Results of Archaeological Excavation

ARNEY FORT, MARBLE ARCH ROAD, COUNTY FERMANAGH

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Site Name:	Arney Fort, Marble Arch Road, Co. Fermanagh
Project Type:	Results of Archaeological Excavation
Licence Number:	AE/19/127
Commissioned by:	Outdoor Recreation Northern Ireland on behalf of Cuilcagh to Cleenish: A Great Place
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NAC reference:	Arney19

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1	8/11/2019	Arney Fort, Marble Arch Road, Co. Fermanagh; Results of Archaeological Excavation	Excavation Report	S. Alexander	J. Barkley	L. Heaney	121119a

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Executive Summary

County:	Fermanagh
Site name:	Arney Fort, Marble Arch Road
Sites and Monuments Record No:	FER229:023
Licence Number:	AE/19/127
Site type:	Medieval Enclosure
ITM:	E 622112 N 836423
Irish Grid Reference:	H 22163 36408
Date of Excavation:	16th – 30th September 2019

This report is designed to present the results of a community archaeological excavation carried out at Arney Fort, Marble Arch Road, County Fermanagh, between 16th September and 30th September 2019, under archaeological licence AE/19/127.

Five trenches were hand excavated within the interior of Arney Fort and two on an annex adjacent to the monument. A metal detector survey was also carried out on the adjacent drumlin. The excavation was led by professional archaeologists with the excavation and recording carried out by local volunteers.

The excavation uncovered evidence for structures within the interior of the fort, along with material relating to iron working and glass production. Artefactual material recovered, included a Neolithic end scraper, iron nails and coarse pottery, identified as Medieval Ulster Coarse Pottery. Based on the results of the excavation the fort has been tentatively dated to the 15th – 16th century. Finds uncovered during the metal detector survey of the drumlin, included material dating to the post medieval period; notably a George III, 1805, Irish penny and the cock and jaws of a flintlock firearm with gunflint still attached.

CONTENTS

1 INTRODUCTION

1.1 This report is designed to present the results of a community archaeological excavation that was undertaken at Arney Fort, Marble Arch Road, County Fermanagh between 16th September and the 30th September 2019.

1.2 Prior to work commencing an Archaeological Written Scheme of Investigation was prepared in July 2019 by Northern Archaeological Consultancy Ltd, having been commissioned by Outdoor Recreation Northern Ireland on behalf of Cuilcagh to Cleenish: A Great Place.

1.3 The client wished to undertake a community excavation, comprising geophysical survey, hand-excavated test trenches and limited metal detecting, on the site of the scheduled Arney Fort (FER229:023) and adjacent drumlin. The aim of this project was to investigate the fort and to try and ascertain the function and period of the site. A written scheme of investigation (NAC Doc No. 190919a) was prepared and submitted to DfC: HED for approval (Appendices 1 & 2). An excavation licence was granted (AE/19/127) (Appendix 5), along with scheduled monument consent (HED ref: FER229:023, CO1-19-12491) (Appendix 6) and consent to carry out metal detecting (DDC/019/003) (Appendix 7). The geophysical survey of the interior of the fort and drumlin was carried out by Earthsound Geophysics Ltd. A separate programme of works and licence application was submitted by them to DfC: HED. The full results of their work are included in Appendix 8.

1.4 The excavation was led by professional archaeologists from Northern Archaeological Consultancy Ltd with the majority of the excavation work being carried out by local volunteers. Five trenches were excavated within the interior of Arney Fort and two on an adjacent annex to the monument. A limited metal detector survey was also carried out on the adjacent drumlin and on the land between the fort and the river.

1.5 The excavation uncovered evidence for structures, domestic and industrial activity within the interior of the fort. Artefactual material recovered, included a Neolithic end scraper, iron nails, Medieval Ulster Coarse Pottery (MUCP) and slag from both iron and glass working. Based upon the results of the excavation the fort has been tentatively dated to the 15th – 16th century. Finds from the metal detector survey include material dating to the post medieval period, notably a George III 1805 Irish penny and the cock and jaws of a flintlock firearm with gunflint still in place.

2 LOCATION AND PHYSICAL SETTING

LOCATION

2.1 The site lies on the southern bank of the Arney River, approximately 1km north of the Marble Arch Road (222173E, 336411N) (Figure 1). The site lies in the townland of Clontymullan, in the parish of Killesher, Barony of Clanawley and in the county of Fermanagh.

PHYSICAL BACKGROUND

2.2 The site of the fort sits beneath the 50m OD contour, on the southern bank of the Arney River, and lies on topsoil and superficial deposits of lacustrine alluvium (clay, silt, sand, sand and gravel unlithified deposits) laid down by the same river. The investigation area on the drumlin sits on and above the 60m OD contour, in an area of topsoil of poor drainage surface water gleys of shale-, limestone- and sandstone till parent material, atop superficial geology of the same glacial till. Both areas lie atop bedrock of calcareous mudstone and limestone of the Bundoran Shale Formation.

THE SITE AT PRESENT

2.3 The site of the investigations comprised the scheduled area for FER229:023 and the top of the drumlin that lies approximately 200m to the southeast. The two areas under investigation comprised Arney Fort (approx. 1494m^2) and the top of the adjacent drumlin (approx. 11,000m^2).

2.4 The area of Arney Fort was covered in trees, but Scheduled Monument Consent was granted to allowed removal of the majority of the trees to open up the interior of the fort. The drumlin was under unimproved pasture.

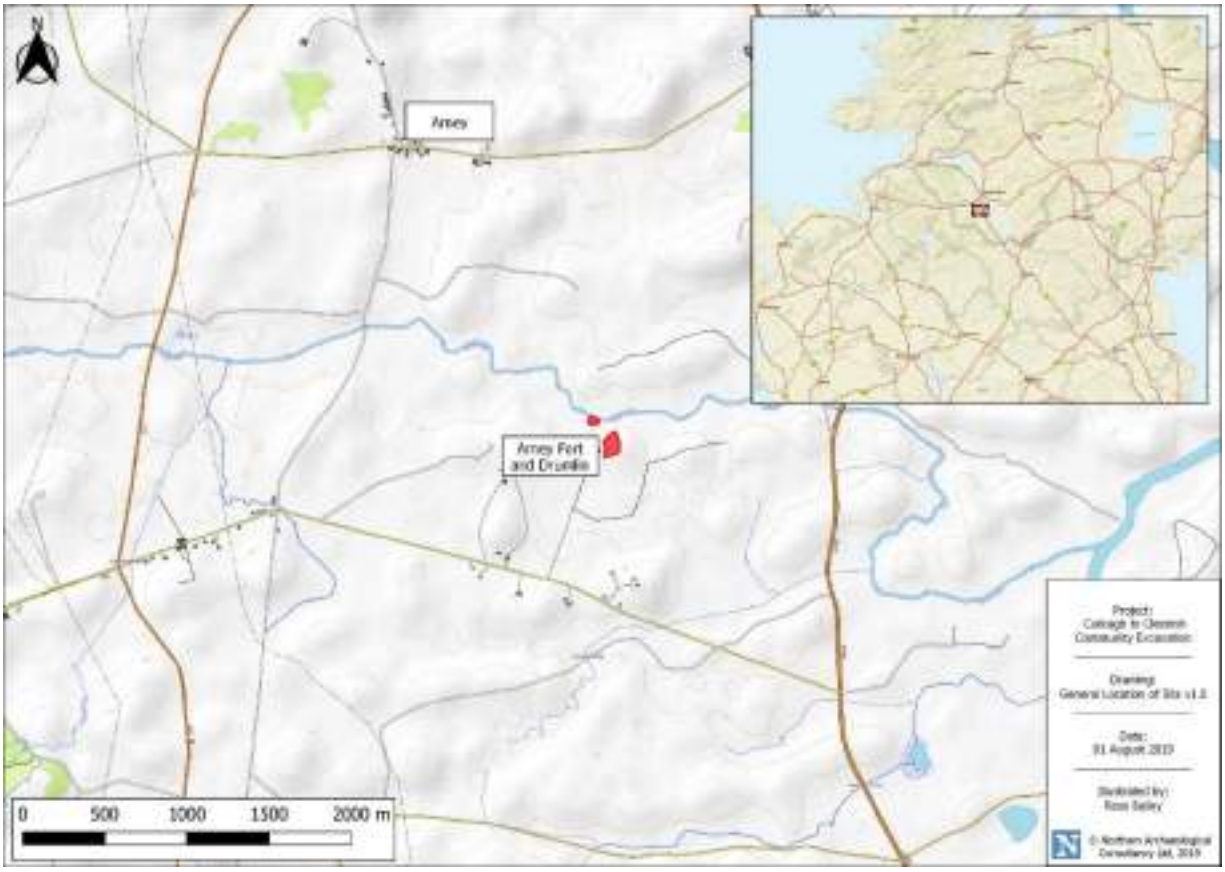

Figure 1: General location of proposed investigation areas

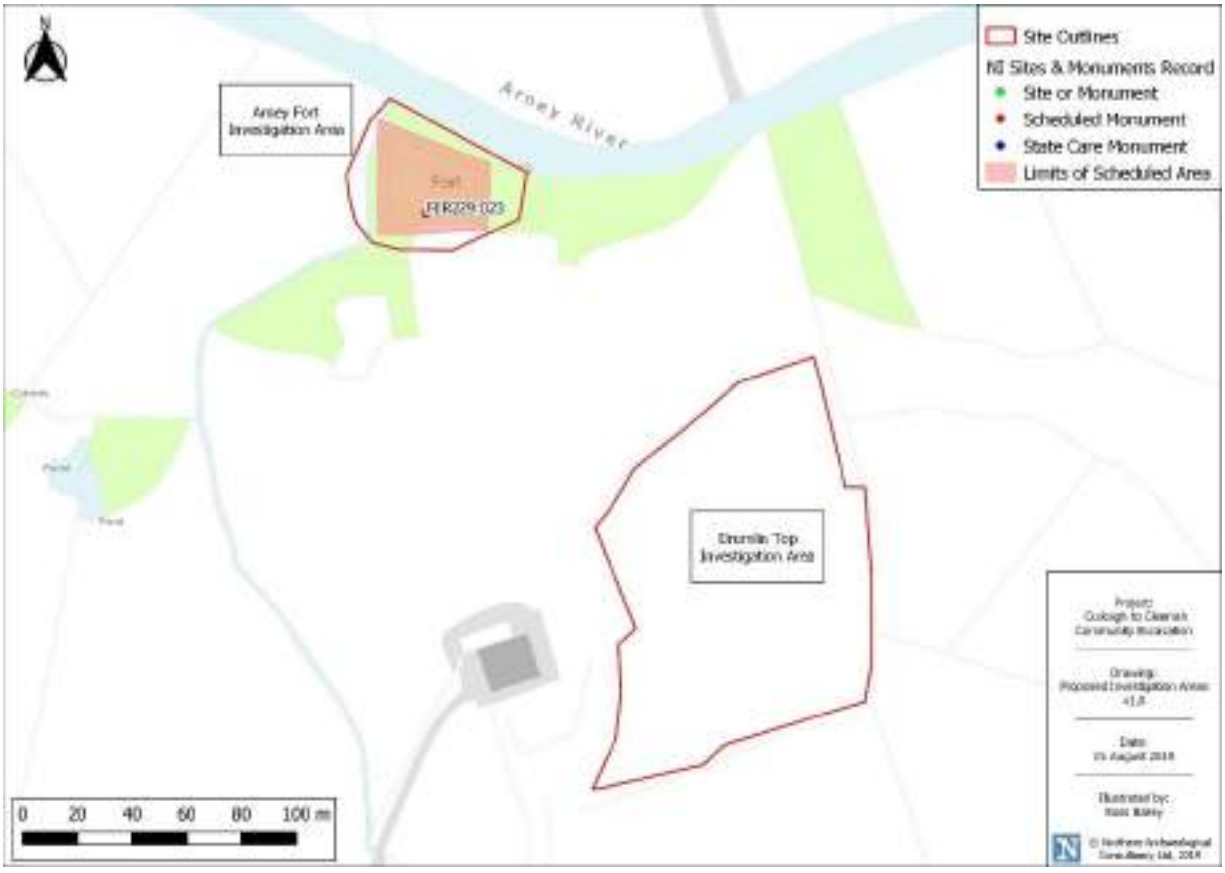

Figure 2: Location of proposed investigation areas

3 THE PROJECT

3.1 The proposed investigations were intended to allow the Cuilcagh to Cleenish: A Great Place partnership to undertake a community-based excavation. The archaeological excavation and survey were under the direction and direct supervision of professional archaeologists and geophysicists. The investigations were centred on the site of Arney Fort, a trapezoidal enclosure that lies on the banks of the Arney River, and the top of an adjacent drumlin that may also be connected to the site.

3.2 A series of both invasive and non-invasive techniques were utilised in order to facilitate the investigation. These included magnetometry and resistivity surveys of the centre of Arney Fort and the top of the adjacent drumlin. Limited hand-excavated test trenches within the centre of the fort and associated annex to try and identify structures that may have been present, and metal-detecting surveys of the lands between the fort and the river and the adjacent drumlin.

3.3 The aims of the project were:

- To help engage the local community with the heritage of the area through enjoyable 'hands-on' archaeological activities. This would be achieved by the participation of local volunteers and schools' groups, during the excavation, geophysical analysis and metal detector survey.

- Arney fort has been categorized as a 'rath' in the Sites and Monuments Record. However, the site is trapezoidal in shape rather than circular. The SM7 file for the site notes that *"There are no other comparable sites in the county"* and, further to this, it's location adjacent to the river and the overall proportions of the fort make this an important strategic site. The aim of the excavation within the fort and its associated annex was to try and gain a better understanding of the function and period of the site.

- The drumlin located to the southeast of Arney Fort has a commanding view that overlooks the fort and the river. As a strategic high point there is the potential that this site was utilised throughout the prehistoric and historic periods. Geophysical analysis of the drumlin was intended to identify any subsurface features, that may add to the understanding to the overall area.

- There is a clear indication of prehistoric activity within the local area, with the discovery of two Late Bronze Age artefacts, a sword and socketed axe, found approximately 500m to the west of Arney fort. Furthermore, in the same area, previous archaeological research identified the location of the Battle of the Ford of the Biscuits, a significant battle engagement in 1594, relating to the early stages of the Nine Years War in Ireland. The metal detector survey of the drumlin and the area between the fort and the river was intended to uncover any further artefacts relating to either of these time periods.

4 RESULTS OF ARCHAEOLOGICAL INVESTIGATION

EXCAVATION OF ARNEY FORT AND ASSOCIATED ANNEX *(For full context descriptions see Appendix 3)*

4.1 The excavation was led by professional archaeologists from Northern Archaeological Consultancy Ltd with most of the excavation work and recording being carried out by local volunteers. Five trenches were hand-excavated within the interior of Arney Fort and two on an annex to the east of the monument (Figure 3).

TRENCH 1

4.2 Trench 1 measured 5m long by 2m wide, situated on the northern side of the enclosure across one of the possible entrances to the fort. Although there are five breaks in the banks of the fort it is unclear which of these may have been original entrance/s. Trench 1 was located at a potential entrance that would have, most likely, provided access to and from the adjacent Arney River. This trench was located as to encompass the potential entrance way and to try and identify any surfaces that were present as well as any potential entrance structure. Further to this it was intended that this trench would also examine the make-up of the bank by partially excavating and straightening one of the existing eroded sections.

4.3 Between 0.20m and 0.30m of topsoil [1] was cleaned off onto subsoil [2] a firm, yellowish orange clay with no stones. No surfaces were uncovered and there was no evidence of a potential entrance structure. The eroding east facing section of the enclosure bank was straightened with spades and cleaned down with trowels (Plate 1), this revealed five deposits [100], [101], [102], [103] and [104] (Figure 4). Deposit [104] was the initial construction deposit of the bank, consisting of redeposited subsoil, this had then been covered by layer [103], a possible historic topsoil horizon and redeposited subsoil mix. Above this [102], an orange redeposited subsoil was laid down. This was then covered by [101], which has been interpreted as the topsoil horizon that formed over the enclosure bank. The uppermost deposit was a humic topsoil that formed the modern ground surface covering the earthwork.

Plate 1: Trench 1, post excavation showing the east facing section of enclosure bank, looking west

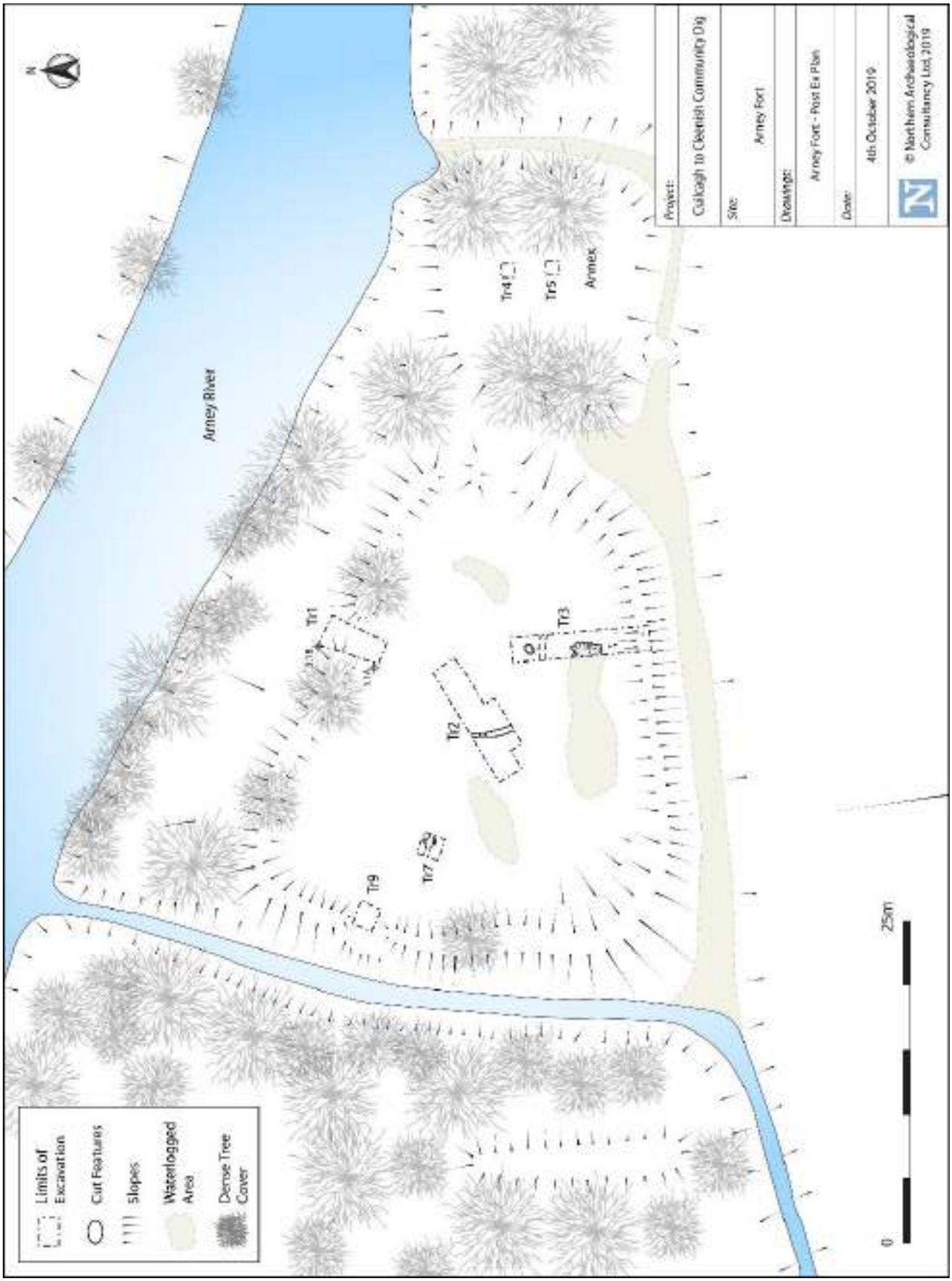

Figure 3: Layout of Trenches within the fort and annex

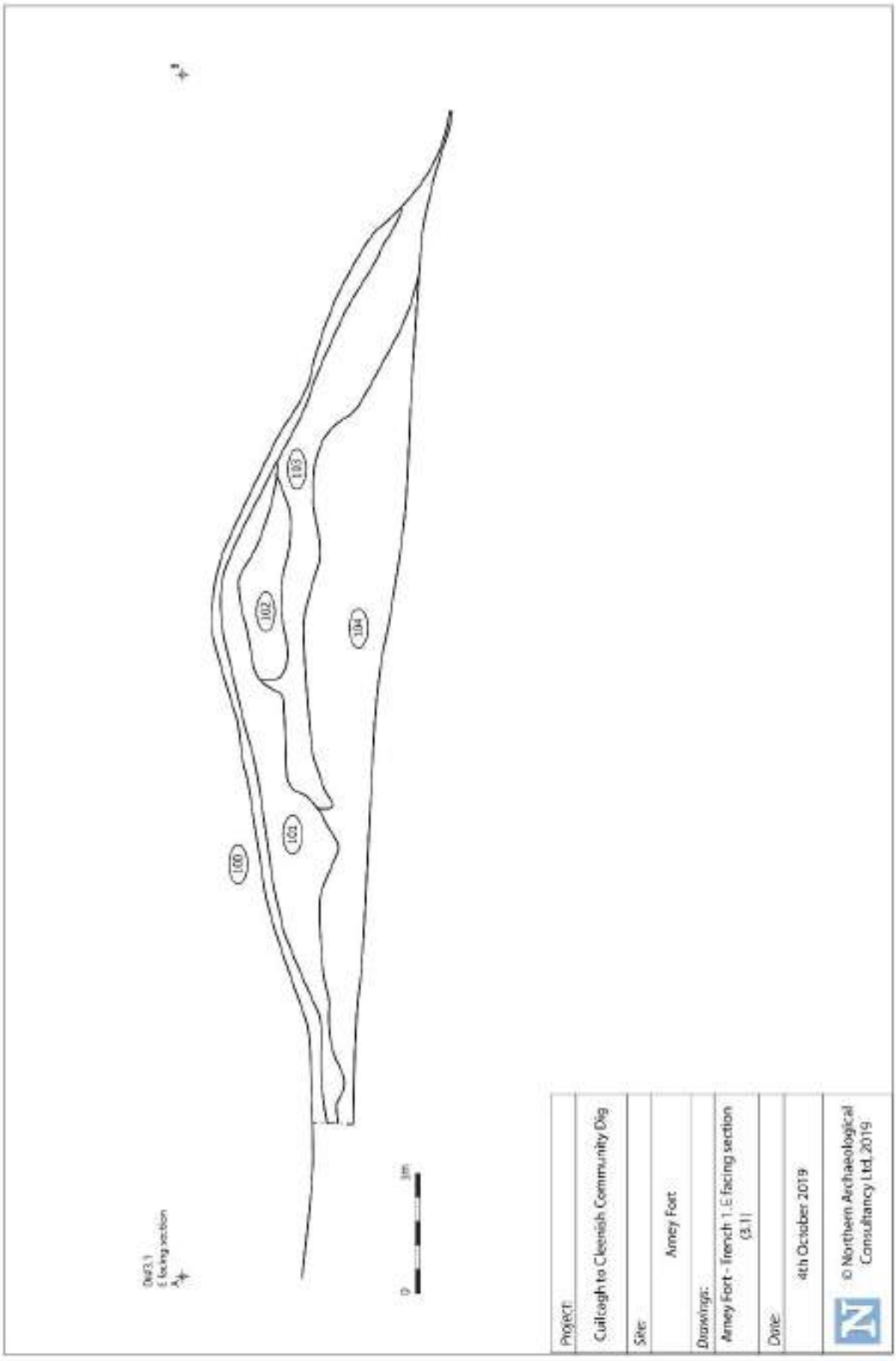

Figure 4: Trench 1, East facing section of enclosure bank

TRENCH 2

4.4 Trench 2 measured 10m long by 2m wide and was located in the middle of the fort on an east to west alignment. The aim of this trench was to establish whether there was any evidence for a central structure.

4.5 Approximately 0.20m to 0.25m of topsoil [1], was cleaned off onto a firm, yellowish orange clay subsoil [2]. A linear gully [200], 0.32m wide, on a north to south alignment filled by a single charcoal rich deposit [201], crossed the northern end of the trench (Plate 2). In order to determine the course of this feature, a 1m wide and 4m long extension, was excavated on the southern side of Trench 2 (Figure 5). This extension showed that the gully curved very slightly to the east. A single box section was excavated through the feature and discovered that it was 0.08m deep (Figure 5). Nineteen sherds of Medieval Ulster Coarse Pottery (FN# 1-19) (Plate 3), an iron nail (FN#27), iron slag (S#6, S#9, S#10), glass slag (S#7, S#8, S#11), brick fragments (S#12) and burnt bone fragments (S#25, S#29) were recovered from the topsoil during the excavation of this trench.

