TOBIN

# Rooaunalaghta Green Energy Project

## Appendix 16-6
## Geophysical Survey Report

ROOAUNALAGHTA
Green Energy

BUILT ON KNOWLEDGE

# Report on an Archaeological Geophysical Survey at Rooaunalaghta Windfarm, Co. Mayo

Archaeological
Management Solutions



**By Finn Melia & Dr James Bonsall**

**Detection Device Consent No: 26R0503**

**For Greensource**

**October 2026**

## TITLE PAGE

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Note that the geophysical properties of subsurface features must contrast sufficiently with the surrounding soils/background variation and 'noise' to enable them to be detected and mapped using geophysical methods. As such, the clarity and definition of buried features can vary considerably, with some having well-defined signatures while others, lying on the threshold of background noise, are only barely visible or not visible at all, in geophysical imagery. A lack of geophysical anomalies cannot be taken to imply a lack of archaeological features. Some geophysical anomalies may be verified as archaeological remains via intrusive means.

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# Executive Summary

This report describes the results of an archaeological geophysical survey undertaken within the townlands of Cloghmoyne, Carrowoughteragh, Brodullagh South, and Kinlough, Co. Mayo under Detection Device Consent No. 26R0503. The survey was undertaken by Archaeological Management Solutions (AMS) for Greensource on 23 September 2026 and was required as part of an archaeological assessment in advance of a proposed development. The investigation comprised approximately 8ha of high-resolution magnetometry survey across five Survey Areas in advance of the proposed Rooaunalaghta Windfarm development.

The survey successfully characterised geophysical responses across the site. Areas 1–4 contained no substantial anomalies indicative of archaeological remains. The responses in these areas were predominantly associated with near-surface limestone geology, agricultural activity and localised modern or ferrous disturbance. No anomalies corresponding with the nearby Recorded Monuments: (MA123-041001- ; hillfort) and (MA123-041002-; hut site) were identified in Area 3, while no evidence corresponding with (MA123-038----; field system) (also a Recorded Monument) was identified in Area 4. The eastern part of Area 4 was unsuitable for survey due to outcropping bedrock and very shallow near-surface geology.

Area 5 contained the only anomalies of potential archaeological significance. Anomaly 1 is a clear C-shaped response, approximately 3m in radius, which may represent a hut site. Anomaly 2 is a sub-rectangular response measuring approximately 13m by 7m and may represent a pair of ditches. Anomalies 3 and 4 are weaker circular or C-shaped responses that may be archaeological, although their interpretation remains uncertain. Anomaly 5 is an elongated C-shaped response approximately 47m long that may represent a ditch or a natural change in the near-surface geology. Its eastern edge extends into the proposed development area, whereas Anomalies 1–4 lie outside it.

Although much of Area 5 lies within the Zone of Notification (ZoN) of Recorded Monument (MA123-042---- ; ringfort – cashel), no anomalies indicative of archaeological remains were identified within the ZoN. Overall, the survey identified a limited concentration of possible archaeological remains in Area 5, but the weaker responses cannot be confidently distinguished from natural geological variation.

**Please note that the National Monuments Service of the Department of Housing, Local Government and Heritage, the National Museum of Ireland and the local planning authority may issue recommendations/ conditions regarding further investigation and management of the geophysical anomalies described in this report.**

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## Abbreviations and Acronyms

| Abbreviation/Acronym | Definition |
|---|---|
| **AMS** | Archaeological Management Solutions |
| **ATV** | All-Terrain Vehicle |
| **DHLGH** | Department of Housing, Local Government and Heritage |
| **DIER** | Database of Irish Excavation Reports |
| **GIS** | Geographic Information System |
| **GSI** | Geological Survey Ireland |
| **Hz** | Hertz |
| **ITM** | Irish Transverse Mercator |
| **m** | Metre |
| **NIAH** | National Inventory of Architectural Heritage |
| **NMS** | National Monuments Service |
| **nT** | nanoTesla |
| **OD** | Ordnance Datum |
| **OS** | Ordnance Survey |
| **SMR** | Sites and Monuments Record |
| **RMP** | Record of Monuments and Places |
| **ZoN** | Zone of Notification |

## Coordinate Reference System

All grid coordinates in this report use the Irish Transverse Mercator (ITM) coordinate reference system unless otherwise stated.

# 1 Introduction

## 1.1 Project Background

This report describes the results of an archaeological geophysical survey undertaken within the townlands of Cloghmoyne, Carrowoughteragh, Brodullagh South, and Kinlough, Co. Mayo under Detection Device Consent No. 26R0503 (Figure 1). The survey was undertaken by Archaeological Management Solutions (AMS) for Greensource on 23 September 2026 and was required as part of an archaeological assessment in advance of a proposed windfarm development. The investigation comprised high-resolution magnetometry survey.

## 1.2 Aim and Scope of the Survey

The primary aim of the geophysical survey was to determine the likely presence of archaeological remains within the Survey Area. The survey involved:

- identifying geophysical anomalies of possible archaeological origin within the specified Survey Area,
- accurately locating these anomalies and presenting the findings in map form,
- describing the anomalies and discussing their likely provenance,
- incorporating all the above into a report for the Client, and
- preparing and submitting the archive of the project data and report to the relevant statutory authorities.

For a more detailed discussion of the methods used, see Section 2.

## 1.3 Site Location

The Survey Area is located in the townlands of Cloghmoyne, Carrowoughteragh, Brodullagh South, and Kinlough, located in the civil parish of Shrule within the barony of Kilmaine, Co. Mayo (Figure 2).

## 1.4 Soils and Geology

Survey Areas 1, 2 and 4 are located on a bedrock of pale grey massive limestone (Oakport Limestone Formation; GSI 2026). Survey Areas 3 and 5 are located on a bedrock of dark fine limestone and calcareous shale (Oldchapel Limestone Formation). The quaternary comprises karstified bedrock outcrop or subcrop across all areas except for Survey Area 5 and the western half of Survey Area 4, which comprise till derived from limestones. The soils across all areas are well-draining fine loamy over limestone bedrock except for Survey Area 1 which is a well-draining fine loamy drift with limestones.

## 1.5 Archaeological Background

### *1.5.1 Previously Recorded Archaeological Sites and Monuments*

There are no archaeological sites listed in the Sites and Monuments Record (SMR) within any of the Survey Areas, although the Zone of Notification (ZoN) of a Recorded Monument (MA123-042----; ringfort – cashel) listed on the Record of Monuments and Places (RMP) intersects Survey Area 5 (Figure 7). Recorded archaeological sites in the SMR are present in the wider landscape, the most significant of which are two Recorded Monuments (MA123-041001-; hillfort) and (MA123-041002-; hut site), located 130m west of Survey Area 3 (Figure 5). Additionally, there are a total of 20 SMR sites recorded within 500m of the proposed Survey Areas (see Table 1 below).

