

9.0 CULTURAL HERITAGE

9.1 Introduction

This chapter of the remedial Environmental Impact Assessment Report (rEIAR) presents a retrospective assessment of the potential effects that may have occurred, and may continue to occur, on cultural heritage as a result of activities at the existing quarry site at Windmillhill, Rathcoole, Co. Dublin ('the Site') between 1990 and the present day.

The choice of team members for each study has been informed by the experience of the relevant lead specialist in their area of technical interest. The cultural heritage assessment has been prepared by Conor Ryan (BA Jt. Hons.). Conor is an Associate of the Chartered Institute for Archaeologists (CIfA) and has more than 6 years' experience in cultural heritage assessment.

This rEIAR has been prepared to accompany a substitute consent application for an existing quarry at Windmillhill, Rathcoole, Co. Dublin. The substitute consent application is to be made concurrent with an application for further development of the quarry for extraction to be made under S.37L of the Planning and Development Act, 2000 as amended that is accompanied by an Environmental Impact Assessment Report (EIAR).

The lands the subject of this rEIAR extend to 46.14 ha. that reflect historic operational site information including the extractable area declared under S.261 quarry registration in 2005. The quarry area that makes up the application for substitute consent planning unit currently extends to approximately 28.8 ha. at the centre of the EIA project area that is generally bounded by the N7 to the north and the local Windmillhill Road to the south. The eastern and western EIA project boundaries are demarcated by the Windmillhill townland boundary that consist of field boundaries and the entrance to a dwelling called 'Four Winds' that is within the ownership of the substitute consent applicant to the east; and the former local Steelstown Road to the west.

The current quarry site is accessed toward the centre of its northern boundary from the N7 and has been accessed from that road since grant of planning permission for stone quarrying on site in 1968. The current quarry void is centrally located within the EIA unit and roughly rectangular in shape with an east – west orientation, parallel to the N7 and local Windmillhill Road. At the centre of the current quarry area is the existing administration and processing plant area over approximately 5 ha.

A detailed description of the Site and the activities that have been undertaken ('the Development') can be found in Chapter 2 of this rEIAR (Project Description).

9.1.1 Scope

The scope of this cultural heritage assessment comprises a baseline study, effects analysis and retrospective impact assessment for the Development. The baseline is informed by the results of desk-based and archival research.

The impact assessment considers both direct and indirect impacts of the Development upon cultural heritage assets, and also considers cumulative and combined effects. Mitigation measures that were used between 1990 and 2021 are described and, where relevant, additional measures have been recommended that could be implemented now, with residual effects subsequently assessed.

In lieu of specific guidance from the Institute of Archaeologists of Ireland (IAI), this impact assessment conforms to the guidelines set out by the Chartered Institute for Archaeologists (CIfA, 2020a¹; 2020b²).

¹ CIfA (2020a). Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment.

² CIfA (2020b). Standard and guidance for historic environment desk-based assessment.

For the purposes of this rEIAR, the term 'cultural heritage' is used as a collective term to refer to all assets of archaeological, architectural and historical or cultural value. Archaeological heritage typically refers to objects, monuments, buildings, environmental remains or cultural landscapes older than AD 1700, although it can also be used to describe objects, monuments and other tangible remains that date from post-AD 1700³. Architectural heritage (or built heritage) refers to structures or buildings (including their contents) of cultural value that are younger than AD 1700. Designed landscapes and gardens dating to post-AD 1700 are also considered to be architectural in this assessment. In both cases, the setting of an asset is considered an integral part of its value.

9.1.2 Site Location and Description

The Site measures approximately 46.14 ha and is located approximately 2.5 km southwest of Rathcoole, Co. Dublin, in the townland of Windmillhill (ITM E 699869, N 725715). It is adjacent to the N7 motorway, approximately 1.5 km from the county boundary with Co. Kildare. The surrounding land is generally rural, agricultural land, particularly to the north, west and south, with greater densities of urban and industrial/commercial development to the east.

9.1.3 Study Area

In order to capture sufficient baseline data to robustly assess direct impacts to cultural heritage assets, the spatial scope of the assessment comprises all the land within the Site (i.e. land situated within the 'EIA Boundary'), together with a buffer of 1 km around the Site to allow the assessment of indirect impacts. This buffer area is considered to be appropriate, given the nature of the Development and the purpose of this rEIAR. The Study Area is shown in Drawing 9.1 (contained in Appendix 9.1).

9.1.4 Chapter Structure

This chapter is divided into the following sections:

- 9.1 – Background and Scope, which includes details of the assessment scope, study area and structure;
- 9.2 – Policy and Legislation Context, which includes a description of legislation, policy, standards and guidance relevant to cultural heritage;
- 9.3 – Assessment Methodology and Significance Criteria, which presents a description of how the assessment has been undertaken and includes any assumptions that have been made or limitations that have been encountered;
- 9.4 – Baseline Conditions, which presents the sources of information used, a detailed breakdown of the assets recorded, a summarised historic map regression and a summarised appraisal of previous archaeological investigations in the study area;
- 9.5 – Potential Effects, which summarises the cultural heritage assets considered in the assessment and identifies the sensitivity of those assets. It also retrospectively presents the potential effects upon these assets as a result of the Development during construction and operation;
- 9.6 – Mitigation and Monitoring, which presents details of mitigation and monitoring that was adopted to manage potential effects. It also presents any recommendations for additional mitigation measures that could be implemented now;
- 9.7 – Residual Effects, which presents the residual effects of the Development, taking account of mitigation; and

³ AD 1700 is a point in time used by the National Monuments Service and the National Inventory of Architectural Heritage to distinguish between 'archaeology' and 'architecture'. Although archaeological remains exist that are younger than AD 1700, any buildings, structures or designed landscapes/gardens built during this period are considered in this assessment to be 'architectural'.

- 9.8 – Summary and Conclusions, which presents a summary of the assessment and final conclusions.

9.2 Policy and Legislation Context

9.2.1 Legislation and Guidance

The Minister for Housing, Local Government and Heritage (representing the Department of Housing, Local Government and Heritage) is responsible for the conservation, preservation, protection and presentation of Ireland's cultural heritage. The protection of archaeological heritage is the responsibility of the National Monuments Service (NMS), whilst architectural heritage is the responsibility of the Built Heritage Policy Section (including the Architectural Heritage Advisory Service (AHAS) and National Inventory of Architectural Heritage (NIAH)).

At the national and international level, the key legislation pertinent to this assessment includes:

- The National Monuments Acts, 1930 to 2004;
- The Heritage Act, 1995;
- The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999;
- The Planning and Development Acts, 2000 to 2016;
- The Convention concerning the Protection of the World Cultural and Natural Heritage (1972), ratified by the Irish Government in 1991; and
- The European Convention on the Protection of the Archaeological Heritage (Revised) (1992), ratified by the Irish Government in 1997.

Guidelines on the assessment of impacts on, and the protection of, cultural heritage assets in Ireland have been consulted and adhered to for this impact assessment, including:

- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (2017) – EPA;
- The Framework and Principles for the Protection of the Archaeological Heritage (1999) – Department of Arts, Heritage, Gaeltacht and the Islands (DAHGI); and
- Architectural Heritage Protection: Guidelines for Planning Authorities (2011) - Department of Arts, Heritage, and the Gaeltacht (DAHG).

9.2.2 Legislative Mechanisms of Protection

There are a number of mechanisms for heritage protection in Ireland. Heritage assets can be protected under the National Monuments Acts 1930 to 2004 in four ways:

- The asset is recorded in the Record of Monuments and Places (RMP);
- The asset is registered in the Register of Historic Monuments (RHM);
- The asset is a national monument subject to a Preservation Order (or Temporary Preservation Order); or
- The asset is a National Monument in State Care.

Heritage assets can also be protected under the Planning and Development Act 2000, which requires all Local Authorities to curate and maintain a Record of Protected Structures (RPS). An asset is protected if it is inscribed

on a county’s RPS. Protected Structures may be archaeological in nature, and so an asset may appear on both the RMP and county RPS.

The ‘Convention concerning the Protection of the World Cultural and Natural Heritage’ (1972) provides The United Nations Educational, Scientific and Cultural Organization (UNESCO) with the power to inscribe assets of international importance on the World Heritage List as a World Heritage Site. Local authorities and stakeholders are encouraged to protect these sites through the production of Management Plans, which aim to manage the site in a suitable fashion.

Local authorities also have mechanisms by which to protect heritage assets, including the creation of Architectural Conservation Areas (ACAs) and Areas of Archaeological Potential (AAPs) (or equivalents).

The mechanisms of heritage protection described here also afford protection to the setting of cultural heritage assets, as well as the physical assets.

9.2.3 Planning Policy

At the local level, the South Dublin County Development Plan (SDCDP) (2016-2022) guides planning policy in relation to cultural heritage. Chapter 9 of the SDCDP specifically outlines the approach taken by the Local Planning Authority to protecting architectural and archaeological heritage within the planning process, with South Dublin County Council (SDCC) stating their overarching policy is to “*protect, conserve and enhance natural, built and cultural heritage features and restrict development that would have a significant negative impact on these assets*”. Policy areas pertinent to this assessment are summarised in Table 9.1.

Table 9.1: South Dublin County Development Plan (2016 - 2022) Relevant Policies and Objectives - Cultural Heritage

| Policy Area | Policy | Objective |
|-------------------------|--|---|
| Archaeological Heritage | It is the policy of the Council to manage development in a manner that protects and conserves the Archaeological Heritage of the County and avoids adverse impacts on sites, monuments, features or objects of significant historical or archaeological interest | To favour the preservation in-situ of all sites, monuments and features of significant historical or archaeological interest in accordance with the recommendations of the Framework and Principles for the Protection of Archaeological Heritage, DAHGI (1999), or any superseding national policy document. |
| | | To ensure that development is designed to avoid impacting on archaeological heritage that is of significant interest including previously unknown sites, features and objects. |
| | | To protect and enhance sites listed in the Record of Monuments and Places and ensure that development in the vicinity of a Recorded Monument or Area of Archaeological Potential does not detract from the setting of the site, monument, feature or object and is sited and designed appropriately. |
| | | To protect and preserve the archaeological value of underwater archaeological sites including associated features and any discovered battlefield sites of significant archaeological potential within the County. |
| | | To protect historical burial grounds within South Dublin County and encourage their maintenance in accordance with conservation principles. |
| Protected Structures | It is the policy of the Council to conserve and protect buildings, structures and sites contained in the Record of Protected | To ensure the protection of all structures (or parts of structures) and the immediate surroundings including the curtilage and attendant grounds of structures contained in the Record of Protected Structures. |

| Policy Area | Policy | Objective |
|----------------------------------|---|--|
| | Structures and to carefully consider any proposals for development that would affect the special character or appearance of a Protected Structure including its historic curtilage, both directly and indirectly. | <p>To ensure that all development proposals that affect a Protected Structure and its setting including proposals to extend, alter or refurbish any Protected Structure are sympathetic to its special character and integrity and are appropriate in terms of architectural treatment, character, scale and form. All such proposals shall be consistent with the Architectural Heritage Guidelines for Planning Authorities, DAHG (2011) including the principles of conservation.</p> <p>To address dereliction and encourage the rehabilitation, renovation, appropriate use and re-use of Protected Structures.</p> <p>To prevent demolition and inappropriate alteration of Protected Structures.</p> <p>SLO 3: To secure the preservation of Windmill Hill, Rathcoole (RPS Ref. 358)</p> |
| Architectural Conservation Areas | It is the policy of the Council to preserve and enhance the historic character and visual setting of Architectural Conservation Areas and to carefully consider any proposals for development that would affect the special value of such areas. | <p>To avoid the removal of structures and distinctive features that positively contribute to the character of Architectural Conservation Areas including buildings, building features, shop fronts, boundary treatments, street furniture, landscaping and paving.</p> <p>To ensure that new development, including infill development, extensions and renovation works within or adjacent to an Architectural Conservation Area (ACA) preserves or enhances the special character and visual setting of the ACA including vistas, streetscapes and roofscapes.</p> <p>To address dereliction and promote appropriate and sensitive reuse and rehabilitation of buildings, building features and sites within Architectural Conservation Areas.</p> <p>To reduce and prevent visual and urban clutter within Architectural Conservation Areas including, where appropriate, traffic management structures, utility structures and all signage.</p> |
| Features of Interest | It is the policy of the Council to secure the identification, protection and conservation of historic items and features of interest throughout the County including street furniture, surface finishes, roadside installations, items of industrial heritage and other stand alone features of interest. | To ensure that development within the County including Council development seeks to retain, refurbish and incorporate historic items and features of interest. |
| Views and Prospects | It is the policy of the Council to preserve Views and Prospects and the amenities of places and features of natural beauty or interest including those located within and outside the County. | <p>To protect, preserve and improve Views and Prospects of special amenity, historic or cultural value or interest including rural, river valley, mountain, hill, coastal, upland and urban views and prospects that are visible from prominent public places.</p> <p>Windmill Hill is identified as a Prospect to be Preserved and Protected.</p> |

SDCC has a heritage management plan (South Dublin County Heritage Plan 2010-2015), which has been consulted for reference, where applicable.