Plate 2: Trench 2, Pre ex shot of liner gully [200], prior to trench extension, looking west

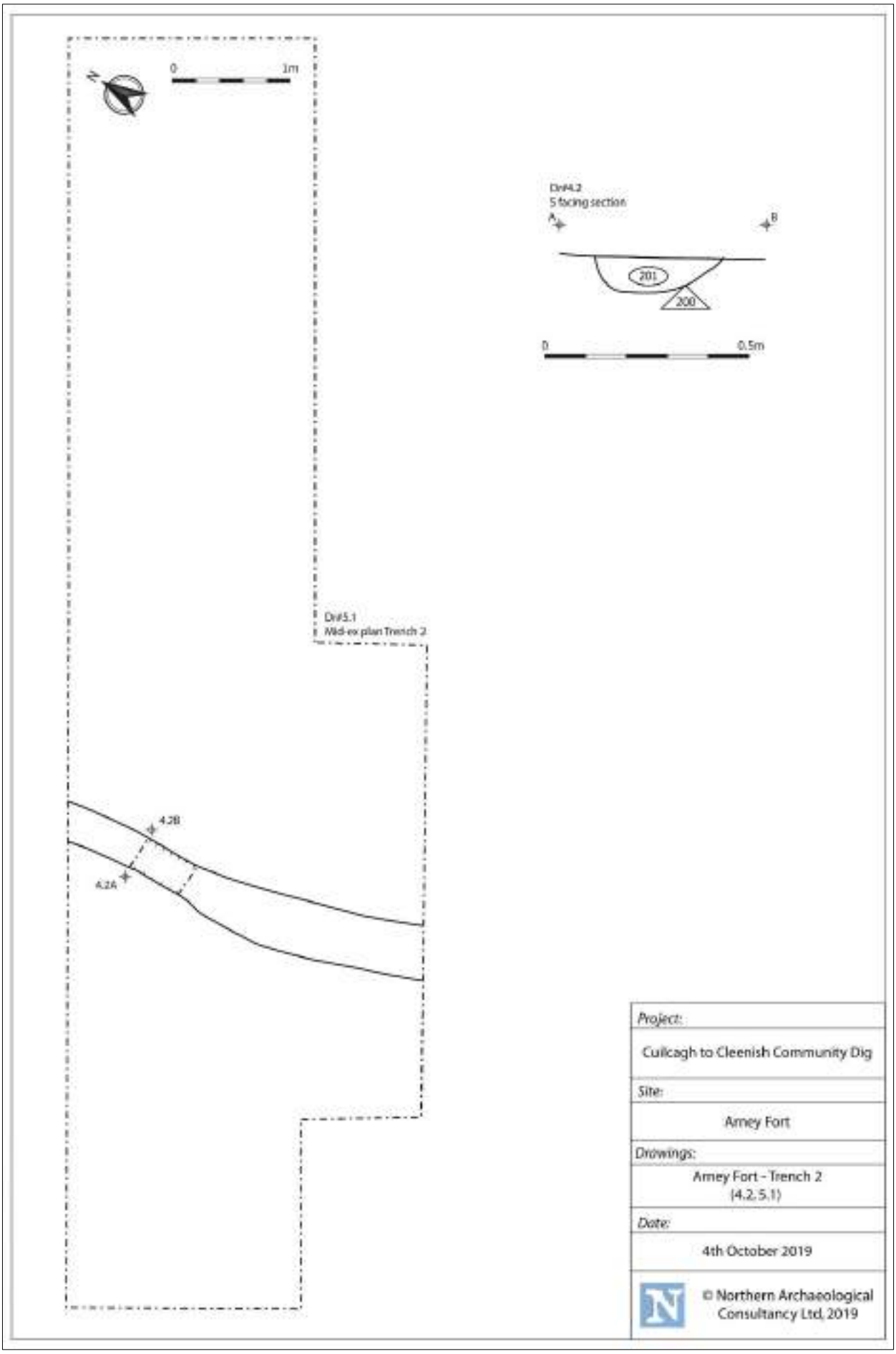

Figure 5: Mid excavation plan of Trench 2 and section across gully [201]

Plate 3: Sherds of Medieval Ulster Coarse Pottery from Trench 2

TRENCH 3

4.6 Trench 3 measured 10m long by 2m wide and was located on the southern side of the fort, aligned north to south, and perpendicular to Trench 2. It extended from the top of the southern bank towards Trench 2 in the centre of the monument. The aim of this trench was to identify if there were any structures associated with or constructed adjacent to the bank. Furthermore, by positioning the trench towards Trench 2 it was hoped that any features associated with a possible central structure might be uncovered. Trench 3 was also positioned over an area of boggy ground that measured approximately 2.5m north to south and 10m east to west, and which was 1m away from and ran parallel to the southern bank of the fort. The trench was positioned so that the western half of the trench was located across the eastern end of this anomaly.

4.7 Several features were uncovered in Trench 3 (Figure 6), notably the eastern edge of a large irregular pit [300], this was filled by two deposits [301] and [302]. This pit corresponded with the large boggy area, that ran parallel to the southern bank. It is believed that this pit extends for the length of the boggy ground visible on the surface and is the reason for its existence, as water is gathering within this feature (Plate 4). Immediately south of this pit and located at the base of the enclosure bank, two postholes [308] and [310] were excavated. Both contained charcoal, however [308] also contained two pieces of Medieval Ulster Coarse Pottery (FN#31-32), and small fragments of burnt bone. On top of the bank a small stakehole [303] was excavated. Each of these features was filled by a single deposit [309], [311] and [304] respectively. At the northern end of Trench 3 a medium sized shallow irregular oval shaped

pit [306] was uncovered, the fill [307] of this feature contained charcoal and small fragments of burnt bone. A potential linear gully, 0.56m wide and running on an east to west alignment, was identified immediately south of this feature. However, due to time constraints it was not investigated. A single piece of Medieval Ulster Coarse Pottery (FN#33), an iron nail, (FN#35) iron slag (S#16, S#18), glass slag (S#17) brick fragments (S#15) and a Neolithic end scraper (FN#37) were found in the topsoil during the excavation of this trench.

Plate 4: Trench 3, pit [300] post-excavation, note the boggy ground extending to the west, looking west

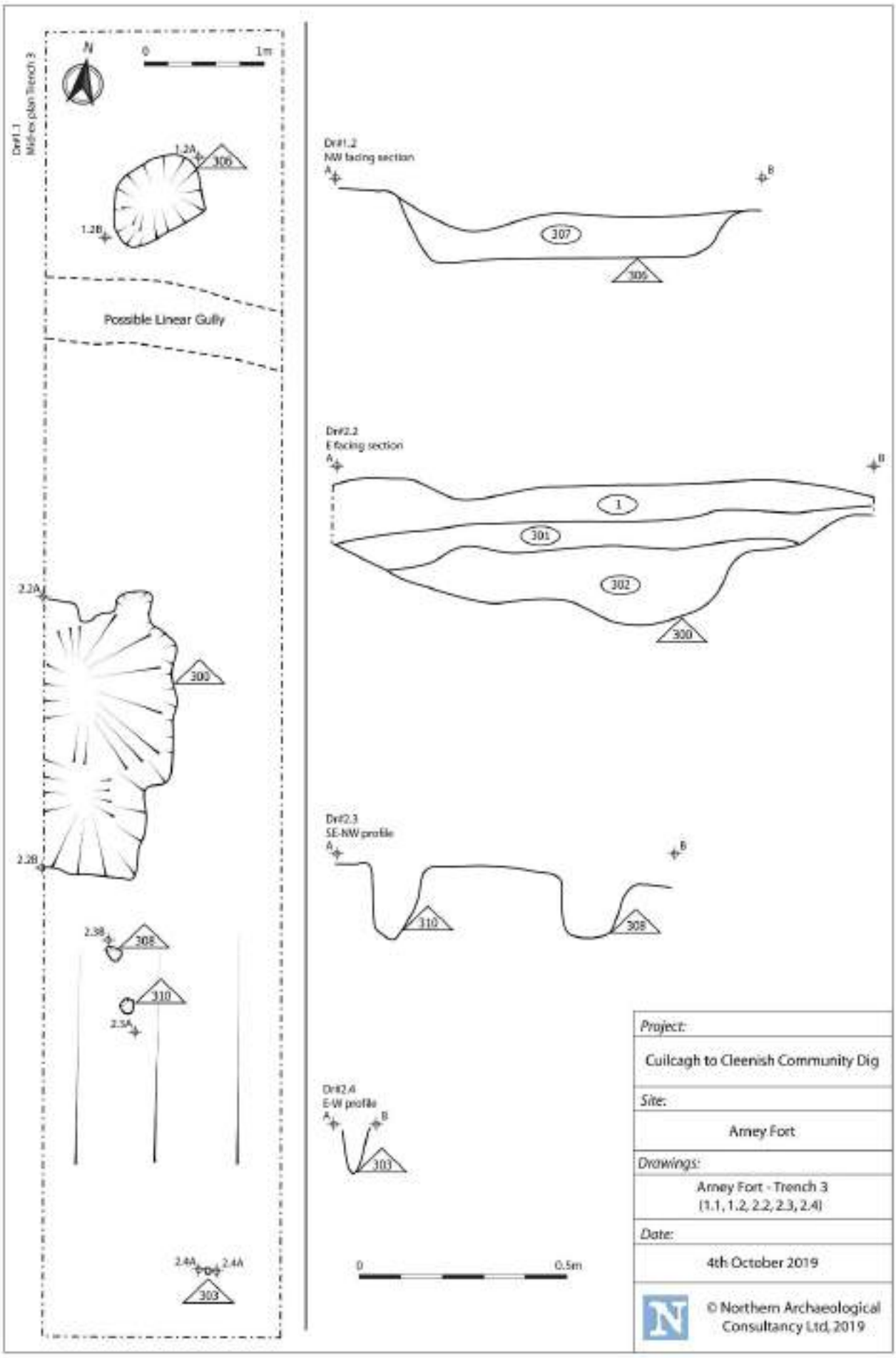

Figure 6: Mid excavation plan of Trench 3 and sections across features

TRENCHES 4 & 5

4.8 Trenches 4 and 5 each measured 1m by 1m and were located on the small 'D' shaped annex, located on the eastern side of the main enclosure. The function of this annex is unclear, as it is separated from the main fort by the ditch but is itself enclosed by a further section of ditch that, on its eastern side, may have been utilised as a small harbour. It was hoped that excavation of these trenches would provide evidence for a purpose or activities taking place within this area. However, nothing of archaeological significance was uncovered. Around 0.20m – 0.30m of heavily root affected grey brown silty clay topsoil [400] and [500] was removed onto to subsoil [2] (Plate 5).

Plate 5: Post excavation shot of Trenches 4 and 5, looking northeast

TRENCH 6

4.9 As per the written scheme of investigation, Trench 6 was a reserve trench, the square meterage was subsequently used for the extension to Trench 2.

TRENCH 7

4.10 Trench 7 measured 2m by 2m and in the written scheme of investigation was initially located in the northwest corner of the fort, with a view to examine the possibility of ancillary structures, workshops, etc. However, following the results of the geophysical analysis (Appendix 7), Trench 7 was moved approximately 5m to the south in order to place it over a possible anomaly listed as S8. This was one of five anomalies (S4, S5, S6, S7, S8) located in an arc curving around the interior of the fort. Around 0.25-0.30m of topsoil [1] was removed onto subsoil [2], two definite features were uncovered, the remains

of a small iron furnace base [700] (Plate 6) and an arrangement of four stones, associated with a patch of burning [701]. Between these features a linear gully 0.45m wide on an east to west alignment was uncovered (Figure 7). Due to time constraints, none of the features in this trench were excavated.

Plate 6: Pre ex shot of small iron furnace base [700], looking north

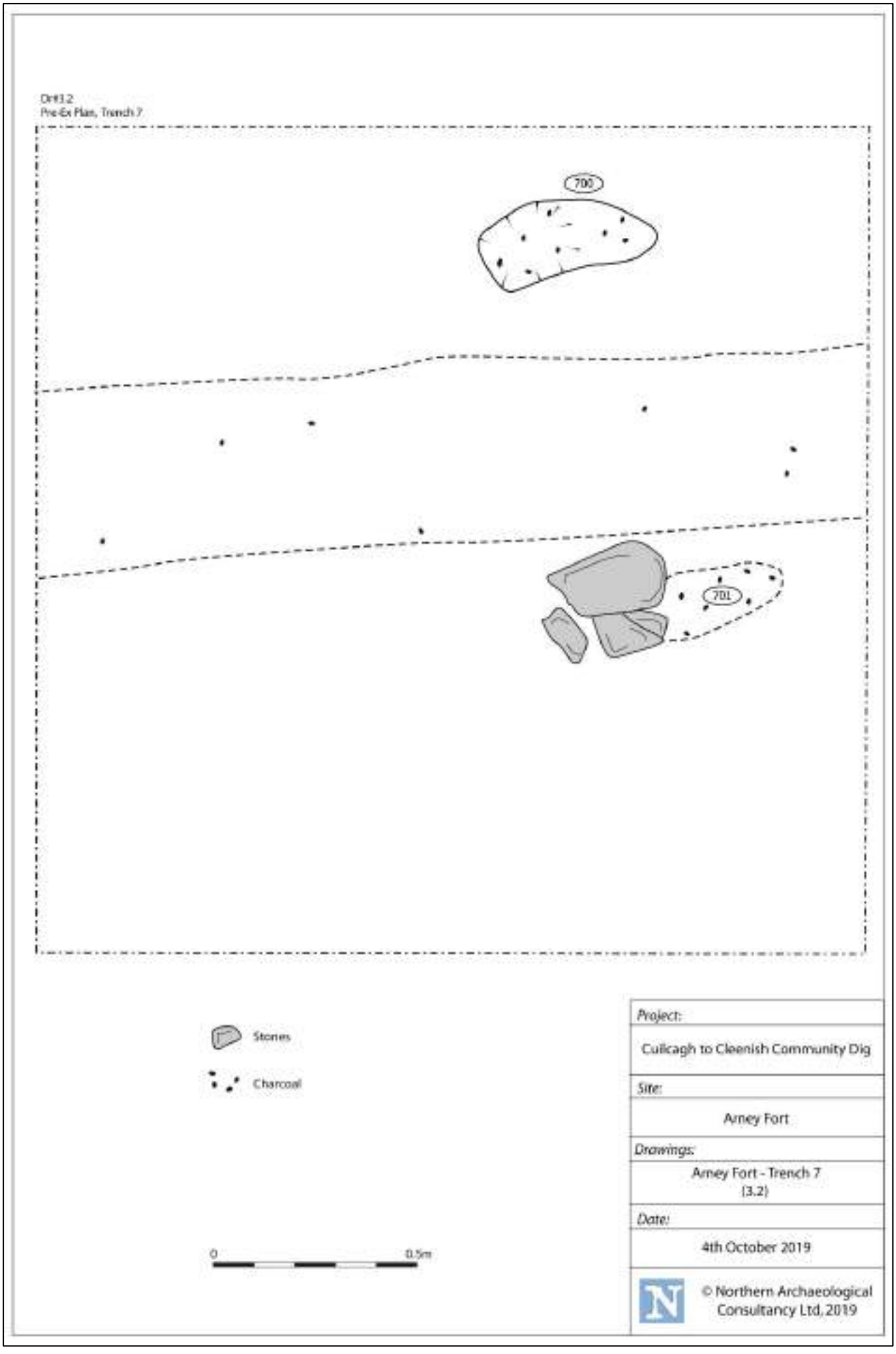

Figure 7: Trench 7, pre excavation plan of features [700], [701] and linear gully

TRENCH 8

4.11 As per the written scheme of investigations, Trench 8 was a reserve trench, to be utilised if needed. Due to time constraints it was not excavated.

TRENCH 9

4.12 Trench 9 measured 2m by 2m and was located across a break in the banks on the western side of the fort. The aim of this trench was to examine if it may have been used as an entrance and if so whether any structure was present. Approximately 0.30m – 0.35m of topsoil [1] was removed onto subsoil [2], no evidence of any surfaces or structures were uncovered (Plate 7).

Plate 7: Post ex shot of Trench 9, looking north

TRENCH 10

4.13 As per the written scheme of investigations, Trench 10 was a reserve trench, to be utilised if needed. Due to time constraints it was not excavated.

METAL DETECTOR SURVEY

4.14 A metal detector survey (HED consent DDC/019/003) was carried out on the ground between Arney Fort and the Arney River and across the drumlin to the southeast of the site. The metal detecting was carried out by school groups and volunteers from the local community. Invasive works to investigate the findspots were carried out under excavation licence AE/19/127. This work was always supervised by an

experienced field archaeologist, who assisted with the excavation. The location of each artefact was recorded using a differential GPS, Trimble R8 (Figure 9).

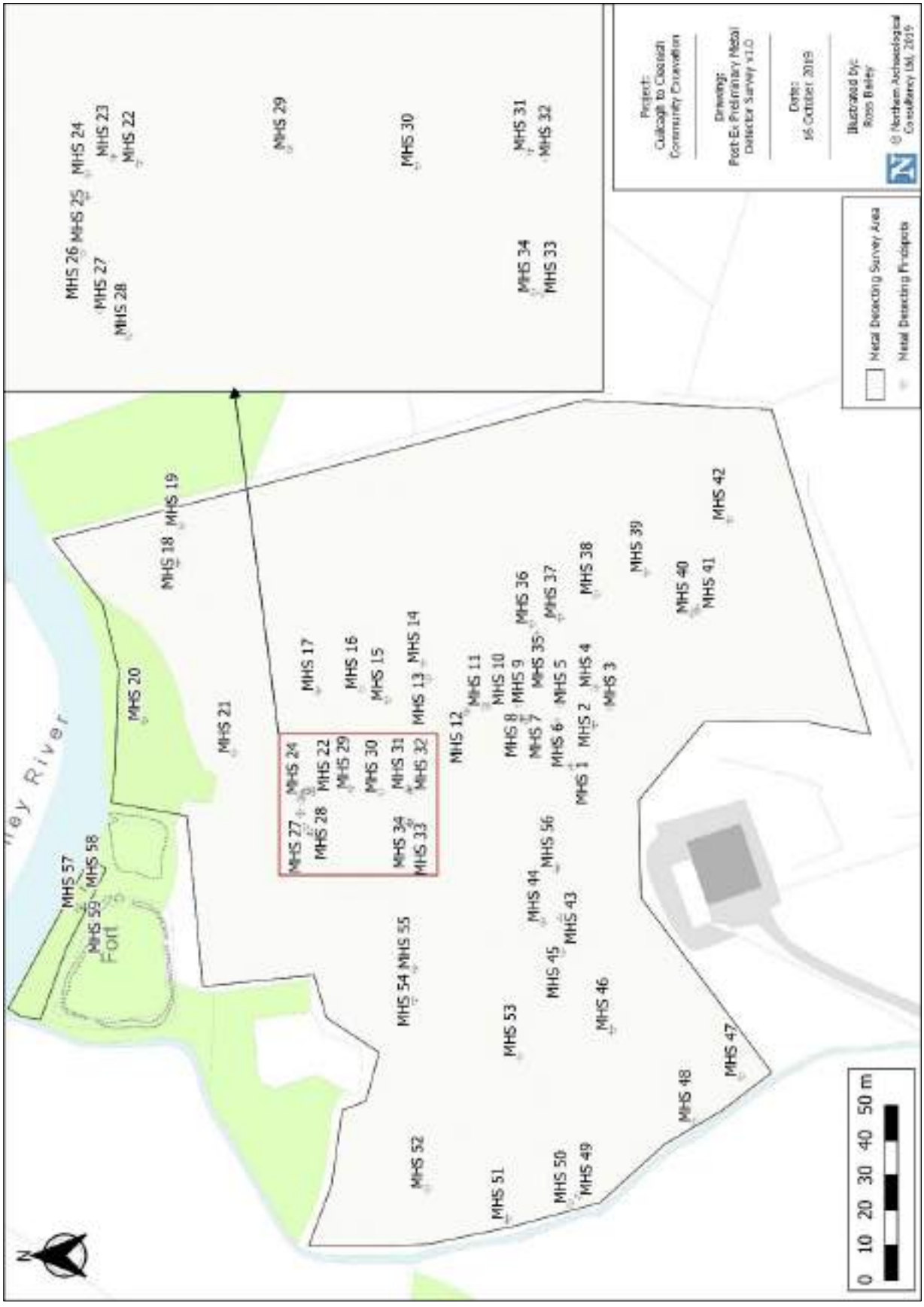

Figure 9: Map of Metal Detector Hits

DRUMLIN

4.15 Fifty-six findspots were recorded across the drumlin. Most of the artefacts uncovered were iron fragments and related to the modern era. However, the most notable finds were two copper alloy buttons (MHS#'s 29 and 53), a George III, 1805, Irish penny (MHS#18) (Plate 8) the cock and jaws of a flintlock firearm, with gun flint still in place (MHS#10) (Plate 9) and an unidentified copper alloy object (MHS#40) (Plate 10).

LANDS BETWEEN THE FORT AND RIVER

4.16 Three findspots were recorded between the fort and the river. The only one of significance was a lead token, with the words 'Enniskillen' and 'Forsyth' marked around its edges (MHS# 59) (Plate 11).

Plate 8: George III, 1805, Irish half penny (MHS#18)

Plate 9: Cock and jaws of flintlock firearm, following conservation (MHS#10)

Plate 10: Unidentified copper alloy object (MHS#40)

Plate 11: Lead token (MHS#59)

5 DISCUSSION

5.1 The Northern Ireland Sites and Monuments Record (NISMR), lists Arney Fort as a rath. However, the site does not conform to this assumption. The fort is situated on low lying ground at the base of a drumlin and immediately beside a river. This is not a typical location for raths which are found on high, well drained ground, with panoramic views. Further to this, raths are circular in shape, rather than trapezoidal as is the case of Arney Fort. Recent works on settlement in late medieval Gaelic Ireland has identified several sub-rectangular or trapezoidal enclosures that appear to be similar in style to moated sites in the areas of Ireland that were under Anglo-Norman control.

5.2 Work has been undertaken by T. Finan and K. O'Connor (2002) on the trapezoidal moated site at Cloonfree, Co. Roscommon in comparing the monument with the description of the site in two contemporary bardic poems. Here the site is recorded in 1306 as belonging to Aodh O'Connor, the king of Connacht. Descriptions within the text describe the bank with a palisade fence, a potential gatehouse structure at the entrance, the presence of a large timber banqueting hall and other possible houses or buildings within the interior of the fort.

5.3 Further to this, 'A true description of the north part of Ireland' circa 1601 complied by Griffin Crocket (Figure 10) Trinity College Dublin TCD MS1209/14 (Figure 10), shows what appears to be two 16th - 17th century Gaelic moated sites, that had been incorporated into English military fortifications, following their capture during the Nine Years War 1594-1603. The first is located at Lifford, Co Donegal (Figure 11), here the moated site, is depicted as abutting the English garrison fort and shows a square double moated fort, with a palisade or wall, surrounding a large wooden building in one corner and two ancillary structures. The second is at Dunnalong, Co Londonderry, (Figure 12), it shows, a moated site that, rather than being on the periphery of the English fort, has been incorporated inside of it. Like the one at Lifford it is also square in shape, however it has single moat. The original Gaelic building is depicted like Lifford off centre, but in this instance made of stone and is in ruins. Three other wooden buildings are also depicted in the interior, however, whether they are original Gaelic or later Crown constructions is unknown, but the fact that they are roofed suggests that they are in use by the English.

Figure 10: 'A true description of the north part of Ireland' circa 1601 complied by Griffin Crocket, Trinity College Dublin TCD MS1209/14

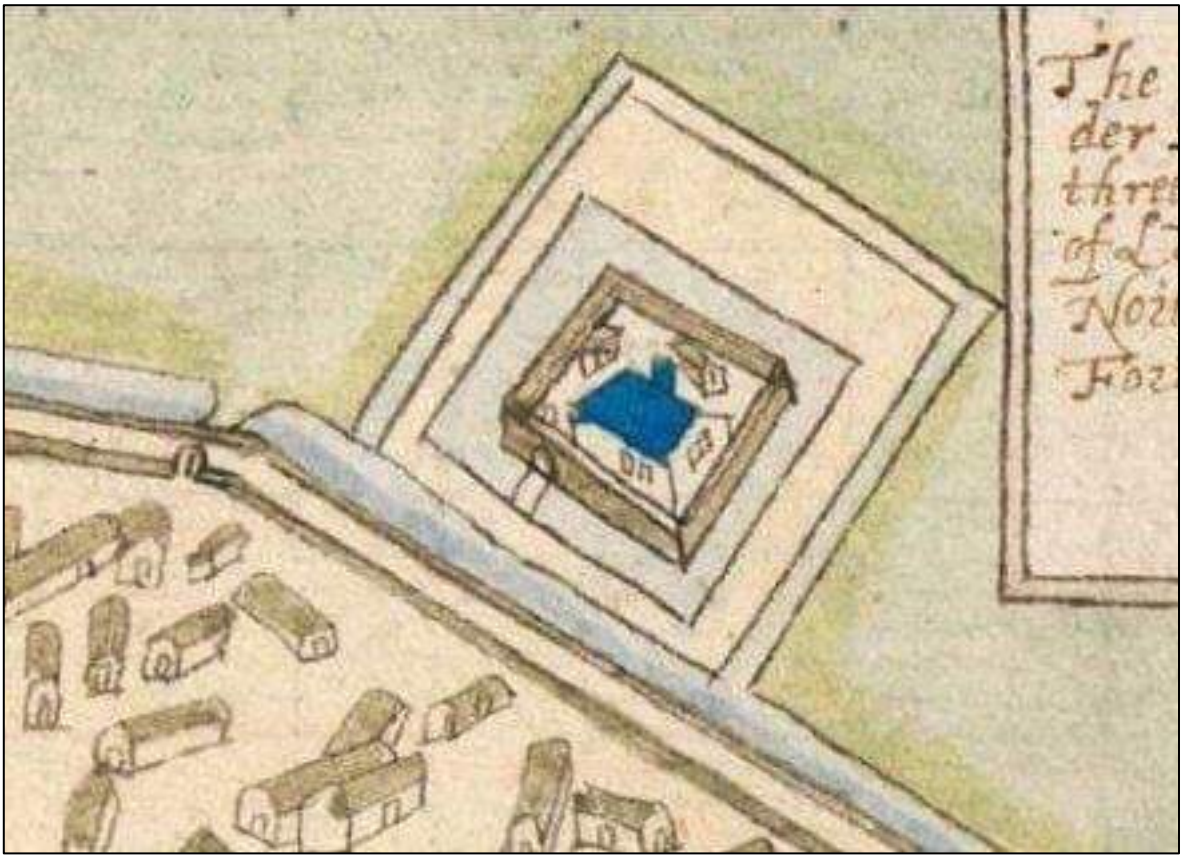

Figure 11: Excerpt from Griffin Crocket map, showing Gaelic moated site at Lifford

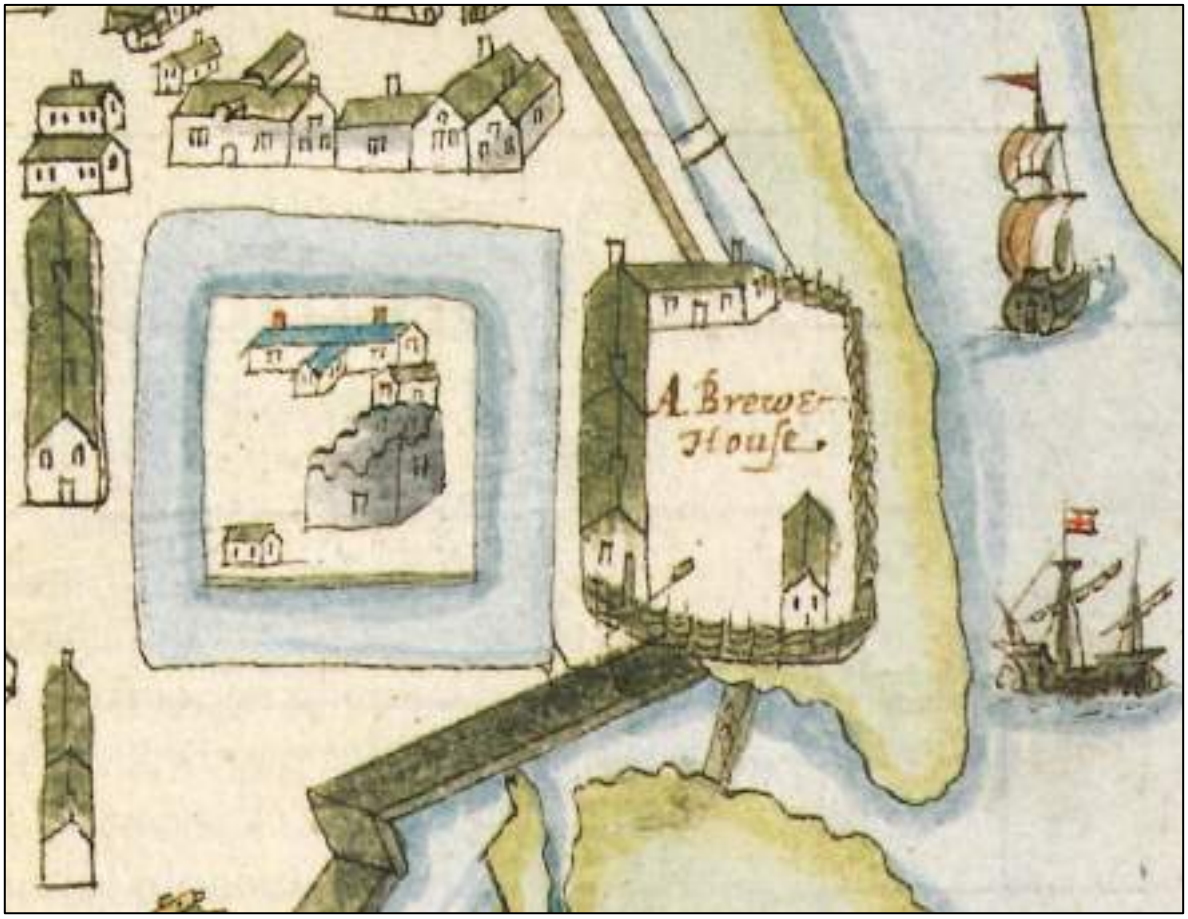

Figure 12: Except from Griffin Crocket map, showing Gaelic moated site at Dunnalong

5.4 Excavation of Arney Fort revealed subsoil cut features that may relate to buildings within the interior of enclosure. The gully uncovered in Trench 2 may be a section of wall slot for a structure present within the centre of the monument. The recovery of iron nails, and the lack of stone rubble could suggest that it was a timber-built construction. The postholes uncovered in Trench 3 may relate to an ancillary building, or may be part of a retaining palisade along the base of the bank. The large pit uncovered in Trench 3 is also of interest; it has been suggested that this may be an extraction pit for earth mortar. If this could be proved to be correct this would indicate that there was a stone construction within the interior of the fort, possibly similar to the one depicted in ruins at Dunnalong, Co Londonderry (Figure 12). This may be supported by the geophysical analysis (Appendix 7). The interpretation of the earth resistance results (Figure 13) indicate the presence of a possible structure and collapsed masonry on the northern side of the fort. The five results from the earth resistance survey are listed as follows:

- *Anomaly R9 is a right-angled high resistance feature which was detected close to the north-eastern edge of the survey area. Measuring 5m in length this anomaly is likely to be associated with stone or compacted earth and may be structural in origin. The anomaly runs parallel to R10.*

- *Anomaly R10 is a 'C-shaped' area of high resistance measuring 15m in length. Associated with stone or compacted earth this feature has the same orientation and width as R9 and is likely to be structural in origin, possibly intersecting with R12.*

- *Anomaly R11 is a zone of high resistance which leads from the north-western edge of the fort to cover R10 and a portion of R9. This anomaly is likely to be associated with compact ground or stone remains and may represent demolition debris or surfaces associated with structure R10.*

- *Anomaly R12 comprises a right-angled high resistance anomaly, measuring 4m E-W x 4m N-S. A number of low resistance zones extend from the anomaly and are likely to be related. It is possible that R12 represents structural stone or compacted earth remains, surrounded by demolition debris, surfaces or internal divisions.*

- *Anomaly R16 consists of a right-angled high resistance anomaly. This feature is slightly wider in form to any other feature seen within the earth resistance data, indicating that it might have a more significant physical presence. Measuring 5m N-S x 7m E-W, this potential stone or compacted earth feature may indicate structural remains, located on the northern internal edge of Arney Fort.*

5.5 The fact that these anomalies are not in the centre of the site may give it credence to it being a building; as the 17th century cartographic evidence of the Gaelic moated sites at Lifford and Dunnalong depicts the main residence off centre.

