Enclosure

The clarity with which the Four-Poster enclosure appears on the aerial photography is as informative as it is stunning. The similarity of the Newgrange example to the site excavated by Professor Barry Hartwell at Ballynahatty, Co. Down, is striking. While the interpretation of these sites as mortuary enclosures is to some degree speculative, the fact that a similar structure was excavated at Knowth indicates that such sites are an intrinsic part of Late Neolithic timber architecture tradition.

As will be noticed with other sites on the floodplain, the large scale of the Four-Poster compared to other known examples suggests a level of aggrandisement of monuments at Bru na Boinne.

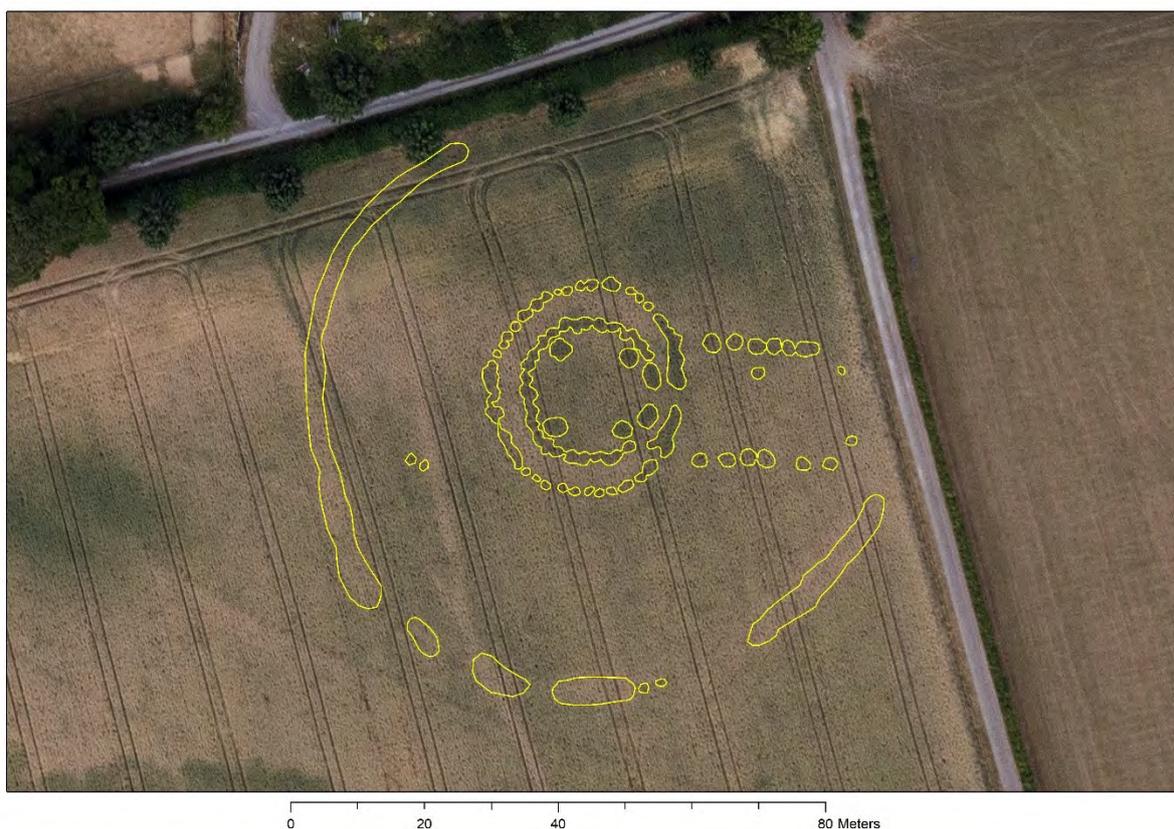


Fig. 121–GIS plan of the Four-Poster Enclosure.

The Great Rectangular Palisade Enclosure

This site is fascinating in terms of its scale and design. Following the identification of the eastern end of the site by geophysics and the subsequent exploratory excavation recently carried out by Dr Geraldine Stout, the aerial photographs have added significant information about its nature and extent. The sheer scale, linearity and rectangularity of the site appear to distinguish it as one of great importance in our understanding of the Late Neolithic. It has been classed as a type of 'hybrid cursus' and the challenge in visualisation of the original superstructure of this site and its function within the landscape should energise a phase of detailed analysis.

The henge complexes

The grouping of the henge monuments, such as Henge Complexes 1 and 2, at Newgrange indicates the importance of the use of space, in particular the areas in close proximity to the river, its weirs and crossing points. The contrast between the apparent simplicity of design in the eastern complex (Complex 2) and the sophisticated design of those in the western group is noticeable. How we understand the proximity and the chronology of these complexes will require much further analysis. The presence of what we have called the Hidden Henge within Complex 1 and its effect on the linear

arrangement of the other three henges are intriguing, as are the tentative suggestions of similarity in architecture across the newly discovered sites.