9.3 Assessment Methodology and Significance Criteria

9.3.1 Assessment Methodology

This assessment has been produced in accordance with national and local legislation and policy, as well as best practice guidance. The impact assessment methodology aligns with EPA guidelines (EPA, 2017) and has been adapted from the advice provided by the National Roads Authority (NRA), in their Guidelines for the Assessment of Architectural Heritage Impacts of National Roads Schemes and Guidelines for the Assessment of Archaeological Heritage Impacts of National Roads Schemes (no publication date). These guidelines can be equally applied to other development schemes.

The assessment has been completed using a phased qualitative assessment methodology, as outlined here:

- Cultural heritage assets with the potential to be affected by the Development are identified and ascribed a 'value', ranging from "unknown" to 'very high';
- The 'magnitude' of any effects resulting from the Development upon the identified receptors are established, ranging from 'no change' to 'major' (assuming no mitigation is in place);
- A comparison of the magnitude of effect and receptor value is used to calculate the significance of effect;
- Where relevant, the mitigation strategy used is described, with the significance of effect re-calculated (assuming that mitigation is in place) to ascertain the residual effects.

Effects to cultural heritage assets can result from both direct and indirect effects. Direct effects are considered here to be those that result in an immediate, physical impact to an asset, such as ground disturbance. Indirect effects are considered here to include those that occur through an environmental pathway (e.g. air, waterways, and groundwater) or that are secondary (e.g. mitigation measures for a different impact affecting cultural heritage). These indirect effects may be physical but may also affect the setting of an asset. Indirect effects can include, but are not limited to:

- Noise effects;
- Air pollution/dust effects; and
- Visual effects.

Consultation with other specialists, in particular air quality, noise and landscape and visual, have been undertaken to capture combined effects and provide a holistic assessment of impacts upon cultural heritage assets.

9.3.2 Assessment of the Value of Cultural Heritage Assets

The value of a cultural heritage asset can be assessed using the criteria presented in Table 9.2.

Table 9.2: Criteria for Assessing the Value of Cultural Heritage Assets

| Value of Asset | Criteria |
|----------------|--|
| Very High | <ul style="list-style-type: none"> ■ World Heritage Sites (including nominated sites); ■ Assets of acknowledged international importance; and ■ Assets that can contribute significantly to acknowledged international research objectives. |
| High | <ul style="list-style-type: none"> ■ Protected Assets (e.g. assets inscribed on the RMP, RHP or RPS); |

| Value of Asset | Criteria |
|----------------|---|
| | <ul style="list-style-type: none"> ■ Undesignated assets of recognised quality or importance (e.g. proposed for inclusion on the RMP, ACAs); and ■ Assets that can contribute significantly to acknowledged national research objectives. |
| Medium | <ul style="list-style-type: none"> ■ Undesignated assets of regional importance or that might contribute to regional research objectives. |
| Low | <ul style="list-style-type: none"> ■ Undesignated assets of local importance; ■ Assets compromised by poor preservation and/or poor survival of contextual associations; and ■ Assets of limited value, but with potential to contribute to local research objectives. |
| Negligible | <ul style="list-style-type: none"> ■ Assets with very little or no surviving cultural interest. |
| Unknown | <ul style="list-style-type: none"> ■ The importance of the asset cannot be ascertained. |

9.3.3 Assessment of Magnitude of Effect

The scale and magnitude of effects on cultural heritage assets can be assessed using the tiered grading system presented in Table 9.3.

Table 9.3: Criteria for Assessing Magnitude of Effect on Cultural Heritage Assets

| Magnitude of Effect | Criteria |
|---------------------|--|
| High | <ul style="list-style-type: none"> ■ Changes to most or all key archaeological/architectural elements, such that the asset is totally altered; and ■ Comprehensive changes to setting. |
| Medium | <ul style="list-style-type: none"> ■ Changes to many key archaeological/architectural elements, such that the asset is clearly modified; and ■ Considerable changes to setting. |
| Low | <ul style="list-style-type: none"> ■ Changes to key archaeological/architectural elements, such that the asset is slightly altered; and ■ Slight changes to setting. |
| Negligible | <ul style="list-style-type: none"> ■ Very minor changes to elements or setting; and ■ Archaeological receptors are altered but no information is lost (through archaeological excavation and recording). |
| No change | <ul style="list-style-type: none"> ■ No change. |

9.3.4 Assessment of Significance of Effects

Using the value of an asset as indicated in Table 9.2, and the magnitude of effect as ascertained from Table 9.3, Table 9.4 indicates how the assessment of the significance of an effect has been concluded.

Table 9.4: Significance of Effect Matrix

| | | MAGNITUDE OF EFFECT | | | | |
|----------------|------------|---------------------|--------------------|--------------------------|--------------------------|--------------------------|
| | | No change | Negligible | Low | Medium | High |
| VALUE OF ASSET | Very High | Imperceptible | Slight | Moderate/ Significant | Significant/ Profound | Profound |
| | High | Imperceptible | Slight | Slight/ Moderate | Moderate/ Significant | Significant/ Profound |
| | Medium | Imperceptible | Not Significant | Slight | Moderate | Moderate/ Significant |
| | Low | Imperceptible | Not Significant | Not Significant | Slight | Slight/ Moderate |
| | Negligible | Imperceptible | Imperceptible | Not Significant | Not Significant | Slight |

The methodology outlined in this section is reliant on an element of subjectivity, and so inherently requires a level of professional judgement. It is considered, however, that the criteria described in Table 9.2 and Table 9.3 provide robust and transparent decision-making guidance that can be widely applied to a variety of potential cultural heritage assets.

9.3.5 Assumptions and Limitations

A key limitation is that the assessment methodology cannot account for cultural heritage assets that are not recorded in the available data sources. Previously unrecorded assets, such as sub-surface archaeological remains, which do not present any diagnostic features, would not necessarily be identified by the desk-study.

Information has been used from a range of sources to determine baseline cultural heritage conditions. This assessment is therefore limited by the availability and reliability of these data sources.

9.4 Baseline Conditions

The results of the baseline study are presented here as a summarised appraisal of the various disparate data sources. They have been separated into archaeological and architectural assets. For ease of reference, each asset has been assigned a unique ID reference comprising a two-letter prefix ('AR' for archaeological assets and 'BU' for architectural assets), followed by a sequentially increasing number. This allows information from different datasets, each with their own reference systems, to be collated into a single receptor list.

9.4.1 Data Sources

The baseline study comprised a comprehensive desk-based review of existing, remotely available heritage datasets within the Study Area, which has allowed a good understanding of the baseline cultural heritage conditions at and around the Site to be established. Sources of information consulted include:

- The Sites and Monuments Record (SMR), compiled and maintained by the Archaeological Survey of Ireland (ASI) unit of the NMS, for details regarding all known monuments and sites⁴;
- The NIAH Building⁴ and Garden⁵ Surveys, for details regarding buildings, structures, demesnes, designed landscapes and historic gardens of architectural importance;
- The RMP, compiled and maintained by the NMS, for details regarding protected sites;

⁴ The SMR and NIAH Building Survey datasets are available in a downloadable Geographical Information System (GIS) format.

⁵ The NIAH Garden survey is a work in progress. The desk-based survey (Phases 1 and 2) has been completed, but the field survey (Phase 3) remains incomplete. A policy framework and method of protection remains to be determined.

- The NMS for details regarding national monuments in State care (ownership or guardianship of the Housing, Local Government and Heritage) and for monuments subject to Preservation Orders;
- The South Dublin County Development Plan (2016-2022) for details regarding the county's RHM, RPS, national monuments in State care (ownership or guardianship of the Local Authority), monuments subject to Preservation Orders, ACAs and AAPs;
- The Kildare County Development Plan (2017 - 2023) for details regarding the county's protected heritage, including the county RPS (relevant where the Study Area extends beyond Co. Dublin into Co. Kildare, to the west);
- UNESCO for details regarding inscribed and tentative World Heritage Sites;
- The topographical files of the National Museum of Ireland (NMI) for details of any finds held in the national archive relevant to the Site;
- The SMR, Excavations Bulletin, and Transport Infrastructure Ireland Digital Heritage Collection for details of previous excavations;
- Ordnance Survey Ireland for historic cartographic and aerial image sources, in order to conduct a map regression
- Pre-existing environmental reports containing information pertinent to the historic environment of the Site; and
- Modern online aerial image sources (e.g. Google Earth, Bing Maps).

9.4.2 Historical Background and Archaeological Context

The well-documented archaeological record in the South Dublin area stretches from prehistory through to the modern era, and comprises a wide variety of material culture, with both archaeological and architectural heritage from throughout antiquity evident within the landscape. Early ecclesiastical sites formed the origins of many of the villages in the area, such as Tallaght, Saggart and Rathfarnham, whilst the manorial agricultural landscape of the area, which developed under the Normans in the 13th century, prevails across large areas. Industrialisation from the 17th century onwards, particularly around established villages, and the advent of aviation in the early to mid-20th century have also shaped the modern landscape.

9.4.3 Archaeological Heritage

Sites and Monuments Record and the Record of Monuments and Places

There are 13 archaeological assets from the SMR recorded within the Study Area, as shown in Drawing 9.1, (contained in Appendix 9.1), of which 5 are located within the Site (AR-01 to AR-05). The details of all 13 assets are summarised in Table 9.5, with full details presented in the Cultural Heritage Gazetteer (Appendix 9.2). The assets located within the Site include the extant remains of a circular windmill (AR-01, shown in Figure 9.1), considered to be circa 18th century in origin. The remains stand at two storeys high and are constructed of irregularly coursed masonry. It is believed the existing windmill was built upon the former location of 15th century windmill, which is the assumed origin of the townland name. The other four assets within the Site are located in close proximity to AR-01 and comprise a group of potentially prehistoric features identified primarily through regional scale LiDAR (Light Detecting and Ranging) studies (Davis, 2014); a burial cairn, ring-ditch, hillfort and ceremonial enclosure.



Figure 9.1: Remains of circular windmill, AR-01

To the northwest of the Site there are seven assets, clustered into three groups. The first, comprising one asset (AR-06), is a cave site recorded in the 19th century and interpreted as a potential souterrain, although the record entry describes that modern interpretations suggest the asset is likely a natural feature. The second group, comprising two assets (AR-07 and AR-08), are the remains of Colmanstown Castle and the associated field system. The castle was demolished in 1960. The third group (AR-09, AR-10 and AR-11) comprise a church and graveyard, with an earlier ecclesiastical enclosure at the same location.

The other two assets (AR-12 and AR-13), located to the south and southeast of the Site respectively, comprise a prehistoric ring-barrow and a holy well, dedicated to St. Catherine.