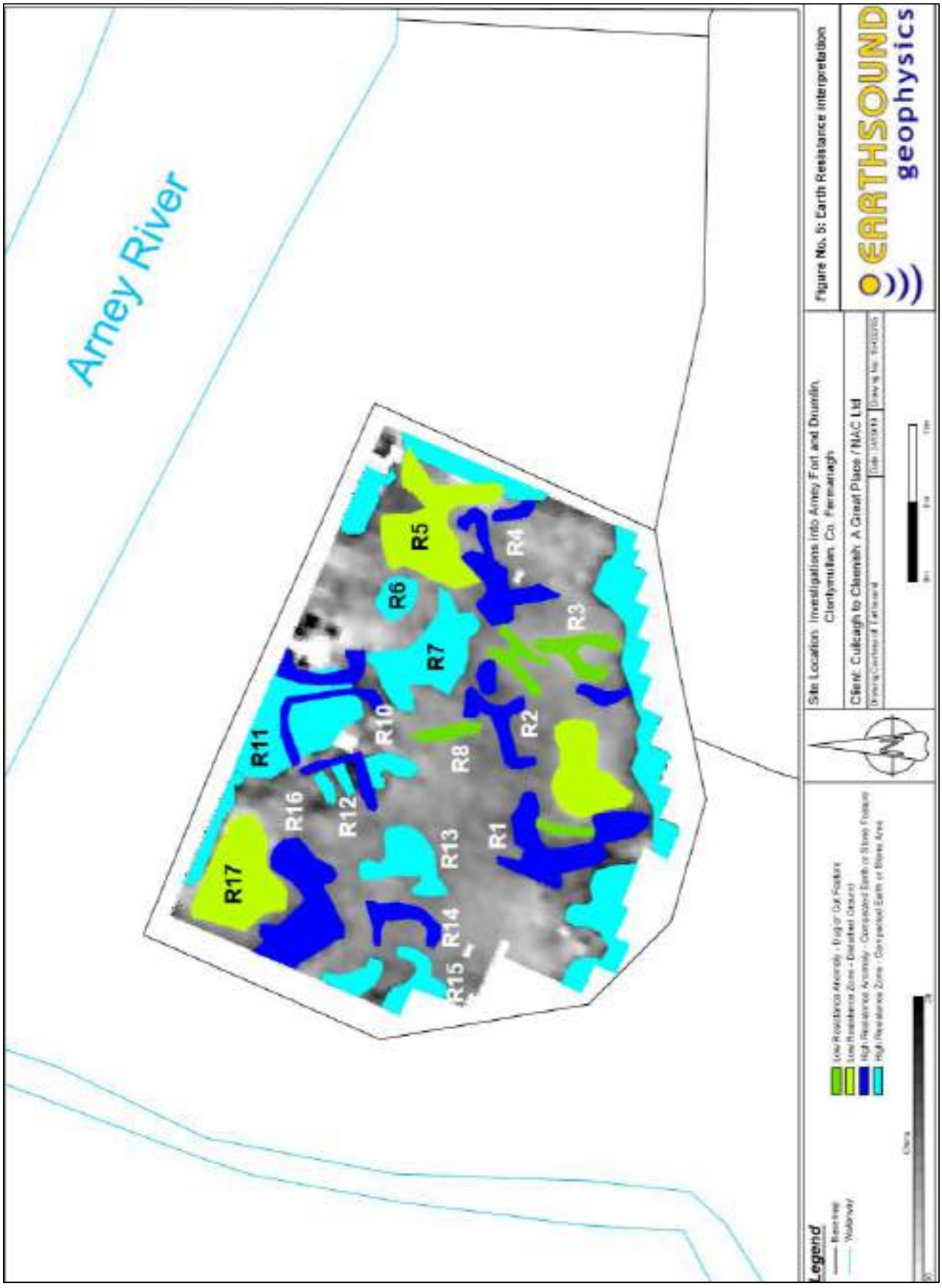

Figure 13: Earthsound geophysics: Earth resistance survey interpretation of the interior of Arney fort

5.6 The recovery of 53 sherds of Medieval Ulster Coarse Pottery (MUCP) and fragments of burnt bone from the trenches within the interior of the fort indicate domestic activity. Medieval Ulster Coarse Pottery is a local production that first appears in the Irish archaeological record around the 13th century and is in use until the 17th century. Based on the fabric, rim style and decoration, the assemblage recovered at Arney fort dates to the 15th -16th century (Appendix 2). The lack of heavy abrasion on the pottery leads to the conclusion that the fragments had not travelled far or moved from their original deposition. The presence of this pottery type suggests that Arney fort is a Gaelic Irish construction. If the site was built by either, the Anglo Normans during their invasion, the Anglo Irish/Old English elite in the centuries that followed or the Tudors during their conquest, then glazed or imported pottery would probably have been present, not simple fired earthenware. In addition, if the fort related to either the Nine Years War 1593-1603, the Irish Confederate Wars 1641-1653 or Williamite War in Ireland 1688-1691, the fort would have been constructed with bastions to accommodate cannon, allowing for lines of sight so defenders could shoot at any attackers along the length of the ramparts. Furthermore, the discovery of an iron furnace base in Trench 7 and the presence of iron slag and glass slag within Trenches 2 and 3, indicate the presence of localised industry taking place within the fort.

5.7 The previous discoveries of a Late Bronze Age sword and socketed axe indicates that the area around Arney Fort was a focal point in prehistory. The Neolithic end scraper (FN#37) found in Trench 3 only serves to further this belief. Its presence within the fort may be coincidental, it may have been considered 'elf shot' and deliberately brought into the settlement, or is indicative of Neolithic settlement within the vicinity of the fort. It is believed that during the medieval period flint and other stone artefacts were accidentally found during agricultural work, these prehistoric artefacts were considered magical or charmed and were brought home for luck or to ward off disaster (O'Sullivan, 2014, 100).

5.8 Although the exact entrance or entrances into the fort could not be positively determined within Trenches 1 and 9, the construction deposits of the bank were examined. It confirmed the assumption that the bank was constructed from redeposited subsoil. Although a buried soil horizon was not uncovered beneath this section of bank, there is still a high likelihood that one exists beneath other sections of the earthwork.

5.9 Trenches 4 and 5 uncovered no information in relation to the function and use of the annex. However, both pits were small when compared to the size of the annex and therefore any possible structures, or evidence relating to its function, may be present outside the limit of excavation.

5.10 The metal detector survey of the lands between the Arney River and Arney Fort and of the adjacent drumlin, uncovered several interesting post-medieval artefacts. The cock, jaws and still attached gun flint of a flintlock firearm (FMHS#10), are an interesting and rare find. The flintlock mechanism was developed in the late 16th century, and was being widely used by the middle of the 17th century. It became the principal firing mechanism for weapons for the next 200 years, before it was gradually replaced by the percussion cap design (DK, 2014, 37). As such it cannot related to the Battle of the Ford of the Biscuits that took place in 1594, as the firearms of this period were matchlock muskets. Coins are

a useful find as they provide good dating evidence, the George III, penny had to have been deposited sometime after its mint in 1805 (MHS#18). The lead token is likely a maker's mark (MHS#59), related to a Robert J Forsythe, who is listed in the 1901 census as being 29 years of age, residing at 22 Belmore Street, Enniskillen, with his occupation listed as a saddler. The fact that his father is listed as a constabulary pensioner from Armagh suggests that Robert is the initial proprietor of the business in Enniskillen. In the 1907 Belfast/Ulster street directory, he is again listed, this time as a harness maker. Further to this he is listed in the Kelly's Directory of Leather Trades in Ireland 1915 as a saddle and harness maker, having apparently combined both trades.

5.11 The geophysical analysis (Appendix 7) of the drumlin identified several possible pits and ditches, the majority of which are likely to be agricultural in nature. However, the magnetometer survey and interpretation identified a sub-rectangular enclosure, with central arcing feature, that may be archaeological in nature (Figure 14). It is listed in the geophysical report (Appendix 7) as follows:

- *Anomaly M13 consists of three ditched or cut features. A southern right-angled ditch possibly leads from relict field boundary M5. Measuring 26m in length this anomaly probably interlinks with the northern and appears to be bounding the central sub-circular feature. The central sub-circular measures 7m in diameter and may contain a break or entranceway to the north. Its presence surrounded by a rectangular ditch system may indicate defence or the features may not be contemporary.*

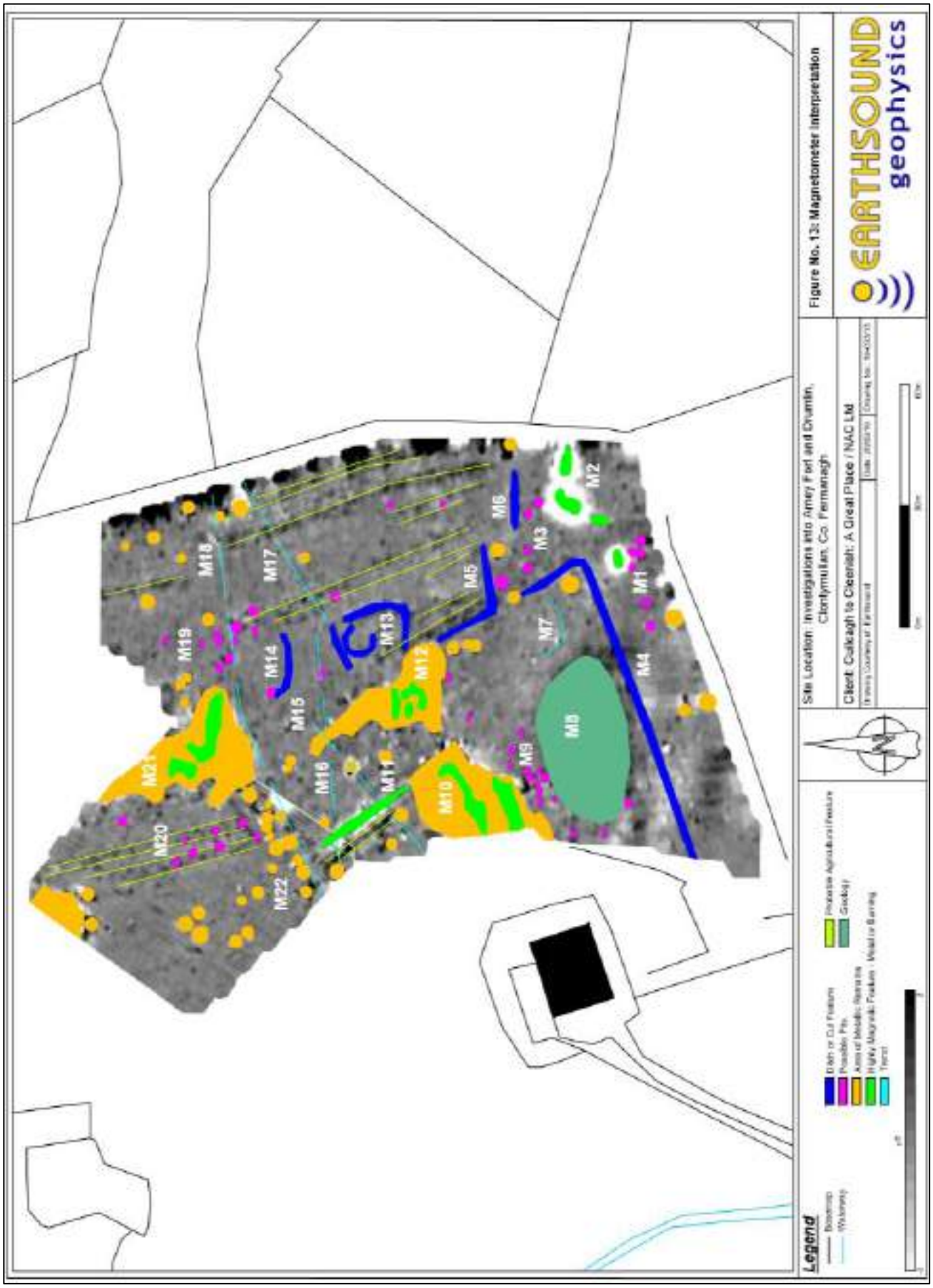

Figure 14: Earthsound Geophysics interpretation of magnetometer survey of drumlin

6 CONCLUSIONS

6.1 The research objectives of this project were to:

- To engage the local community with the heritage of the area though enjoyable 'hands-on' archaeological activities.
- Re-examine Arney fort's classification in the Northern Ireland Sites and Monuments Record as a Rath, and to gain a better understanding of the sites function and period.
- To study the drumlin located to the southeast of Arney Fort and see if it was utilised throughout the prehistoric and historic periods.
- To carry out a metal detector survey to so see if any artefacts relating to the Battle of the Ford of the Biscuits or earlier prehistoric activity could be uncovered.

6.2 Through desktop research, archaeological excavation and post excavation analysis all of the research aims have been addressed.

6.3 During the course of the two-week excavation over 50 volunteers from the local community took part in the project, excavating within the interior of the fort and annex (Plate 12 and 13). Several volunteers also assisted Earthsound Geophysics Ltd with their survey of the drumlin and were given a talk on the methodology of geophysics and its benefits to archaeological research. A number of volunteers also assisted with the metal detecting survey of the drumlin. One hundred and twenty pupils from four different local schools visited the site. They all received a tour of the fort, assisted with the metal detecting survey of the drumlin and carried out artefact identification and cartographic exercises. Furthermore, during the project over 200 members of the public visited the site, all received tours and spent time talking to the professional archaeologists and volunteers.

6.4 Initial assessment identified Arney Fort as not being a rath based upon its shape and location. Subsequent historical research, cartographic evidence and archaeological excavation have identified Arney Fort as a Gaelic moated site and not a rath. The 53 sherds of Medieval Ulster Coarse Pottery uncovered at the site, indicate that it dates to the 15th – 16th century and suggests that the site is a Gaelic construction. The presence of iron slag and glass slag within the trenches, and the furnace base in Trench 7, is evidence of industrial activity. The effort that it would have taken to construct such an earthwork would have required a lot of manpower and therefore social and political influence. By the 15th – 16th century the Maguire lordship, who was installed in Enniskillen, controlled much of the area around Fermanagh, as such it is likely that with Arney Forts proximity to their ancestral home, it came under their domain. It may be that Arney Fort was the home to a vassal lord or was occupied by a lesser branch of the Maguire family.

6.5 Geophysical analysis of the adjacent drumlin identified several agricultural features and possible pits, along with what appears to be a sub-rectangular enclosure, with central arcing feature, that may be archaeological, however its date and function are currently unknown.

6.6 Although no evidence of the Battle of the Ford of the Biscuits or earlier prehistoric activity was uncovered during the metal detecting survey several interesting post medieval artefacts were recovered.

Plate 12: Volunteers excavating in Trench 2 extension, looking south

Plate 13: Volunteers excavating in Trench 3, looking south

7 POSSIBLE FURTHER RESEARCH OBJECTIVES

7.1 Although the work carried out at Arney Fort was a success, both in its archaeological research aims and community engagement objectives, there is scope for further work in relation to the site. A second season of excavation at Arney Fort and drumlin could help to resolve some uncertainties and gain more information into the nature and function of the site.

7.2 Excavation of some of the geophysical anomalies within the interior of the fort, would give clarity on their nature. It would be interesting to identify further evidence for iron and glass working, especially with the uncovering of the bowl furnace in Trench 7 located across anomaly S8. This trench could be extended, and others opened across similar geophysical anomalies within the interior. The geophysical survey also identified possible rubble collapse and structural remains along the northern edge of the fort, that may be from a stone building. A trench across this area would determine the validity of this hypothesis.

7.3 The annex warrants further excavation, Trenches 4 and 5 were each only 1m by 1m in size and could easily have missed any structural evidence. It would be beneficial to open a larger trench across this area in order to identify any possible structures. Further to this the slot trench identified within Trench 2 merits further investigation. A section across the ditch on the south side of the fort would be appealing in order to determine its depth, as well as the potential for organic artefacts preserved in the wet conditions. It is however recognised that this may be too difficult to accomplish in the waterlogged conditions and would require several weeks of very dry and warm weather before and during the excavation.

7.4 The possible sub-rectangular enclosure, with central arcing feature, identified during the geophysical survey of the drumlin, may be archaeological. In order to determine its nature, date and function it would be necessary to open a trench across it. It may also be useful to open a trench across one of the possible pits in this field, in order gain a better understanding of whether they are archaeological in nature.

7.5 Following the success of the community engagement during the excavation an aim would be to replicate the public outreach aspect during a second season of works. School groups could again be involved with different pupils. In addition, volunteers from the local community would again be involved with digging and recording, with both new and returning excavators taking part. The site would again be open to members of the public to visit for tours, and with new trenches opened and further research objectives, it would make a different experience to the previous season.

7.6 Finally, following all fieldwork at Arney Fort and drumlin it would be prudent to commission a reconstruction drawing of the site and to disseminate the results of the excavations in publications such as the Ulster Journal of Archaeology and Archaeology Ireland. Based on upon available funding a

publication detailing all the archaeological work that has taken place in the Arney area would also be beneficial. This would include the results of geophysical analysis, archaeological excavations and historical research, together with visitor and volunteers' experiences working on the projects.

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APPENDIX 1

APPROVED SCHEME OF INVESTIGATION

1.1 An archaeological, hand-excavated test trenching layout (Figure 1, Table 1) has been devised. This is focused on the interior of Arney Fort and each trench has been situated so as to enable specific queries about the site to be addressed.

1.2 It is proposed that five test trenches be excavated within the interior of the fort. These trenches cover a total area of 52m^2, compared to the 1494m^2 area of the fort. This equates to an excavation area of approximately 3.5% of the fort. The recommendations for each trench are as follows below.

Trench 1 (5m long x 2m wide) – Although there are five breaks in the banks of the fort it is unclear which of these may have been the original entrance. Trench 1 has been located at the entrance that would have, most likely, provided access to and from the adjacent Arney River. The trench has been located so as to encompass the potential entrance way and to try and identify any surfaces that are present as well as any potential entrance structure. Further to this it is intended that this trench will also examine the make-up of the bank by partially excavating and straightening one of the existing eroded sections.

Trench 2 (10m long x 2m wide) – The trench has been located centrally within the fort and aligned perpendicular to the potential entrance at the river. The aim of this trench is to establish whether there was a central structure or hall within the fort.

Trench 3 (10m long x 2m wide) – This trench has been located at the southern side of the fort, extending from the base of the bank towards the centre of the site. This trench will aim to identify whether there were any structures associated with or constructed adjacent to the bank of the fort. By extending the trench towards the centre of the site, and towards Trench 2, if a structure was present within the centre of the fort then it should be further identified and defined within this trench.

Trenches 4 and 5 (1m long x 1m wide) – These two trenches have been located on the small 'D' shaped annex located to the east of the main enclosure. The function of this annex is unclear, as it is separated from the main fort by the ditch but is itself enclosed by a further section of ditch on its eastern side. The excavation of these two trenches may provide evidence for the purpose of or activities that were taking place on this annex.

(N.B. This trench layout should be taken as indicative. Due to the presence of trees throughout the site trenches may need to be staggered so as to avoid trees and root structures. Any alterations to the trenching layout will be agreed with HED prior to excavation.)

Figure 1: Proposed Test Trench and Auxiliary Test Trench layout for Arney Fort

Trench	Area (m^2)
1	$10m^2$
2	$20m^2$
3	$20m^2$
4	$1m^2$
5	$1m^2$
Total	**$52m^2$**

Table 1: Proposed test trenches

RESERVE EXCAVATION AREA

1.3 It is further proposed that 20m^2 be held in reserve to be utilised should it be required. The requirement for the reserve excavation area will be determined by the nature of any archaeological material that is uncovered within the original five proposed test trenches.

1.4 It is proposed that should archaeological evidence for structures, etc., be encountered then it may be necessary to extend one or more of the original trenches in order to try and establish the scope or limits of the archaeology encountered.

1.5 Should some or all of the test trenches (1 – 5) fail to uncover archaeological remains then it is proposed that the 20m^2 be utilised in opening further test trenches to try and identify whether remains are present within the fort, providing that sufficient time allows for excavation and recording. Five test trenches (6 – 10), each measuring 2m long by 2m wide, are proposed and indicative locations are shown.

1.6 Any extension to the excavation areas or opening of new test trenches will be agreed with HED prior to excavation being undertaken.

Trench 6 – This trench has been located towards a gap in the banks on the eastern side of the fort. This break in the bank may have provided access to the annex that lay on the opposite side of the ditch and the trench has been located so as to examine any potential paths or structures that may have been present. Due to the presence of trees within the current break in the banks the trench has been located to the west of potential entrance rather than directly over it.

Trench 7 – This trench is located in the northwest corner of the fort and has been positioned to examine the possibility of ancillary structures, workshops, etc., being located on the periphery of the interior of the fort.

Trench 8 – This trench is located in the southwest corner of the fort and, like Trench 7, has been positioned to examine the possibility of structures being located on the periphery of the enclosure. It is also positioned close beside the southern break in the banks with a view to examining the possibility that this was an original entrance and whether any associated structures are present.

Trench 9 – This trench is located over the break in the banks at the western side of the fort. The aim of this trench is to examine whether there is any evidence that this was an entrance and if so whether any structure was present.

Trench 10 – This trench has been located at the southeast corner of the interior to examine the possibility of structures being present immediately beside the bank.

EXCAVATION METHODOLOGY

1.7 The site is currently covered in trees, though clearance of these should be undertaken prior to the start of the excavation. On the first day Trenches 1 and 2 will be marked out and de-sodded. The volunteers will then begin the excavation of these trenches. No further trenches will be opened until the excavation and recording of each trench is nearing completion.

1.8 Each trench will be excavated in 5cm deep layers, until either an archaeological layer or subsoil is reached.

1.9 The volunteers will be supervised at all times by qualified archaeologists and if or when archaeological layers or features are encountered they will be shown how to excavate and then record what they have found. At the start of each session there will be an explanation of the methodology of what the volunteers have to do, and each person will be provided with a written guide on how to excavate and how to record the archaeology. The aim is to ensure that the volunteers undertake as much of the work as possible so that they gain a full archaeological experience and ensuring that this is a fully integrated community excavation. During the excavation the volunteers will sieve all spoil created and, possibly, undertake the cleaning of any artefacts that may be uncovered. The cleaning of artefacts will depend on the type and preservation of the artefacts uncovered and any decision on this will take place if and when the time arises.

1.10 During the course of the excavation NAC will have a staff of five experienced archaeologists present to help and guide the volunteers and to ensure that the excavation, while still community based, is undertaken to the highest standard.

1.11 As soon as archaeological material is uncovered the site director (Jonathan Barkley) will inform the HED archaeological inspectors (Ken Neill and Ronan McHugh) by phone. If substantial remains are uncovered it is proposed that the site director submit daily updates by email to Ken Neill and Ronan McHugh and accommodate and encourage their visits to the site in order to view the progress and to discuss the best way to proceed.

1.12 No mechanical machinery will be allowed on the site; all excavation and backfilling will be done by hand.

GEOPHYSICAL SURVEY

1.13 It is proposed that a geophysical survey of the interior of the monument and the top of the drumlin be undertaken. The survey of the interior of the monument will be undertaken in the week prior to the excavation taking place and, providing the data has been processed, may be used to refine the test trenching layout. If the results of the survey require any change to the proposed test trenches this will only be done following discussion and agreement with HED.

1.14 It is further proposed that the top of the drumlin also be subject to geophysical survey.

1.15 The proposals for geophysical survey and the survey locations will be subject to a separate programme of works and licence application to be submitted by Earthsound Geophysics Ltd.

METAL DETECTING METHODOLOGY

1.16 It is proposed that during the course of the excavation of the test trenches within the fort a programme of metal detecting is also undertaken. It is proposed that a three-phase approach for metal detecting be undertaken:

Phase 1: Metal detecting be undertaken of the arisings from the excavation of the test trenching to be systematically undertaken to ensure that no small artefacts (pins, etc.,) are missed.