**Table 1: Recorded archaeological sites and monuments in the vicinity of the Survey Area.**

| Ref. No. | Classification | Townland | ITM (centroid) |
|---|---|---|---|
| **MA123-015----** | Ringfort – cashel | Carrowoughteragh | 524027, 751973 |
| **MA123-015001-** | Souterrain | Carrowoughteragh | 524027, 751971 |
| **MA123-016----** | Enclosure | Cahernbrock | 524443, 752085 |
| **MA123-017----** | Enclosure | Cahernbrock | 524554, 752100 |
| **MA123-022----** | Earthwork | Brodullagh South | 526195, 752246 |
| **MA123-023----** | Ringfort – cashel | Brodullagh South | 526254, 752215 |
| **MA123-024----** | Enclosure | Brodullagh South | 525902, 751948 |
| **MA123-024001-** | Burial ground | Brodullagh South | 525902, 751950 |
| **MA123-033----** | Enclosure | Ballisnahyny (Kilmaine By., Kilmainebeg Par.) | 522608, 750364 |
| **MA123-036----** | Ringfort – cashel | Carrowoughteragh | 523722, 750939 |
| **MA123-037----** | Enclosure | Cloghmoyne | 523507, 750154 |
| **MA123-038----** | Field system | Brodullagh South | 524873, 751780 |
| **MA123-041001-** | Hillfort | Brodullagh South, Kinlough | 525357, 751434 |
| **MA123-041002-** | Hut site | Kinlough | 525353, 751452 |
| **MA123-042----** | Ringfort – cashel | Brodullagh South | 525802, 751722 |
| **MA123-043001-** | Ringfort – cashel | Kinlough | 525859, 751396 |
| **MA123-043002-** | Souterrain | Kinlough | 525850, 751394 |
| **MA123-044----** | Ringfort – cashel | Brodullagh South | 526018, 751568 |
| **MA123-045----** | Enclosure | Kinlough | 525927, 751186 |
| **MA123-067005-** | Burnt mound | Toorard (Kilmaine By.) | 524970, 750966 |

### *1.5.2 Previous Archaeological Investigations*

According to the Database of Irish Excavation Reports (DIER), no previous archaeological investigations have occurred within the Survey Areas, or within 500m of their location.

### *1.5.3 Cartographic Analysis*

Historical mapping indicates that there has been very little change to the layout of the lands within the Survey Areas since the first-edition six-inch Ordnance Survey (OS) map was published in 1840 (sheet MO-123, surveyed 1837).

# 2 Methodology

## 2.1 Personnel

The survey was undertaken by Finn Melia and Jeff O'Neill (Archaeological Geophysical Directors).

## 2.2 Method Selection

The geophysical investigation comprised a high-resolution magnetometry survey. The rationale for selecting this method is based on the geological and archaeological conditions present across the site. As noted above in Section 1.4, the underlying bedrock geology is mostly comprised of near surface limestones. These geological conditions are generally considered suitable for magnetometer survey.

The methodology was approved by the Archaeological Licensing Section of the National Monuments Service (NMS) and consent to use a detection device under Section 2 (2) of the National Monuments (Amendment) Act 1987 was issued to Finn Melia by the Minister for Housing, Local Government and Heritage under Detection Device Consent No. 26R0503. The report was written by Finn Melia & Dr James Bonsall.

## 2.3 Magnetometry Survey

The magnetometry survey recorded the vertical magnetic gradient using a fluxgate gradiometer (Table 2). This technique measures variations in the magnetic properties of the soils. It is widely used in archaeological geophysical prospection due to its ability to detect and map a broad range of subsurface archaeological remains, including cut features such as ditches and pits, and thermoremanent features such as burnt or fired features associated with metalworking and pottery production (Aspinall et al. 2008).

**Table 2: Magnetometry data acquisition, processing and display.**

| Variable | Information |
|---|---|
| **Magnetometer type** | Fluxgate gradiometer |
| **Magnetometer probe** | Five Sensys FGM650/3 probes per cart system |
| **Resolution** | 0.2nT |
| **System** | Sensys MAGNETO MX PDA 5 Channel cart system |
| **No. of Systems used** | One |
| **Method of acquisition** | ATV-acquired using a 2023 CFMOTO CFORCE 450 quad bike and an OXP Geophysics Cart (carbon fibre, non-magnetic cart) |
| **Gridding method** | Acquired gridlessly with Sensys MonMX Lite Software connected to a Carlson BRX7 GNSS Smart Antenna RTK GPS |
| **Gridding accuracy** | 0.1m |
| **Probe spacing** | 0.5m |
| **Sample rate** | 10Hz |

| Variable | Information |
|---|---|
| **Data Processing steps** | The magnetometry and GPS data were processed through Geoserver, followed by DLMGPS 4.01-12 and finalised in Sensys MAGNETO 3.01-14.<br>MAGNETO software was used for trace correction and equalisation. |
| **Gridded sample resolution** | 0.5m x 0.25m |
| **Data visualisation** | The data were imported into QGIS as a GeoTIFF for display and interpretation as greyscale images. |
| **Dynamic range** | ±3nT (Figures 8–12) |