Table 9.5: Archaeological Assets within Study Area

| Golder ID | SMR Ref | Easting (ITM95) | Northing (ITM95) | Asset Description | Included (or Proposed for Inclusion) on RMP | Distance to Site | Value |
|-----------|---------------|-----------------|------------------|----------------------|---|-------------------|--------|
| AR-01 | DU021-038---- | 699846 | 725586 | Windmill | Yes* | 0 m | High |
| AR-02 | DU021-113---- | 699846 | 725592 | Cairn - burial cairn | No | 0 m | Medium |
| AR-03 | DU021-114---- | 699839 | 725583 | Ring-ditch | No | 0 m | Medium |
| AR-04 | DU021-115---- | 699852 | 725580 | Ceremonial enclosure | No | 0 m | Medium |
| AR-05 | DU021-116---- | 699823 | 725571 | Hillfort | No | 0 m | Medium |
| AR-06 | DU020-010---- | 698690 | 725751 | Souterrain | Yes | 760 m (northwest) | High |

| Golder ID | SMR Ref | Easting (ITM95) | Northing (ITM95) | Asset Description | Included (or Proposed for Inclusion) on RMP | Distance to Site | Value |
|-----------|---------------|-----------------|------------------|--------------------------|---|-------------------|-------|
| AR-07 | DU020-011001- | 699259 | 726195 | Castle - tower house | Yes | 440 m (northwest) | High |
| AR-08 | DU020-011002- | 699260 | 726191 | Field system | Yes | 440 m (northwest) | High |
| AR-09 | DU020-009001- | 699406 | 726232 | Church | Yes* | 380 m (northwest) | High |
| AR-10 | DU020-009002- | 699406 | 726234 | Graveyard | Yes* | 380 m (northwest) | High |
| AR-11 | DU020-009004- | 699406 | 726234 | Ecclesiastical enclosure | Yes* | 380 m (northwest) | High |
| AR-12 | DU021-039---- | 699795 | 725014 | Barrow - ring-barrow | Yes | 315 m (south) | High |
| AR-13 | DU021-040---- | 701178 | 725429 | Ritual site - holy well | Yes | 860 m (southeast) | High |

*also included on the SDCC RPS.

Preservation Orders

None of the assets within the Study Area are subject to a Preservation Order. The nearest asset to the Site that is subject to a Preservation Order is an unclassified cairn (SMR ref: DU024-002001--) located in Crockaunadreenagh, approximately 2 km to the southeast of the Site.

National Monuments in State Care

A national monument is defined by the National Monuments Act, 1930 as an asset 'the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto'. A National Monument in State Care is one in the ownership or guardianship of the Minister for Housing, Local Government and Heritage or a Local Authority.

The nearest National Monument in State care is the church at Oughterard, Kildare (SMR ref: KD015-007005-), located 14.3 km northeast of the Site.

Register of Historic Monuments

There is no RHM disclosed for SDCC. The nearest monument to the Site that is inscribed on a county-level RHM is the medieval settlement in Killeel, Kildare (comprising SMR ref: KD020-005----, KD020-006----, KD020-007002-- to KD020-0070010-, and KD020-008----), located approximately 3.9 km to the south of the Site.

Record of Protected Structures

Four of the archaeological assets recorded within the Study Area are listed on the SDCC RPS. The extant remains of an 18th century windmill (AR-01), which are located within the Site, are listed on the RPS (RPS ref. 358) and are also the subject of planning policy objective SLO 3, specifically "to secure the preservation of Windmill Hill, Rathcoole (RPS Ref. 358)". The church, graveyard and potential enclosure at Colmanstown (AR-09, AR-10 and AR-11) are also included on the SDCC RPS (RPS ref. 341).

Areas of Archaeological Potential

The Site is not located within an AAP. The nearest AAP is the Rathcoole AAP, located approximately 1.3 km northeast of the Site.

World Heritage and the Tentative List

There are no World Heritage Sites recorded within the Study Area. The nearest World Heritage Site to the Site is Brú na Bóinne (Archaeological Ensemble of the Bend of the Boyne), located 45 km to the north. The Royal Sites of Ireland, comprising five individual sites in Ireland (Cashel, Dún Ailinne, the Hill of Uisneach, the Rathcroghan Complex and the Tara Complex) as well as Navan Fort in Northern Ireland (UK), is listed on the Tentative List for Ireland for consideration for inclusion on the World Heritage List. Dún Ailinne, the seat of the kings of Leinster, is located approximately 25 km southwest of the Site.

Topographical Files

A remote search was conducted of the topographical files archive at the NMI for all entries recorded in the 17 townlands that are within 1 km of the Site. The search returned 15 entries, all of which are recorded in Colmanstown in the vicinity of AR-11 to the north of the Site. The entries comprise 13 pottery finds made in 1999 and a copper buckle and clasp, both found in 1982. All 15 entries were chance finds were made by members of the public.

9.4.4 Architectural Heritage

The National Inventory of Architectural Heritage

A total of eight architectural assets listed on the NIAH Building Survey are recorded within the Study Area, although none lie within the Site. There are no assets listed on the NIAH Garden Survey that are within the Study Area. Details of architectural assets within the Study Area are summarised in Table 9.6 and their locations are shown in Drawing 9.1 (contained in Appendix 9.1), with full details presented in the Cultural Heritage Gazetteer (Appendix 9.2).

Table 9.6: Architectural Assets within Study Area

| Golder ID | NIAH ref | Easting (ITM95) | Northing (ITM95) | Asset Description (Asset Date) | Asset listed on RPS? | Distance to Site | Value |
|-----------|----------|-----------------|------------------|---|----------------------|---------------------|--------|
| BU-01 | 11213007 | 700300 | 726202 | Keatingspark House (1870 – 1900) | Yes (RPS ref. 344) | 208 m (northeast) | High |
| BU-02 | 11213008 | 701135 | 726085 | Farm house (1800 – 1840) | Yes (RPS ref. 347) | 768 m (east) | High |
| BU-03 | 11218001 | 701462 | 725816 | Woodfield House (1880 – 1900) | Yes (RPS ref. 355) | 1,050 m (east) | High |
| BU-04 | 11218002 | 701328 | 725410 | Mount Carmel (1890 – 1910) | No | 1,006 m (southeast) | Medium |
| BU-05 | 11218003 | 700786 | 725072 | House (1810 – 1840) | No | 760 m (southeast) | Medium |
| BU-06 | 11218003 | 700764 | 725058 | House (1810 – 1840) | No | 760 m (southeast) | Medium |
| BU-07 | 11217002 | 699192 | 724995 | Steelstown Lodge gate lodge (1875 – 1880) | Yes (RPS ref. 368) | 527 m (southwest) | High |
| BU-08 | 11218004 | 700545 | 724667 | House (1800 – 1840) | No | 1,000 m (south) | Medium |

Record of Protected Structures

Four of the eight architectural assets recorded within the Study Area are included on the SDCC RPS:

- BU-01, BU-02, BU-03 and BU-07.

Architectural Conservation Areas

The Site is not within an ACA. The nearest ACA to the Site is the Rathcoole ACA, located approximately 1.6 km northeast of the Site.

9.4.5 Previous Studies and Archaeological Investigations

Geophysical survey was undertaken in 2018 within the undisturbed southern area of the Site, outside the existing quarry area (Target, 2018; Appendix 9.3), including the locations of AR-01 to AR-05. A complex of potential archaeological features were identified from this survey, particularly around the location of AR-01 and in the southwestern area of the Site (areas M1 and M2 in Target (2018), Appendix 9.3), with no anomalies of archaeological significance in the southeastern areas (areas M3 and M4 in Target (2018), Appendix 9.3). Anomalies in area M3 were considered likely to be of geological origin. The interpretation of the geophysical results aligns with previous, wider scale LiDAR studies, suggesting the area around AR-01 was a prehistoric hillfort, potentially built upon an earlier funerary monument (Target, 2018; Davis, 2014). The extent of archaeological features identified at the Site by this survey are presented in Figures 5 to 7 in Appendix 9.3.

Four other previous archaeological investigations are recorded within the Study Area, three of which were associated with road widening and improvement activities along the N7 motorway. Geophysical survey and trial trenching along the route of the N7 undertaken in 2003 and 2004 revealed two sites of archaeological potential in Bustyhill and Steelstown to the northwest and southwest of the Site, which were both excavated under licence in 2004 (Duffy, 2010 and Duffy, 2011, respectively).

The Bustyhill excavation (Duffy, 2010) to the northwest revealed a potential enclosure site with two entrances, although due to their depth and layout they are considered to potentially form part of the field system, rather than a ringfort or other earthwork construction. Two pits were also identified and dated to the early medieval period.

The Steelstown excavation (Duffy, 2011) to the southwest revealed a potential late Neolithic period structure, indicated by pits and postholes, as well as large amounts of lithics and Grooved Ware pottery sherds in the fill. A fragment of a polished stone axe was also identified. Burnt remains, first identified during trial trenching, were also confirmed, with an Iron Age/early medieval furnace revealed at the location. The interpretation of the Site as either domestic or ritual remains unclear. Excavation undertaken in 2005 at a neighbouring location, however, identified a curvilinear ditch interpreted as an enclosure for a cemetery, consisting of four cremation pit burials containing worked flint, pottery and metal work (Excavations Bulletin ref: 2005:532). It is suggested the two sites may be linked, although the results of radiocarbon dating samples are not available to confirm.

The other excavation in the Study Area was undertaken in 2004 at AR-06 and the entry concludes that the asset is not a souterrain, as recorded on the SMR and RMP (Excavations Bulletin ref: 2004:0474).

9.4.6 Historic Map Regression and Aerial Imagery

Historic mapping and aerial imagery for the Site is available from Ordnance Survey Ireland, including:

- 6 Inch Colour and Black & White – 1829-1841;
- 25 Inch Black & White – 1897-1913;
- Aerial photography (black and white) – 1991;
- Aerial photography (black and white) – 1994;
- Aerial photography (black and white - orthorectified) – 1995;
- Aerial photography (colour - orthorectified) – 2000; and

- Aerial photography (colour - orthorectified) – 2005.

The 6" map, dating from the early- to mid-19th century, depicts the Site as largely undeveloped agricultural land within a wider rural landscape. The original farmhouse is indicated in its current location and the modern-day field and road system layout is easily discernible. Two small areas along the western boundary of the Site are recorded as quarries, as well to the south. AR-01 is labelled as 'Windmill Stump' and AR-06 to AR-10 are clearly labelled the northwest of the Site.

The 25" map, dating from the turn of the 20th century, is equally recognisable when compared to modern aerial imagery and shows that the Site remained largely undeveloped throughout this period. The areas of quarrying previously depicted along the western boundary are shown to have extended eastwards across the Site, following the alignment of a field boundary. AR-01 is indicated on the map but is not labelled. The locations of AR-07 to AR-10 are indicated with labels.

Aerial photography from 1991 is the next available imagery, which documents large scale quarrying and stockpiling activity over the majority of the central area of the Site, with the western end undisturbed. Expansion westwards is documented in aerial imagery from 1994 and 1995. The southern area, where AR-01 to AR-05 are located, remains undisturbed throughout this period. The extent of the quarry in 1995 is shown to be smaller as it is at present, with limited eastwards expansion. The original farm buildings and field layout are still discernible. In the wider area, the rural landscape is still evident, although westward urban expansion from Rathcoole is also documented, with significant residential development along the route of the N7 motorway. The double hedgerow at the western end of the Site demarcate the former alignment of a small road, oriented north-south, known as Tierney's Lane, which was closed in the 1960s.

The steady expansion eastwards, westwards and downwards of the quarry is documented in aerial photographs from 2000 and 2005. The southern area of the Site remains undisturbed, with the focus on eastwards expansion. The 2005 imagery indicates the quarry had not reached its current extent at that time. Modern aerial imagery indicates that eastwards expansion continued until at least 2009. Throughout this period, a rural landscape persists in the surrounding Study Area.