Phase 2: Metal detecting to be undertaken outside but in the immediate vicinity of Arney Fort and the Arney River. At the location of a previously existing ford, further along the river to the west, a Bronze Age sword was recovered. Further to this a Bronze Age socketed axe was also recovered from material that had been dredged from the river at approximately the same location. With Bronze Age artefacts, the potential medieval/later medieval date of the fort and the late 16th century Battle of the Ford of the Biscuits having taken place nearby the potential for metal artefacts to have been dropped or deposited in or beside the river is high.

Phase 3: Metal-detecting to be undertaken in transects across the top of the drumlin.

HUMAN REMAINS

1.17 Given the proximity of the site to the location of the Battle of the Ford of the Biscuits there is a possibility that human remains could be uncovered during the excavation. If human remains, or any suspected grave cuts, are observed, excavation by the volunteers in that area will cease and the remains will be covered over. The Police Service of Northern Ireland (PSNI), HED area archaeologists Ken Neill and Ronan McHugh will be informed immediately. If the remains have to be excavated a suitable methodology for dealing with the human remains or grave cuts will be agreed in writing with HED. Work will not recommence in the area containing the human remains until such a methodology has been agreed, and all works subsequently undertaken in this area will be in accordance with this methodology. Any excavation of human remains will only be undertaken by qualified archaeologists, no volunteers will be allowed to excavate the remains. If there is no valid reason to excavate the remains, they will be fully recorded by a qualified archaeologist and their location surveyed. As per the Excavation Licence any human remains which are uncovered must immediately be reported to the Police Service of Northern Ireland.

SPOIL MANAGEMENT AND SITE RE-INSTATEMENT

1.18 NAC staff will ensure the spoil heaps are safely and sufficiently managed. The site will be backfilled, and the de-sodded turf re-laid, which will have been set to one side at the beginning of the excavation.

SURVEY METHODOLOGY

1.19 The location of all excavated trenches (each corner point) shall be surveyed using appropriate GPS equipment and a digital scaled map provided as part of any subsequent report. This will allow for the excavated test trenches and any features that are uncovered to be accurately positioned within the fort.

RECORDING AND EXCAVATION

1.20 Features discovered during test trenching will be excavated. If time does not allow for excavation and recording of all features then preservation in-situ will be undertaken. Those features that are discovered and excavated must be planned, sampled, recorded and written up. All archaeological works and structural recording will be carried out in accordance with the Standard and Guidance for Archaeological Field Evaluation prepared by the Chartered Institute for Archaeologists (CIfA) (IfA 2008), the CIfA Code of Conduct (IfA 2012), Understanding Historic buildings – a guide to good practice prepared by English Heritage (2006) and the Environmental Good Practice Guide for Archaeological Excavations, Version 4 (NIEA 2012).

- DfC: HED currently policy indicates that 100% excavation should be considered for most features, however larger features (e.g. long ditches) and those features which have been identified as modern during initial examination may require a lesser degree of excavation and recording. Any changes to 100% excavation and recording will require prior approval from DfC: HED.
- The discovery of possible treasure items (as defined by the Treasure Act 1996 and the Treasure (Designation) Order 2002) must be reported at once to the DfC: HED.
- The actual areas of trenching and any features of possible archaeological concern noted within the trenches, must be accurately located on a site plan and recorded by photographs, summary scale drawings, and written descriptions.
- All trenches which contain archaeological features will be planned at 1:50, with individual features being planned at 1:20 where additional detail is required. Sections and profiles of each feature sampled will be drawn at 1:10 or 1:20, depending on the size of the feature. All plans, sections and profiles will be related to Ordnance Datum, in metres.

ARCHAEOLOGICAL PERSONNEL

1.21 All of the archaeological measures outlined in this section will be carried out by volunteers under supervision from five professional archaeologists. There will no be no more than 10 volunteers excavating at any one time ensuring a ratio of one archaeologist to two volunteers. All archaeological work will be carried out under the direction of the archaeological licence holder.

POST-EXCAVATION WORK AND FINAL REPORT

1.22 In addition to funding the fieldwork, the post-excavation analysis of the findings and the writing up of the findings by the licensed archaeologist will be funded. Funding may also be required for specialist archaeological services, such as radiocarbon dating, osteoarchaeology, etc., depending on the nature on any discoveries. These services are a basic requirement for the assessment of some types of evidence. The post-excavation process will be monitored by the client and HED. It is intended that a talk will be

given on the results of the excavation in November 2019 to the public and interested parties. Where significant archaeological material is encountered the results will be published as both academic and popular reports, at a level of detail appropriate to the works, and as agreed by the client and HED.

THE LICENSED ARCHAEOLOGIST

1.23 The nominated Licence holder (Site Director) will provide the DfC: HED case officer with contact details, i.e. mobile phone number, in advance of fieldwork. The site director will contact and inform the case officer, in advance, of the date when archaeological works are due to begin on site. The case officer will be given regular verbal updates regarding progress of the works and notified immediately of all new discoveries. The site director will contact and inform the case officer, in advance, of the date when archaeological mitigation work is due to finish on site. The site director will forward the case officer a map (of appropriate scale) illustrating the precise area evaluated within fourteen days of the end of archaeological works.

APPENDIX 2

ARCHAEOLOGICAL CONTEXT OF THE SITE

ARCHAEOLOGICAL SITES WITHIN THE PROPOSED INVESTIGATION AREA

1.1 The investigation area comprises the scheduled zone for Arney Fort enclosure FER229:023 and the top of the drumlin that is located to the southeast of the enclosure (Figures 1 & 2).

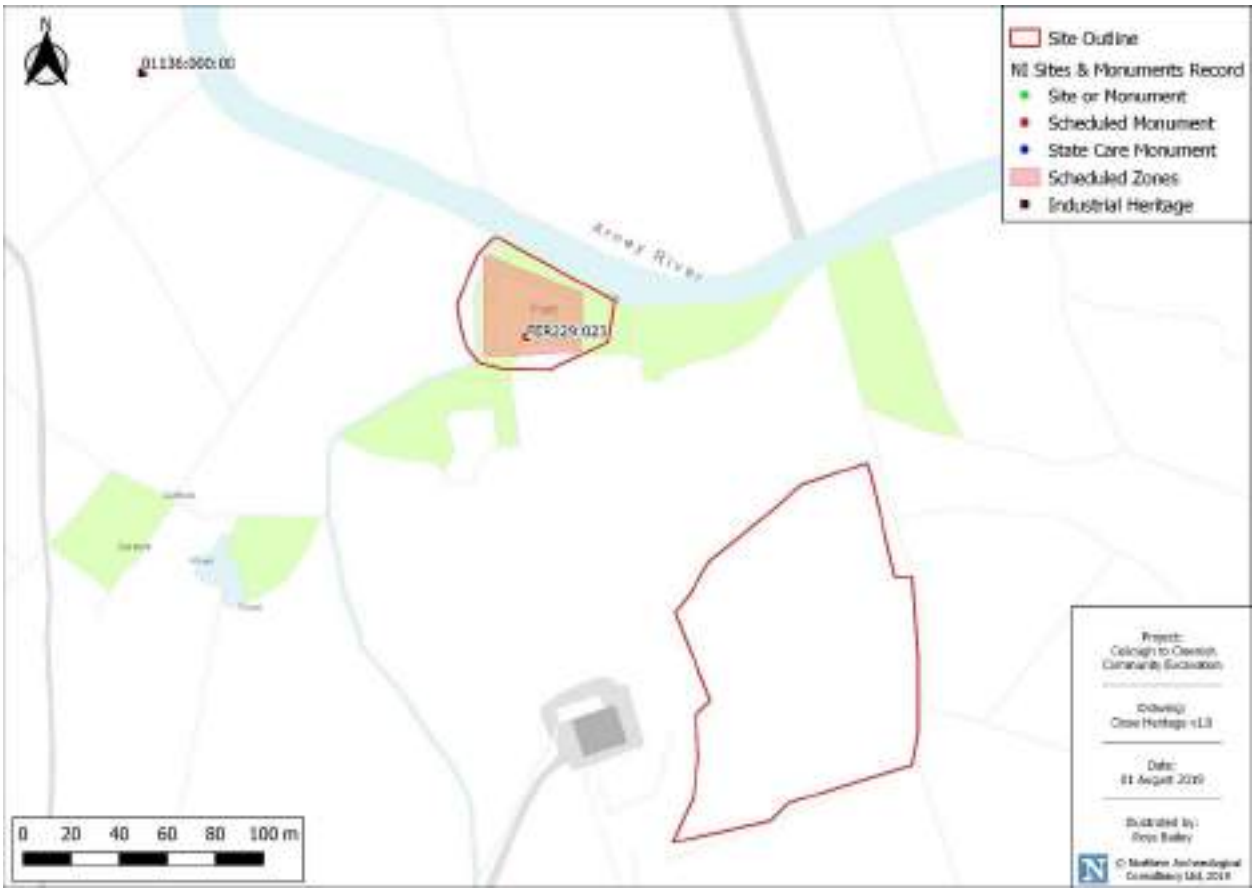

Figure 1: Archaeological and Heritage sites within the investigation areas

FER229:023 – SCHEDULED RATH

1.2 The investigation site comprises the FER229:023 scheduled area, marking the extent of the enclosure of Arney Fort that is recorded as a rath:

> **FER229:023**
> **Rath**
> Situated on the S bank of the Arney River. This is a trapezoidal enclosure 36m long NW-SE & 31.5m at the NW end narrowing to 15m at SE. The level interior is enclosed by almost straight earthen banks 6.7m wide, 1.1m high internally & 2m above a ditch which is 2.5m wide & 0.2m deep. It survives as a shallow, wet feature in an arc ESE-S-NW. There are slight remains of an outer bank 4.5m wide at SE & W-NW. There are 5 gaps in the inner bank & it is not clear which of them may have been original.
> *NISMR File*

1.3 The shape, general layout, and topographical position of the monument does not, however, conform to our current understanding of raths, and it seems much more likely that this is misclassified. One of the primary aims of the investigation is to aid in the correct reclassification of the site.

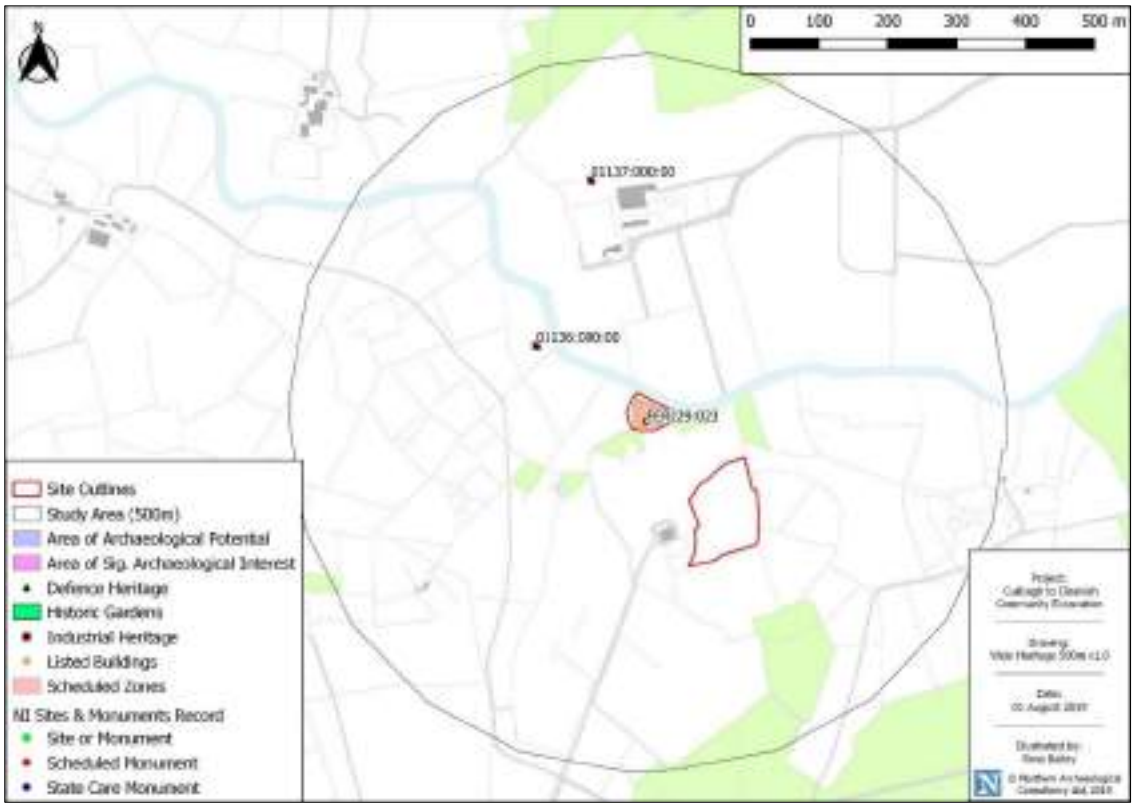

Figure 2: Archaeological and Heritage sites within the surrounding area

PREVIOUS ARCHAEOLOGICAL WORK IN THE SURROUNDING AREA

1.4 A previous community excavation was undertaken in 2014, under licence AE/14/01E, and was concentrated on the original village of Arney; located approximately 1.50km to the northwest of the site. As part of these investigations a metal detector survey was undertaken to try and identify the location of the 1894 Battle of the Ford of the Biscuits, which is recorded in the Northern Ireland SMR as being at Drumane Bridge, approximately 1.4km to the east of the site. The results of the metal detecting survey showed that the most likely location for the battle was actually 2km to the west of Drumane Bridge, and approximately 500m west of Arney Fort.

ARCHAEOLOGICAL FINDSPOTS

1.5 A search for findspots of archaeological objects within the townland of Clontymullan was carried out using the computerised database at the Ulster Museum, Belfast. No objects were recorded from Clontymullan, nor from the adjacent townland of Ross.

1.6 Despite this, two objects are known to have been recovered from the approximate location of the Ford of the Biscuits. A Late Bronze Age sword was discovered in 1965 by a local landowner and now resides in Fermanagh County Museum. It has also been reported that a Bronze Age socketed axe was discovered by a metal detectorist close to the site of the Ford of the Biscuits.

OTHER MAPPED HERITAGE IN THE SURROUNDING AREA

1.7 Other mapped heritage within the 500m study area comprised two Industrial Heritage sites, both clay hole or brickfield sites.

IHR/LB No.	Type	Townland	Location	Grid Ref
01136:000:00	Brickfield	Clontymullan	South of Arney River	H21993653
01137:000:00	Clay Hole / Brickfield	Ross	North of Arney River	H22073677

Table 1: Other mapped heritage within the study area

THE INVESTIGATION SITE ON AERIAL PHOTOGRAPHS

1.8 A search of the aerial photography databases did not reveal anything of a clear archaeological nature within the investigation area boundaries, other than the heavily tree covered Arney Fort.

THE APPLICATION SITE ON EARLY OS MAPS

1.9 The 1st edition of the Ordnance Survey map showed the enclosure as being circular (Figure 3). In the 2nd edition (Figures 4) the enclosure is shown as being 'D' shaped. By the time of the 3rd edition (Figure 5) the enclosure is more accurately shown as being trapezoidal in shape.

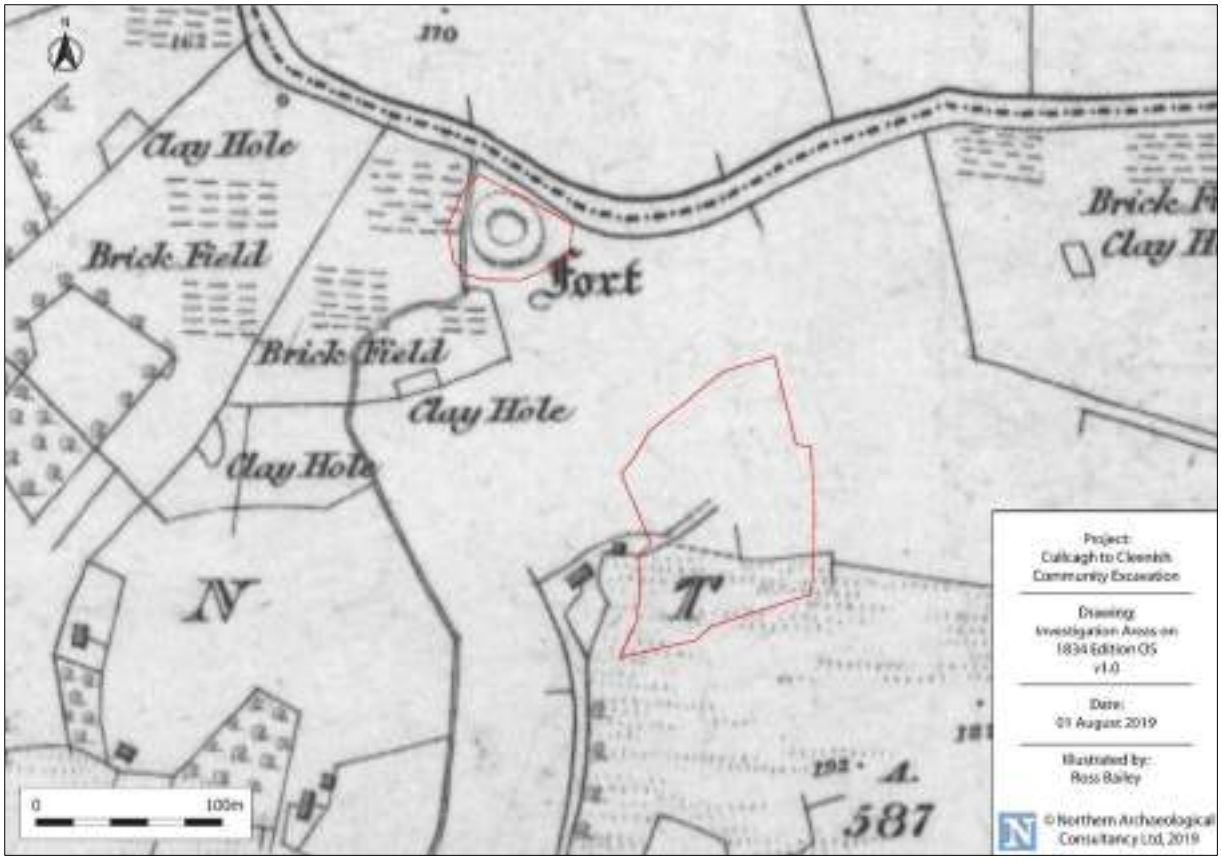

Figure 3: Ordnance Survey 1st edition six-inch map, investigation areas in red

Figure 4: Ordnance Survey 2nd edition six-inch map, investigation areas in red

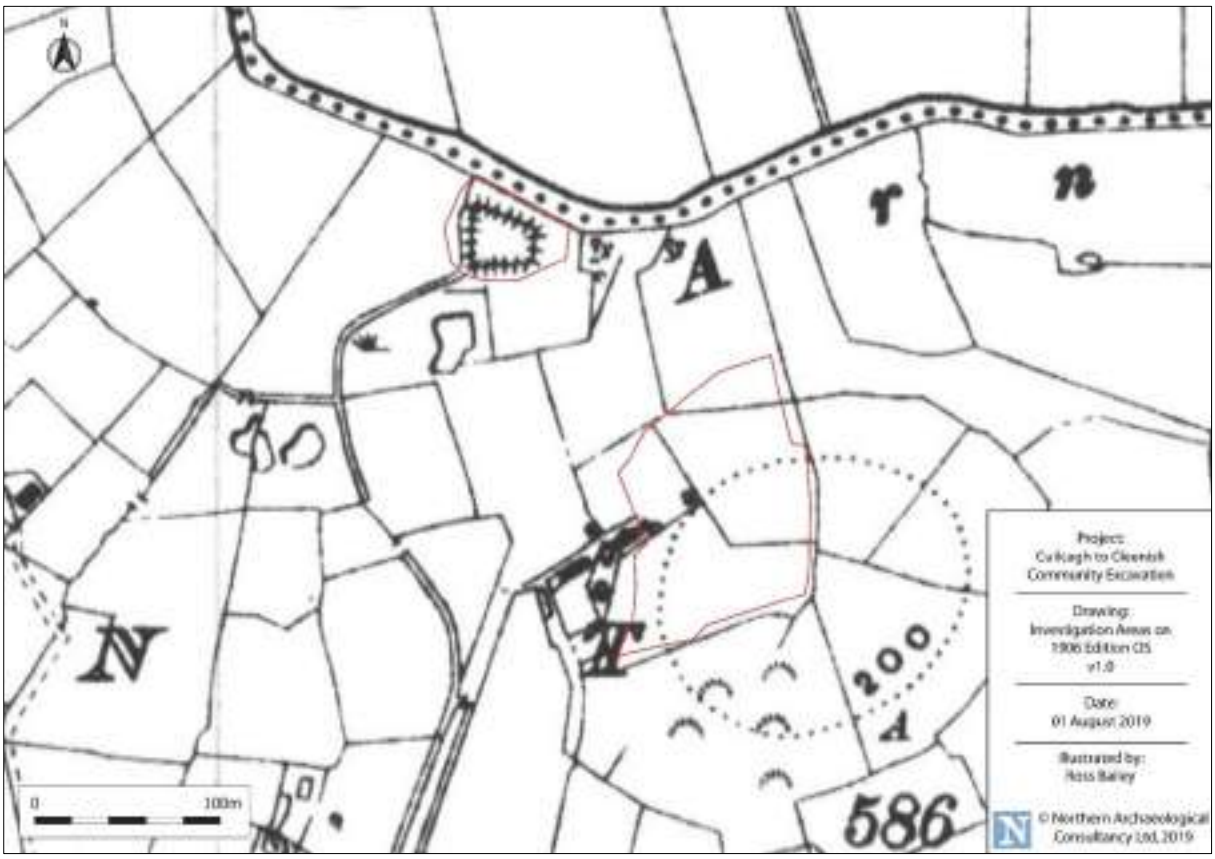

Figure 5: Ordnance Survey 3rd edition six-inch map, investigation areas in red

APPENDIX 3

SUMMARY OF INDIVIDUAL CONTEXTS

Topsoil [1] within the interior of the enclosure was a grey brown silty clay, this was found in all the trenches. Subsoil [2] across the site was a firm, sticky, yellowish orange clay with no stones.

Trench One

Context No.	Type	Fill of	Filled by	Length (m)	Width (m)	Depth (m)	Brief Description
100	Layer	-	-	4.80	-	0.08	Loose, grey brown, humic loam, with occasional charcoal flecks and no coarse components. This is the upper most layer covering the bank.
101	Layer	-	-	3.02	-	0.32	Firm, light brown, silty clay, with occasional charcoal flecks and occasional very small rounded stones. This layer is the historic topsoil horizon, that formed over the redeposited subsoil bank.
102	Layer	-	-	0.92	-	0.20	Firm, orange brown, clay with infrequent charcoal smears and no coarse components. This redeposited subsoil.
103	Layer	-	-	3.30	-	0.29	Firm, brownish orange, silty clay with occasional charcoal flecks and infrequent very small rounded stones. This layer is the historic topsoil horizon that formed over the redeposited subsoil bank.
104	Layer	-	-	4.00	-	0.40	Firm, brownish orange clay with infrequent charcoal smears and infrequent small rounded stones. This layer is the redeposited subsoil bank.

Trench Two

Context No.	Type	Fill of	Filled by	Length (m)	Width (m)	Depth (m)	Brief Description
200	Gully	-	201	3.00	0.32	0.08	Linear in plan on a north to south alignment. Sides were smooth on the west and convex on the east. They were moderately sloped with a flat base. Break of slope at the top and base were sharp on both sides.
201	Fill	200	-	3.00	0.32	0.08	Soft, orange pale grey, silty clay with frequent charcoal flecks and chunks, with no other coarse components.

Trench Three

Context No.	Type	Fill of	Filled by	Length (m)	Width (m)	Depth (m)	Brief Description
300	Pit	-	301, 302	2.55	>1.10	0.76	Irregular in plan, with an irregular base. Sides were moderately sloped on the north and steep on the south. Break of slope at the top was sharp with a gradual break of slope at the base. This pit extends beyond the western limit of trench.
301	Fill	300	-	2.55	>1.10	0.20	Firm, grey, clay with occasional charcoal flecks and no coarse components.
302	Fill	300	-	2.55	>1.10	0.40	Firm, light greyish orange, clay, with no charcoal or coarse components.
303	Stakehole	-	304	0.08	0.08	0.08	Circular in plan, with a rounded base and 'U' shaped section. Sides were vertical with a sharp break of slope at the top and base.
304	Fill	303	-	0.08	0.08	0.08	Soft, grey brown, silty clay with infrequent charcoal flecks and no coarse components.
305	-	-	-	-	-	-	Void context
306	Pit	-	307	0.90	0.75	0.11	Irregular oval in plan, with a flat base. Sides were concave and steep sloping with a sharp break of slope at the top and a gradual break at the base.
307	Fill	306	-	0.90	0.75	0.11	Friable, dark grey, silty clay, with occasional charcoal flecks and very small fragments of burnt bone.
308	Postho	-	309	0.15	0.11	0.13	Oval in plan, with a concave base. Sides were smooth and vertical with a sharp break of slope at the top and base.

	le						
309	Fill	308	-	0.15	0.11	0.13	Soft, dark grey, silty clay with frequent charcoal flecks. Two pieces of coarse pottery were recovered from this fill FN# 31-32-.
310	Postho le	-	311	0.12	0.10	0.17	Oval in plan, with a flat base. Sides were smooth and vertical with a sharp break of slope at the top and base.
311	Fill	310	-	0.12	0.10	0.17	Soft, dark grey silty clay with frequent charcoal flecks and chunks and no coarse components.

Trench Four

Context No.	Type	Fill of	Filled by	Length (m)	Width (m)	Depth (m)	Brief Description
400	Layer	-	-	>1.00	>1.00	0.20	Topsoil, firm brownish orange clay with occasional charcoal flecks and no coarse components. Heavily affected by root action.

Trench Five

Context No.	Type	Fill of	Filled by	Length (m)	Width (m)	Depth (m)	Brief Description
500	Layer	-	-	>1.00	>1.00	0.20	Topsoil, firm brownish orange clay with occasional charcoal flecks and no coarse components. Heavily affected by root action.

Trench Seven

Context No.	Type	Fill of	Filled by	Length (m)	Width (m)	Depth (m)	Brief Description
700	Bowl furnace	-	-	0.43	0.18	-	Base of a bowl furnace orientated east to west and oval in plan. Left unexcavated due to time constraints.
701	Burning & Stones	-	-	0.60	0.26	-	An arrangement of four stones associated with a patch of burning. Left unexcavated due to time constraints.

Trench Nine

Context No.	Type	Fill of	Filled by	Length (m)	Width (m)	Depth (m)	Brief Description
900	Layer	-	-	2.00	2.00	0.50	Topsoil firm greyish brown, silty clay with infrequent charcoal flecks and occasional small sub rounded stones.

APPENDIX 4

CERAMICS REPORT, ARNEY FORT, CO. FERMANAGH

BY JONATHAN BARKLEY

1 INTRODUCTION

1.1 The aim of this report is to detail the ceramic material that was recovered during excavations at Arney Fort, Co. Fermanagh. In total 53 sherds of pottery were recovered, with the material dating to the medieval period.