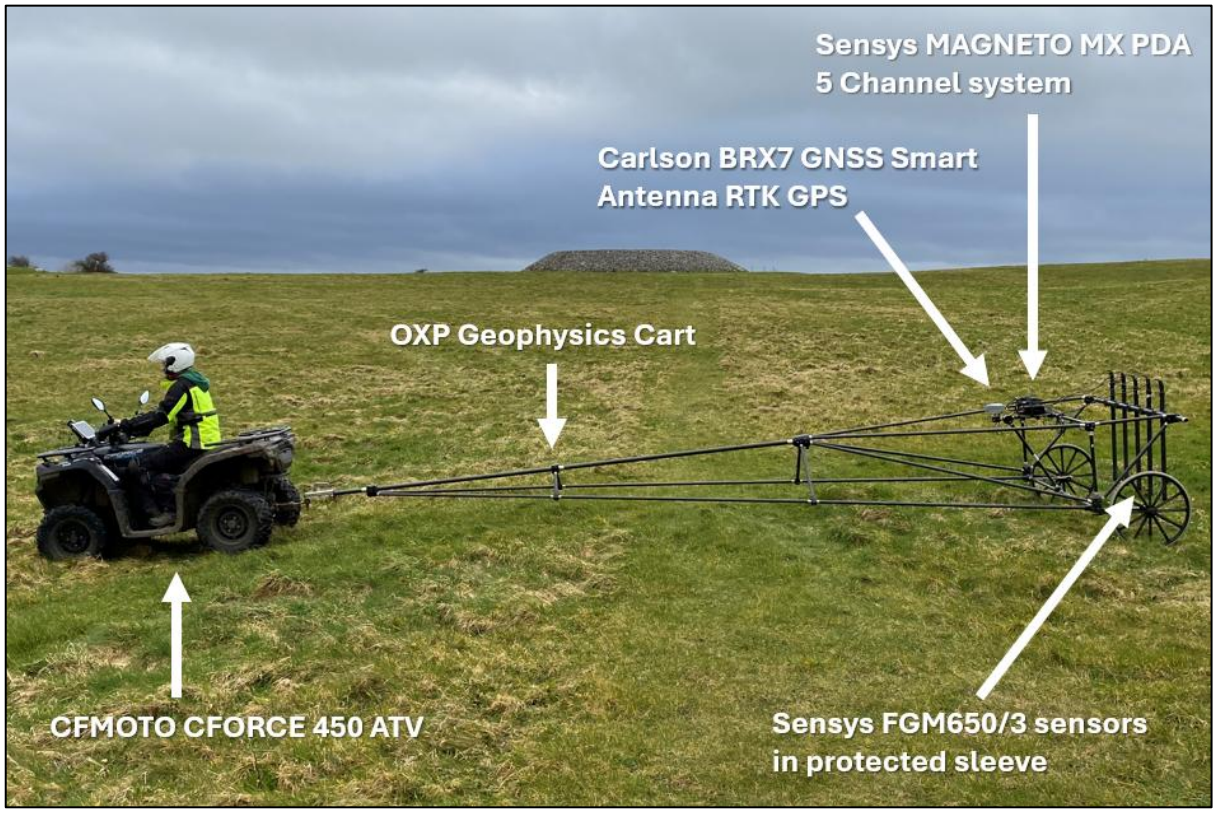



**Plate 1. Example of a magnetometry survey in progress using an ATV-powered cart.**

## 2.4 Geophysical Data Management, Processing, and Interpretation

A variety of computer software programmes were used to acquire and process the geophysical data, produce the visualisations, and to fully analyse the archaeological remains (Table 3). QGIS was used as a Geographic Information System (GIS) to manage the data generated by the survey and to compare the visualisations with other relevant geospatial databases, record the analysis through digitising the morphology and magnitude of anomalies identified, and output a table catalogue of this analysis and corresponding maps. For the purposes of this survey, the datasets outlined below in Table 4 were also accessed and/or downloaded.

**Table 3: Software Used**

| Software | Version | Description | Source |
|---|---|---|---|
| **DLMGPS** | 4.01 | DLMGPS is a software tool for managing, interpreting, and exporting GPS coordinates linked to measurement data. It supports input from handheld devices and multichannel systems, integrating diverse data into one project. DLMGPS allows exports to geophysical software like MAGNETO®, supports multiple coordinate systems (WGS84, UTM, ITM), and includes tools for map alignment, layout customisation, and spatial calculations. Its user-friendly interface simplifies complex coordinate transformations and survey data processing. | Sensys |
| **MAGNETO®** | 3.0 | MAGNETO® is a geophysical software tool for analysing and visualising measurement data that combines advanced semi-automatic analysis functions with powerful visualisation tools. | Sensys |
| **MonMX®** | | MonMX® Software is the control and data management platform for the MAGNETO® MXPDA measurement system. It enables system configuration, GNSS monitoring, and real-time data acquisition within a structured, project-based environment. MonMX® stores georeferenced and locally coordinated data, provides survey feedback, and supports data export. | Sensys |
| **QGIS** | 3.28.14-Firenze | QGIS is an open-source GIS which can be used to create, edit, visualise, analyse and publish geospatial information. This project used the long-term release version of the software as the basic platform to access, view and analyse the geophysical visualisations. QGIS also allowed us to compare these visualisations with other relevant geospatial databases, record the analysis through digitising anomalies, and output this analysis and maps. | https://www.qgis.org/en/site/ |

**Table 4: Public datasets used.**

| Dataset | Originator | Link |
|---|---|---|
| **Historical maps and orthographic photographs** | Tailte Éireann (formerly Ordnance Survey Ireland) | https://osi.maps.arcgis.com/apps/webappviewer |
| **National Inventory of Architectural Heritage (NIAH)** | Department of Housing, Local Government and Heritage | https://data.gov.ie/dataset/national-inventory-of-architectural-heritage-niah-national-dataset |
| **National soils database** | Geological Survey Ireland | https://gis.epa.ie/GetData |
| **Rivers and lakes** | Geological Survey Ireland | https://gis.epa.ie/GetData |
| **Sites and Monuments Record (SMR)** | Archaeological Survey of Ireland | https://data.gov.ie/dataset/national-monuments-service-archaeological-survey-of-ireland |

| Dataset | Originator | Link |
|---|---|---|
| **Townlands** | Tailte Éireann (formerly Ordnance Survey Ireland) | https://www.arcgis.com/home/item.html?id=eaf49e95c55a4271ac980dfa726e401e#overview |

The following vector layers were generated for the project as shapefiles:

- Polygons for the Survey Areas.
- Polygons and/or polylines for each identified geophysical anomaly.

The dimensions of individual anomalies were calculated in QGIS using the measure tools. All anomalies are defined by polygons and/or polylines.

## 2.5 Interpretation Categories

Each digitised anomaly was classified according to an interpretation category (Table 5).

**Table 5: Interpretation categories.**

| Variable | Information |
|---|---|
| **Archaeology** | Where the signal is clear and coherent, strongly resembling known archaeological morphologies (e.g., an enclosure). These anomalies are strongly indicative of archaeological remains, supported by existing records, remote sensing, or diagnostic morphology. Typically shows abrupt transitions suggesting cut features. High-temperature features are classified under 'Industrial' and 'Area of Burning'; ferrous anomalies are listed separately. |
| **Possible Archaeology** | As above, but where the signal is less clear and an archaeological cause is less certain. Anomalies may represent either an archaeological origin or a natural origin (such as iron pan, a doline or other natural feature that mimics the morphology of an archaeological feature). Still displays clear edges and transition patterns similar to features such as pits or ditches, but the signal may be weaker. |
| **Area of Enhancement** | In magnetometry data, this presents as broad, diffuse or amorphous spreads of positive magnetic enhancement that are not associated with a discrete feature. These could represent archaeology, geology, soil noise, or occupationally enhanced soils. |
| **Industrial** | Anomalies that suggest thermoremanence (i.e., remains that have been subject to high temperature with morphologies that match those of kilns, furnaces etc.). Considered potentially archaeological, although modern burning events will also create such an anomaly. |
| **Area of Burning** | Anomalies that suggest thermoremanence (i.e., remains that have been subject to high temperature with morphologies that match those of hearths or burnt mounds). Considered potentially archaeological, although modern burning events will also create such an anomaly. |
| **Historical Feature** | Corresponds with features mapped historically, supported by evidence from historical OS maps or aerial photographs, such as former buildings, field boundaries, paths, or quarries. May reflect changes through time. |
| **Unclear Origin** | Weak, discontinuous, or isolated features lacking clear context. Could be archaeological, natural, agricultural, or modern in origin. |
| **Agricultural** | Features linked to farming practices, either modern or historic. May be informed by field inspection or aerial images. Includes access tracks and unrecorded ploughing. |

| Variable | Information |
|---|---|
| **Ridge and Furrow / Rig and Furrow** | Broad, regular linear or slightly curved anomalies with alternating magnetic or resistivity signatures. Reflect historic cultivation, often showing multiple orientations and distinct headlands. |
| **Ploughing Trend** | Regular linear features or textural shifts parallel to field boundaries, indicating headlands or repetitive ploughing. |
| **Drain** | Magnetic linear anomalies with alternating polarity, typically representing ceramic drains. May appear in dendritic or herringbone layouts. |
| **Geology / Natural** | An unambiguous response created by geology or soil noise, which can include palaeochannels, igneous dykes, near surface cropping or spreads of glacial material. These can also appear as irregular, weak anomalies with gradual value changes, reflecting natural soil or geological variability. |
| **Pipe** | Strong, dipolar linear anomalies with disturbance haloes, indicative of buried services like pipes or cables. |
| **Interference** | In magnetometry data, this presents as magnetic disturbance usually created by responses from nearby fences, pylons, vehicles or structures, as well as interference derived from overhead powerlines, electrical substations and radio antennae. Can obscure underlying features. |
| **Ferrous** | Localised, strong magnetic responses from iron-rich debris on or below the surface. Commonly associated with manuring, demolition rubble, or track surfacing. Unlike general magnetic disturbance, they align directly with the source object. This anomaly is visible in magnetometry data as a clear dipolar signal. These could relate to any post-Iron Age period, but are mostly associated with modern farming debris and/or green waste. |
| **Trend** | Subtle, poorly defined linear textures in the dataset. |
| **Artefact of Survey** | An artefact introduced during data processing, typically appearing as a single traverse with consistently high contrast. It can occur when a zero-mean traverse or zero-median traverse filter is used to equalise the data and the traverse contains an extreme ferrous outlier, causing the values across the entire line to be shifted artificially high. |

## 2.6 Standards

The geophysical survey and report follow best practice as outlined by relevant guidance documents as a minimum standard (Bonsall et al. 2014; David et al. 2008; Gaffney et al. 2002; Schmidt et al. 2015).