9.4.7 Undiscovered Archaeological Remains

Based upon the presence of sub-surface archaeological remains within the Site that have only been identified in recent years through non-invasive surveying techniques, combined with the range and density of archaeological assets within the Study Area, it is not unreasonable to consider that there is potential for undiscovered archaeological remains to have existed at the Site prior to quarrying activity commencing. Indeed, the shape of the large enclosures identified through geophysical survey at the Site appear to be truncated along their northern periphery by the existing quarry (see Figures 5 to 7 in Appendix 9.3).

9.5 Potential Effects

Using the assessment methodology described in Section 9.3, the effects of the Development upon cultural heritage assets between 1990 and the present have been assessed. Aerial imagery from 1991 has been used as the closest representation of baseline conditions in 1990 and is assumed to represent the maximum extent of the quarry at that time. Due to the nature of the Development (i.e. progressive quarrying), all effects have been considered as occurring during the operational phase (i.e. no discrete construction phase has been considered).

9.5.1 Operation Phase

Quarrying activity within the Site boundary has the potential to have directly impacted five designated cultural heritage assets (AR-01 to AR-05) located in the southern area of the Site. It also cannot be discounted that

undiscovered archaeological remains may have existed, or may continue to exist, within the Site that have the potential to have been directly impacted by quarrying activity.

The air quality and noise assessments indicate that no significant effects have occurred during the operation of the Site. As such, no indirect effects on the setting of cultural heritage assets within the wider Study Area are considered likely to have occurred as a result of air or noise emissions.

The landscape and visual assessment has identified a number of visual changes that have occurred during operation of the Site, which are considered to have affected the setting of 13 cultural heritage assets in the wider Study Area. Seven of these assets are located to the south and east of the Site (BU-02 – BU-06, BU-08 and AR-13), where there is some potential intervisibility with mounds and stockpiles along the ridge, but no views of the quarry pit or exposed rockface are possible. A negligible to low magnitude effect is considered to have occurred at these assets. The other six assets (AR-06 to AR-11) are located to the northwest of the Site where there are clear views towards the quarry pit and exposed rockface, which are considered to have resulted in a medium magnitude effect. No change is considered to have occurred at three assets (BU-01, BU-07 and AR-12).

Table 9.7 presents the potential effects on cultural heritage assets during operation.

Table 9.7: Potential Effects

| Asset | Description of Effect | Magnitude of Effect | Asset value | Significance of Effect (before mitigation) |
|---|---|---------------------|-------------|--|
| AR-01 | Damage or loss of asset through quarrying activity | High | High | Profound adverse |
| AR-02 | Damage or loss of asset through quarrying activity | High | Medium | Significant adverse |
| AR-03 | Damage or loss of asset through quarrying activity | High | Medium | Significant adverse |
| AR-04 | Damage or loss of asset through quarrying activity | High | Medium | Significant adverse |
| AR-05 | Damage or loss of asset through quarrying activity | High | Medium | Significant adverse |
| Potential Undiscovered Archaeological Remains | Damage or loss of asset through quarrying activity | High | Very High | Profound adverse* |
| AR-06 | Considerable changes to setting as a result of visual changes | Medium | High | Moderate adverse |
| AR-07 | Considerable changes to setting as a result of visual changes | Medium | High | Moderate adverse |
| AR-08 | Considerable changes to setting as a result of visual changes | Medium | High | Moderate adverse |
| AR-09 | Considerable changes to setting as a result of visual changes | Medium | High | Moderate adverse |

| Asset | Description of Effect | Magnitude of Effect | Asset value | Significance of Effect (before mitigation) |
|-------|---|---------------------|-------------|--|
| AR-10 | Considerable changes to setting as a result of visual changes | Medium | High | Moderate adverse |
| AR-11 | Considerable changes to setting as a result of visual changes | Medium | High | Moderate adverse |
| AR-12 | Slight changes to setting as a result of visual changes | No change | High | Imperceptible |
| AR-13 | Slight changes to setting as a result of visual changes | Negligible | High | Slight adverse |
| BU-01 | Slight changes to setting as a result of visual changes | No change | High | Imperceptible |
| BU-02 | Slight changes to setting as a result of visual changes | Negligible | High | Slight adverse |
| BU-03 | Slight changes to setting as a result of visual changes | Negligible | High | Slight adverse |
| BU-04 | Slight changes to setting as a result of visual changes | Negligible | Medium | Not significant |
| BU-05 | Slight changes to setting as a result of visual changes | Negligible | Medium | Not significant |
| BU-06 | Slight changes to setting as a result of visual changes | Negligible | Medium | Not significant |
| BU-07 | Slight changes to setting as a result of visual changes | No change | High | Imperceptible |
| BU-08 | Slight changes to setting as a result of visual changes | Negligible | Medium | Not significant |

*this is a conservative scenario, assuming very high value archaeological remains did/do exist within the Site.

9.6 Mitigation and Monitoring

The southern area of the Site, which contains AR-01 to AR-05, has been intentionally avoided so as not to disturb known archaeological remains in that area. This has avoided any potential direct impacts to these known assets. Avoidance of this area should be continued as an ongoing mitigation measure.

No further mitigation measures have been enacted on-site with regards to cultural heritage assets.

9.7 Residual Effects

By implementing the mitigation measures outlined in Section 9.6, direct impacts to known on-site cultural heritage assets (AR-01 to AR-05) have been avoided. Indirect impacts to the setting of these assets though, through noise, dust and visual changes, are likely to have resulted in residual impacts.

The potential residual effects of the Development on cultural heritage assets are presented in Table 9.8

Table 9.8: Residual Effects

| Asset | Description of Effect | Magnitude of Effect | Asset value | Significance of Effect (after mitigation) |
|---|--|---------------------|-------------|---|
| AR-01 | Considerable changes to setting through increased noise and dust, and visual changes | Medium | High | Moderate adverse |
| AR-02 | Considerable changes to setting through increased noise and dust, and visual changes | Medium | Medium | Moderate adverse |
| AR-03 | Considerable changes to setting through increased noise and dust, and visual changes | Medium | Medium | Moderate adverse |
| AR-04 | Considerable changes to setting through increased noise and dust, and visual changes | Medium | Medium | Moderate adverse |
| AR-05 | Considerable changes to setting through increased noise and dust, and visual changes | Medium | Medium | Moderate adverse |
| Potential Undiscovered Archaeological Remains | Damage or loss of asset through quarrying activity | High | Very High | Profound adverse* |
| AR-06 | Considerable changes to setting as a result of visual changes | Medium | High | Moderate adverse |
| AR-07 | Considerable changes to setting as a result of visual changes | Medium | High | Moderate adverse |
| AR-08 | Considerable changes to setting as a result of visual changes | Medium | High | Moderate adverse |
| AR-09 | Considerable changes to setting as a result of visual changes | Medium | High | Moderate adverse |
| AR-10 | Considerable changes to setting as a result of visual changes | Medium | High | Moderate adverse |
| AR-11 | Considerable changes to setting as a result of visual changes | Medium | High | Moderate adverse |

| Asset | Description of Effect | Magnitude of Effect | Asset value | Significance of Effect (after mitigation) |
|-------|---|---------------------|-------------|---|
| AR-12 | Slight changes to setting as a result of visual changes | No change | High | Imperceptible |
| AR-13 | Slight changes to setting as a result of visual changes | Negligible | High | Slight adverse |
| BU-01 | Slight changes to setting as a result of visual changes | No change | High | Imperceptible |
| BU-02 | Slight changes to setting as a result of visual changes | Negligible | High | Slight adverse |
| BU-03 | Slight changes to setting as a result of visual changes | Negligible | High | Slight adverse |
| BU-04 | Slight changes to setting as a result of visual changes | Negligible | Medium | Not significant |
| BU-05 | Slight changes to setting as a result of visual changes | Negligible | Medium | Not significant |
| BU-06 | Slight changes to setting as a result of visual changes | Negligible | Medium | Not significant |
| BU-07 | Slight changes to setting as a result of visual changes | No change | High | Imperceptible |
| BU-08 | Slight changes to setting as a result of visual changes | Negligible | Medium | Not significant |

*this is a conservative scenario, assuming very high value archaeological remains did/do exist within the Site.

9.8 Cumulative Effects

Due to the nature of the Development and the likely effects described, potential cumulative effects would be limited to indirect effects to the setting of cultural heritage assets within the Study Area. As the landscape within the Study Area has remained relatively unchanged outside the Site, no cumulative effects upon cultural heritage assets are considered to have occurred.

9.9 Remedial Measures

No remedial measures are considered feasible to mitigate the residual effects that are likely to have occurred at cultural heritage assets within the Site.

9.10 Summary and Conclusions

A retrospective impact assessment was required to determine the potential effects of quarrying activity at the Windmillhill quarry site between 1990 and the present. A detailed desk-based assessment has been undertaken to determine the cultural heritage baseline conditions and a full retrospective impact assessment of the Development has been completed.

Through desk-based research and previous on-site survey work, it is clear that the Site contains a number of cultural heritage assets, with the potential for undiscovered archaeological remains to exist at the Site

considered to be real. There are also a number of cultural heritage assets, both archaeological and architectural, within the wider Study Area.

It is considered that, whilst direct impacts have been avoided, there are likely to have been moderate adverse effects to the settings of the five known cultural heritage assets within the Site (AR-01 to AR-05) through increased noise and dust emissions, as well from visual changes to the landscape. A potential profound adverse effect may have occurred to undiscovered archaeological remains that had the potential to exist within the quarry footprint. Moderate and slight adverse effects are considered likely to have occurred to nine cultural heritage assets outside the Site within the wider Study Area as a result of visual changes to setting, with a further four assets experiencing not significant effects.