2 TYPOLOGY

2.1 All of the 53 pottery sherds that were recovered from the excavation were coarse ware and could be assigned to the Medieval Ulster Coarse Pottery (MUCP) typology. The majority of the assemblage was recovered from the topsoil layer within the enclosure and, while the edges of the sherds were worn, there was no evidence for heavy abrasion. This would lead to the conclusion that the sherds had not travelled or moved much beyond their area of deposition.

2.2 Medieval Ulster Coarse Pottery A type of coarse pottery that was produced from the 13th to 17th centuries and two types of fabric are recorded: Type A and Type B. The Type A fabric is typically buff to reddish brown in colour, though grey to black fabrics are also known, and these vessels usually date to the early 13th - 14th centuries. Type B fabric is grey to dark black in colour, though orange to red fabrics are also recorded, and is usually dated to the 15th - 17th centuries.

Plate 1: Sherds of Medieval Ulster Coarse Pottery – Type B recovered from Arney Fort

2.3 The assemblage was dominated by grey to dark greyish black fabrics and, on this basis, the assemblage conforms more to the Type B fabric than the Type A.

2.4 Thirteen rim sherds were present within the assemblage, with flattened and hammerhead style rims predominating. This conforms with the Type B fabric, where a greater variety of rim types have been recorded and the flatter rims, hammerhead in particular, are more frequently found (McSparron 2012, 116).

2.5 Decoration was present on nine of the sherds within the assemblage and showed a number of different styles, including impressed and slashed lines and comb impressed lozenge pattern. Where decoration was present it tended to be on rim sherds and on the interior surface at the top. As the rims on these vessels would have been predominantly everted this would have placed the decoration facing upwards and visible.

2.6 A single large hammer head rim sherd (F#4) possessed a break on its exterior surface that was indicative of a handle having been attached.

3 DISCUSSION AND CONCLUSION

3.1 All of the sherds of pottery that were recovered during the excavation belonged to the Medieval Ulster Coarse Pottery (MUCP) type.

3.2 Appearing around the 13th century, MUCP was a coarse hand-made ware, that saw continued use until the 17th century. Although in use through the medieval period, MUCP continued the tradition of locally produced, coil-built vessels that were dominant in the Early Medieval period, but the use of better firing techniques and the copying of decorative techniques from imported contemporary wares produces a marginally better quality harder bodied vessel.

3.3 On the basis of the fabric, rim styles and decoration, the assemblage conforms to McSparron's MUCP Type B and dates to the 15th – 16th centuries (McSparron 118). This also conforms with the recorded distribution of MUCP, where Type B pottery dominates in the west of the country (McSparron 118).

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APPENDIX 5

COPY OF ARCHAEOLOGICAL EXCAVATION LICENCE

Licence for Archaeological Excavation

DfC Department for Communities www.communities-ni.gov.uk

Historic Monuments and Archaeological Objects (Northern Ireland) Order 1995

The Department for Communities Northern Ireland (hereinafter referred to as "the Department"), in exercise of its power under Article 41 of the above-mentioned Order (hereinafter referred to as "the Order"), hereby licenses

Jonathan Barkley

and

Northern Archaeological Consultancy Ltd

(hereinafter [jointly] referred to as "the Licensee[s]") to excavate for purposes of archaeological investigation in or under part of the Townlands (towns) of

Clontymullan

in the County of Fermanagh (being the archaeological site or reputed site known as))

Arney Fort, Lane access off Druminiskill Road, Arney

(hereinafter referred to as "the lands") during the period of six months, commencing on 29 Aug 2019 and ceasing 28 Feb 2020 , subject to the following conditions:

1. This Licence is granted on condition that, except in the case of an excavation referred to in Article 32 (1) (b) of the Order, the Licensees have obtained from the owner and occupier of the lands their consent to the excavation on, in or under the said lands, and the Department, if the Licensees are not Officials of the Department, shall not be under any responsibility for the consequences of any failure on the part of the Licensees to obtain such consent.

2. Should any part of the excavation involve disturbance of an area designated as a Scheduled Monument under Article 3 of the Order, the Licensees must ensure that Scheduled Monument Consent has been obtained from the Department before any such disturbance is undertaken. It is an offence to disturb a scheduled monument without prior Scheduled Monument Consent. The Licensees shall, on request, produce this Licence to the owner and occupier of the lands.

2

3. In advance of commencement of the excavation, the Licensees must inform the Department of the start date of the excavation and likely duration. If the anticipated completion date changes during the course of the excavation, the Licensees must inform the Department of the revised completion date as soon as possible.

4. The Licensees shall ensure that adequate resources are in place to carry out all excavation, post-excavation analysis, reporting, archiving and publication requirements that arise from the excavation carried out under this licence.

5. The Licensees shall carry out all excavation and associated works under this licence pursuant to the agreed Programme of Works (insert ref number CO1-19-9071). Should circumstances arise during the excavation which necessitate an amendment to the Programme of Works, the Licensees must inform the Department immediately and any amendment must be agreed in writing in advance of further works being carried out. Such agreed amendments shall be deemed to be incorporated into the Programme of Works. All works carried out on foot of this licence shall comply in all respects with recognised archaeological standards.

6. The Licensees shall inform the Department of the first discovery of archaeological remains, objects or material under this licence as soon as practicable after such discovery.

7. The Licensees shall report the finding of any treasure or potential treasure items to the Coroner. This must be done within 14 days from the day following the finding of the item(s) or 14 days after the realisation that the item(s) might be treasure.

8. The Department may, at its discretion, choose to inspect the excavation and the Licensees shall permit any person or persons nominated by the Department to be present on the lands at any stage during the course of the excavation.

9. The Licensees shall, during the progress of the excavation, take adequate steps to safeguard any monuments or other structures upon or adjoining the lands.

10. The Licensees shall, immediately on completion of the excavation, restore the lands and their surroundings as far as possible to their original condition unless otherwise agreed with the landowner and occupier.

Licence to Excavate for Archaeological Purposes

11. The Licensees shall furnish to the Department:
    (a) A summary report on the excavation within four weeks of the end of the excavation or its temporary cessation, unless an alternative date for the summary report has been agreed in writing with the Department

    (b) A comprehensive report on the excavation and its significance within six months of the end of the excavation unless an alternative date for the comprehensive report has been agreed in writing with the Department. The final comprehensive report will be made available to the public through the National Monuments and Buildings Record and to facilitate this, the Licensees will supply the following:
    - Final comprehensive report in digital and hardcopy forms. Acceptable digital formats include Microsoft Word (.doc/.docx), OpenDocument Text (.odt) or PDF/A (.pdf)
    - The excavation reporting form, and any associated site reporting forms, as prescribed by the Department at **www.communities-ni.gov.uk/archaeological-excavation-licence**
    - A GIS dataset showing the extent of the investigation, supplied in an open or industry standard georeferenced vector format (e.g. ESRI shapefile or CAD DXF), including all appropriate metadata
    - Confirmation that all necessary copyrights and permissions for the public dissemination of both the comprehensive report, including all of its contents, and the GIS data have been obtained

12. The Department may review the duration of the licence, and grant such extensions that it deems appropriate, where the Licensees apply, in writing, for such a review prior to the date of cessation shown on the face of the licence.

13. The Department reserves the right to suspend or revoke this Licence in the event of failure by the Licensees to comply with these conditions or any part thereof.

Authorised Officer:	Dated this:
[redacted]	29th August 2019
Serial number of excavation:	AE/19/127

DfC
Department for Communities
www.communities-ni.gov.uk

APPENDIX 6

COPY OF SCHEDULED MONUMENT CONSENT

Department for Communities
www.communities-ni.gov.uk

Lianne Heaney
c/o Northern Archaeological Consultancy Ltd
Unit 33 Farset Enterprise Park
638 Springfield Road
Belfast
BT12 7DY

Historic Environment Division

Ground Floor
9 Lanyon Place
Town Parks
Belfast BT1 3LP

Telephone (028) 90819 266

Our reference: FER 229:023; C01-19-12491
Date: 11th September 2019

Dear Lianne,

APPLICATION FOR SCHEDULED MONUMENT CONSENT UNDER THE HISTORIC MONUMENTS AND ARCHAEOLOGICAL OBJECTS (NI) ORDER 1995 to excavate for archaeological research at Arney Fort in the townland of Clontymullan, Co. Fermanagh.

Please read the contents of this letter carefully. The conditions are binding and will be monitored. If you foresee any difficulties in complying with the conditions, please discuss before any work takes place.

The Department hereby grants you Scheduled Monument Consent for this work with the following 12 conditions:

1. The works to which this consent relates shall be carried out to the satisfaction of the Department's Historic Environment Division (HED).

2. It is the responsibility of the applicant to ensure that staff, contractors, volunteers or staff from other organisations working on the site during this project, are provided with a copy of this consent, and that they fully understand and adhere to the conditions contained within it. A copy of the consent shall be kept on site by the contractor at all stages of the work.

3. HED archaeologist, Ronan McHugh, **must** be furnished with at least two days' notice **(email - ronan.mchugh@communities-ni.gov.uk; tel. - 02871314163)** before commencement of work to permit a monitoring visit to be arranged.

4. The work shall be carried out as detailed in your scheduled monument consent application received by HED on 1st August 2019 together with the accompanying written scheme of investigation (HED record no. CO1/19/492361). Any changes to the details outlined in these documents must be discussed and agreed in advance with HED.

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5. All excavation associated with the works must be carried out under the direction and supervision of an archaeologist licensed under Article 41 of the Historic Monuments and Archaeological Objects (NI) Order 1995. This licence must be applied for and granted prior to works being carried out.

6. The excavation shall, in the first instance, consist of Trenches Tr1-Tr5, schematically depicted on Figure 9 of the written scheme of investigation. The trenches shall be of the following dimensions Tr1 5m x 2m; Tr2 10m x 2m; Tr3 10m x 2m; Tr4 1m x 1m; Tr5 1m x 1m. Some minor latitude will be granted in the location of the trenches due to the vegetation in the interior of the site but any alteration must be agreed with HED in advance. When material of archaeological significance is discovered HED must be notified immediately to determine a strategy to continue the excavation. After the agreement of such a strategy, the applicant shall make a written weekly report to HED (via email if wished) detailing the excavation process.

7. There will be an additional 20m² of reserve trenching available under this consent and this may be used in the event either that extensions are required to resolve archaeological issues encountered in Tr 1-5 or, that some or all of Tr 1-5 produce no archaeologically significant material. In the latter eventuality, reserve trenches Tr6-Tr10, all measuring 2m x 2m and schematically depicted on Figure 9 of the written scheme of investigation may be excavated, up to the maximum of 20m² as stated above. The use of any or all of the reserve trenching, must be agreed in advance by HED.

8. No disturbance to the surrounding scheduled area shall be permitted other than that detailed in the application for scheduled monument consent and the written scheme of investigation. The scheduled area shall not be used at any time for the storage of equipment or materials. Any rubbish created during the course of these works shall be disposed of off-site, not buried or burnt in situ. All spoil excavated shall be placed on geotextile or other appropriate material during the course of the excavation, and not on the ground surface.

9. Site amenities shall not be permitted within the scheduled area.

10. All ground surfaces disturbed during these works must be reinstated to as existing or better standards.

11. Any changes to the works proposed in this application, or any additional works, shall be discussed in advance and approved by HED and may require additional written consents.

12. A written report shall be submitted to the HED scheduling team within 4 weeks of the completion of the excavation. This can be a duplicate of the report supplied to HED excavation licensing team as a condition of the licence referred to in Condition 5 of this consent.

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The granting of Scheduled Monument Consent under the Historic Monuments and Archaeological Objects (NI) Order 1995 does not affect the application of any other legislation which might have a relevance in this case.

Historic Environment Division operates an environmental management system to the requirements of ISO 14001 and would remind all parties of the need to comply with relevant environmental legislation. Legislation covers, but is not limited to, waste management issues, water pollution, air pollution and appropriate storage of materials.

Yours sincerely

[redacted]

Dr Paul Logue
Senior Archaeologist, Heritage Advice and Regulation Branch

Cc Ronan McHugh, Archaeologist, Heritage Advice and Regulation Branch
Gail Russell, Archaeologist, Heritage Advice and Regulation Branch
Barney Devine, Field Monument Warden, Heritage Advice and Regulation Branch

APPENDIX 7

COPY OF METAL DETECTING CONSENT

DEPARTMENT FOR COMMUNITIES

(HISTORIC ENVIRONMENT DIVISION)

Historic Monuments and Archaeological Objects (Northern Ireland) Order 1995

CONSENT ISSUED PURSUANT TO ARTICLE 29 FOR THE USE/POSSESSION OF A DETECTION DEVICE IN A PROTECTED PLACE

The Department for Communities for Northern Ireland (hereinafter referred to as "the Department"), in exercise of its power under the above article, hereby consents to the use of a detection device by Lianne Heaney (hereinafter referred to as the "Consent Holder") at Clontymullan in the County of Fermanagh (being the archaeological site or reputed site known as 'Arney Fort', and further being a 'Protected Place' as defined in the above article)(hereinafter called 'the lands') during the period of six months, commencing on **27th August 2019,** subject to the following conditions:-

1. The detection device shall be used for survey in the manner and at the lands only as specified in the Geophysical Method Statement received by the Department on 1st August 2019 (Record No. CO1/19/492361). All works carried out on foot of this Consent shall comply with the highest relevant contemporary archaeological standards, having regard to the particular circumstances of the survey and the lands being surveyed.

2. This Consent is for non-invasive works only, and no condition of this Consent, or any document associated with it, shall be interpreted as a licence to dig or excavate for the purpose of searching for archaeological objects, or a consent to remove any archaeological objects or material found by the use of the detection device, or by any other means, during the course of the consented works.

3. This Consent is granted on condition that the Consent Holder has obtained from the owner and occupier of the lands their permission for the use of the detection device on the lands and the Department shall not bear any responsibility for the consequences of any failure on the part of the Consent Holder to obtain such permission.

4. The Consent Holder shall, on request, produce this Consent to the owner and occupier of the lands.

5. The Consent Holder shall permit any person or persons nominated by the Department to be present at any stage of the work.

6. The Consent Holder shall, before expiry of the Consent, restore the lands as far as possible to their original condition unless otherwise agreed with the owner and occupier of the lands.

7. The Consent Holder shall, within a period of six months of the expiry of this Consent, submit to the Department, a full report on the findings of the survey carried out with the detection device,

illustrated with survey plots, interpretative drawings and photographs and suitable for lodgement in the Historic Environment Record of Northern Ireland.

8. The Department reserves the right to suspend or revoke this Consent at any time in the event of failure by the Consent Holder to comply with these conditions or any part thereof.

Authorised Officer [redacted]

Dated this 27th August 2019

Consent Number DDC/019/003

APPENDIX 8

RESULTS OF GEOPHYSICAL SURVEY

Investigations into Arney Fort and adjacent drumlin, Clontymullan, Co. Fermanagh

Archaeological Geophysical Survey

Licence No. DDC/019/002

Survey undertaken on behalf of Cuilcagh to Cleenish: A Great Place

H. Gimson BA (Hons) MSc MIAI
C. Hogan BSc (Hons) MIAI
U. Garner BSc (Hons) MSc

EAG 389

4th October 2019

Prospect House, Drumagh, Claremorris, County Mayo, Ireland

earthsound.ie

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Summary of Results

On the 12th and 13th September 2019, a geophysical survey commissioned by Cuilcagh to Cleenish: A Great Place was conducted at Arney Fort and on an adjacent drumlin in Clontymullan, Co. Fermanagh. The surveys were carried out as part of a community research project funded by the Heritage Lottery Fund and the Local Council. The project was interested in investigating two separate areas within Clontymullan.

The interior of scheduled monument FER229:023 Arney Fort was investigated using detailed earth resistance and electromagnetic surveys. The second site comprised a portion of a drumlin. This summit was thought possibly to have related to the battle of the 'Ford of the Biscuits' (7th August 1594), was surveyed using a magnetometer. One day of community engagement was held where members of the public were given demonstrations of the geophysical survey techniques and invited to participate in parts of the survey.

The survey was conducted upon a bedrock geology consisting of Bundoran Shale Formation, beneath fluvisols. The site of Arney Fort was covered in newly cleared ground with tree stumps present. The potential battlefield site was covered in cropped grass.

Within Arney Fort a series of compacted earth or stone remains were detected. These are comprised of a series of intersecting or parallel and perpendicular anomalies which may relate to structural remains. At least five of these possible structures have been identified, all orientated on a southwest to northeast direction. The structures appear be to 9m or less in width and contain a number of potential internal divisions. Evidence of potential surfaces or compacted earth areas were also detected which may be related to the structures.

In addition, a number of possible ditches or cut features were also detected. The majority of these appear to be located between the possible structures. However, a few appear to run parallel to the structures and therefore could relate to foundation trenches.

A number of possible pits were also detected throughout the survey area as well as five larger areas of low susceptibility. These run in a central band across the survey area and one was investigated during the excavation carried out by Northern Archaeological Consultancy Ltd. and identified as containing the basal remains of two small bowl furnaces (J. Barkley, pers. comm.).

The survey on the drumlin revealed the presence of a number of possible pits. A number of ditched features were also identified; the majority of these are likely to be agricultural in origin, however the presence of a sub-rectangular enclosure and central arcing feature was detected which may be archaeological in origin. In addition, a highly magnetic boundary feature was detected in the southeastern corner of the survey area which may have archaeological implications.

It had been suggested that the drumlin may have formed part of the battlefield associated with the 'Battle of the Ford of the Biscuits'. The magnetometer data did not reveal a landscape that contained a large amount of magnetic debris as you would expect from a battlefield. However, three large zones of metallic remains were detected, of unknown origin, as well as a relict boundary which contained a large number of isolated metallic remains.

Acknowledgements

Earthsound Geophysics Ltd. would like to acknowledge the landowners, local community and Northern Archaeological Consultancy Ltd. for their assistance in this project. Prior to the archaeological geophysical survey being undertaken, the site underwent some preparatory work. This field clearance allowed for the survey of Arney Fort to take place and improved the quality of the survey undertaken.

Statement of Indemnity

A geophysical survey is a scientific procedure that produces observations of results which are influenced by specific variables. The results and subsequent interpretation of the geophysical survey presented here should not be treated as an absolute representation of the underlying archaeological features, but as a hypothesis that must be proved or disproved. ***Direct investigations are recommended to confirm the findings of this report.*** *Verification can only be provided via intrusive means, such as Test Trench excavations.*

1 Introduction

Earthsound Geophysics Ltd. was commissioned by Cuilcagh to Cleenish: A Great Place to execute a series of geophysical surveys at Arney Fort (Area 1) and on an adjacent drumlin (Area 2) in Clontymullan townland, Co. Fermanagh.

The geophysical survey was requested to determine the presence/absence of unknown archaeological features associated with scheduled monument Arney Fort (FER229:023) and across a portion of a drumlin thought possibly to have been associated with a battle.

The surveys are being undertaken as part of the Cuilcagh to Cleenish: A Great Place project, which includes archaeological excavations undertaken by Northern Archaeological Consultancy Ltd. (NAC Ltd.) and community engagement undertaken by NAC and Earthsound.

No specification document was issued. Earthsound Geophysics Ltd. agreed to assess the site using an earth resistance meter and an electromagnetic instrument to investigate the fort, while a magnetometer was used to investigate the drumlin.

The method was approved by the Historic Environment Division of the Department of Communities. A licence was issued for the work No. DDC/019/002, issued to Heather Gimson.

1.1 Geography, Geology, Topography & Climate

Townland	Clontymullan
County	Fermanagh
Central NGR Co-ordinates of the site	Fort/Area 1: 222152.02/336427.87 Battlefield/Area 2: 222284.54/336270.71
Ground Cover per Field	Fort/Area 1: cleared ground, occasional tree stumps Battlefield/Area 2: cropped grass
Geology	Mudstone and Limestone (GSNI 2019)
Expected effect of Soils/Geology	The local sedimentary bedrock geology should not have an effect on any of the geophysical surveys
Topography	A rolling hillside, down to flat, wet ground. The Arney River bordered one survey area to the north.
Climate	The weather encountered during the survey was overcast with periods of rain and sunshine. The unsettled conditions left the site particularly wet for the earth resistance survey, however none of the survey techniques used were likely to be adversely affected by the weather conditions.

1.2 Archaeological Background

The site known as Arney Fort is a scheduled monument (FER229:023) and is listed in the SMR records as a rath of uncertain date which contains substantial remains (from www.dfcgis.maps.arcgis.com). The SMR records the site as:

> 'Situated on the S bank of the Arney River. This is a trapezoidal enclosure 36m long NW-SE & 31.5m at the NW end narrowing to 15m at SE. The level interior is enclosed by almost straight earthen banks 6.7m wide, 1.1m high internally & 2m above a ditch which is 2.5m wide & 0.2m deep. It survives as a shallow, wet feature in an arc ESE-S-NW. There are slight remains of an outer bank 4.5m wide at SE & W-NW. There are 5 gaps in the inner bank & it is not clear which of them may have been original.'

The Battle of the Ford of the Biscuits took place on 7th August 1594. This involved Irish and English forces in skirmishes, fire-fights and a rearward attack (O'Neill and Logue 2014). It is recorded on the SMR as FER:229:057, and located to the north of the Arney River. While there is some debate as to its location (O'Neill and Logue 2014), consensus places it at or near to Drumane Bridge, most likely to the west of it. However, it is possible that a portion of the battle took place within the vicinity of Arney Fort and therefore the community wanted the adjacent Drumlin investigated.

1.3 Aims & Objectives

The aim of the geophysical survey was to determine the nature of the archaeological resource in advance of the proposed development scheme. Specific objectives identified by Cuilcagh to Cleenish: A Great Place were to investigate the interior of the fort and a section of a drumlin thought to possibly be associated with the battle of the 'Ford of the Biscuits':

- Determine the presence or absence of archaeological features within the fort
- Assess the spatial extent of any detected archaeological features within the fort
- Determine the presence or absence of archaeological features possibly associated with the battlefield
- Assess the spatial extent of any detected archaeological features possibly associated with the battlefield

Detailed magnetometer, electromagnetic and earth resistance surveys were carried out over portions of the site. The techniques have been used in commercial and research archaeological projects for many years and are considered the most appropriate techniques for a detailed investigation of the underlying archaeology (Aspinall *et al*. 2008, Clark 1996, Schmidt 2013, Scollar *et al.* 1990, Gaffney & Gater 2003).

Where possible, the use of multiple geophysical techniques allows a greater confidence to be placed in the interpretation of detected anomalies, which is especially useful on small sites such as this. Their combined application can be used to determine the geometry, compositional material and the extent of an archaeological target.

2 Methodology

Fieldwork Dates	12/07/2019 – 13/09/2019
Survey Area	Area 1 / Fort: 700 m² Area 2 / Battlefield: 1.6 ha
Method / Area	Earth Resistance: 700 m² (Area 1) EMI Apparent Electrical Resistivity (ER_a): 700 m² (Area 1), EMI Apparent Magnetic Susceptibility (MS_a): 700 m² (Area 1) Magnetometer: 1.6 ha (Area 2)

2.1 Earth Resistance Survey

Array	Twin Probe
Instrument	Geoscan Research RM15
Components	MPX15 Multiplexer
Data Acquisition Resolution	0.5m x 0.5m
Array	PA5 Array
Data Acquisition Method	Gridded, Zig-Zag
Sensitivity	1 Ω
Multiplexed Data	-
Data Logger	Internal Data logger
Data Processing	Geoplot v.3.00mx: Despike High Pass Gaussian Filter (10, 10) Low Pass Gaussian Filter (1, 1) Interpolation (sine wave) to 0.25m x 0.25m
Graphical Display / Dynamic Range	Greyscale -30Ω (white) to 28Ω (black)

2.2 Electromagnetic Induction Survey

EMI Measurement	Apparent Magnetic Susceptibility (MS_a)	Apparent Electrical Resistivity (ER_a)
Instrument	GF Instruments CMD-MiniExplorer	GF Instruments CMD-MiniExplorer
Data Acquisition Resolution	0.5m x 0.2s	0.5m x 0.2s
Coil Configuration / Effective depth range	Vertical Coplanar Coil configuration (VPC) or 'half-depth', effective depth range: 0.25m, 0.5m, 0.9m	Vertical Coplanar Coil configuration (VPC) or 'half-depth', effective depth range: 0.25m, 0.5m, 0.9m
Platform	Hand-held sensor	Hand-held sensor
Data Acquisition Method	Continuous mode, Gridded, Zig-zag	Continuous mode, Gridded, Zig-zag
Measuring Range	MS_a: ±80ppt, resolution 10ppm	ER_a: 1000mS/m, resolution 0.1mS/m
Data Logger	CMD Control Unit	CMD Control Unit
Calibration	According to manufacturers guidelines (GF Instruments 2010)	According to manufacturers guidelines (GF Instruments 2010)
Data Processing	CMD Data Transfer Downloaded as Apparent Magnetic Susceptibility (MS_a) (In-phase) Geoplot v.3.00mx: Despike Low Pass Gaussian Filter (1, 1) Interpolation (sine wave) to 0.25m x 0.25m	CMD Data Transfer: conversion to Apparent Electrical Resistivity (ER_a) from Apparent Electrical Conductivity (Quadrature) Geoplot v.3.00mx: Despike Low Pass Gaussian Filter (1, 1) Interpolation (sine wave) to 0.25m x 0.25m
Graphical Display / Dynamic Range	Greyscale ±3 Standard Deviations (low to high: white to black)	Greyscale ±2 Standard Deviations (low to high: white to black)

2.3 Magnetometer Survey

Instrument	Eastern Atlas LEA MAX^{1505} System
Components	LEA D2, 10-channel digitiser
Data Acquisition Resolution	0.5m x 0.1m
Sensors	8 x Förster FEREX® 4.032 CON650 fluxgate gradiometers
Platform	LEA MAX^{1505} System cart
Data Acquisition Method	Gridless, using a Trimble RTK GPS VRS Now system to an accuracy of 5cm
Sensitivity	<0.2 nT
Data Logger	Panasonic Toughbook CF-H2 Field computer
Calibration	According to manufacturers guidelines (Pilz & Goossens 2015)
Data Processing	Ealdec: Profile decoding Ealmat.m: Normalisation, drift correction Process-it: Surfer 8: Data Gridding (0.5m x 0.25m), using the Kriging Gridding Method
Graphical Display / Dynamic Range	Greyscale -2nT (white) to 2nT (black)

2.4 Reporting, Mapping & Archiving

The geophysical survey and report follow the recommendations outlined by relevant best practice guidance documents as a minimum standard (David *et al*. 2008; Gaffney *et al*. 2002, Schmidt *et al*. 2015).

Geophysical data, the figures presented here and the text have been archived following the recommendations of the Archaeology Data Service (Schmidt & Ernenwein 2011).

3 Results & Discussion

The interpretation figures should not be looked at in isolation but in conjunction with the information below and classification terms contained in the Appendices.

***Significant Anomalies** are highlighted in Figures 5, 8, 10 & 12 and are described within the text.*

Number classification for geophysical anomalies

R1	*Earth Resistance anomalies*
E1	*Electromagnetic Apparent Electrical Resistivity anomalies*
S1	*Electromagnetic Apparent Magnetic Susceptibility anomalies*
M1	*Magnetometer anomalies*

3.1 Arney Fort

3.1.1 Earth Resistance Survey

Figure 4 – Earth Resistance Data

Figure 5 – Earth Resistance Interpretation

A series of high resistance zones were detected around the very edge of the survey area. These are associated with the extant earthworks associated with Arney Fort.

