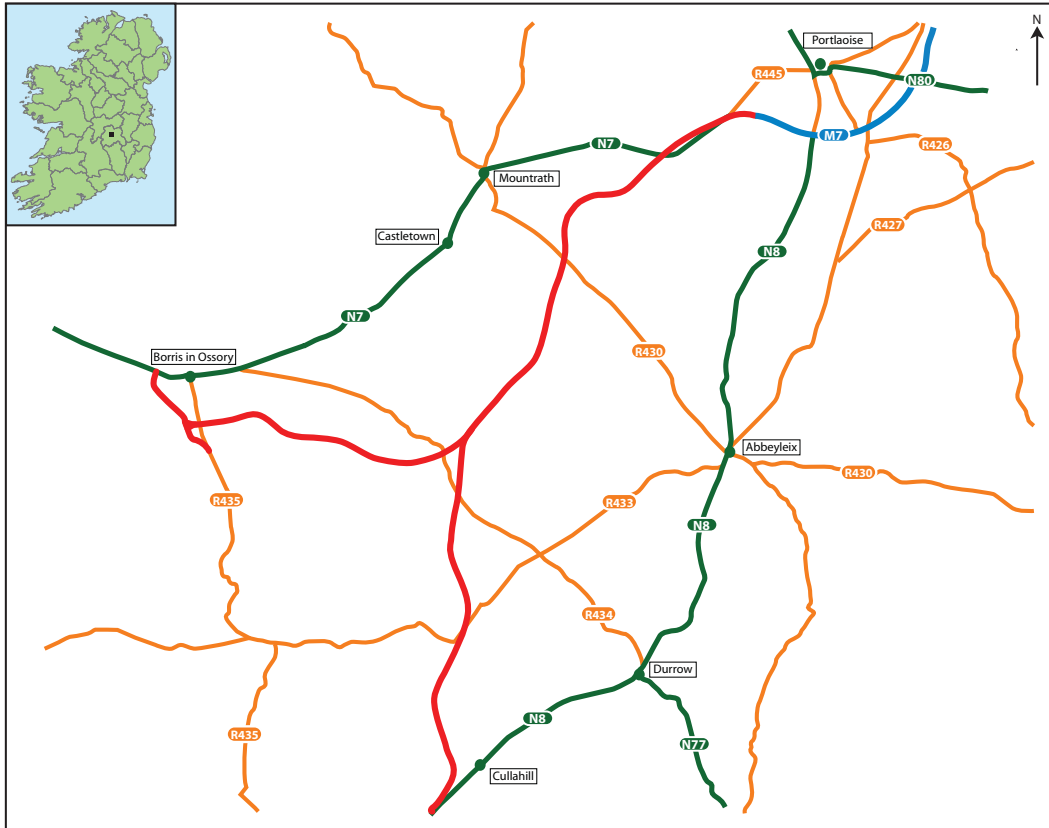


10. Archaeological aerial survey—a bird’s-eye view of the M7/M8 in County Laois

Lisa Courtney



Illus. 1—Location map showing the route of the M7 Portlaoise–Castletown/M8 Portlaoise–Cullahill Motorway scheme, indicated in red (Kildare County Council National Roads Design Office)

The M7 Portlaoise–Castletown/M8 Portlaoise–Cullahill Motorway scheme through County Laois will comprise 41 km of motorway and 11 km of link roads (Illus. 1). It will commence from the existing Portlaoise Bypass and tie in with the N7 Castletown–Nenagh road scheme, south of Borris in Ossory, and the M8 Cullahill–Cashel Motorway scheme, south of Cullahill. The M7/M8 scheme is the largest infrastructural project to be undertaken in County Laois. The proposed motorway is routed through a rural landscape, with the existing land use being almost exclusively agricultural. Villages and settlements in the environs of the motorway include Borris in Ossory, Cullahill, Ballycolla, Aghaboe and Clogh. The landscape is characterised by well-drained, gently undulating, broad valleys, giving rise to good-quality pastureland and pockets of bogland. Remnants of historical landscapes and woodland demesne planting occur along the route at Abbeyleix, Castledurrow, Donore, Palmerhill, Lismore and Granston.



Illus. 2—Ringfort (RMP No. LA034-034) in Oldtown townland in the vicinity of the southernmost section of the M8 Portlaoise–Cullahill Motorway Scheme. Although not directly affected by the scheme, this site was photographed as part of the route selection phase (Margaret Gowen & Co. Ltd)

Archaeological aerial survey

The preferred route assessed in the Environmental Impact Statement (EIS) was selected after a detailed route selection process that considered, among other things, the potential impact of the proposed routes on the archaeological heritage. The archaeological study in the EIS was based on desk study, field inspection, and aerial and geophysical surveys. The use of aerial survey at the earliest stage of road design, in conjunction with other techniques such as field inspection and documentary research, assists in the assessment of the archaeological potential of a road scheme and informs the later testing and excavation phases.