9.11 References

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APPENDIX 9.1

**Drawing – Cultural Heritage
Assets and Study Area**

APPENDIX 9.2

Cultural Heritage Gazetteer

APPENDIX 9.3

Geophysical Survey



golder.com

APPENDIX 9.1

**Drawing – Cultural Heritage
Assets and Study Area**

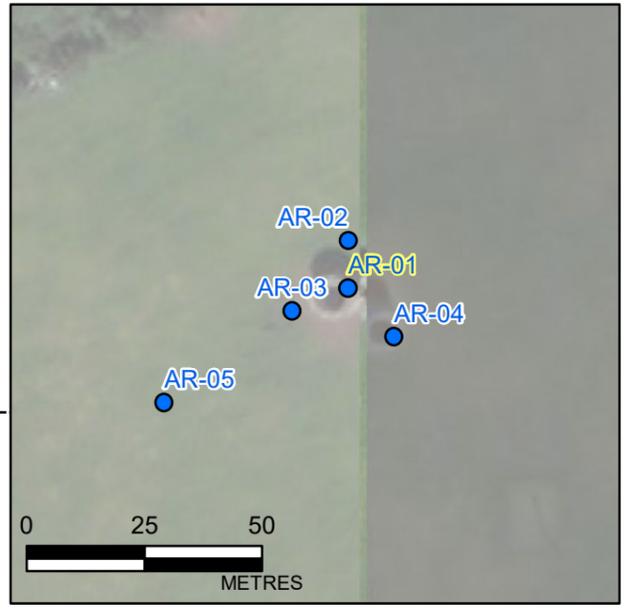
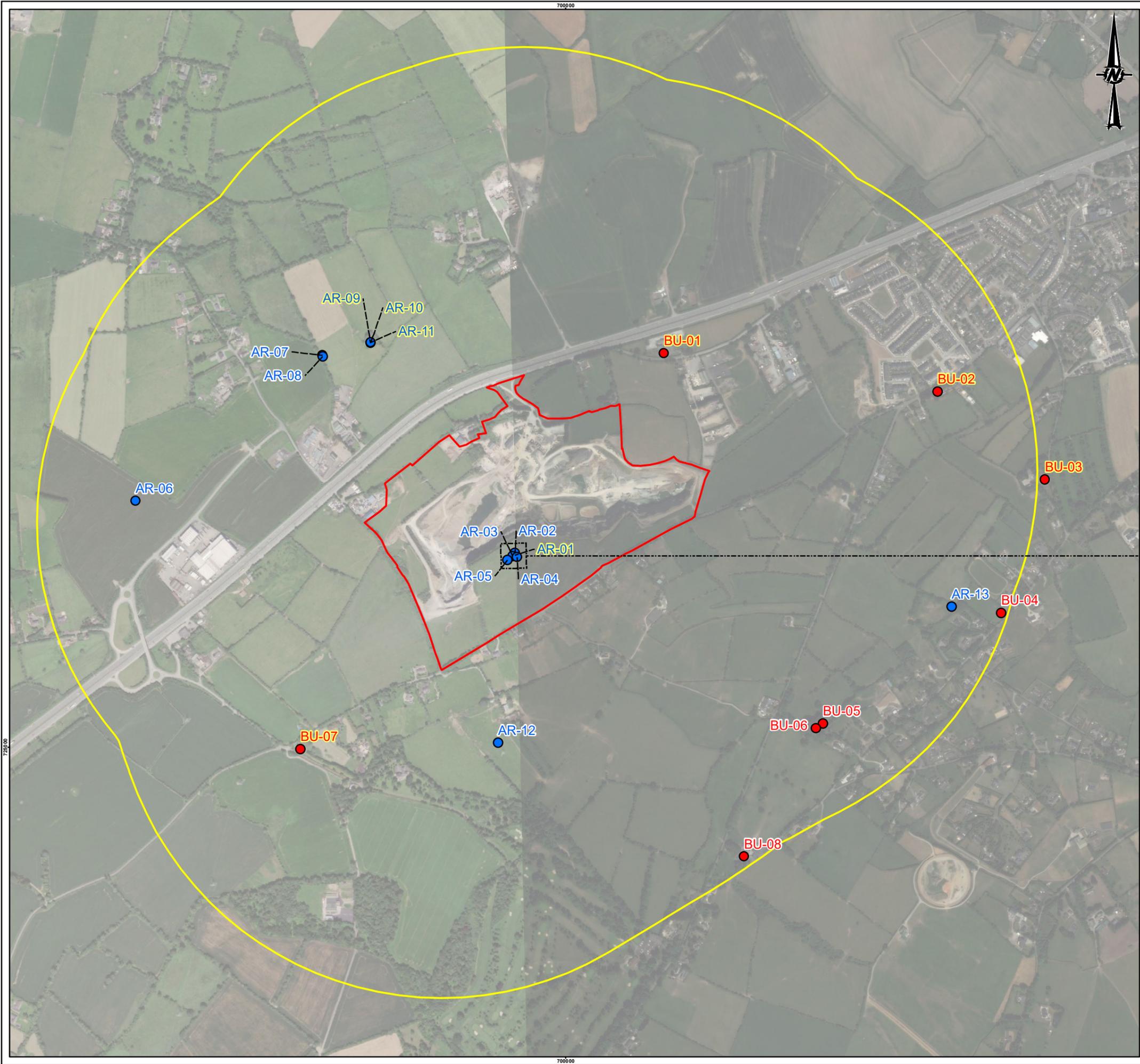
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LEGEND

- Archaeological Asset
- Architectural Asset
- EIA Boundary
- Study Area



NOTE(S)
 YELLOW HIGHLIGHT INDICATES ASSET IS LISTED ON SDCC RPS

- REFERENCE(S)**
1. COORDINATE SYSTEM: IRENET95 IRISH TRANSVERSE MERCATOR
 2. SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRIID, IGN, AND THE GIS USER COMMUNITY
 3. SITES AND MONUMENTS RECORD DATA CREATED AND MAINTAINED BY THE NATIONAL MONUMENT SERVICE.
 4. NATIONAL INVENTORY OF ARCHITECTURAL HERITAGE BUILDING AND GARDEN SURVEY DATA CREATED AND MAINTAINED BY THE NATIONAL INVENTORY OF ARCHITECTURAL HERITAGE.

CLIENT
 L. BEHAN AGGREGATES & RECYCLING LTD

PROJECT
 WINDMILL HILL QUARRY REIAR

TITLE
 CULTURAL HERITAGE ASSETS AND STUDY AREA

| CONSULTANT | YYYY-MM-DD | 2021 MAR 04 |
|------------|------------|-------------|
| DESIGNED | CR | |
| PREPARED | CR | |
| REVIEWED | PW | |
| APPROVED | PW | |



PROJECT NO. 20137776 CONTROL R01.9-EIA-001 REV. B.0 DRAWING 9.1

PATH: E:\Behan_Aggregates_and_Recycling_L1\Windmill_Hill_Reiars\09_PRODUCTION\MKD\20137776_R01_10_EIA_001_D001_CH_Study_Area_Aerial_01.mxd PRINTED ON: 2021-03-04 AT: 10:48:01 AM

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APPENDIX 9.2

Cultural Heritage Gazetteer

CULTURAL HERITAGE GAZETTEER

1.0 ARCHAEOLOGICAL ASSETS

| Golder ID | SMR Reference | Description | Easting (ITM) | Northing (ITM) | Townland | RMP | Sensitivity/Value |
|-----------|---------------|--------------------------|---------------|----------------|---------------|-----|-------------------|
| AR-01 | DU021-038---- | Windmill | 699846 | 725586 | WINDMILLHILL | Yes | High |
| AR-02 | DU021-113---- | Cairn - burial cairn | 699846 | 725592 | WINDMILLHILL | No | Medium |
| AR-03 | DU021-114---- | Ring-ditch | 699839 | 725583 | WINDMILLHILL | No | Medium |
| AR-04 | DU021-115---- | Ceremonial enclosure | 699852 | 725580 | WINDMILLHILL | No | Medium |
| AR-05 | DU021-116---- | Hillfort | 699823 | 725571 | WINDMILLHILL | No | Medium |
| AR-06 | DU020-010---- | Souterrain | 698690 | 725751 | BUSTYHILL | Yes | High |
| AR-07 | DU020-011001- | Castle - tower house | 699259 | 726195 | COLMANSTOWN | Yes | High |
| AR-08 | DU020-011002- | Field system | 699260 | 726191 | COLMANSTOWN | Yes | High |
| AR-09 | DU020-009001- | Church | 699406 | 726232 | COLMANSTOWN | Yes | High |
| AR-10 | DU020-009002- | Graveyard | 699406 | 726234 | COLMANSTOWN | Yes | High |
| AR-11 | DU020-009004- | Ecclesiastical enclosure | 699406 | 726234 | COLMANSTOWN | Yes | High |
| AR-12 | DU021-039---- | Barrow - ring-barrow | 699795 | 725014 | NEWTOWN LOWER | Yes | High |
| AR-13 | DU021-040---- | Ritual site - holy well | 701178 | 725429 | CROCKSHANE | Yes | High |

2.0 ARCHITECTURAL ASSETS

| Golder ID | NIAH Reference | Building Name | Original Use | Date | Easting (ITM) | Northing (ITM) | Townland | RPS | Sensitivity |
|-----------|----------------|--------------------|--------------|-------------|---------------|----------------|--------------|-----|-------------|
| BU-01 | 11213007 | Keatingspark House | House | 1870 - 1900 | 700300 | 726202 | KEATINGSPARK | Yes | High |
| BU-02 | 11213008 | | Farm house | 1800 - 1840 | 701135 | 726085 | CROCKSHANE | Yes | High |
| BU-03 | 11218001 | Woodfield House | House | 1880 - 1900 | 701462 | 725816 | CROCKSHANE | Yes | High |
| BU-04 | 11218002 | Mount Carmel | House | 1890 - 1910 | 701328 | 725410 | CROCKSHANE | No | Medium |
| BU-05 | 11218003 | | House | 1810 - 1840 | 700786 | 725072 | CARRIGEEN | No | Medium |
| BU-06 | 11218003 | | House | 1810 - 1840 | 700764 | 725058 | CARRIGEEN | No | Medium |
| BU-07 | 11217002 | Steelstown Lodge | Gate lodge | 1875 - 1880 | 699192 | 724995 | STEELSTOWN | Yes | High |
| BU-08 | 11218004 | | House | 1800 - 1840 | 700545 | 724667 | CARRIGEEN | No | Medium |

APPENDIX 9.3

Geophysical Survey

Geophysical Survey Report

**Proposed quarry development at Windmillhill,
Rathcoole,
South County Dublin**

Detection License
18R0211

Client
Byrne Mullins & Associates

On behalf of
L. Behan Aggregates & Recycling Ltd.

Date
November 2018

Project
TAG1800IE39



TARGET REPORT 1800IE39

PROPOSED QUARRY DEVELOPMENT AT WINDMILLHILL, RATHCOOLE, SOUTH COUNTY DUBLIN

PROJECT BACKGROUND

Geophysical survey was undertaken at the site of a proposed quarry development situated in Windmillhill townland, c.2.4km SW of Rathcoole in South County Dublin, at the southern edge of an existing quarry located c.0.9km NE of Junction 5 on the N7. The site lies directly N of a minor road serving Rathcoole and Steeltown/Newtown Lower, and extends over c.13 hectares of land, traversing 4 adjacent fields. An 18th century windmill, recorded monument and place (RMP) DU021-038, lies within the site boundary to the NW.

This geophysical survey forms part of a pre-planning archaeological assessment, and it was commissioned by Byrne Mullins & Associates on behalf of L. Behan Aggregates & Recycling Ltd. The survey objectives were to identify the location, form and extent of buried archaeological remains, where present within the site boundary, and to advise further archaeological works, which may be required prior to the proposed development of the site.

| | |
|---------------------------------|---|
| Coordinates | 699961 725516 (ITM central coordinate) |
| Townland | Windmillhill |
| County | South County Dublin |
| Landuse | Pasture |
| Landscape, soils geology | Hilltop (215m O.D) occupied by clayey drift with siliceous stones of the Drumkeeran (0700DK) association, with bedrock comprising of calcareous greywacke siltstone and shale of the Carrighill Formation (Irish National Soils Map, 1:250,000k, V1b, 2014; Geological Survey Ireland Spatial Resources, Public Data Viewer Series). |
| Archaeology | DU021-038 represents the only RMP situated within the site boundary. The site does, however, encompass lands deemed to have a high archaeological potential as defined during the course of previous developments, and a recent UCD LIDAR study of the Dublin Mountains (Davis, 2014). The UCD LIDAR study, in particular, reports the discovery of a cairn on which DU021-038 and its 15 th century predecessor are located; two sub-circular enclosures; and three suspected barrows within the site boundary. The following extract from the National Monuments Service SMR Database provides details of DU021-038 and further RMPs within the wider landscape: |

| SMR No. | Class | Townland | ITM Easting | ITM Northing |
|---------------|--------------------------|---------------|-------------|--------------|
| DU020-009001- | Church | Colmanstown | 699406 | 726232 |
| DU020-009002- | Graveyard | Colmanstown | 699406 | 726234 |
| DU020-009004- | Ecclesiastical enclosure | Colmanstown | 699406 | 726234 |
| DU020-010---- | Souterrain | Bustyhill | 698690 | 725751 |
| DU020-011001- | Castle - tower house | Colmanstown | 699259 | 726195 |
| DU020-011002- | Field system | Colmanstown | 699260 | 726191 |
| DU021-038---- | Windmill | Windmillhill | 699846 | 725586 |
| DU021-039---- | Barrow - ring-barrow | Newtown Lower | 699795 | 725014 |

| | | | |
|---------------------|--|--------------------------|--|
| Fieldwork | 31 st October – 1 st November 2018 | Detection license | 18R0211 |
| Report issue | 18 th November 2018 | Client | Byrne Mullins & Associates on behalf of L. Behan Aggregates & Recycling Ltd. |
| Author | John Nicholls MSc | Techniques | High resolution magnetic gradiometry and electromagnetic induction (EMI) |

1 SURVEY METHODOLOGY

1.1 Survey methodology, coverage and data collection

1.1.1 High resolution magnetic gradiometry was undertaken at the site investigating all available lands within the proposed development boundary, completing a c.10.5 hectares of survey in 4 fields (M1-M4). The magnetic gradiometer survey employed an advanced multichannel fluxgate gradiometer system combined with cm precision GPS. Magnetic gradiometer and GPS data were recorded simultaneously at rates of 75Hz and 1Hz respectively, conducting parallel instrument traverses 3.2m in width across the site.