Anomaly **R1** is an arcing high resistance anomaly which is located in the southern edge of the survey area. Measuring 4m E-W x 8m N-S this anomaly is likely to be structural in origin, comprising of stone or compacted earth. The feature appears to possibly contain a northern subdivision measuring 5m N-S which is crossed by a linear low resistance ditch or cut feature. It seems likely that anomaly R1 represents the western portion of a structure which most likely continues into R2.

Anomaly **R2** comprises a series of curvilinear high resistance stone or compacted earth features. Covering an area of 6m E-W x 10m N-S these anomalies are likely to be structural in origin, the western and southern portions of R2 are likely to be related to R1, while the northern spur and eastern isolated area may indicate the presence of adjoining structures.

Anomalies R1 and R2 appear to form a structure 9m in width and 8m in length which possibly abutted the southern edge of Arney Fort earthworks. This structure appears to surround a zone of low resistance. This may be associated with water pooling on the remains of the surface or floor associated with this structure, or represent disturbed ground within the centre of the structural remains.

Anomaly **R3** consists of a series of low resistance features which were detected between R2 and R4. The low resistance nature of the anomalies indicate that they are associated with dug or cut features, these are most likely archaeological in origin, however the site had been covered in trees and therefore the low resistance features could be associated with tree root activity.

Anomaly **R4** comprises a series of linear or interconnecting high resistance features. These have a rectangular formation to them and are likely to relate to structural remains. Measuring 5.5m E-W and detected for a length of approximately 4m N-S this structure is on the same alignment as R1 and R2 and it is likely that R4 also extends to the southern edge of Arney Fort earthworks.

Anomaly **R5** is a diffuse zone of low resistance. This anomaly may be associated with vegetation and tree root action, waterlogged ground or disturbed soil from an archaeological source. Covering an area of 9m E-W x 8m N-S, R5 appears to bound R4 indicating that it may be archaeological in origin.

Anomalies **R6** and **R7** are two zones of high resistance which were detected in the centre of the survey area. Measuring 2.5 E-W x 2.5m N-S and 6m E-W x 7m N-S respectively, these anomalies are likely to be associated with compact ground or stone remains.

Anomaly **R8** is a linear low resistance feature measuring 4m in length. This ditch or cut feature is aligned with portions of R2 and R8 and it may therefore be associated with the structural remains or a feature which divides them.

Anomaly **R9** is a right-angled high resistance feature which was detected close to the northeastern edge of the survey area. Measuring 5m in length this anomaly is likely to be associated with stone or compacted earth and may be structural in origin. The anomaly runs parallel to R10.

Anomaly **R10** is a 'C-shaped' area of high resistance measuring 15m in length. Associated with stone or compacted earth this feature has the same orientation and width as R9 and is likely to be structural in origin, possibly intersecting with R12.

Anomaly **R11** is a zone of high resistance which leads from the northwestern edge of the fort to cover R10 and a portion of R9. This anomaly is likely to be associated with compact ground or stone remains and may represent demolition debris or surfaces associated with structure R10.

Anomaly **R12** comprises a right-angled high resistance anomaly, measuring 4m E-W x 4m N-S. A number of low resistance zones extend from the anomaly and are likely to be related. It is possible that R12 represents structural stone or compacted earth remains, surrounded by demolition debris, surfaces or internal divisions.

Anomaly **R13** is a zone of high resistance measuring 5m E-W. This diffuse zone may be associated with compacted earth and is probably archaeological in origin.

Anomaly **R14** is a 'C-shaped' area of high resistance measuring 4m N-S. This anomaly is on the same alignment as R13 and R15 and therefore they may be associated. The high resistance nature of R14 indicates that it is likely to comprise of stone or compacted earth.

Anomaly **R15** is a zone of high resistance which is located on the western edge of the survey area. The western portion of this anomaly is likely to be associated with water pooling up against Arney Fort earthworks. However, the presence of a spur extending eastwards suggests that it might be, at least in part archaeological in origin.

Anomaly **R16** consists of a right-angled high resistance anomaly. This feature is slightly wider in form to any other feature seen within the earth resistance data, indicating that it might have a more significant physical presence. Measuring 5m N-S x 7m E-W, this potential stone or compacted earth feature may indicate structural remains, located on the northern internal edge of Arney Fort.

Anomaly **R17** is a zone of low resistance which may be bounded by R16. The presence of low resistance may indicate waterlogged soils, possibly laying on archaeological remains or disturbed soils.

3.1.2 Electromagnetic Apparent Electrical Resistivity Survey

Figure 6 – Combined Electromagnetic Data

Figure 7 – Electromagnetic Apparent Electrical Resistivity Data

Figure 8 – Electromagnetic Apparent Electrical Resistivity Interpretation

The apparent electrical resistivity survey detected two small zones of high resistivity which are located on the western edge of the survey area. These are located adjacent to the earthworks of Arney Fort and are therefore likely to be associated with the construction of the fort rather than unknown archaeological deposits.

Anomaly **E1** is a large zone of high resistivity which is located on the southern edge of Arney Fort. Measuring 7m E-W x 6m N-S, this anomaly extends beyond the fort earthworks and therefore is likely to be associated with previously unknown archaeological remains. The high resistivity nature of the anomaly indicates that it is likely to be associated with compacted earth or stony ground.

Anomaly **E2** is a right-angled high resistance feature, measuring 6m N-S x 5m E-W. This anomaly coincides with R1 detected in the earth resistance data and represents probable structural remains.

Anomaly **E3** comprises of two linear and curvilinear high resistance features which have the same alignment as E2. The northern portion of E3 matches the location of the northern portion of R2. It is therefore likely that E3 represents the eastern boundary of the structure also detected in E2, the earth resistance having detected internal divisions within this structure.

Anomaly **E4** is a zone of low resistivity which was detected in between E2 and E3. Measuring 12m E-W x 7m N-S, this anomaly partially coincides with the low resistance zone detected in the earth resistance data between R1 and R2. It is likely that this anomaly has been created by water collecting on the top of a compact surface or is associated with a zone of disturbed soil. The fact that it is bounded by E2 and E3 suggests that the anomaly is associated with the structural remains.

Anomaly **E5** consists of two intersecting low resistivity anomalies. Both measuring approximately 6m in length these anomalies are likely to be associated with ditches, dug or cut remains; although there is a possibility that they are associated with tree roots.

Anomaly **E6** contains a series of low resistivity ditches or cut features, the longest being 11m in length. These features could be archaeological in origin or assoicated with tree roots.

Anomaly **E7** is an isolated high resistance feature, measuring 1.6m in approximate width, which could be associated with a tree stump, stone or compacted earth remains.

Anomaly **E8** consists of two interconnecting low resistivity ditches or cut features. The orientation of these features matches those of the high resistance anomalies detected in the earth resistance data. It is therefore likely that E8 is archaeological in origin, possibly assoicated with structural remains.

Anomaly **E9** is a large zone of high resistivity which was detected on the northern edge of the survey area. Measuring 11m N-S x 10m E-W, this anomaly coincides with a zone of high resistivity (R11) detected in the earth resistance data and is therefore E9 is likely to be associated with structures R10 and R12.

Anomaly **E10** is an isolated high resistance feature, measuring 1m in approximate width, which could be associated with a tree stump, stone or compacted earth remains.

Anomaly **E11** comprises a series of low resistivity zones which were detected in the centre of the survey area. Covering an area of 15m E-W x 5m N-S, these may be archaeological in origin, possibly associated with disturbed or waterlogged ground

Anomaly **E12** is a high resistivity linear feature which matches the location of R16. This stone or compacted earth feature is likely to be associated with structural remains.

3.1.3 Electromagnetic Apparent Magnetic Susceptibility Survey

Figure 6 – Combined Electromagnetic Data

Figure 9 – Electromagnetic Apparent Magnetic Susceptibility Data

Figure 10 – Electromagnetic Apparent Magnetic Susceptibility Interpretation

Anomaly **S1** is a right-angled low susceptibility anomaly. Measuring 6m N-S x 3m E-W the low susceptibility nature of the anomaly indicates that it is likely to be associated with very near surface stone or waterlogged soils. The location of the anomaly means it coincides with anomalies R1 and E2 and is therefore part of the structure previously identified.

Anomaly **S2** consists of a rectangular low susceptibility anomaly (5m N-S x 4.7m E-W) with eastern extension (8m long). The location of this anomaly places it within the centre of the structure previously identified above and within an area of low resistance and resistivity. The presence of the low susceptibility feature S2 may be associated with internal divisions, internal surface or waterlogged soils.

Anomaly **S3** is a linear alignment of low susceptibility, 4.5m in length. The alignment of this anomaly matches S1 and S2 and therefore they could be related, all probably being associated with near surface stone remains or waterlogged soils. S3 may also be associated with S6 as it appears to terminate adjacent to the anomaly.

Anomalies **S4**, **S5**, **S6**, **S7** and **S8** comprise of five isolated areas of low susceptibility, measuring c.2.5m in diameter, which span the centre of the survey area. The low susceptibility nature of all the anomalies indicates that they are likely to be associated with stone or clay remains or waterlogged soils. The linear formation and similar size of the anomalies suggests that they come from similar sources, most likely archaeological in origin.

Anomaly **S9** is a curvilinear linear area of low susceptibility which is located near to the western edge of the survey area. Measuring 6m in length this anomaly has a similar orientation to S1 and S2 and may be archaeological in origin, possibly associated with stone or clay remains or waterlogged soils.

Anomaly **S10** consists of a defuse area of low susceptibility which is located in the northern corner of the survey area. Measuring 3.5m N-S and 2.5m E-W, this anomaly is more diffuse in nature than S4-S7 and although it may be related it appears to have another origin, either archaeological or associated with the construction of Arney Fort earthworks.

Anomaly **S11** is a curvilinear linear area of low susceptibility, 6.5m in length which is likely to be associated with near-surface stone or waterlogged soils and may be structural in origin.

Anomaly **S12** comprises a number of raised susceptibility anomalies. Two possible pits (c.1m in diameter) were detected as well as right-angled feature with arcing northern extension (7m E-W and a covering a total width of 6.5m N-S). The high susceptibility nature of these anomalies indicates that they comprise of imported soils or have been enhanced by human activity or debris. The location and orientation of S12 means that it could represent a continuation of R12 detected within the earth resistance data.

Anomaly **S13** is a right-angled low susceptibility feature. Measuring 5m E-W and 8m N-S, this anomaly is likely to be associated with near-surface stone or waterlogged soils and may be structural or archaeological in origin.

Anomaly **S14** is an arcing area of raised susceptibility which extends from the eastern earthworks associated with Arney Fort. Measuring 5.5m in length this anomaly is associated with enhanced or imported soils and may be archaeological in origin or associated with vegetation activity.

Anomaly **S15** is a zone of low susceptibility which is located on the northern edge of Arney Fort earthworks. The anomaly could be archaeological in origin or associated with stone placed within the earthworks and subsequently eroded from it.

Anomaly **S16** is a zone of low susceptibility which contains a central area of raised susceptibility. This zone of located on the edge of the earthworks associated with Arney Fort and therefore it is likely that the anomalies have been caused by the construction of the fort, however the presence of adjacent archaeological activity cannot be totally ruled out as a cause for the anomalies.

3.2 Drumlin - Possible location of the battle of the Ford of the Biscuits

3.2.1 Magnetometer Survey

Figure 12 – Magnetometer Data

Figure 13 – Magnetometer Interpretation

In magnetic data, a dipolar anomaly or 'iron spike' is a response to buried ferrous objects, often in the topsoil. Iron spikes generally are not removed in geophysical data, although often modern in origin, they can be indicative of archaeological material.

Anomaly **M1** is a collection of six possible pits which are located on the southern edge of the survey area. Covering an area 21m in width these features may be archaeological, agricultural or geological in origin.

Anomaly **M2** comprises of four highly magnetic anomalies which form a right-angled feature, 13m E-W x 13m N-S, with a western spur. The highly magnetic signatures indicate that they could contain highly burnt deposits but more likely contain metallic remains, either archaeological or agricultural in origin. The location of this anomaly adjacent to the field boundaries and on the top of the drumlin could indicate that it represents a structure or defence.

Anomaly **M3** consists of a series of possible pits which are located to the north of M2. The majority of these are located between M2 and M5 and therefore may be associated; however, two further pits can be seen to the north of M6 and may be related or may be associated to the adjacent agricultural features.

Anomaly **M4** is a right-angled ditch which dissects the southwestern portion of the field. It is likely to be associated with M5 and possibly M6 and may represent a relict field boundary.

Anomaly **M5** is a right-angled ditch which likely represents a continuation of M4. This feature is visible on the aerial views of the site.

Anomaly **M6** is a linear ditch or cut feature which may be associated with M4 and M5 and is visible on the aerial views of the site. The orientation of the anomaly suggests that it may once have been a continuation of the adjacent field boundary.

Anomaly **M7** consists of a curvilinear trend, probably associated with a ditch or cut feature. Measuring 18m in length this anomaly could be agricultural, archaeological or geological in origin.

Anomaly **M8** is an area of slightly raised and lower magnetic values. Measuring 40m E-W and 22m N-S this relates to geological activity and is of no archaeological significance.

Anomaly **M9** comprises a series of possible pits which are located around the edge of M8 and to the south of M12. These could be geological, agricultural or archaeological in origin.

Anomaly **M10** is a large area of dipolar values, 27m E-W x 25m N-S. These dipoles relate to metallic remains and it is likely that the area relates to relatively modern deposits, most likely either agricultural or associated with dumping. However, archaeological activity cannot be totally ruled out without further investigation. Contained within the centre of these values two linear trends can be seen, which are of unknown origin.

Anomaly **M11** is a linear trend of highly magnetic material which is similar in formation to the central trends within M10. The origin of this feature is unknown.

Anomaly **M12** consists of a large area of dipolar values which may be associated with the relict field boundary M5. Measuring 18m E-W x 40m N-S this anomaly has a number of trends within it which are similar to M10 and M11. This area could be agricultural or possibly archaeological in origin and would need further investigation to establish its true nature.

Anomaly **M13** consists of three ditched or cut features. A southern right-angled ditch possibly leads from relict field boundary M5. Measuring 26m in length this anomaly probably interlinks with the northern and appears to be bounding the central sub-circular feature. The central sub-circular measures 7m in diameter and may contain a break or entranceway to the north. Its presence surrounded by a rectangular ditch system may indicate defence or the features may not be contemporary.

Anomaly **M14** is an arcing possible ditch or cut feature. Measuring 15m in length this anomaly could be archaeological or agricultural in origin.

Anomalies **M15**, **M16**, **M17** and **M18** are linear or curvilinear magnetic trends which traverse the northern half of the survey area. M18 is likely to once have been a field boundary as it matches the adjacent boundary and it is therefore possible that some of the other anomalies may be relict boundaries. However, they could also be ditches or cut features of agricultural or archaeological origin.

Anomaly **M19** is a series of possible pits which may be agricultural or archaeological in origin.

Anomaly **M20** represents a series of possible pits which are located on the northern extent of the survey. These are surrounded by agricultural features and may be associated with this activity or may be geological or archaeological in origin.

Anomaly **M21** is a large area of dipolar values measuring 25m E-W x 37m N-S. This anomaly is similar in formation to M10 and M12 and contains a number of magnetic trends. This feature could be agricultural or possibly archaeological in origin and would need further investigation to establish its true nature.

Anomaly **M22** represents a linear collection of isolated dipoles to the southwest of M21. These anomalies could represent modern metallic remains, however the presence of the adjacent relict field boundary M18 could suggest that they have an archaeological significance as during a battle more projectiles and items of war are likely to collect on boundaries as they can be used as cover during the skirmish.

A series of parallel agricultural features were detected throughout the survey area. These are most likely to be associated with cultivation furrows; although their magnetic signature is not that typically associated with cultivation furrows and therefore they could have a different origin.

4 Conclusion

4.1 Summary of Results

The geophysical surveys undertaken for this report have allowed the mapping of underground features which may relate to archaeological activity. The surveys were undertaken at two locations: the monument known as Arney Fort; and over a portion of an adjacent drumlin.

Within Arney Fort a series of compacted earth or stone remains were detected. These are comprised of a series of intersecting or parallel and perpendicular anomalies which may relate to structural remains. At least five of these possible structures have been identified, all orientated on a southwest to northeast direction. The structures appear be to 9m or less in width and contain a number of potential internal divisions. Evidence of potential surfaces or compacted earth areas were also detected which may be related to the structures.

In addition, a number of possible ditches or cut features were also detected. The majority of these appear to be located between the possible structures. However, a few appear to run parallel to the structures and therefore could relate to foundation trenches.

A number of possible pits were also detected throughout the survey area as well as five larger areas of low susceptibility. These run in a central band across the survey area and one was investigated during the excavation carried out by Northern Archaeological Consultancy Ltd. and identified as containing the basal remains of two small bowl furnaces (J. Barkley, pers. comm.).

The survey on the drumlin revealed the presence of a number of possible pits. A number of ditched features were also identified; the majority of these are likely to be agricultural in origin, however the presence of a sub-rectangular enclosure and central arcing feature was detected which may be archaeological in origin. In addition, a highly magnetic boundary feature was detected in the southeastern corner of the survey area which may have archaeological implications.

It had been suggested that the drumlin may have formed part of the battlefield associated with the ‘Battle of the Ford of the Biscuits’. The magnetometer data did not reveal a landscape that contained a large amount of magnetic debris as you would expect from a battlefield. However, three large zones of metallic remains were detected, of unknown origin, as well as a relict boundary which contained a large number of isolated metallic remains.

4.2 General Overview and Implications

The surveys undertaken at Arney Fort have not revealed any further internal defensive structures other than those earthworks visible on site. The interior of the monument appears to contain features associated more with habitation and industrial activity. The presence of multiple possible structural remains within close proximity to one another and all on the same alignment suggests an organised community. Indeed, it is peculiar that the orientation of these structures does not appear to match the long axis of the monument.

The detection of five large low susceptibility anomalies spanning the centre of the fort, one of which was later excavated and identified as containing the remains of two small bowl furnaces, indicate some form of industrial activity associated with these structures. When the

location of these anomalies is matched against the possible structures there does appear to be correlation in their placement.

When the drumlin, possible battlefield, survey is considered, a landscape of multiple possible pits is revealed but also one of very few isolated ferrous (metallic) remains. If a battle had taken place within this landscape it would be logical to assume the presence of more isolated metallic remains, associated with projectiles, uniforms and battle debris. The presence of three large zones of metallic remains could be attributed to mass deposition pits; however, their location close to the modern farm buildings probably indicates that they have a relatively modern origin.

A sub-rectangular enclosure with central arcing ditch, and a highly magnetic boundary feature are potentially defensive in origin. Without further investigation the true nature and extent of these remains cannot be established.

The presence of multiple isolated metallic remains along a relict field boundary could also possibly be attributed to battle, as you would expect a high concentration of projectiles and debris to be deposited against such a feature. However, this zone also sees the deposition of modern debris and therefore without further investigation or evidence as to what these isolated metallic remains are, a link to the potential battle cannot be established.

4.3 Recommendations

Within Arney Fort further geophysical investigations could be undertaken on the visible earthworks surrounding the monument. These would aid in our understanding of the construction of the monument and allow an assessment to be made as to whether a ditch once surrounded the banks as well as potentially establishing an original entranceway.

At the drumlin additional methodologies could be deployed to investigate the sub-rectangular enclosure and southern highly magnetic boundary feature to establish their true composition. In addition, geophysical surveys could help to assess the larger areas of metallic remains, determining if they have any internal structure or are contained within a cut feature.

4.4 Dissemination

The results of this survey were submitted to Northern Archaeological Consultancy Ltd. Additional copies will be distributed in accordance with the Licence (see Appendix 2).

5 Acknowledgements

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7 Figures

Technical Appendix

Appendix 1: Anomaly Classifications

Earth Resistance

Earth resistance (ER) surveys transmit a small electrical current into the soil enabling the soils resistive properties to be calculated.

Anomaly classification used to interpret Earth Resistance data

After Gaffney & Gater (2003) and Gaffney *et al*. (2000).

A known archaeological feature type e.g. Ditch / Wall / Structure etc: An anomaly with a resistance that contrasts strongly with the surrounding sub-soil, where the presence of a type of archaeological feature is known from supporting evidence.

Archaeology: A linear, curvilinear or isolated anomaly with an earth resistance that contrasts strongly with the surrounding sub-soil, without any supporting evidence from another source.

- **Ditch / Wall:** A discrete linear, curvilinear, annular or penannular anomaly with an earth resistance that contrasts strongly with the surrounding sub-soil. A low resistance anomaly suggests a ditch (or gully); a high resistance anomaly suggests a stone-filled ditch or wall.
- **Mound of Stones:** A discrete horseshoe or ovoid shaped anomaly with a higher resisitance than the surrounding sub-soil.
- **Pit:** A small isolated area (>1-2m diameter) of typically low resistance that contrasts with the surrounding sub-soil, judged to be caused by a pit-type feature. An isolated high resistance anomaly could indicate a stone-filled pit or isolated stone deposits.
- **Cultivation:** Parallel linear responses of high or low resistance.
- **Disturbed Soil:** A broad area of moderate low resistance change that contrasts with the surrounding sub-soil. May represent cultural noise associated with soil disturbance, judged to be of archaeological origin.

High resistance Anomalies
Soils comprised of materials of a higher earth resistance than the surrounding soil will exhibit anomalies of 'higher resistance'. These are likely to include stone walls, masonry, rubble, cobbled or gravel surfaces, as well as near surface geology.

Low resistance Anomalies
Soils that are comprised of materials of a lower earth resistance than the surrounding soil will exhibit anomalies of 'lower resistance'. These are likely to include ditches, drainage ditches and pits, as well as palaeochannels, drained soils, a high water table, deep topsoil, springs, boggy areas, areas adjacent to rivers and clay soils.

Modern Disturbance: Area where the ground has been disturbed in the recent past. Characterised by very large low or high resistance gradients.

Modern Pipe: Straight, linear anomaly with a resistance contrast.

Geology: Usually visible as broad background changes, indicating possible geomorphological origin.

Absence of Anomalies
It is also possible that archaeological features exist that exhibit no earth resistance contrast and hence cannot be identified by an earth resistance survey.

Electromagnetic Apparent Electrical Resistivity

Electromagnetic instruments transmit an alternating current which induces a primary and subsequently a secondary electromagnetic field which interacts with the underlying soils. One of the subsequent responses is the Apparent Electrical Conductivity of the soil, which are subsequently calculated via automated software to Apparent Electrical Resistivity (ERa).

Anomaly classification used to interpret ER_a data

After Gaffney & Gater (2003) and Gaffney *et al*. (2000).

A known archaeological feature type e.g. Ditch / Wall / Structure etc: An anomaly with a ER_a that contrasts strongly with the surrounding sub-soil, where the presence of a type of archaeological feature is known from supporting evidence.

Archaeology: A linear, curvilinear or isolated anomaly with an ER_a that contrasts strongly with the surrounding sub-soil, without any supporting evidence from another source.

- **Ditch / Wall:** A discrete linear, curvilinear, annular or penannular anomaly with an ER_a that contrasts strongly with the surrounding sub-soil. A low ER_a suggests a ditch; a high ER_a suggests a stone-filled ditch or wall.
- **Mound of Stones:** A discrete horseshoe or ovoid shaped anomaly with a higher ER_a than the surrounding sub-soil.
- **Pit:** A small isolated area (>1-2m diameter) of ER_a that contrasts with the surrounding sub-soil, judged to be caused by a pit-type feature.
- **Cultivation:** Parallel linear responses of high or low ER_a.
- **Disturbed Soil:** A broad area of moderate ER_a change that contrasts with the surrounding sub-soil. May represent cultural noise associated with soil disturbance, judged to be of archaeological origin.

High ER_a Anomalies
Soils comprised of materials of a higher ER_a than the surrounding soil will exhibit anomalies of 'higher resistivity'. These are likely to include stone walls, masonry, rubble, cobbled or gravel surfaces, as well as near surface geology.

Low ER_a Anomalies
Soils that are comprised of materials of a lower ER_a than the surrounding soil will exhibit anomalies of 'lower resistivity'. These are likely to include ditches, drainage ditches and pits, as well as palaeochannels, drained soils, a high water table, deep topsoil, springs, boggy areas, areas adjacent to rivers and clay soils.

Modern Disturbance: Area where the ground has been disturbed in the recent past. Characterised by very large ER_a gradients and a high level of noise.

Modern Pipe: Straight, linear anomaly with an ER_a contrast.

Geology: Anomalies of possible geomorphological origin.

Absence of Anomalies
It is also possible that archaeological features exist that exhibit no resistivity contrast and hence cannot be identified by Apparent Electrical Resistivity survey.

Electromagnetic Apparent Magnetic Susceptibility

The electromagnetic instrument transmits an alternating current which induces a primary and subsequently a secondary electromagnetic field which interacts with the underlying soils. Apparent Magnetic Susceptibility (MSa) is a response derived from the ratio of the magnetic susceptibility of the soil.

Anomaly classification used to interpret MS_a data

After Gaffney & Gater (2003) and Gaffney *et al*. (2000).

A known archaeological feature type e.g. Ditch / Wall / Structure etc: An anomaly with a MS_a gradient that contrasts strongly with the surrounding sub-soil, where the presence of a type of archaeological feature is known from supporting evidence.

Archaeology: A linear, curvilinear or isolated anomaly with a MS_a that contrasts strongly with the surrounding sub-soil, without any supporting evidence from another source.

- **Ditch:** A linear, curvilinear, annular or penannular anomaly with a MS_a gradient that contrasts strongly with the surrounding sub-soil, judged to be caused by a pit-type feature with a fill more magnetic than the surrounding soil.
- **Burnt Mound / Spread:** A horseshoe or ovoid shaped anomaly with a MS_a that contrasts strongly with the surrounding sub-soil.
- **Hearth:** A small isolated area (<2m diameter) of higher MS_a than the surrounding sub-soil.
- **Pit:** A small isolated area (>1-2m diameter) of moderate to high MS_a, judged to be caused by a pit-type feature with a fill more magnetic than the surrounding soil.
- **Industrial:** An isolated anomaly with a strong MS_a, judged not to be surface iron. This type of anomaly is typically caused by the remains of kilns or furnaces.
- **Cultivation:** Parallel linear responses of contrasting MS_a.
- **Magnetic Enhancement:** A broad area of moderate MS_a that contrasts with the surrounding sub-soil. May represent cultural noise associated with occupation or soil disturbance, judged to be of archaeological origin.
- **Metal:** Isolated anomalies indicating metallic responses, judged to be in the near-surface.

?Archaeology: A linear, curvilinear or isolated anomaly with a MS_a that contrasts weakly with the surrounding sub-soil, without any supporting evidence from another source. Such categories may represent possible archaeological or geological sources.

Modern Disturbance: Area where the ground has been disturbed in the recent past. Characterised by very large MS_a gradients and a high level of noise often.

Modern Pipe: Straight, linear anomaly with a MS_a contrast.

Geology: Anomalies of possible geomorphological origin.