## 2.7 Geophysical Survey Archive

Geophysical data, shapefiles, figures and the text have been archived following the recommendations of the Archaeology Data Service (Schmidt & Ernenwein 2011). Raw geophysical data and GIS shapefiles are available in the archive. Digital copies of the geophysical survey archive are held by AMS at separate locations to ensure preservation against accidental damage or theft. Digital geophysical data (magnetometry data) are held on physical media (external hard disk drives) and a cloud based archival system (OneDrive). Digital outputs (report, text, figures and shapefiles) are held on physical media (external hard disk drive) and SharePoint. The Client (Greensource) will be given access to the cloud-based data. A soft copy of the report will be deposited with the Archaeological Licensing Section,

National Monuments Service, DHLGH, transmitted via email or file sharing transfer. A hard copy will be deposited with the National Museum of Ireland, Kildare Street, Dublin 2.

# 3 Results and Interpretation

The magnetometry data (Figures 8–12) and magnetometry interpretations (Figure 13–17) should be cross-referenced with the descriptions (below) for a discussion of the anomalies. The magnetometry survey successfully characterised the extent of some potential archaeological deposits, confined to Survey Area 5. The responses across the targeted Survey Areas were generally good, although near surface geology has created frequent anomalies of magnetic enhancement, which are likely to represent natural soil variations or in-filled natural dissolution holes.

## 3.1 Area 1

A geological band runs across the site. A weakly magnetic semi-circular ring of magnetic enhancement can be seen in the southeastern corner of the Survey Area. As the anomaly lies on the edge of the Survey Area it is difficult to assess but probably relates to natural geology. It lies to the south of the proposed development area and should therefore not be impacted.

## 3.2 Area 2

A small number of plough furrows can be seen running north to south on the western side of the Survey Area. Two small areas of magnetic enhancement can be seen to the north of the plough furrows, which may represent natural geology or pits.

## 3.3 Area 3

The requested Survey Area lies 130m to the east of Recorded Monuments (MA123-041001-; hillfort) and (MA123-041002-; hut site). There are no indications of substantial archaeological features within this area. Some patterns of weakly magnetic enhancement can be seen on the eastern side of the Survey Area. These may represent geological trends. A geological borehole near the centre of the Survey Area has created a strong ferrous anomaly.

## 3.4 Area 4

The eastern half of Area 4 was descoped from the survey following an initial walkover by Dr James Bonsall and Finn Melia on 4 September 2026. Outcropping bedrock and very shallow near-surface geology found at that location made it unsuitable for a geophysical survey. The western half comprised short pasture grass that was suitable for survey. Two broad geological bands were found which indicate changes in the near-surface geology. No anomalies corresponding to Recorded Monument (MA123-038----; field system) 100m to the northeast, were identified.

## 3.5 Area 5

Area 5 contains the only anomalies of potential archaeological significance identified across the Survey Areas. Plough furrows, broadly aligned east-northeast to west-southwest, overprint the area and appear to pre-date the modern field boundaries. A Recorded Monument (MA123-042----; ringfort – cashel) lies to the north of Area 5, and much of the Survey Area falls within its ZoN; however, no anomalies indicative of archaeology were identified within the ZoN.

**Anomaly 1** is a clear, coherent, C-shaped response at the eastern end of Area 5. It is interpreted as possible archaeology, it is 3m in radius and may represent a hut site. It lies outside both the ZoN of the ringfort and the proposed development.

**Anomaly 2** is a sub-rectangular response on the western side of Area 5, comprising possible archaeological remains that measure 13m x 7m. It may represent a pair of ditches. It may be associated with Anomaly 5 (see below). It lies outside both the ZoN of the ringfort and the proposed development.

**Anomaly 3** is a circular area of weakly magnetic enhancement, approximately 5m in diameter, 50m southwest of Anomaly 1. It may be potentially archaeological but is much less convincing than Anomaly 1 due to its weaker signal. It lies outside both the ZoN of the ringfort and the proposed development.

**Anomaly 4** is a C-shaped area of weakly magnetic enhancement, open to the west and approximately 3m in radius. It is similar to Anomaly 3 and may be archaeological, although it is less convincing than Anomaly 1. It lies between Anomaly 1 and Anomaly 3. It lies outside both the ZoN of the ringfort and the proposed development.

**Anomaly 5** is a C-shaped area of weak magnetic enhancement west of Anomaly 2, measuring approximately 47m in length. It may represent a ditch or a change in near-surface geology. The anomaly lies outside the ZoN of the ringfort, but its edge extends into the proposed development footprint.

# 4 Conclusions

The magnetometry survey successfully characterised the geophysical responses across the five Survey Areas. The results were influenced by near-surface limestone geology, agricultural activity and localised ferrous disturbance; however, the data quality was sufficient to identify and assess anomalies of potential archaeological significance.

No substantial anomalies indicative of archaeological remains were identified in Areas 1–4. The responses in these areas predominantly relate to natural geological variations, agricultural activity and modern disturbance. These include geological bands in Areas 1 and 4, plough furrows and localised magnetic enhancement in Area 2, and weak geological trends and a strong ferrous response associated with a geological borehole in Area 3. No anomalies corresponding with the nearby hillfort and hut site (MA123-041001- and MA123-041002-) were identified in Area 3, while no evidence corresponding with field system (MA123-038----) was identified in Area 4. The eastern part of Area 4 was unsuitable for geophysical survey due to outcropping bedrock and very shallow near-surface geology.

Area 5 contained the only anomalies of potential archaeological significance. Anomaly 1 comprises a clear C-shaped response approximately 3m in radius, it is classified as 'possible archaeology' and may represent a hut site. Anomaly 2 is a sub-rectangular response representing 'possible archaeology', measuring approximately 13m by 7m and may represent a pair of ditches. Anomalies 3 and 4 comprise weaker circular or C-shaped areas of magnetic enhancement that may be archaeological, although their weak responses make this interpretation uncertain. Anomaly 5 is an elongated C-shaped anomaly approximately 47m in length that may represent a ditch or a natural change in the near-surface geology. Its eastern edge extends into the proposed development area, while Anomalies 1–4 lie outside the proposed development.