1.1.2 Targeted EMI survey was also undertaken in magnetic gradiometer area M2 focusing on the enclosure and suspected barrow remains noted from previous UCD LIDAR study, completing a total 1.24 hectares of EMI in 2 areas (EMI1-EMI2). The EMI survey employed a sled mounted conductivity meter combined with cm precision GPS, recording quadrature (apparent conductivity -mSm) and in-phase (apparent magnetic susceptibility -ppt) data and GPS measurements simultaneously at rates of 10Hz and 1Hz respectively, conducting parallel instrument traverses 1m in width across EMI1-2.

1.2 Survey instrumentation

1.2.1 Details of the instrumentation employed for this geophysical survey are provided below:

| Technique | Sensor spacing | Sample rate | Instrumentation | Instrument sensitivity/precision |
|---------------------------------|------------------------|-------------|---|--|
| Magnetic (fluxgate) gradiometry | 0.40m | 75Hz | Foerster Ferex CON650 Archaeology fluxgate gradiometers, 10-channel data logger | <75pT/VHz at 1Hz (650mm baseline) |
| EMI | 1m | 10Hz | CMD MiniExplorer conductivity meter | Vertical dipole orientation (0.5m, 1.0m, and 1.8m depth range) |
| GPS | 3.60m -MAG, 1m -EMI | 1Hz | Trimble R10 GPS (VRS system) | <0.1m (vertical & horizontal) |

1.3 Data processing

1.3.1 Survey data were processed using in-house, open-source and commercial software. Following GPS, magnetic gradiometer and EMI measurements on site survey data were processed as follows:

| Process | Technique | Description |
|---------|--|---|
| 1a | Magnetic gradiometry | Zero median drift correction to balance data from entire sensor array |
| 1b | EMI | Smoothed overall drift function (running average) using a window width of 30 readings |
| 2 | Gridding of corrected data via nearest neighbour interpolation | |
| 3 | Greyscale generation at optimum range & export to tiff-format (.tiff & .wld) | |

1.3.2 To assure integrity of the processed data, and maintain close correlation with the original raw on-site measurements, no additional smoothing, low or high pass filters were applied proceeding steps 1a-3.

1.4 Data display

1.4.1 Figure 1 presents a site location diagram at a scale of 1:5000 displaying the boundary of the proposed development, location of 18th century windmill DU021-038, and extent of magnetic gradiometer and EMI surveys.

- 1.4.2 Figures 2-4 display the results from magnetometer survey in M1-M4 presented as greyscale images at scales of 1:2000 and 1:1500.
- 1.4.3 Figure 5-7 present an interpretation of the results from magnetic gradiometer survey in M1-M4 at scales of 1:2000 and 1:1500.
- 1.4.4 Figures 8-10 display the results from EMI survey in EMI1-EMI2 presented as greyscale images of quadrature (apparent conductivity -mSm) and in-phase (apparent magnetic susceptibility -ppt) data (vertical dipole depth ranges 0.5m – 1.8m) at a scale of 1:1250.
- 1.4.5 Figure 11 provides an interpretation of the results from EMI survey in EMI1-EMI2 at a scale of 1:1250.

2 GENERAL CONSIDERATIONS & COMPLICATING FACTORS

2.1 Access & ground conditions

- 2.1.1 Ground conditions at the site were generally suitable for geophysical survey, the investigation area comprising mostly accessible level pasture land. Survey was precluded in M1 to the SW by outcropping geology, and in M4 to the NE by a cattle crush and poor terrain.
- 2.1.2 At the start of fieldwork c.3ha of the site, to the NE in both M2 and M4, was no longer available to geophysical survey, these locations having since been incorporated into the existing quarry.

2.2 Modern interference

- 2.2.1 Numerous small-scale ferrous responses are evident in the results from survey in M1-M4 and in EMI1. Ferrous responses are a common occurrence in magnetic survey data, and in most cases represent modern metal debris contained within the topsoil.
- 2.2.2 Large-scale ferrous responses are also evident in the results from survey in M2-M4. these deriving from survey in proximity to existing field boundaries, metal fencing and other modern surfaces bordering the investigation perimeter. A large ferrous response visible in the results from M2 and EMI1, c.30m S of DU021-038, corresponds to interference from a telegraph pole. Where subtle variations associated with buried archaeological remains may be present in proximity to large-scale ferrous responses such as these, they will likely remain beyond detection due to the range of interference encountered.
- 2.2.3 The route of a buried cable/service, possibly relating to the telegraph pole, is also evident in the results from M2/EMI1, and visible as a linear ferrous response extending in a south-easterly direction from the edge of the existing quarry.
- 2.2.4 High voltage overhead power cables traverse the south-western portion of the site and have contributed large-scale magnetic interference across c.60% of M1, with further interference noted to the SW in M2. Where subtle variations associated with buried archaeological remains may be present in proximity to this magnetic disturbance, these responses will likely remain beyond detection due to the range of interference encountered.

2.3 Former landuse

- 2.3.1 Remains of former cultivation are evident in the results from magnetic gradiometer survey in M2-M4, and visible as a series of closely spaced parallel linear anomalies aligned approximately NW-SE.

3 MAGNETIC GRADIOMETRY RESULTS

3.1 M1

- 3.1.1 The results from survey in M1 are dominated by large-scale magnetic disturbance deriving from high voltage overhead power cables traversing M1 NW-SE. Where subtle variations in response associated with buried archaeological remains may be present in this location, they will likely remain beyond detection due to the range of interference encountered.
- 3.1.2 One strongly magnetic positive response (1) has been recorded NW of survey centre in M1. Interpretation of this anomaly is tentative given its location within broad a region of magnetic disturbance deriving from high voltage power cables traversing this portion of the site. An archaeological interpretation should not be entirely dismissed. A possible archaeological origin for small-scale positive anomaly 2 at the eastern edge of M1 should also not be ignored, although a natural soil/geological or modern ferrous interpretation is expected for this response.
- 3.1.3 No further responses of note are indicated by the results from survey in M1.

3.2 M2

- 3.2.1 The remains of 2 circular enclosures (3-4) recorded immediately NE and SW of DU021-038 are evident to the N in M2. These measure c.25m in diameter, and comprise a series of concentric fragmented positive/negative curving responses containing further small-scale anomalies of likely significance. These enclosures are located in a broad region of increased magnetic response, and partially overlie the location of the suspected cairn referred to by the previous UCD LIDAR study.
- 3.2.2 Two large, external and overlapping enclosures (5-6) encompassing responses 3-4, extending over a total c.2.5ha across the north-western portion of M1, are also evident in the results. Enclosure 5 comprises a poorly defined series of positive/negative linear responses and trends, which are reniform in character and measure c.215m NE-SW by 114m NW-SE. Enclosure 6, which is roughly circular in form, is defined by a series of narrow and weakly magnetic curving responses and trends, and measures c. 170m in diameter. Two converging ditches (7-8) extend through the eastern interior of enclosure 6, with a further outer enclosure ditch (9) indicated to the E. Responses 5-6 correspond to the enclosure features identified by the previous UCD LIDAR study.
- 3.2.3 Numerous responses of likely archaeological significance have been recorded in association with enclosure/ditch remains 3-9. These comprise small-scale positive anomalies, irregular patterns of response, and weak trends. The most notable of these include strongly magnetic responses 10 and weak curvilinear trend 11 to the SW of enclosure 3; a cluster of potential pit/posthole features (12) to the NE of enclosure 4; and linear responses 13 to the E of enclosure 3. The potential that curvilinear response 11 represents a weakly magnetic circular enclosure should also be considered.
- 3.2.4 To the SE of survey centre in M2 a series of weakly magnetic curving trends (14) highlight the location of a possible further enclosure, c.23m in diameter, with a small-scale poorly defined positive (15) of potential significance at the interior. Response 14 corresponds to the location of a suspected bowl barrow identified by the previous UCD LIDAR study.
- 3.2.5 The results from survey in M2 also display an abundance of weakly magnetic anomalies, small-scale positive responses and linear trends, most notably a series of rectilinear responses (16) to the SW. Given the immediate archaeological context the potential that these represent linear remains, posthole and pit locations possibly associated with enclosures 3-6 should not be ignored. However, a natural soil/geological, recent landuse or modern ferrous origin for some of these responses should also be considered. A NE-SW band of natural soil/geological variation is evident at the southern limit of enclosure 6, and corresponds to a distinct change in topography noted at the time of fieldwork.

3.3 M3

- 3.3.1 No responses of definite archaeological character are indicated by the results from survey in M3. Small-scale positives of potential note and weak linear trends are evident in the results NW (17) and NE (18) of

survey centre, and to the SW (19). An archaeological interpretation for these anomalies is tentative, and a natural soil/geological or modern ferrous origin should not be dismissed.

3.3.2 No further responses of note have been recorded from magnetic gradiometer survey in M3.

3.4 M4

3.4.1 No responses of archaeological significance have been recorded from magnetic gradiometer survey in M4. The results from this survey location are dominated by modern ferrous and patterns of former cultivation.

4 EMI RESULTS

4.1 EMI1

4.1.1 The results from survey in EMI1 highlight the locations of the two enclosures recorded immediately NE and SW of DU021-038 by the magnetic gradiometer survey (3-4), which partially overlie the location of the suspected cairn referred to by the previous UCD LIDAR study. These are mostly evident in the apparent magnetic susceptibility results from the vertical dipole 0.5m depth range, and visible as two circular/curvilinear features (A & B), which measure c.24m in diameter. Response A is encompassed by a broad region of high conductivity/low magnetic susceptibility, potentially representing remains of the cairn referred to in the previous UCD LIDAR study, although interpretation remains uncertain.

4.1.2 Remnants of two external enclosures beyond A-B, which were also recorded by the magnetic gradiometer survey in M1 (5-6), and noted by the previous UCD LIDAR study, are evident in EMI1 as linear response C, which extends NW of survey centre on NE-SW alignment; and weak curving trends D, located W of survey centre heading to the SE.

4.1.3 Additional responses of potential note in EMI1 include strongly magnetic positive anomaly E, at the northern survey edge overlapping with enclosure response C; and a curving trend (F), representing remains of a possible further barrow referred to in the previous UCD LIDAR study.

4.1.4 Numerous poorly defined anomalies have also been recorded in EMI1. The exact origin of these remains uncertain. Whilst an archaeological interpretation for these anomalies poorly defined anomalies should not be entirely dismissed, they are mostly expected to derive from near surface variations in underlying soils and/or geology.

4.1.5 The route of a suspected buried cable/service, which was recorded by magnetic gradiometer survey in M2, is also apparent NE of survey centre in EMI1.

4.2 EMI2

4.2.1 Curving trends G at survey centre in EMI2 correspond to the weakly magnetic enclosure remains recorded to the SE in magnetic gradiometer area M2 (14), and highlight the location of a suspected barrow also referred to in the UCD LIDAR study.