Magnetometer

Magnetometer surveys are undertaken using magnetic gradiometers which measure the magnetic content of the underlying soils. Measurements are gained using sensors which calculate the difference between the geological / pedological background and anthropogenic remains associated with archaeological activity.

Positive Magnetic Anomalies
Burnt features, particularly kilns, but also hearths, furnaces and burnt (specifically 'burnt', not 'heated') mounds of stone will create a strongly magnetic anomaly due to thermoremanence. Cut features, such as pits, ditches or wooden postholes will create anomalies that will vary in shape and magnetic intensity depending on which material they were backfilled by (Fassbinder 2015). For cut features backfilled (or 'refilled') by

- magnetically enhanced topsoil – the refill will generate a positive magnetic anomaly
- homogeneous topsoil – the refill will generate an anomaly proportional to the size and volume of the archaeological feature.

The magnetic anomaly shape and intensity will also be determined by concentrations of pottery, ash or burned material, solid rocks or other material.

Negative Magnetic Anomalies
Negative magnetic anomalies have a number of causes (Fassbinder 2015):

- The material remains of the archaeological feature may have a lower magnetic susceptibility (MS) than the adjacent topsoil. In some cases, the MS of a ditch may appear as both a positive and negative anomaly, reflecting the variable MS of the refill material. Some stone foundations can also appear as weakly magnetic or negative magnetic anomalies.
- If a cut feature is immediately refilled by the same material e.g. a grave cut excavated before a funeral is (almost) immediately refilled by the human body and the same (unaltered) sediment that was excavated before.
- Geochemical processes (see Fassbinder 2015) can alter the magnetic response, e.g. an archaeological feature identified by a positive anomaly can convert to a negative anomaly due to the combination of stagnant moisture and a changing groundwater table.

Dipolar Anomalies
A dipolar anomaly is a response to buried ferrous objects, often in the topsoil. Iron spikes generally are not removed in geophysical data; although often modern in origin (iron agricultural implements, rubbish), they can be indicative of archaeological material.

Absence of Anomalies
It is also possible that archaeological features exist that exhibit no magnetic contrast and hence cannot be identified by magnetometer survey.

Anomaly classification used to interpret Magnetometer data

After Gaffney & Gater (2003) and Gaffney *et al*. (2000).

A known archaeological feature type e.g. Ditch / Wall / Structure etc: An anomaly with a magnetic gradient that contrasts strongly with the surrounding sub-soil, where the presence of a type of archaeological feature is known from supporting evidence.

Archaeology: A linear, curvilinear or isolated anomaly with a magnetic gradient that contrasts strongly with the surrounding sub-soil, without any supporting evidence from another source.

- **Ditch / Wall:** A linear, curvilinear, annular or penannular anomaly with a magnetic gradient that contrasts strongly with the surrounding sub-soil. A positive polarity suggests a ditch; a negative polarity suggests a stone-filled ditch or wall.
- **Burnt Mound / Spread:** A horseshoe or ovoid shaped anomaly with a positive magnetic gradient that contrasts strongly with the surrounding sub-soil. An associated trough may be observed as a positive/negative anomaly, a hearth may also be expected nearby. Isolated responses in the vicinity could represent spreads of (or ploughed out) heat shattered stones.
- **Hearth:** A small isolated area (<2m diameter) of higher magnetic gradient than the surrounding sub-soil (typically >6nT).
- **Pit:** A small isolated area (>1-2m diameter) of moderate to high magnetic gradient, judged to be caused by a pit-type feature with a fill more magnetic than the surrounding soil.

Industrial: An isolated anomaly with a strong positive gradient (>30nT), judged not to be surface iron. This type of anomaly is typically caused by the remains of kilns or furnaces.

Magnetic Enhancement: A broad area of moderate positive magnetic gradient that contrasts with the surrounding sub-soil. May represent cultural noise associated with occupation or soil disturbance, judged to be of archaeological origin.

Ferrous: Dipolar anomalies indicating ferrous responses, judged to be in the near-surface.

Cultivation: Parallel linear responses of positive or negative polarity. Strong responses may indicate added magnetic material (e.g. burnt deposits) as fertiliser. Lower magnetic gradient anomalies 'beneath' the furrow overprint may be obscured. Higher magnetic gradient anomalies may be visualised *in situ* or ploughed out 'beneath' the furrow overprint.

?Archaeology: A linear, curvilinear or isolated anomaly with a magnetic gradient that contrasts weakly with the surrounding sub-soil, without any supporting evidence from another source. Such categories may represent possible archaeological or geological sources.

Modern Disturbance: Area where the ground has been disturbed in the recent past. Characterised by very large magnetic gradients and a high level of noise often accompanied by concentrations of dipolar, near-surface ferrous responses. This category also represents anomalies whose source may lie beyond the survey area, such as fencelines, vehicles or modern buildings.

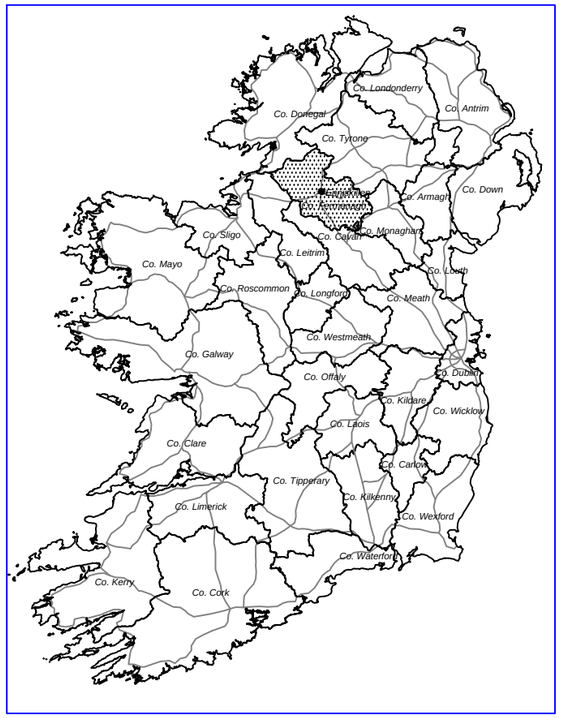
Modern Pipe: Straight, linear anomaly with very large magnetic gradients alternating regularly between positive and negative polarity.

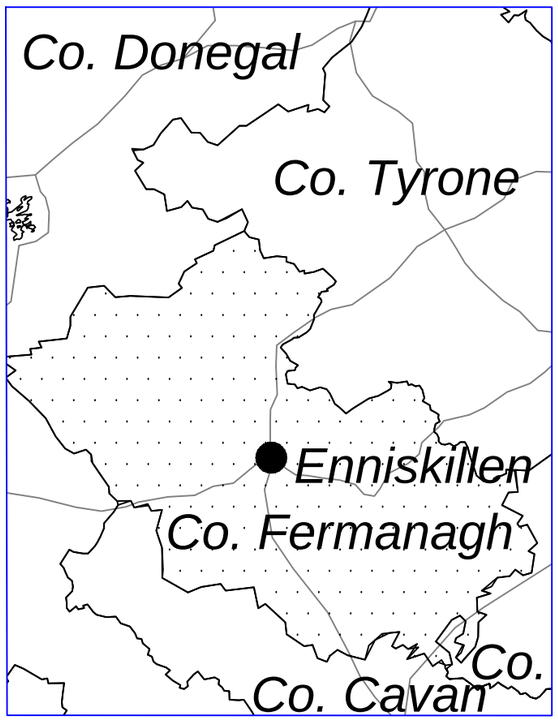
Previous Excavation?: Area of uniform magnetic signal contained within a well-defined boundary in regions otherwise densely covered with archaeological anomalies.

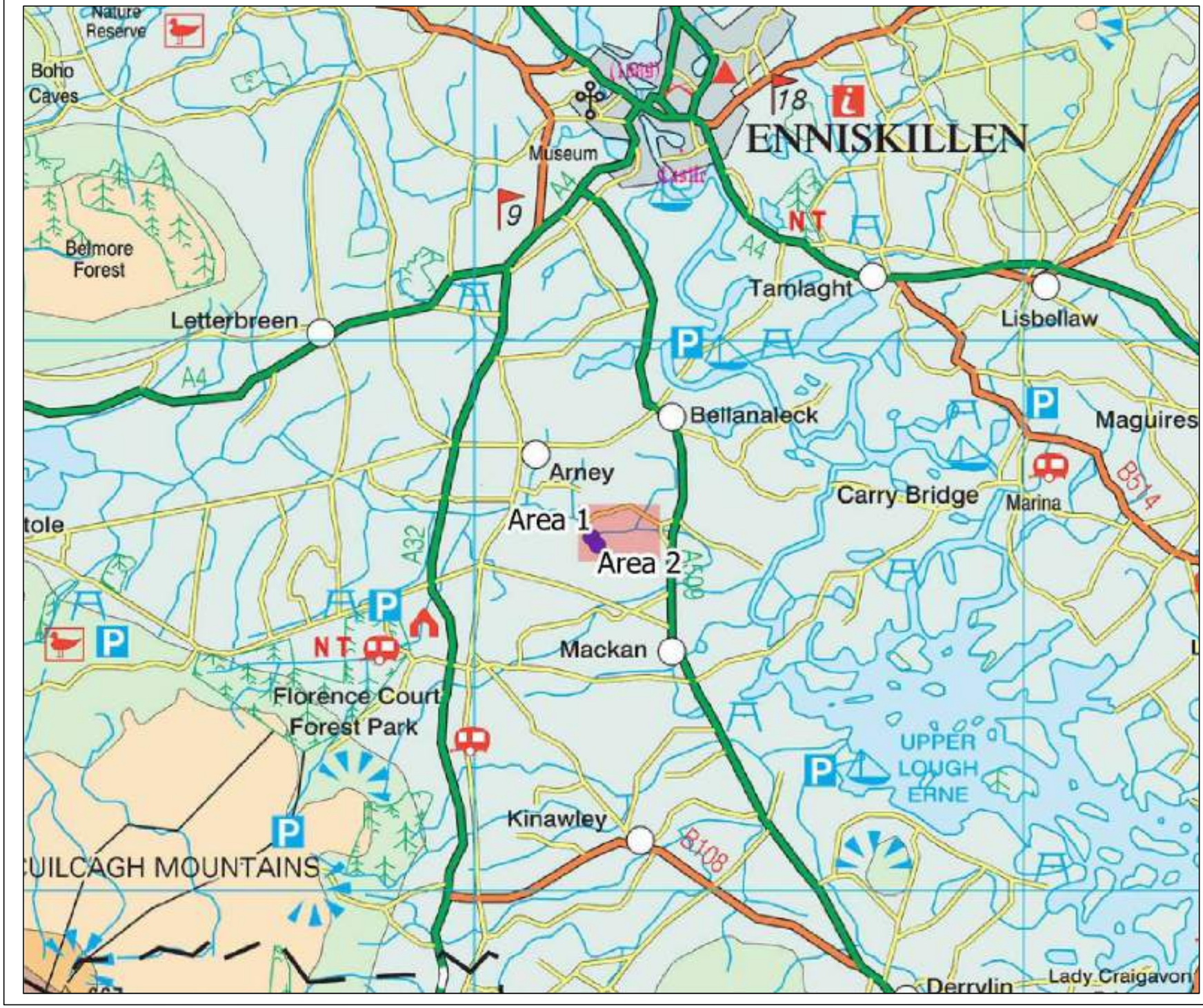
Geology: Anomalies of possible geomorphological origin.

Appendix 2: Geophysical Archive

- Two soft and hard copies of the archive are held by Earthsound Geophysics Ltd., at separate locations to ensure preservation against accidental damage or theft.
- The Client, Cuilcagh to Cleenish: A Great Place, holds further hard and soft copies of the archive.
- A hard copy and a soft copy will be deposited with the Historic Environment Division.







Legend

- Basemap
- Geophysical Survey Area

Site Location: Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

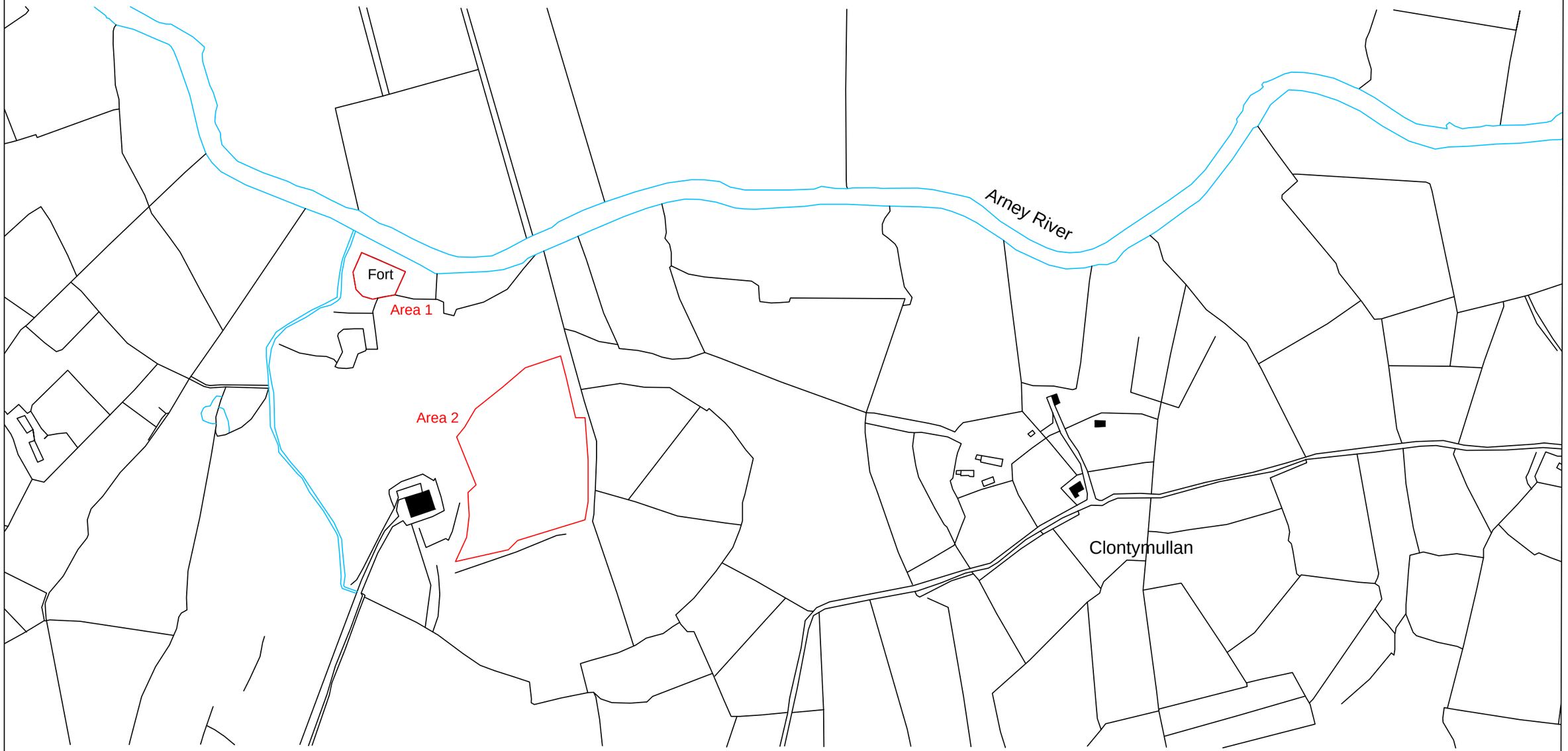
Client: Cuilcagh to Cleenish: A Great Place / NAC Ltd

Drawing Courtesy of: Earthsound	Date: 16/08/19	Drawing No.: 19-033/01

0m 2km 4km

Figure No. 1: Location map

EARTHSOUND geophysics



Legend

- Basemap
- Waterway
- Geophysical Survey Area

Site Location: Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

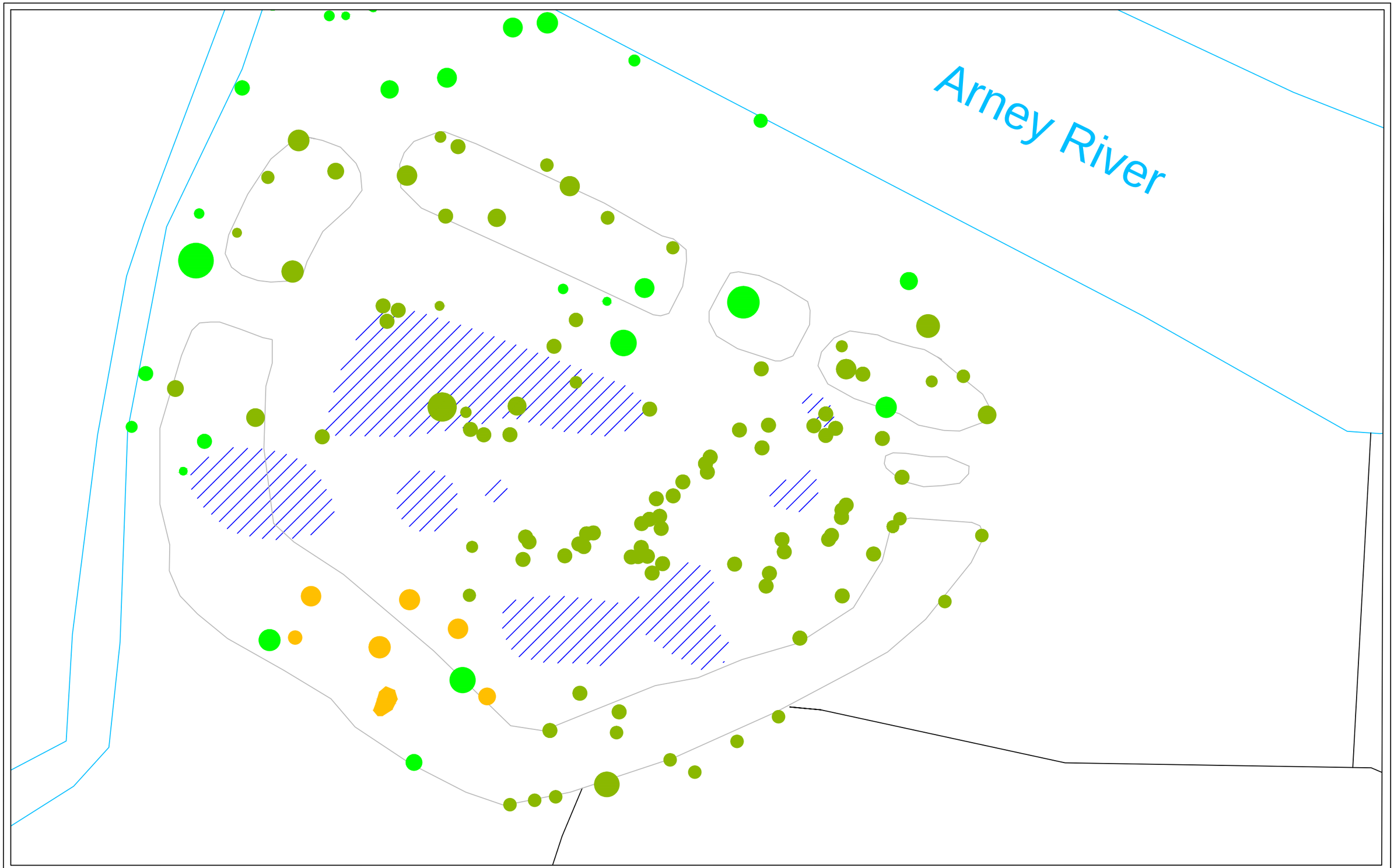
Client: Cuilcagh to Cleenish: A Great Place / NAC Ltd

Drawing Courtesy of: Earthsound	Date: 16/08/19	Drawing No.: 19-033/02

0m 100m 200m

Figure No. 2: Detailed location map

EARTHSOUND geophysics



Legend

- Basemap
- Waterway
- Approximate Location of Earthwork based on surveyors sketch drawing
- Waterlogged Area
- Tree Stump
- Tree
- Hole

Site Location: Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

Client: Cuilcagh to Cleenish: A Great Place / NAC Ltd

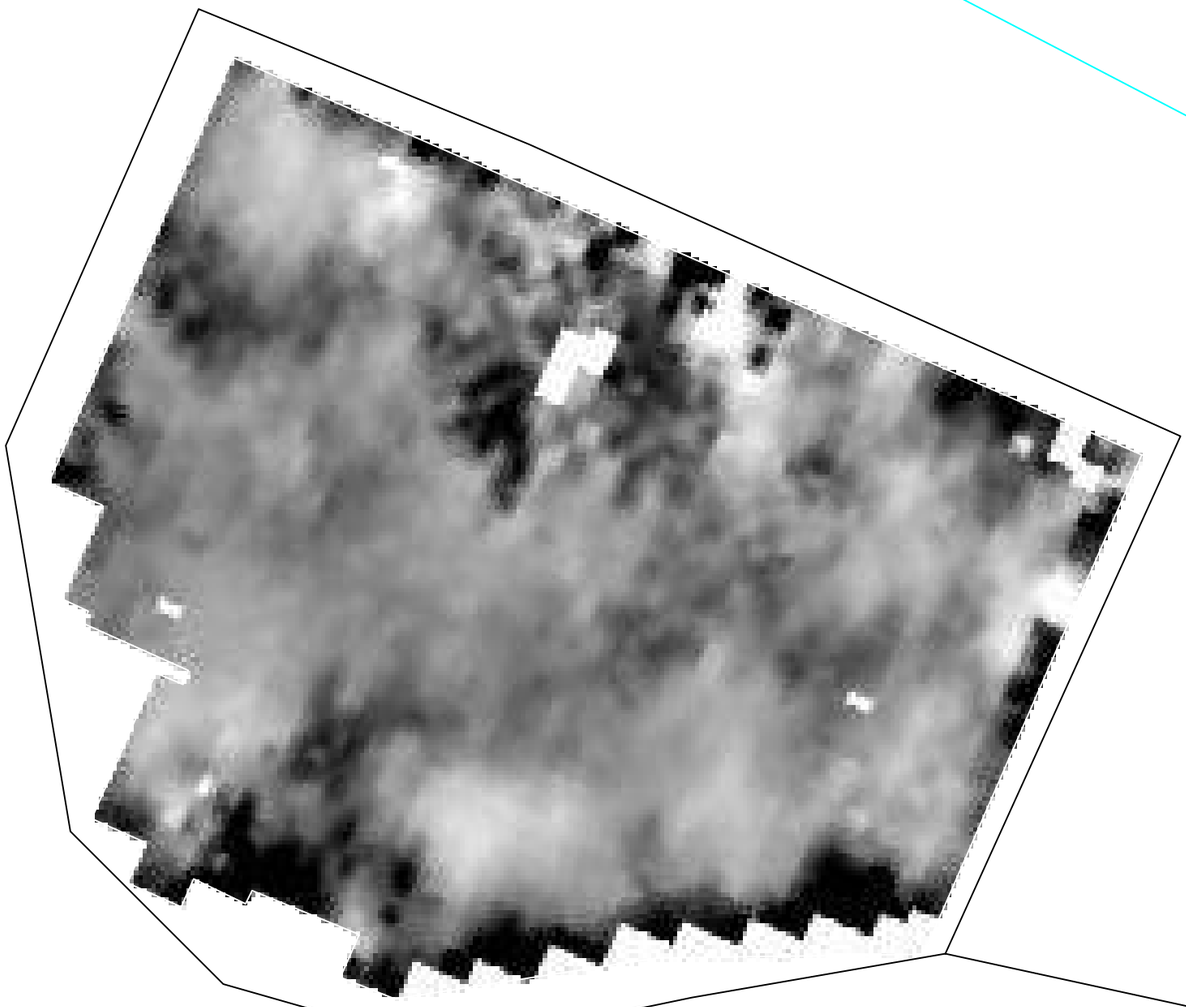
Drawing Courtesy of: Earthsound	Date: 3/10/19	Drawing No.: 19-033/03

0m 5m 10m

Figure No. 3: Arney Fort Detailed Map

EARTHSOUND geophysics

Arney River



Legend

Basemap

Waterway

Ohms

-30 28

Site Location: Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

Client: Cuilcagh to Cleenish: A Great Place / NAC Ltd

Drawing Courtesy of: Earthsound	Date: 17/09/19	Drawing No.: 19-033/04

0m 5m 10m

Figure No. 4: Earth Resistance data

EARTHSOUND geophysics

Arney River

R17
R11
R16
R12
R10
R6
R5
R7
R15
R14
R13
R8
R1
R2
R4
R3

Legend

- Basemap
- Waterway
- Low Resistance Anomaly - Dug or Cut Feature
- Low Resistance Zone - Disturbed Ground
- High Resistance Anomaly - Compacted Earth or Stone Feature
- High Resistance Zone - Compacted Earth or Stone Area

Ohms
-30 28

N

Site Location: Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

Client: Cuilcagh to Cleenish: A Great Place / NAC Ltd

Drawing Courtesy of: Earthsound	Date: 24/09/19	Drawing No.: 19-033/05

0m 5m 10m

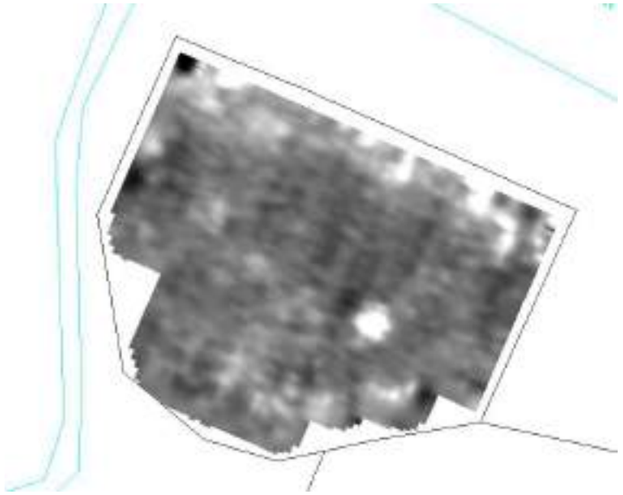
Figure No. 5: Earth Resistance interpretation

EARTHSOUND geophysics

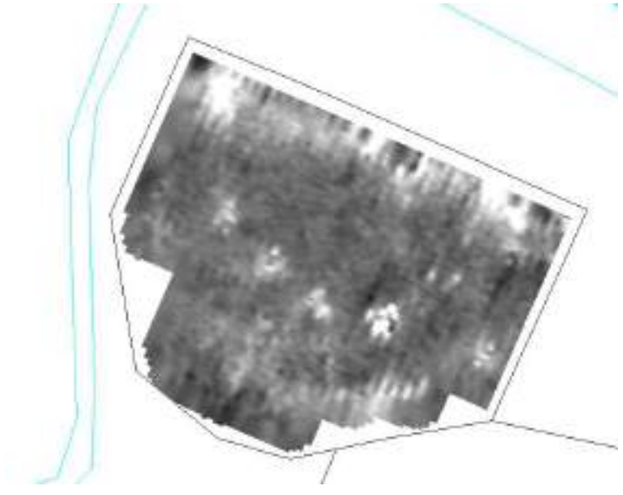
Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