Although much of Area 5 lies within the ZoN associated with ringfort – cashel (MA123-042----), no anomalies indicative of archaeological remains were identified within the ZoN. The anomalies of potential archaeological significance occur outside it. Overall, the survey identified a limited concentration of possible archaeological remains in Area 5 (Anomaly 1), but the interpretation of the weaker responses (Anomalies 2–5) remains uncertain because natural geological variation can produce comparable magnetic responses.

**Please note that the National Monuments Service of the Department of Housing, Local Government and Heritage, the National Museum of Ireland and the local planning authority may issue recommendations/ conditions regarding further investigation and management of the geophysical anomalies described in this report.**

# References

Aspinall, A., Gaffney, C. & Schmidt, A. 2008. *Magnetometry for Archaeologists*. Lanham, MD: Altamira Press.

Bonsall, J., Gaffney, C. & Armit, I. 2014. Preparing for the future: A reappraisal of archaeo-geophysical surveying on National Road Schemes 2001–2010. University of Bradford report for the National Roads Authority of Ireland.

David, A., Linford, N. & Linford, P. 2008. *Geophysical Survey in Archaeological Field Evaluation*. Second edition. English Heritage.

Gaffney, C., Gater, J. & Ovenden, S. 2002. *The Use of Geophysical Techniques in Archaeological Evaluations*. IFA Paper No. 6. Institute of Field Archaeologists.

GSI. 2026. Geological Survey Ireland Data and Maps downloaded as shapefiles from https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx. [Accessed 16 September 2026].

Schmidt, A. & Ernenwein, E. 2011. *Guide to Good Practice: Geophysical Data in Archaeology*. Second edition. Archaeology Data Service.

Schmidt, A.R., Linford, P., Linford, N., David, A., Gaffney, C.F., Sarris, A. & Fassbinder, J. 2015. *EAC Guidelines for the use of Geophysics in Archaeology: Questions to Ask and Points to Consider*. EAC Guidelines 2. Namur, Belgium: Europae Archaeologia Consilium (EAC). Association Internationale sans But Lucratif (AISBL).

## Cartographic Sources

Ordnance Survey (OS). 1840. Ordnance Survey of County Mayo, first-edition six-inch map. Surveyed 1837. Sheet MO-123. Scale 1:10,560. Available at: https://maps.nls.uk/geo/explore/#zoom=7.0&lat=53.82455&lon=-7.66958&layers=257. [Accessed: 11 September 2026].

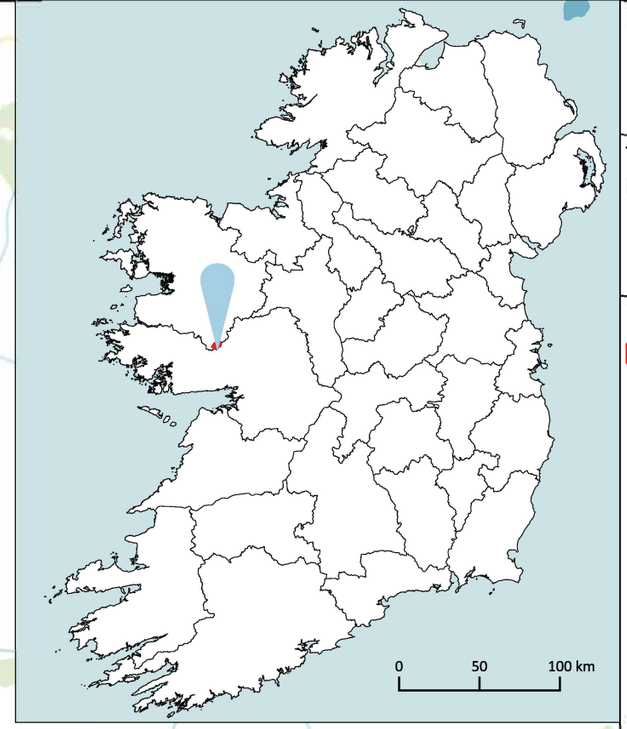
# Figures

Kilmaine

Conga

Shrule

Headford




0 2.5 5 km

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Project
Rooaunalaghta Green Energy Project

Title
Location map

Legend
Survey Area
Settlement

Data Source(s)
MapTilerPlanet: © MapTiler
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| | |
|---|---|
| Project No. 260287 | |
| Scale 1:64,000 | |
| Drawn by FM | Checked by JB |
| Date 29/07/2026 | Revision 1.0 |
| Notes | CRS EPSG:2157 |
| | Figure 1 |




Project
Rooaunalaghta Green Energy Project

Title
Detailed location map

Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area

Data Source(s)
MapTilerPlanet: © Google Satellite 2026

AMS

| | |
|---|---|
| Project No. 260287 | |
| Scale 1:10,000 | |
| Drawn by JB | Checked by JON |
| Date 01/10/2026 | Revision 1.0 |
| Notes | CRS EPSG:2157 |
| | Figure 2 |




Project
Rooaunalaghta Green Energy Project

Title
Area 1 location map

Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- SMR Site
- SMR ZoN

Data Source(s)
MapTilerPlanet: © Google Satellite 2026
SMR Data: © Government of Ireland (downloaded 15/09/2026)
Townland Data: © Government of Ireland (downloaded 15/09/2026)

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|---|---|
| AMS | Project No. 260287 |
| | Scale 1:2,000 |
| | Drawn by JB / Checked by JON |
| | Date 01/10/2026 / Revision 1.0 |
| Notes | CRS EPSG:2157 |
| | Figure 3 |

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750900
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750600
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523700
523800
523900
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Carrowoughteragh
MA123-036---- Ringfort - cashel
Area 2
Toorard
0 20 40 m

Project
Rooaunalaghta Green Energy Project

Title
Area 2 location map

Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- SMR Site
- SMR ZoN

Data Source(s)
MapTilerPlanet: © Google Satellite 2026
SMR Data: © Government of Ireland (downloaded 15/09/2026)
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|---|---|
| Project No. 260287 | |
| Scale 1:2,000 | |
| Drawn by JB | Checked by JON |
| Date 01/10/2026 | Revision 1.0 |
| Notes | CRS EPSG:2157 |
| | Figure 4 |