Owing to the outbreak of foot-and-mouth disease, an aerial inspection was undertaken in August 2001 at the route selection stage of the project. A further survey was conducted in February 2002 for the archaeological impact statement report. This low-level survey (500–1000 ft), with the use of oblique photography, was carried out to identify and determine the extent of previously known and unknown archaeological features and to examine areas of known archaeological potential.

The low-flying survey comprised a direct visual examination of the ground from the air by a qualified archaeologist using digital photography and 35 mm and 60 mm colour print



Illus. 3—Gortnaclea Castle (RMP No. LA023-016) with surrounding bawn (enclosing feature) from the east, August 2001 (Margaret Gowen & Co. Ltd)

photography. The photographs were taken at an oblique angle to maximise the recognition of subtle features. Given the known level of intensive agricultural practices along the scheme, aerial survey was a particularly important tool for identifying levelled or partly levelled sites that had no visible expression at ground level. It also provided an excellent opportunity to view the proposed road scheme from a different perspective and ensured a familiarity with the landscape.

To realise the full benefit of an aerial survey it is imperative that documentary work is carried out before the flight so that the location of recorded monuments and current land use and type can be assessed and any limitations (for example, vegetation cover or underlying geology) in identifying features are known in advance. Certain types of monuments are easier to identify from the air. As this can create a bias in the record, it is useful to identify the location of recorded monuments in advance, so that the features are known before the flight.

The success of an archaeological aerial survey is also dependent on the weather and recent weather patterns. For example, the ideal conditions to photograph subtle earthworks or relic field systems are when the sun is low in the sky, in either winter or late evening in summer. Also, the visibility of cropmarks (see below) tends to vary from year to year. Everything from the time of day, wind speed, cloud cover, altitude and the angle at which the photographs are taken can affect the quality of the final record.

Archaeological background

The proposed route avoided all upstanding recorded archaeological sites, but the research indicated that sites with no visible surface expression from the ground could be affected given the rich and varied archaeological landscape. Although the evidence for prehistoric activity in the study area is not well represented by upstanding monuments, artefacts recovered from the general area indicated a range of human activity during prehistory. The nature of the finds was also indicative of the sensitivity of certain environments; for example, numerous artefacts were recovered during peat extraction in bog at Clonaddadoran or from the riverbeds of the Nore, Gully and Erkina rivers. Ecclesiastical complexes at Aghaboe and Aghmacart also yielded stone and bronze axeheads.

The majority of recorded monuments along the route date from the fifth century AD or later and are classified as ringforts or enclosures. In the early historic period the entire region of Laois formed part of the provincial kingdom of Leinster (Feehan 1983). From this period it was divided into seven septs, or clans, to form the territory of the Laigis, the people who gave the present county its name. Laigis territory is notable for the number of early monastic sites within its borders, and the creation of these settlements provided a magnet for Viking raids. The enduring legacy of the Anglo-Normans in this region is the masonry castle, 56 of which lie ruined in the landscape of County Laois. The majority of these standing castles are tower houses; examples are those at Granstown, Gortnaclea and Tintore and ruins at Aghmacart.

In general, aerial survey is not much used in relation to reconnaissance and the conservation of the architectural heritage. However, it is becoming routine to conduct aerial surveys of all built heritage—including protected structures, items of architectural heritage merit and the general building stock—along a route to provide a comprehensive record. This is the first time that all-inclusive aerial surveys of such structures have been undertaken. A secondary benefit of such surveys is that this information can inform the interim surveys currently being prepared on a county basis by the Department of the Environment, Heritage and Local Government for the National Inventory of Architectural Heritage.

The aerial surveys undertaken for the scheme informed the archaeological research, led to exciting new discoveries and assisted in the selection of the preferred route. Within this scheme, new sites were revealed along the route, the extent of existing sites was clarified and features of architectural interest were identified. Most importantly, all features and archaeological sites identified by the two aerial surveys were avoided by the final route alignment.

Upstanding monuments

Monuments and sites representing past human activity can be viewed from the air in a number of ways. Structures such as tower houses, castles and churches and earthworks in the form of mounds, motte and baileys etc. are easily detectable and readily viewed. Sites of this type along the route have been documented previously. However, aerial survey is especially useful in determining whether there are any previously unrecorded associated sites and features. In the correct conditions, remains of buried archaeological sites are often



Illus. 4—Aghaboe ecclesiastical complex (RMP No. LA022-019) with possible associated earthworks, February 2002 (Margaret Gowen & Co. Ltd)

visible and the full extent of a site can become apparent. The new information gained about the condition and preservation of individual sites can be added to the files in the Archaeological Survey of Ireland (ASI).

It is important to view a site from different angles and heights to ensure that all associated features are identified and that the site is fully recorded. The bawn (an enclosing feature) of Gortnaclea Castle (Record of Monuments and Places [RMP] No. LA023-016) had been previously recorded only to the south and west of the upstanding castle. From the aerial photography, it was possible to see that this feature fully surrounded the castle (Illus. 3). Other monuments, such as ecclesiastical settlements, can have many different associated elements and are defined as complexes. Owing to the nature of these sites, they are often large in scale, and aerial photography is ideal for identifying their full extent and illustrating how they fit into the existing landscape. Aerial survey was particularly useful in assessing two large ecclesiastical complexes in the environs of the route at Aghmacart (LA034-019) and Aghaboe (LA022-019) and in ensuring that no archaeological features associated with these complexes were impinged on by the route (Illus. 4).