4.2.2 No further responses of note have been recorded from EMI survey in EMI2.

5 CONCLUSION

- 5.1 The results from magnetic gradiometer survey and targeted EMI survey within the site boundary have recorded a substantial and highly significant complex of archaeological remains, which extends across the central portion of the proposed quarry development. This complex includes two enclosures, which border the upstanding remains of 18th century windmill DU021-038, and these enclosures are encompassed by two larger outer enclosures, the most substantial of which is c170m in diameter. The remains of at least one further enclosure, which a previous UCD LIDAR study suggests represents a probable bowl barrow, have also been recorded in locations M2/EMI2, in proximity to a minor road which forms the southern site boundary.
- 5.2 Multiple further responses of archaeological significance have also been recorded, the majority extending through magnetic gradiometer area M2.
- 5.3 The results from this geophysical survey largely correspond to the findings from the previous UCD LIDAR study, which concluded that the remains identified at Windmillhill represent part of a hillfort, likely centred on an earlier prehistoric funerary monument (Davis, 2014).
- 5.4 The potential significance of a number of poorly defined responses recorded in M1 and M3 should not be entirely ignored, although these anomalies are largely expected to derive from a combination of natural soil/geological variation, recent landuse and/or modern ferrous debris.
- 5.5 Elsewhere, the results from survey highlight remains of former cultivation, the route of a buried cable/service and an area of natural soil/geological variation.

*** This conclusion must be read in conjunction with the detailed discussion of the results included in the main section of this report.**

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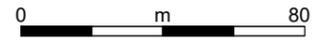
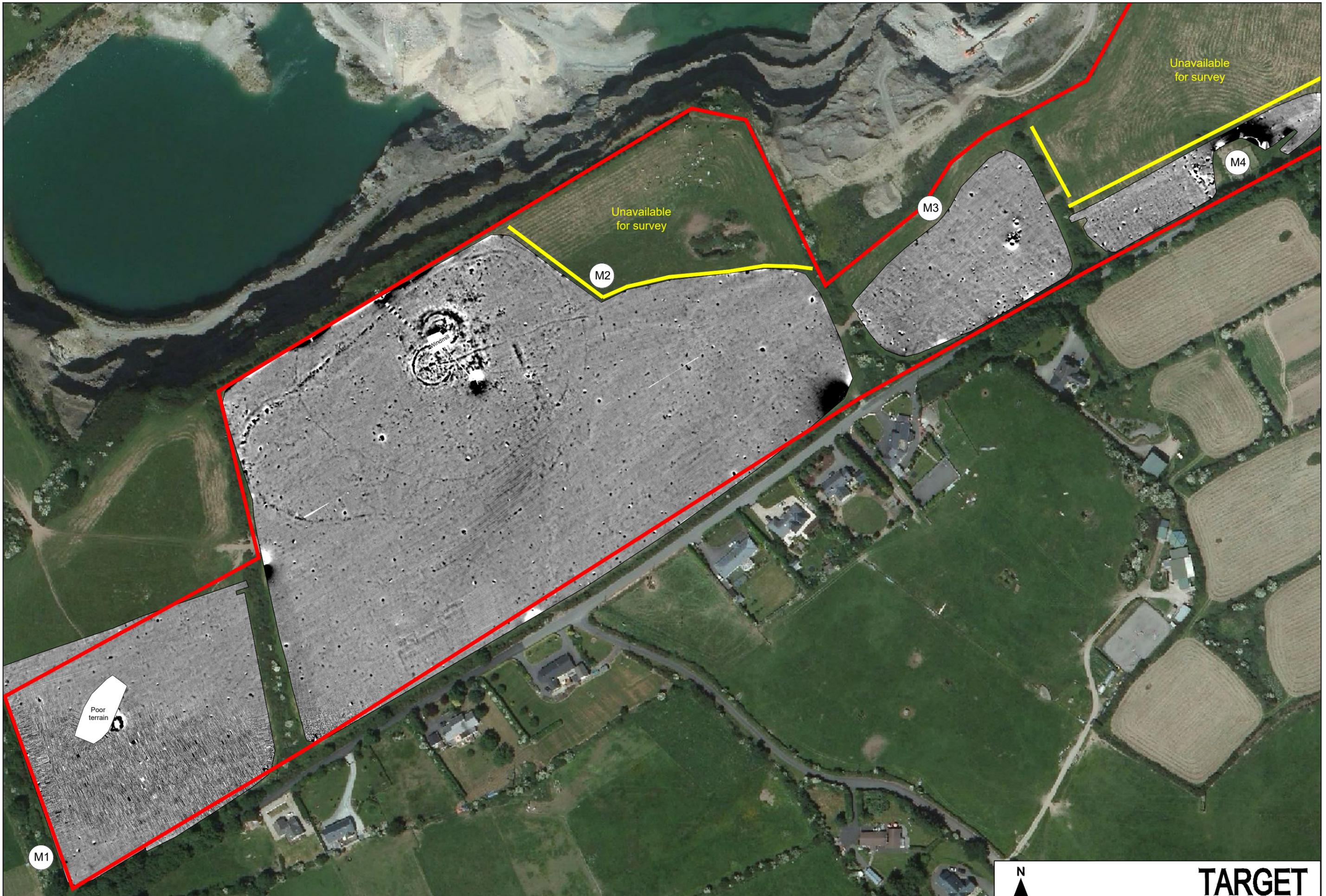
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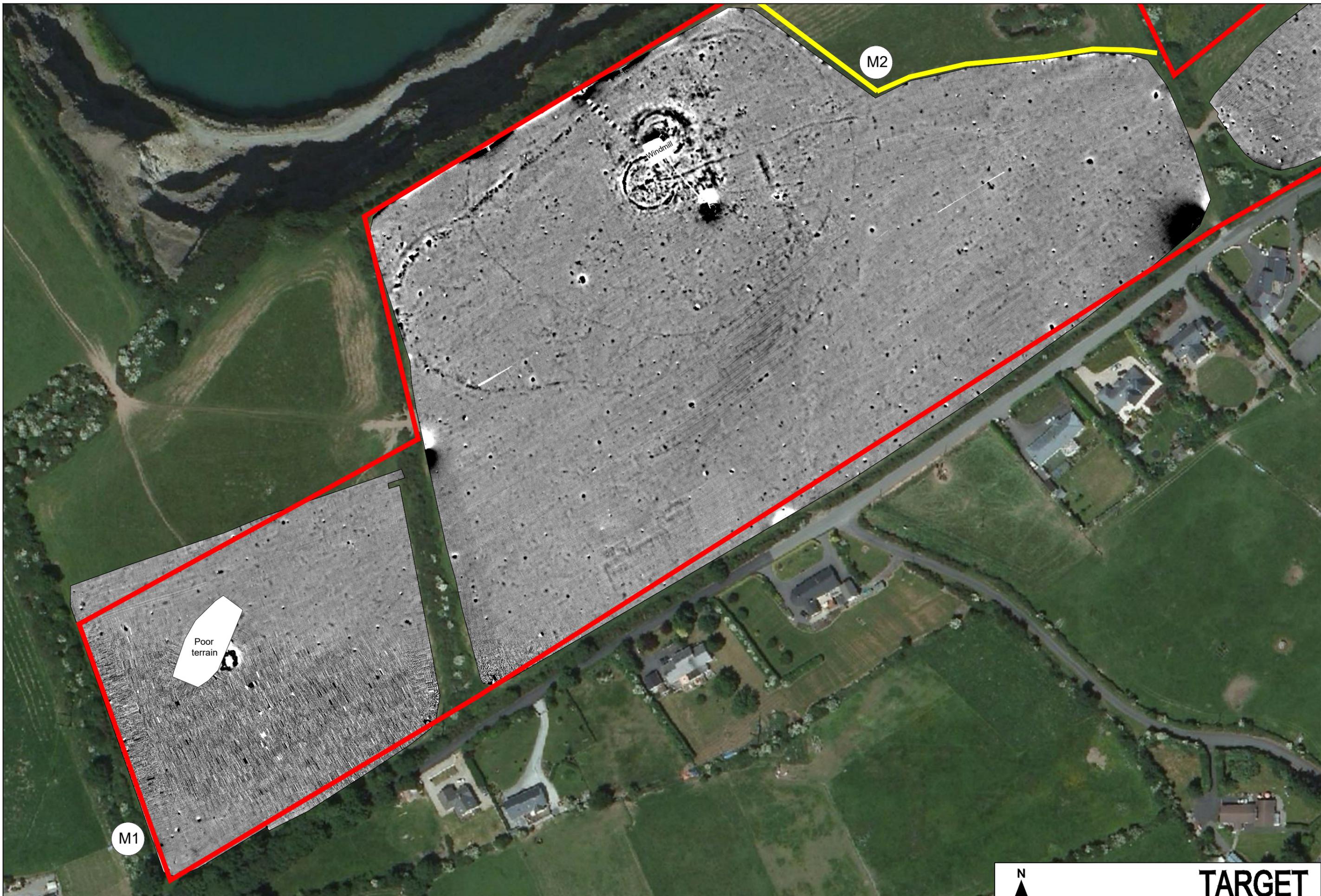
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▬ Site location
■ Magnetic gradiometry
▬ Edge of existing quarry
● SMR
▬ EMI