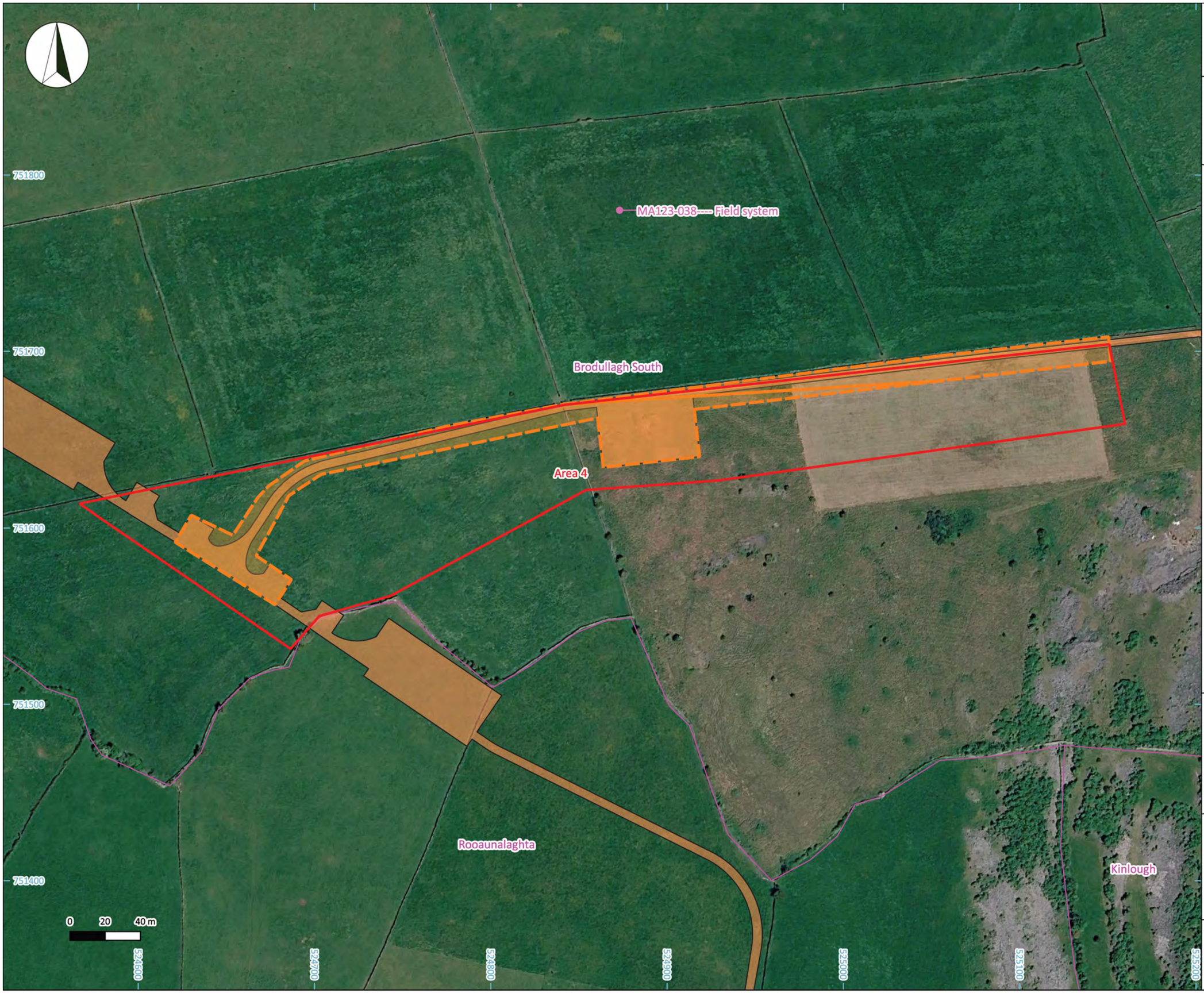

Project
Rooaunalaghta Green Energy Project

Title
Area 3 location map

Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- SMR Site
- SMR ZoN

Data Source(s)
MapTilerPlanet: © Google Satellite 2026
SMR Data: © Government of Ireland (downloaded 15/09/2026)
Townland Data: © Government of Ireland (downloaded 15/09/2026)

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|---|---|
| Project No. 260287 | |
| Scale 1:2,000 | |
| Drawn by JB | Checked by JON |
| Date 01/10/2026 | Revision 1.0 |
| Notes | CRS EPSG:2157 |
| | Figure 5 |



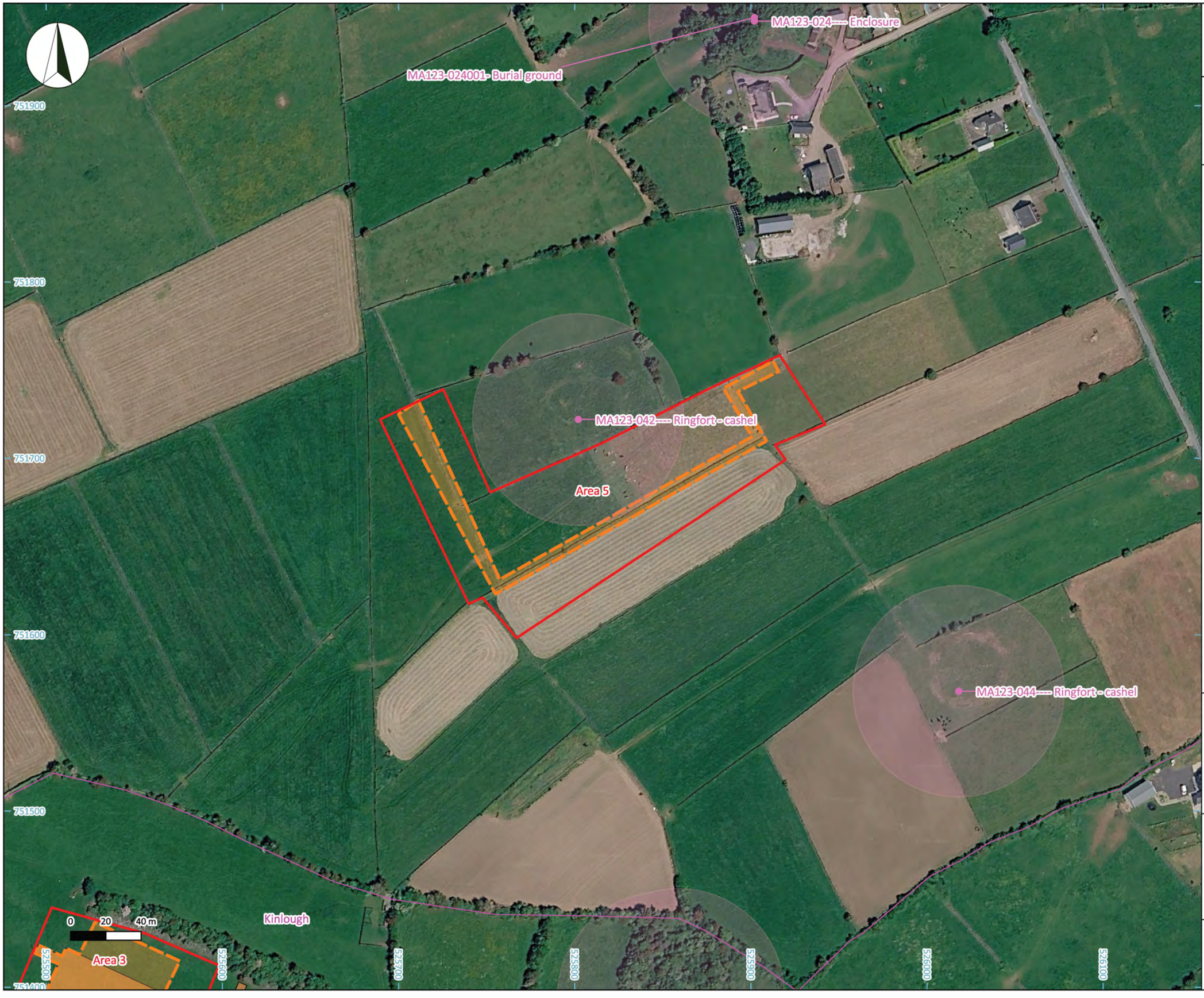

Project
Rooaunalaghta Green Energy Project

Title
Area 4 location map

Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- SMR Site

Data Source(s)
MapTilerPlanet: © Google Satellite 2026
SMR Data: © Government of Ireland (downloaded 15/09/2026)
Townland Data: © Government of Ireland (downloaded 15/09/2026)