Figure 6: Combined Electromagnetic Data

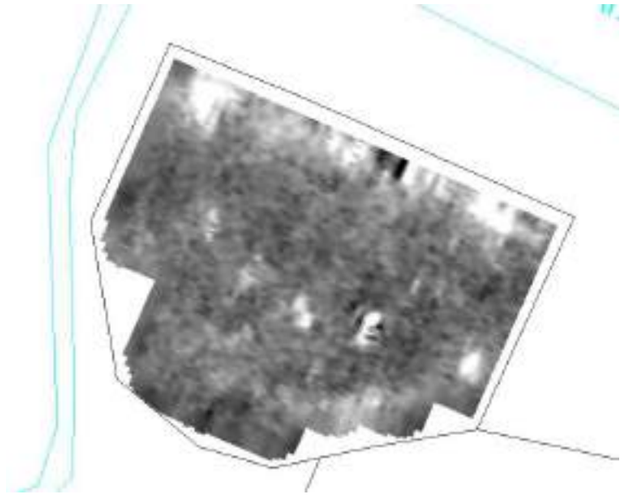
Apparent Magnetic Susceptibility Level 1



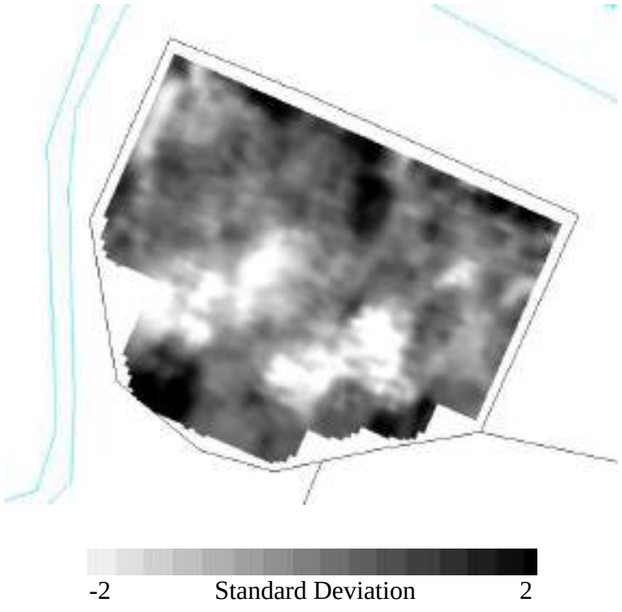
Apparent Magnetic Susceptibility Level 2



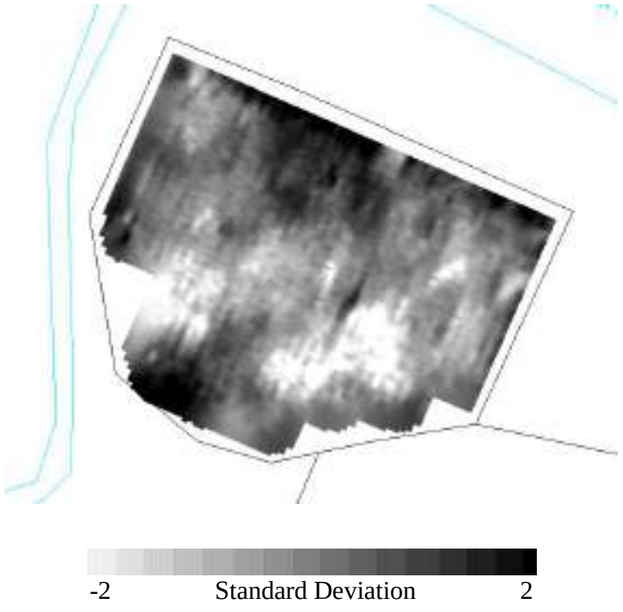
Apparent Magnetic Susceptibility Level 3



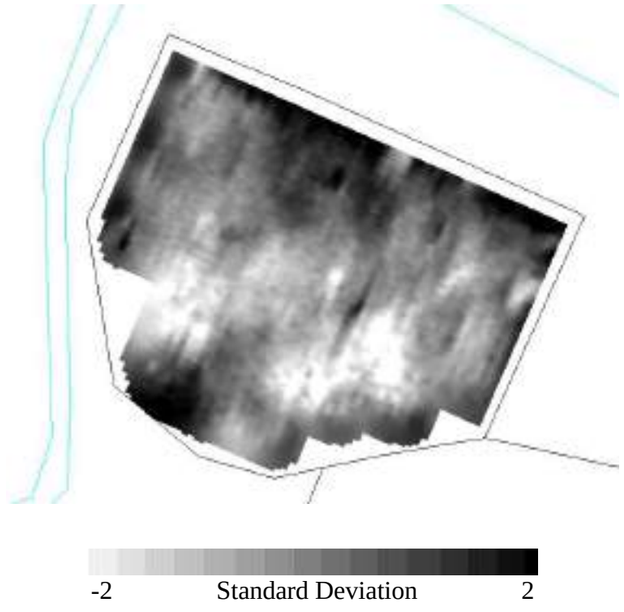
Apparent Electrical Resistivity Level 1



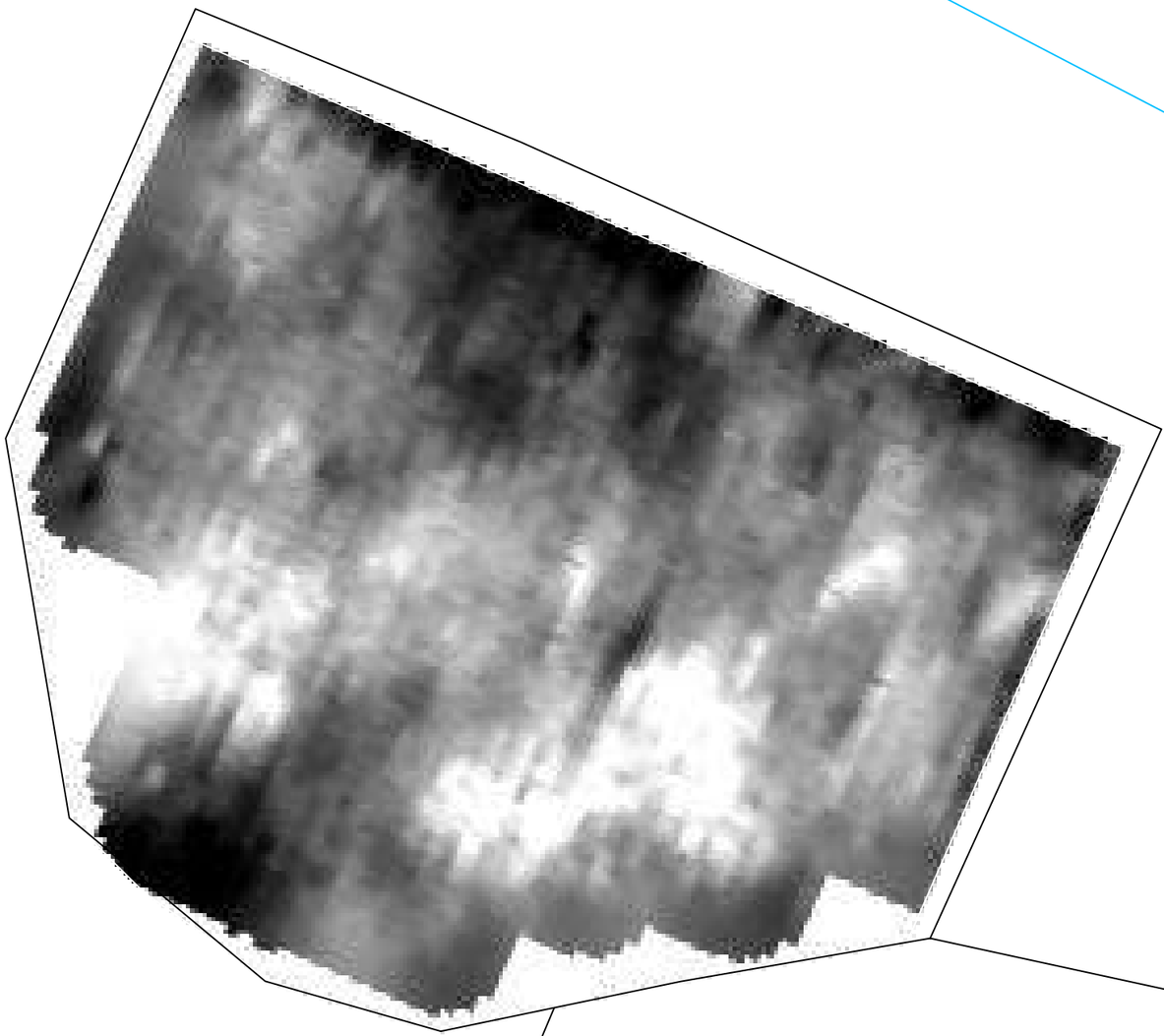
Apparent Electrical Resistivity Level 2



Apparent Electrical Resistivity Level 3



Arney River



Legend

Basemap

Waterway

mS/m

-2 Standard Deviation 2

N

Site Location: Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

Client: Cuilcagh to Cleenish: A Great Place / NAC Ltd

Drawing Courtesy of: Earthsound	Date: 17/09/19	Drawing No.: 19-033/07

0m 5m 10m

Figure No. 7: Apparent Electrical Resistivity data

EARTHSOUND geophysics

Arney River

E12
E9
E8
E10
E7
E11
E6
E3
E5
E4
E1
E2

Legend

- Basemap
- Waterway
- Low Resistivity Anomaly - Dug or Cut Feature
- Low Resistivity Zone - Disturbed Ground
- High Resistivity Anomaly - Compacted Earth or Stone Feature
- High Resistivity Zone - Compacted Earth or Stone Area

mS/m

-2 Standard Deviation 2

N

Site Location: Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

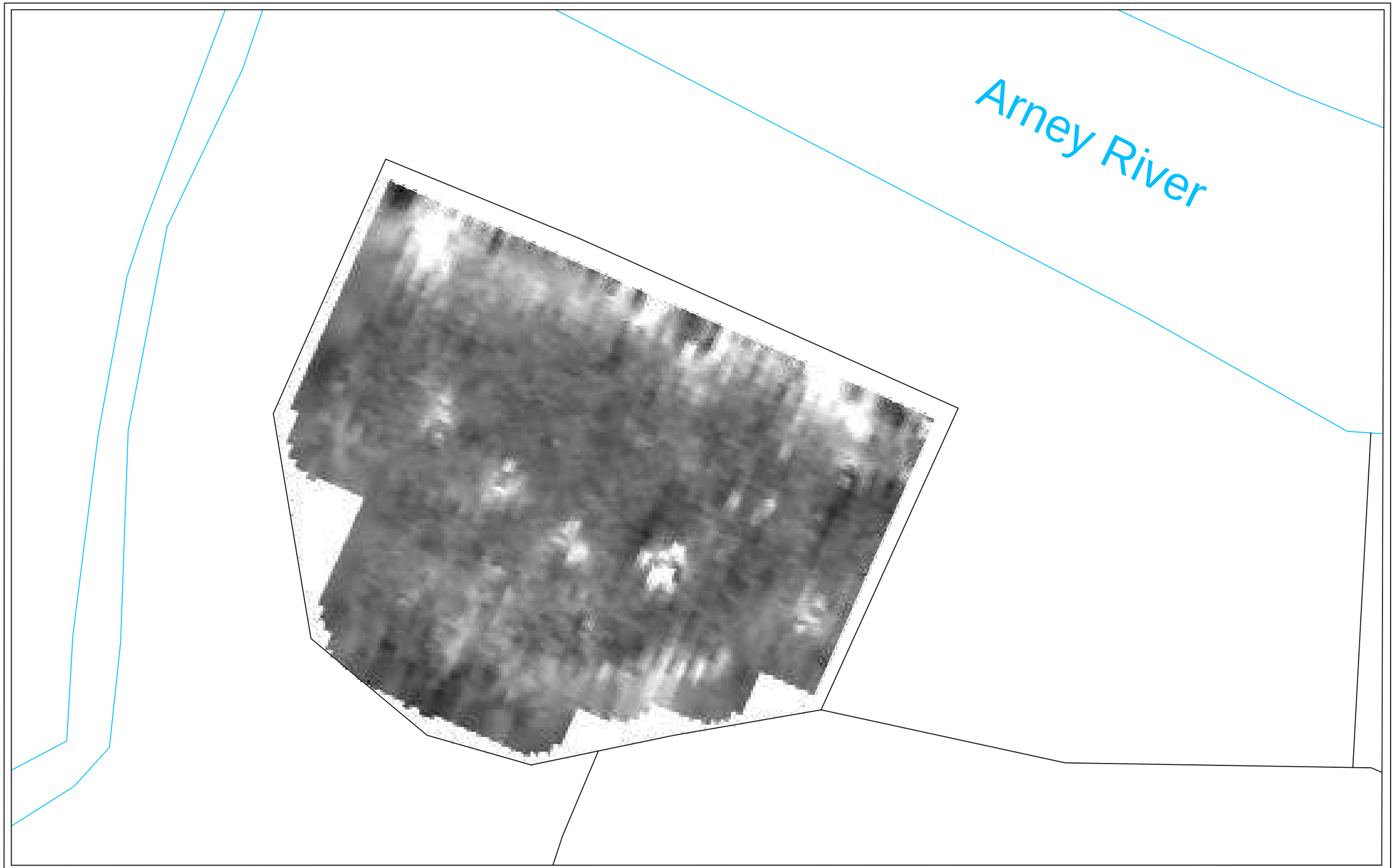
Client: Cuilcagh to Cleenish: A Great Place / NAC Ltd

Drawing Courtesy of: Earthsound	Date: 25/09/19	Drawing No.: 19-033/08

0m 5m 10m

Figure No. 8: Apparent Electrical Resistivity interpretation

EARTHSOUND geophysics



Legend

Basemap

Waterway

ppt

-3 Standard Deviation 3

N

Site Location: Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

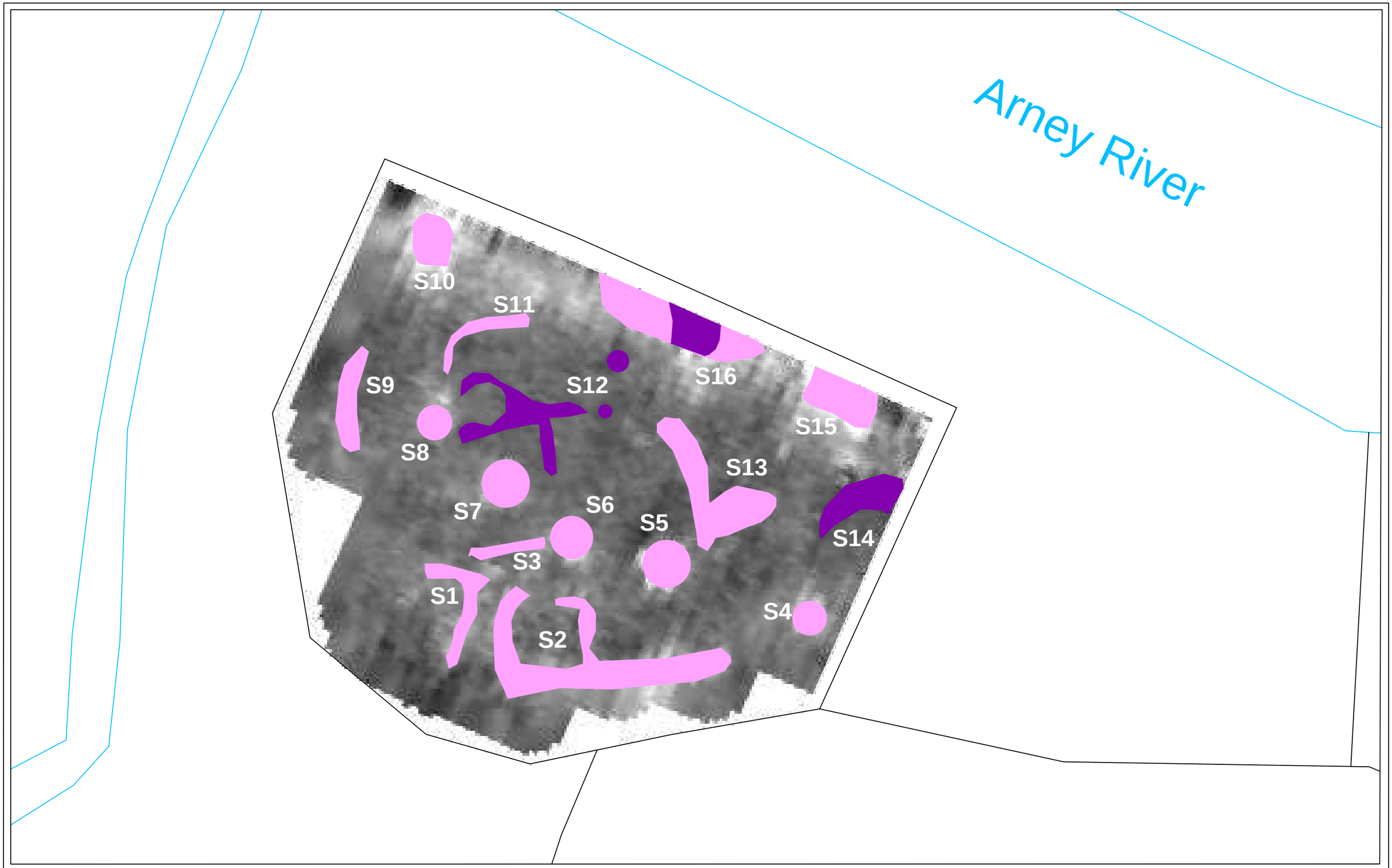
Client: Cuilcagh to Cleenish: A Great Place / NAC Ltd

Drawing Courtesy of: Earthsound	Date: 17/09/19	Drawing No.: 19-033/09

0m 5m 10m

Figure No. 9: Apparent Magnetic Susceptibility data

EARTHSOUND geophysics



Legend

Basemap

Waterway

Low Magnetic Susceptibility Anomaly - Stone or Clay

Raised Magnetic Susceptibility Anomaly - Enhanced Soils

ppt

-3 Standard Deviation 3

N

Site Location: Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

Client: Cuilcagh to Cleenish: A Great Place / NAC Ltd

Drawing Courtesy of: Earthsound	Date: 27/09/19	Drawing No.: 19-033/10

0m 5m 10m

Figure No. 10: Apparent Magnetic Susceptibility interpretation

EARTHSOUND geophysics

Arney River

Legend

- Basemap
- Waterway
- Possible Structural Remains
- Possible Surface
- Possible Ditch
- Possible Pit or Stone Foundations

N

Site Location: Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

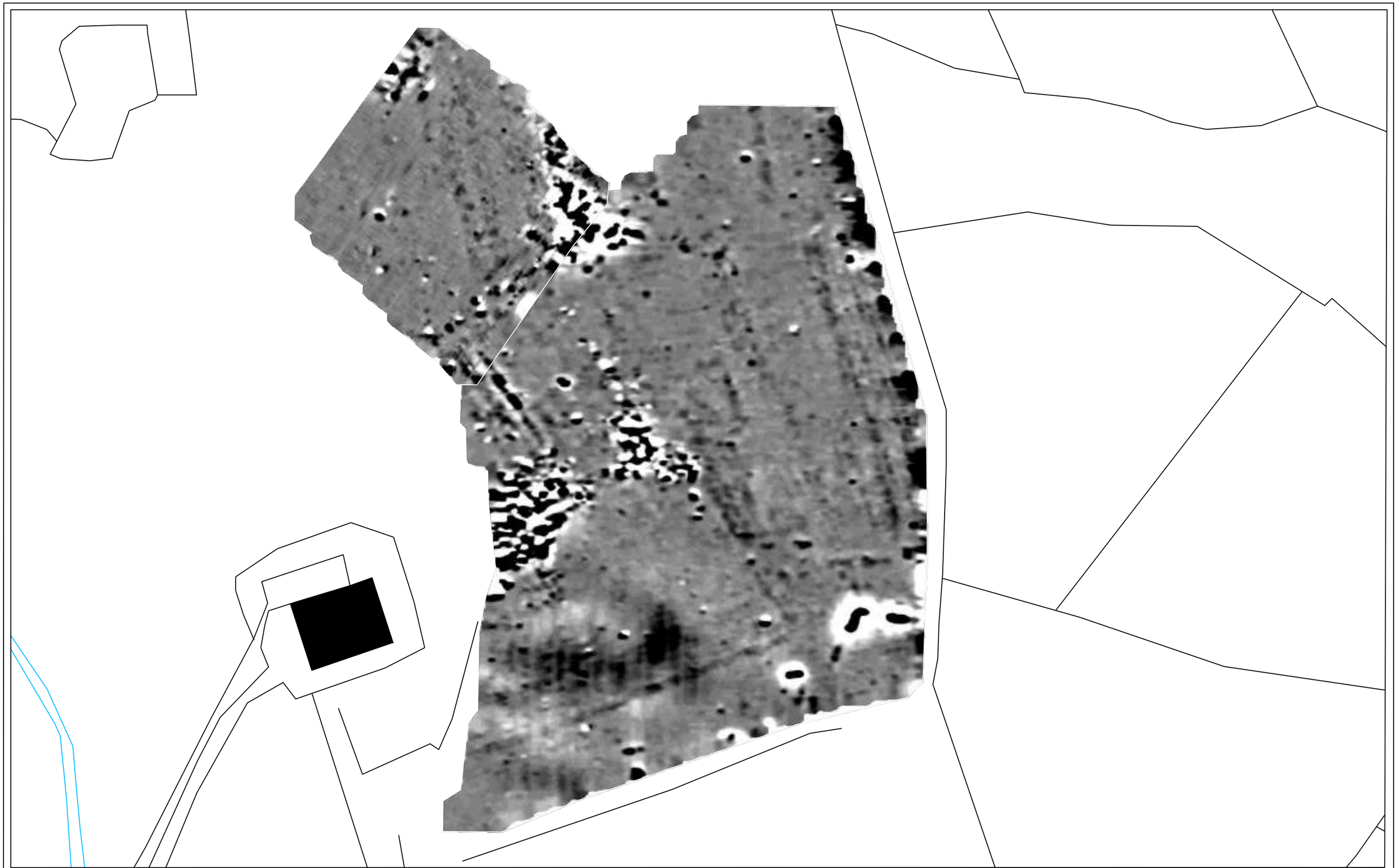
Client: Cuilcagh to Cleenish: A Great Place / NAC Ltd

Drawing Courtesy of: Earthsound	Date: 2/10/19	Drawing No.: 19-033/11

0m 5m 10m

Figure No. 11: Simplified Combined Interpretation - Arney Fort

EARTHSOUND geophysics



Legend

Basemap

Waterway

nT

-2 2

N

Site Location: Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

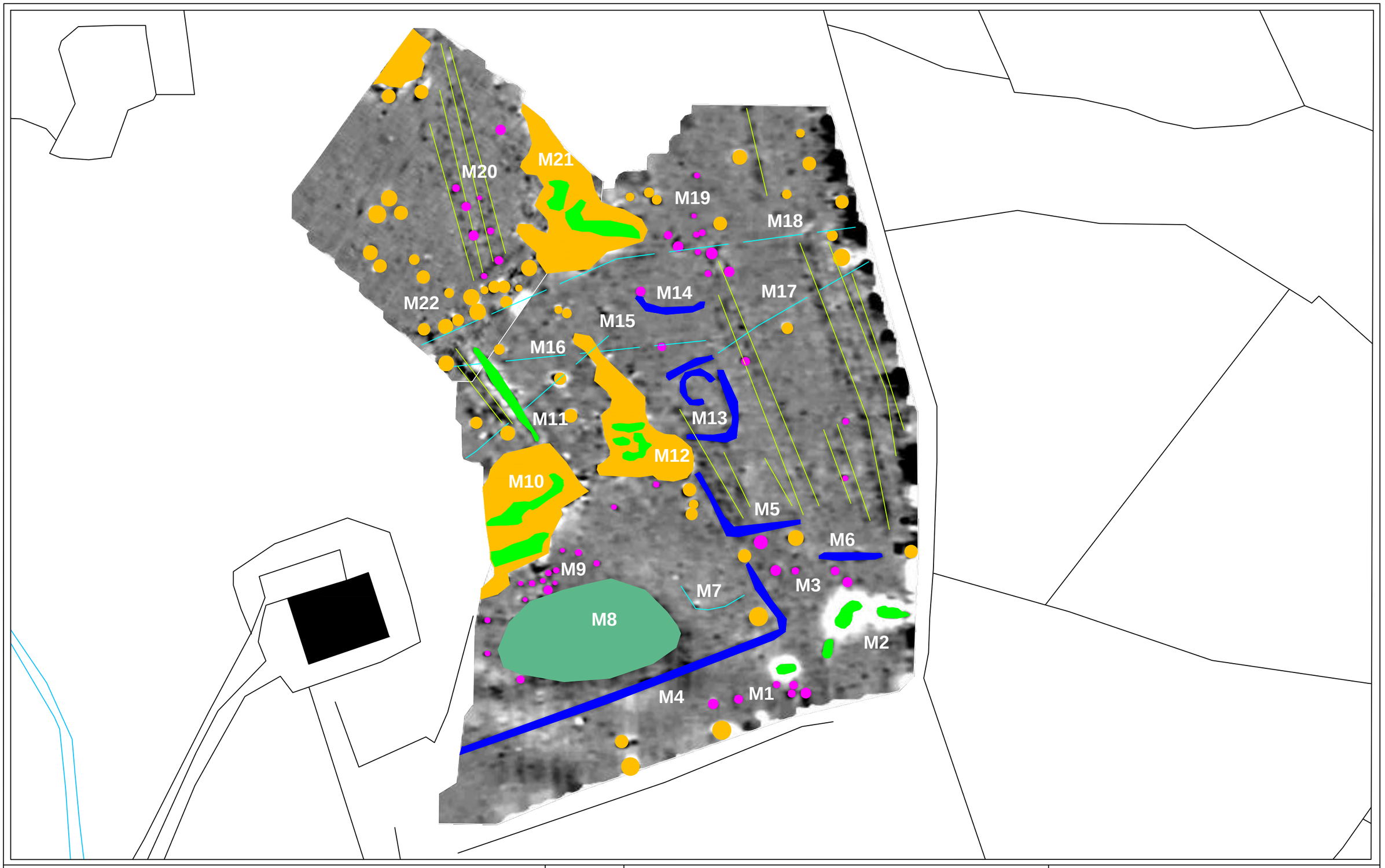
Client: Cuilcagh to Cleenish: A Great Place / NAC Ltd

Drawing Courtesy of: Earthsound	Date: 16/09/19	Drawing No.: 19-033/12

0m 30m 60m

Figure No. 12: Magnetometer data

EARTHSOUND geophysics



Legend

- Basemap
- Waterway
- Ditch or Cut Feature
- Possible Pits
- Area of Metallic Remains
- Highly Magnetic Feature - Metal or Burning
- Trend
- Probable Agricultural Feature
- Geology

nT
-2 2

Site Location: Investigations into Arney Fort and Drumlin, Clontymullan, Co. Fermanagh

Client: Cuilcagh to Cleenish: A Great Place / NAC Ltd

Drawing Courtesy of: Earthsound | Date: 26/09/19 | Drawing No.: 19-033/13

0m 30m 60m

Figure No. 13: Magnetometer Interpretation

EARTHSOUND geophysics