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M1

Poor terrain

Windmill

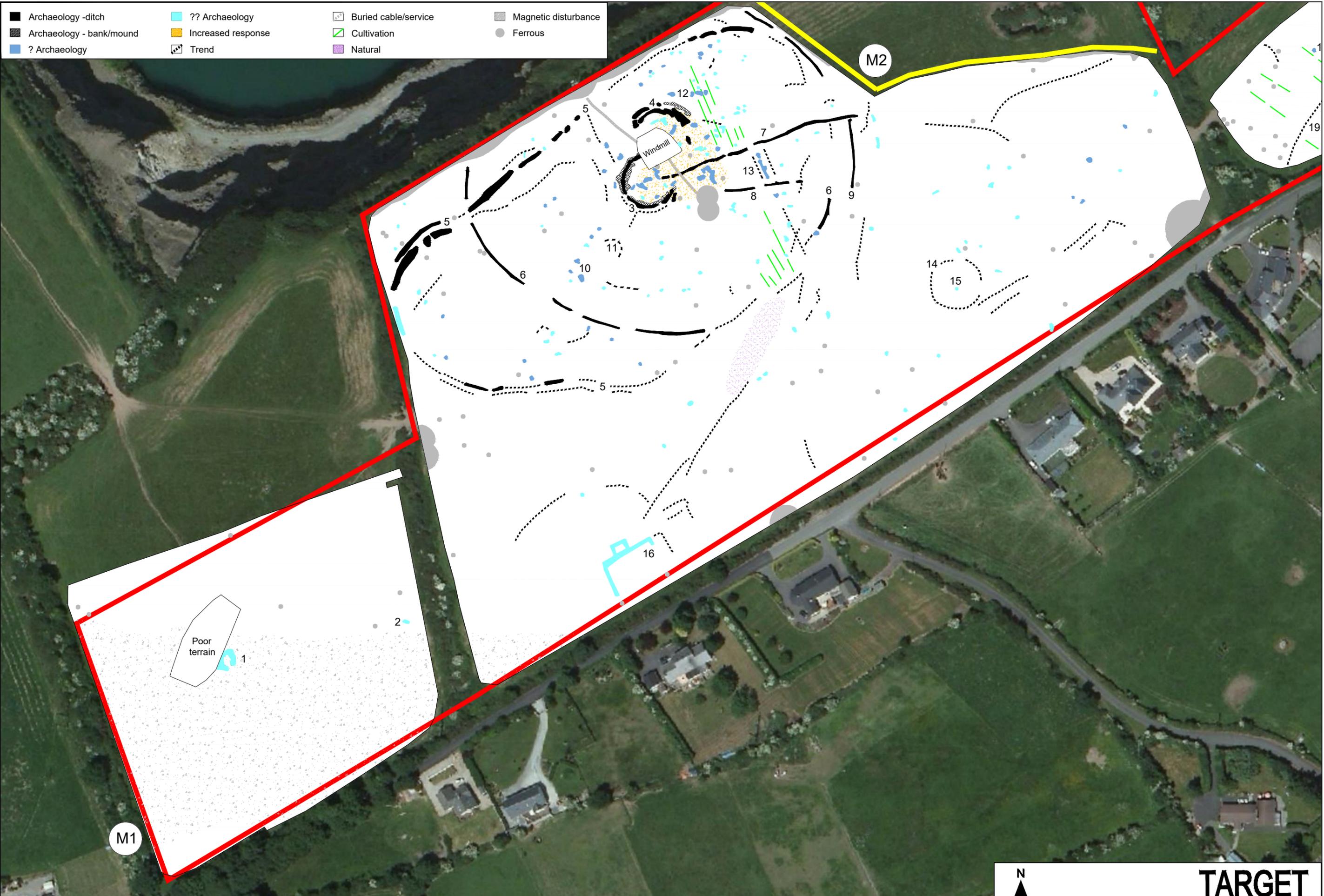
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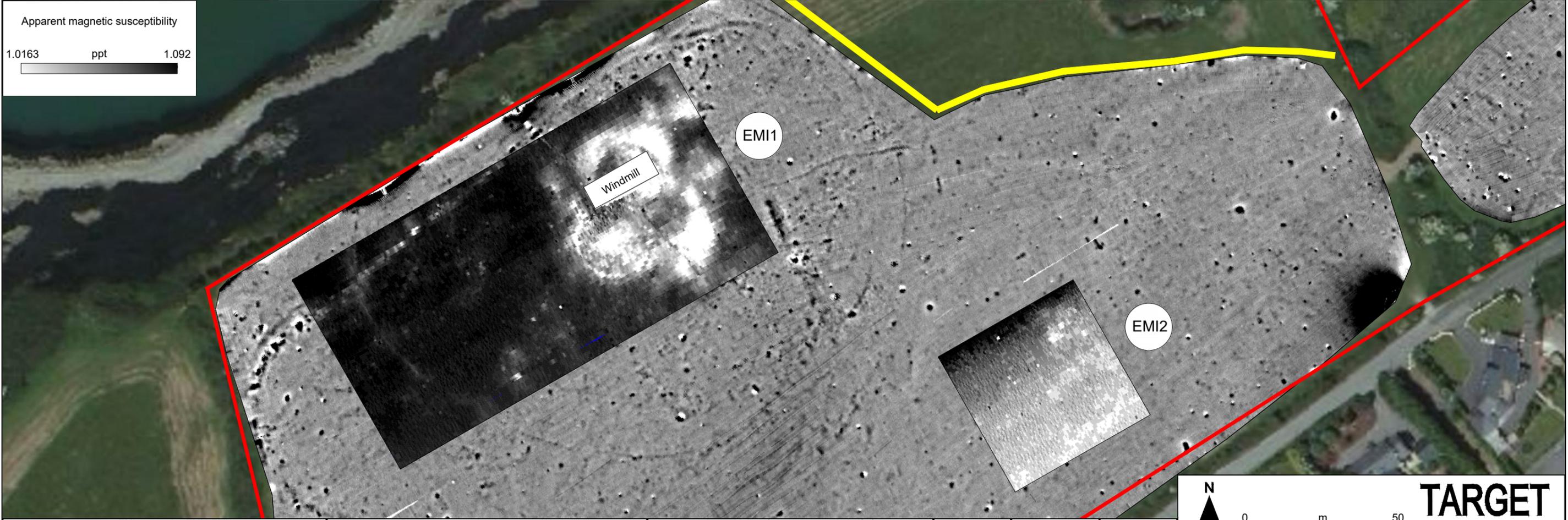
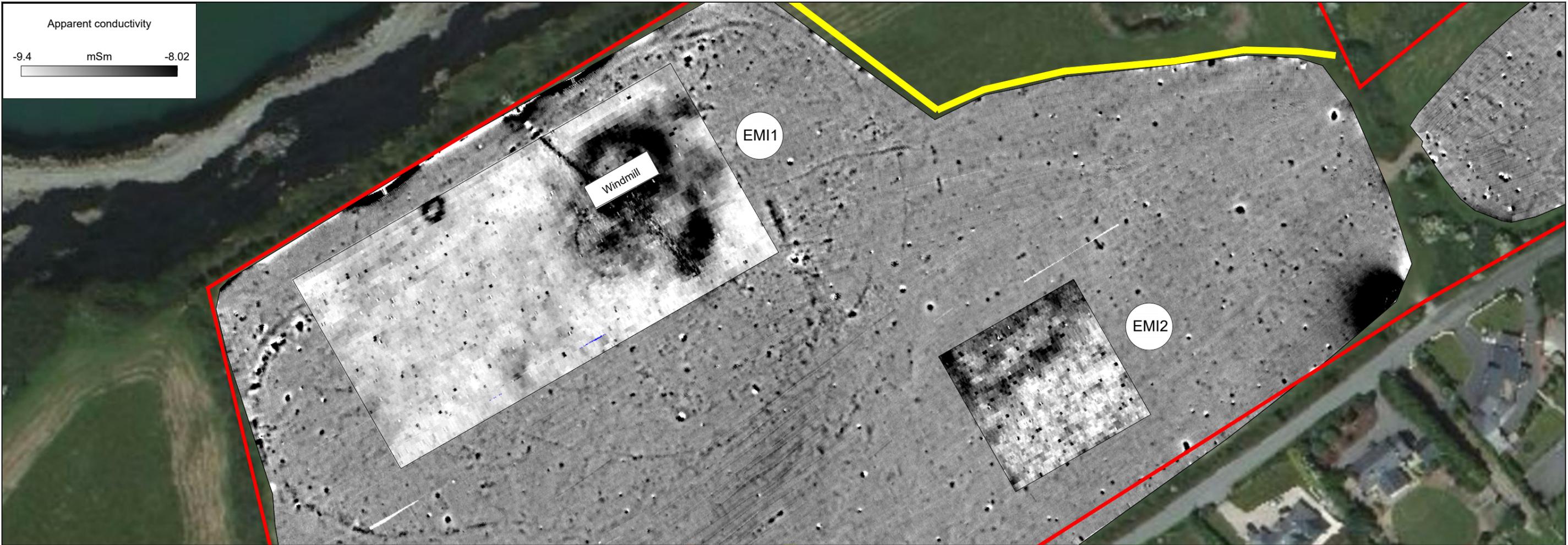
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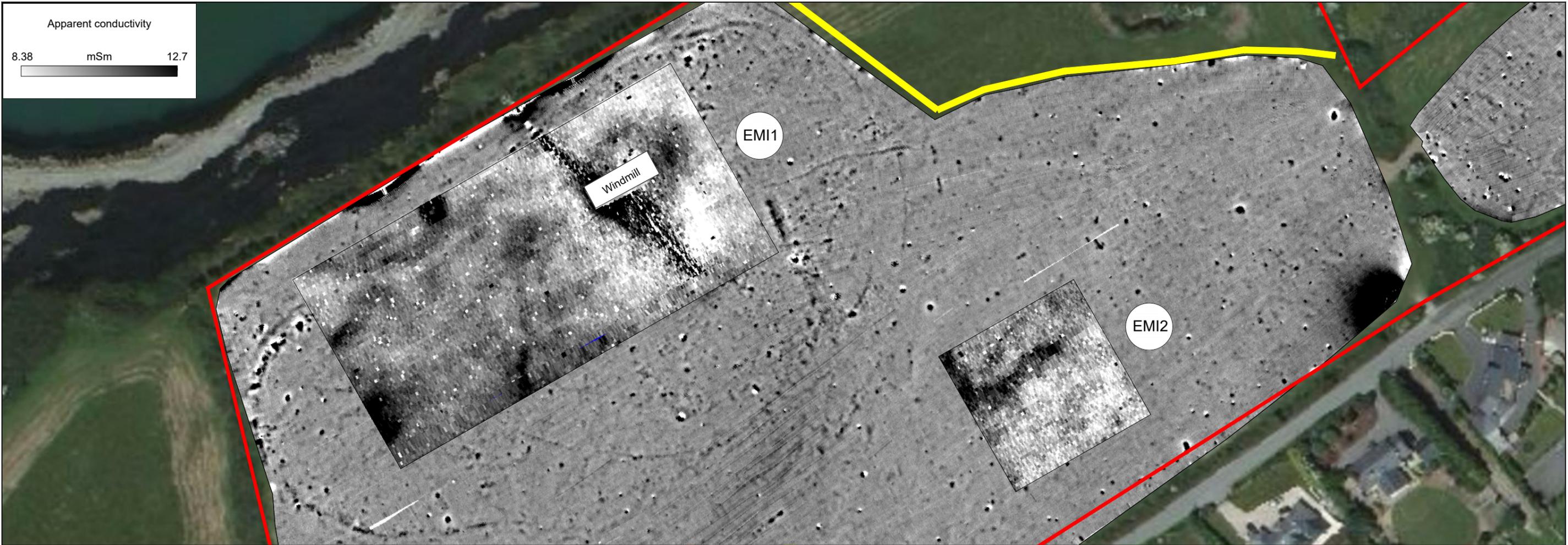


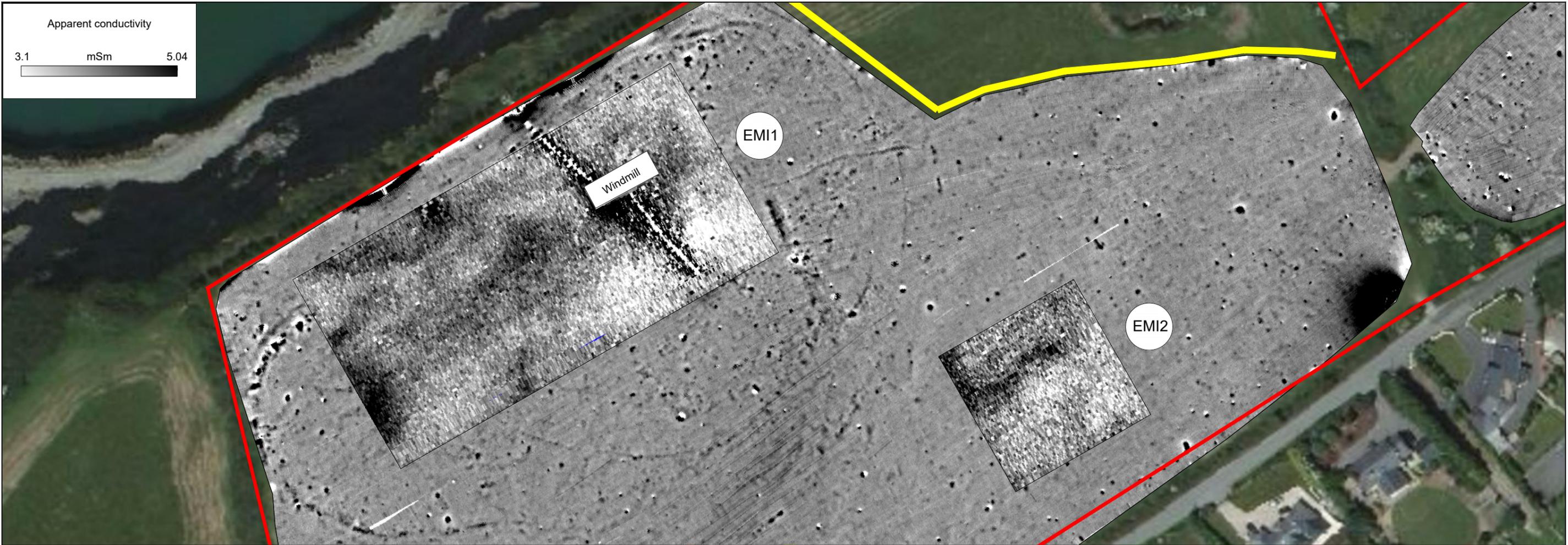












| | | |
|---------------|----------------|----------------------|
| Enclosure | ?? Archaeology | Buried cable/service |
| ? Cairn | Trend | Ferrous |
| ? Archaeology | Natural | |



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