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|---|---|
| Project No. 260287 | |
| Scale 1:2,000 | |
| Drawn by JB | Checked by JON |
| Date 01/10/2026 | Revision 1.0 |
| Notes | CRS EPSG:2157 |
| | Figure 6 |




Project
Rooaunalaghta Green Energy Project

Title
Area 5 location map

Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- SMR Site
- SMR ZoN

Data Source(s)
MapTilerPlanet: © Google Satellite 2026
SMR Data: © Government of Ireland (downloaded 15/09/2026)
Townland Data: © Government of Ireland (downloaded 15/09/2026)

| | |
|---|---|
| Project No. 260287 | |
| Scale 1:2,000 | |
| Drawn by JB | Checked by JON |
| Date 01/10/2026 | Revision 1.0 |
| Notes | CRS EPSG:2157 |
| | Figure 7 |




Project
Rooaunalaghta Green Energy Project

Title
Area 1 magnetometry data

Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- Area Inaccessible
- Additional Survey
- SMR Site

Data Source(s)
MapTilerPlanet: © Google Satellite 2026
SMR Data: © Government of Ireland (downloaded 15/09/2026)
Townland Data: © Government of Ireland (downloaded 15/09/2026)

AMS

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|---|---|
| Project No. 260287 | |
| Scale 1:750 | |
| Drawn by JB | Checked by JON |
| Date 01/10/2026 | Revision 1.0 |

Notes
Dynamic Range:
-3nT (white) to
+3nT (black)

CRS
EPSG:2157

Figure 8




Project
Rooaunalaghta Green Energy Project

Title
Area 2 magnetometry data

Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- Additional Survey
- SMR ZoN

Data Source(s)
MapTilerPlanet: © Google Satellite 2026
SMR Data: © Government of Ireland (downloaded 15/09/2026)
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AMS

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|---|---|
| Project No. 260287 | |
| Scale 1:750 | |
| Drawn by JB | Checked by JON |
| Date 01/10/2026 | Revision 1.0 |
| Notes<br>Dynamic Range:<br>-3nT (white) to<br>+3nT (black) | CRS<br>EPSG:2157<br>Figure 9 |




Project
Rooaunalaghta Green Energy Project

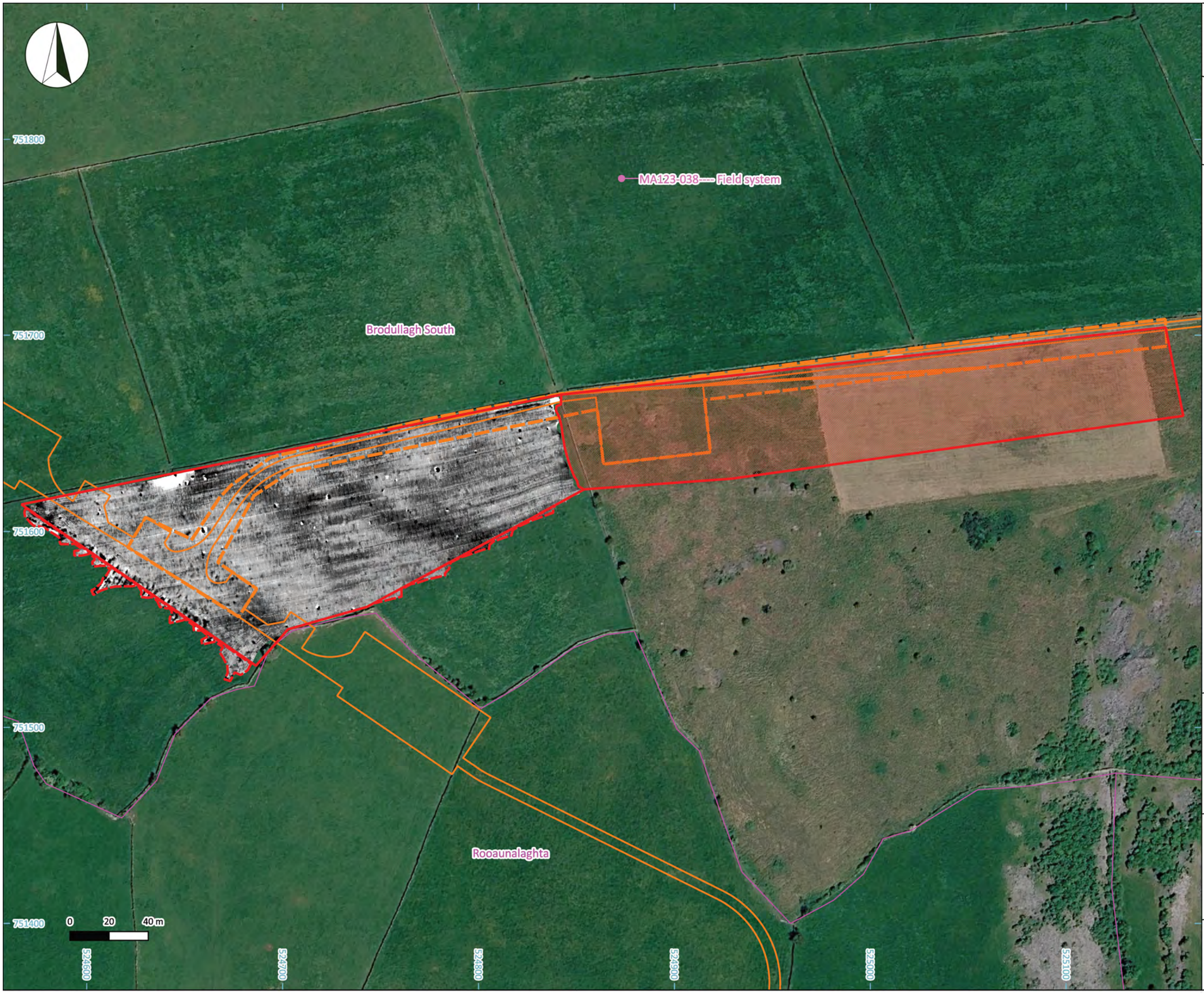
Title
Area 3 magnetometry data

Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- Additional Survey

Data Source(s)
MapTilerPlanet: © Google Satellite 2026
SMR Data: © Government of Ireland (downloaded 15/09/2026)
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AMS

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|---|---|
| Project No. 260287 | |
| Scale 1:750 | |
| Drawn by JB | Checked by JON |
| Date 01/10/2026 | Revision 1.0 |
| Notes<br>Dynamic Range:<br>-3nT (white) to<br>+3nT (black) | CRS<br>EPSG:2157<br>Figure 10 |




Project
Rooaunalaghta Green Energy Project

Title
Area 4 magnetometry data

Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- Area Inaccessible
- Additional Survey
- SMR Site

Data Source(s)
MapTilerPlanet: © Google Satellite 2026
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|---|---|
| Project No. 260287 | |
| Scale 1:1,800 | |
| Drawn by JB | Checked by JON |
| Date 01/10/2026 | Revision 1.0 |
| Notes<br>Dynamic Range:<br>-3nT (white) to<br>+3nT (black) | CRS<br>EPSG:2157<br>Figure 11 |