The striking designs of the Univallate Henge and the Geometric Henge have provided much to consider in terms of their chronology and the interpretation of the superstructures that their ditch features may have held. The segmented ditch formations and the orderly fashion in which they are laid out are unknown at any other ceremonial enclosures in Ireland.

The details of the constructional techniques employed in the earthen embanked enclosure henges are equally intriguing. Most of the details of these sites are imperceptible at ground level. The drought conditions produced such contrasts that fine details can be precisely mapped and better appreciated. Site A, the smaller henge at Site B and the Univallate Henge enclose mounds roughly at the centre of their interiors. The Site A mound is presumed to cover a passage tomb, and the Site B henge is likely to have a stone structure within it. By contrast, the mound within the Univallate Henge appears to enclose a timber arrangement with a specific alignment.

Pits and other features

The distribution of pits throughout the Cropmarks Field is a pervasive feature of the evidence. While not as visually arresting, the distribution of pits throughout the Cropmarks Field is likely evidence for ritual deposition on the floodplain. Others would probably have held timber posts, either as single uprights or as clusters of posts within a single pit.

The pits, no doubt, date from all periods of the Neolithic—pre-dating the tombs, contemporary with them and post-dating them. Based on the current aerial photographic evidence, it would appear that pits are likely to occur right across the entire floodplain. There are pits of various shapes and sizes. Some present themselves as large circular pits, while others are rectilinear. The crescent-shaped pits are noticeable on account of their shape and scale. Some appear to have a single pit within the arc that they form. It is intended to map these as accurately as possible as our project progresses.

The features that we have noted, such as dumbbell-shaped features, are unusual. Again the evidence from the detailed imagery in the Cropmarks Field has highlighted three examples, one in the central mound of the Univallate Henge and two at the riverside feature (Site No. 8). The interpretation, based on the cropmark details, is that these are arrangements of large timber uprights set in a linear trench. The dumbbell shape seems to be a very particular arrangement that requires further research.

Organisation of the ritual landscape

Our overall archaeological appreciation of the ritual landscape on the Newgrange floodplain has now been truly transformed. The newly identified sites, and detail of previously discovered sites, indicate the importance of taking ‘snapshots in time’ of this and similar archaeological landscapes to show the progression of archaeological survey.

When viewed together, the additional information on known sites and the identification of ‘new’ sites present us with a layout of a ritual landscape that invites further detailed analysis. The henges, for example, occurring in two groups, are ranged along the banks of the River Boyne, but equally they appear to relate closely to the course of a particularly large palaeochannel on the floodplain.

The proximity of most of the henges to the river demonstrates that the river itself was of prime ritual significance in the belief systems and religious motivations of those who built and used the henges. Further study of the role of the palaeochannels and the ponds that survive within them will pay dividends.

The delineation of the ritual landscape by the Great Palisade is likewise of great significance. Whatever about its precise chronological relationship with the henges, the apparent deliberate segregation of the Newgrange ridge and slopes is of immense interest. The intent and function of the palisade would appear to have been to make even more special whatever ritual properties were associated with the Newgrange Passage Tomb and the other passage tombs on the ridge. The palisade might not only have excluded general livestock and other fauna but would also have restricted access to ‘invited guests only’. The scale of the palisade, in terms of both its physicality and the resources needed to design and construct it, points in the direction of the significant numbers of people who would have frequented the Newgrange floodplain.



Fig. 122—GIS surface model showing arrangement of monuments on the floodplain. Above image © DCHG; base image © Bluesky International Ltd; open source LiDAR data from <https://dcnr.maps.arcgis.com>

It is interesting to speculate that the Great Palisade may also have been used to deliberately define an area within which funeral and mortuary rites would have taken place, such as at the Four Poster Structure.

The enclosure of the massive rectangular site, within the palisade is also worth detailed consideration. A segregated ritual precinct would ideally be accompanied by a defined focus for gatherings within it.

In 1997 Dr Gabriel Cooney wrote a commentary on the exhibition at the (then) new OPW visitor centre at Brú na Bóinne, in which he made the following prescient remark:

'Ultimately we should remember that, just as the society that built the passage tombs was not static but changing, so too our views of that past are changing because of new information and interpretation. In a few years' time it may be necessary to update our outsider's view of the Neolithic World.'

This summer's discoveries have refreshed our interest in Brú na Bóinne and have transformed our understanding of the sacred places and ritual spaces on the floodplain at Newgrange.



Fig. 123–3D terrain model showing view of the floodplain from the North-East. Above image © DCHG; base image © Bluesky International Ltd; open source LiDAR data from <https://dcentr.maps.arcgis.com>

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