Project
Rooaunalaghta Green Energy Project

Title
Area 5 magnetometry data

Legend
- Townland
- Requested Survey Area
- Geophysical Survey Area
- Area Inaccessible
- Additional Survey
- SMR Site
- SMR ZoN

Data Source(s)
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| AMS | Project No. 260287 | |
| | Scale 1:800 | |
| | Drawn by JB | Checked by JON |
| | Date 01/10/2026 | Revision 1.0 |
| Notes<br>Dynamic Range:<br>-3nT (white) to<br>+3nT (black) | | CRS<br>EPSG:2157<br>Figure 12 |




Project
Rooaunalaghta Green Energy Project

Title
Area 1 magnetometry interpretation

Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- Area Inaccessible
- Additional Survey
- SMR Site

Magnetometry Interpretation
- Possible Archaeology
- Area of Enhancement
- Ferrous
- Geology / Natural
- Interference
- Artefact of Survey

Data Source(s)
MapTilerPlanet: © Google Satellite 2026
SMR Data: © Government of Ireland (downloaded 15/09/2026)
Townland Data: © Government of Ireland (downloaded 15/09/2026)

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|---|---|
| Project No. 260287 | |
| Scale 1:750 | |
| Drawn by JB | Checked by JON |
| Date 01/10/2026 | Revision 1.0 |
| Notes | CRS EPSG:2157 |
| | Figure 13 |




Project
Rooaunalaghta Green Energy Project

Title
Area 2 magnetometry interpretation

Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- Additional Survey
- SMR ZoN

Magnetometry Interpretation
- Area of Enhancement
- Ferrous
- Interference
- Ploughing Trend
- Artefact of Survey

Data Source(s)
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|---|---|
| AMS | Project No. 260287 |
| | Scale 1:750 |
| | Drawn by JB / Checked by JON |
| | Date 01/10/2026 / Revision 1.0 |
| Notes | CRS EPSG:2157 |
| | Figure 14 |




Project
Rooaunalaghta Green Energy Project

Title
Area 3 magnetometry interpretation

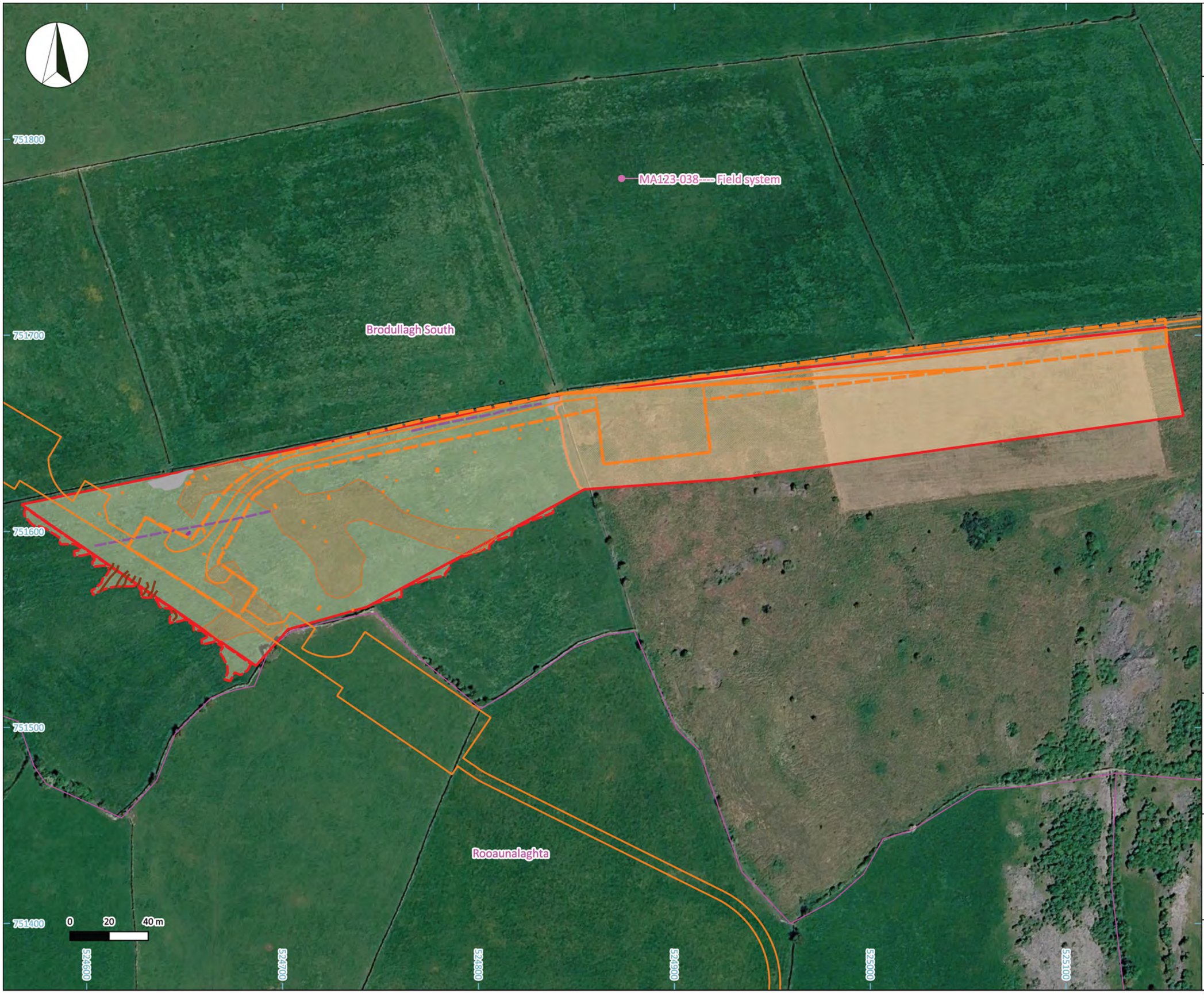
Legend
- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- Additional Survey

Magnetometry Interpretation
- Possible Archaeology
- Area of Enhancement
- Ferrous
- Interference

Data Source(s)
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| Date 01/10/2026 | Revision 1.0 |
| Notes | CRS EPSG:2157 |
| | Figure 15 |




Project
Rooaunalaghta Green Energy Project

Title
Area 4 magnetometry interpretation

Legend

- Townland
- Site Layout
- Requested Survey Area
- Geophysical Survey Area
- Area Inaccessible
- Additional Survey
- SMR Site

Magnetometry Interpretation

- Possible Archaeology
- Ferrous
- Geology / Natural
- Interference
- Ploughing Trend
- Artefact of Survey

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| Date 01/10/2026 | Revision 1.0 |
| Notes | CRS EPSG:2157 |
| | Figure 16 |




Project
Rooaunalaghta Green Energy Project

Title
Area 5 magnetometry interpretation

Legend
- Townland
- Requested Survey Area
- Geophysical Survey Area
- Area Inaccessible
- Additional Survey
- SMR Site
- SMR ZoN

Magnetometry Interpretation
- Possible Archaeology
- Area of Enhancement
- Ferrous
- Interference
- Ploughing Trend
- Trend
- Artefact of Survey

Data Source(s)
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AMS

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| Project No. 260287 | |
| Scale 1:800 | |
| Drawn by JB | Checked by JON |
| Date 01/01/2026 | Revision 1.0 |
| Notes | CRS EPSG:2157 |
| | Figure 17 |