Upstanding sites can often have a low profile or visibility and can appear to be badly damaged or partly destroyed. Such sites are most visible from a low level, at an oblique angle and in the early morning/late evening in wintertime. At Lismore the RMP records a church (in ruins) and a graveyard with headstones dating to 1700 (LA022-018-01 & LA022-018-02). This site is dedicated to St Canice and is known as Kilkennybeg. A tower house is indicated in Lismore on the Down Survey parish maps (dated 1654–6); the two structures indicated on the equivalent barony maps likely represent the tower house and the



Illus. 5—Earthwork visible to the south-west of Lismore church and graveyard (RMP Nos LA022-018-01 and LA022-018-02), February 2002 (Margaret Gowen & Co. Ltd)



Illus. 6—Platform north-west of Boston Bridge, which may represent the remains of a burial ground, February 2001 (Margaret Gowen & Co. Ltd)

church. The aerial survey revealed a large, rectangular, low-visibility earthwork (Illus. 5) adjacent to the upstanding graveyard wall. This feature was identified to the south-west, outside of the recorded monument area. It continued into the neighbouring field and was detectable through the discoloration of the ploughsoil as a soilmark. This mark may be indicative of decayed buried features. Both the earthwork and the recorded monument were avoided by the road scheme.

Natural features, such as rivers, are important to assess from a landscape perspective, as they attracted settlement in the past—providing a source of food and an artery for trade and transportation of goods—and also acted as natural boundaries. Reverend William Carrigan (1905) recorded the existence of a small hill, a quarter of an acre in area, in the centre of a bog at Oldglass Bridge, now Boston Bridge. The hilltop was called ‘the hill of the yew tree’ and reportedly was the site of an ancient burial ground, but no above-ground trace of this was apparent at the turn of the 20th century, according to Carrigan. During the aerial survey a conspicuous raised platform was identified in Kilnaseer townland on the south bank of the River Erkina, upstream of Boston Bridge and c. 100 m west of the realigned road corridor. The site consisted of a roughly semicircular platform, which gently rose to a second, roughly rectangular platform with an uneven surface (Illus. 6). The platform identified during the aerial survey may represent the hill that Carrigan described. It is considered to be of archaeological potential and was avoided by the proposed scheme.

Cropmarks

A number of cropmarks were viewed as part of the M7 Portlaoise–Castletown/M8 Portlaoise–Cullahill Motorway scheme. Cropmarks are caused by variations in the subsoil due to the presence of buried archaeological features, resulting in differential crop growth (Illus. 7 & 8). As the crop begins to ripen in early summer, the buried archaeological features affect the rate at which the crops grow and change colour and the height to which they grow. For example, crop cover over a buried ditch will result in a taller, stronger crop because the ditch will contain additional moisture and more nutrients compared to the surrounding undisturbed subsoil. These are known as ‘positive’ cropmarks. Conversely, the buried remains of a structure or a wall will encourage water to drain from the soil, resulting in weaker, smaller crops and stunted growth. Such features are referred to as ‘negative’ cropmarks. Cereal crops, such as wheat and barley, provide good definition and produce the best results for the identification of cropmarks. Weather patterns can also affect the detection rate. Cropmarks are enhanced and become more pronounced during dry weather and are very marked in drought conditions.

Geological features can often be incorrectly interpreted as cropmarks, and modern agricultural practices also form patterns that add confusion about the true nature of a newly detected feature. However, geological cropmarks may also give useful information about the location and the type of natural landscape in which a site once existed. The use of aerial photography during an Environmental Impact Assessment (EIA) complements field visits on the ground and helps in the full assessment of the nature of a site. As a surveying instrument, aerial photography is a complementary tool and not a replacement for fieldwork.



Illus. 7—Cropmark of ringfort (RMP No. LA034-029) in Parknahown townland from the south-west, August 2001 (Margaret Gowen & Co. Ltd)

New discoveries at Parknahown and Oldtown

There is a cluster of recorded monuments and newly revealed sites at the southern end of the M8 leg of the scheme in the townlands of Parknahown and Oldtown. In Parknahown the scheme runs through a landscape of significant archaeological potential, suggested by two enclosure sites (LA034-023 & LA034-027) and two ringforts (LA034-028-01 & LA034-029). The landscape here is broadly undulating, with soils suited to productive pasture and tillage. It was noticeable that degradation of the features had taken place since they had been officially inspected as part of the ASI in 1990 and 1991 and the time of the 2002 aerial survey. In some cases previously upstanding ringforts had been levelled and could be identified only as cropmarks. Two sites are recorded in Parknahown townland, south-east of the route. A ringfort (LA034-029), recorded as a sub-circular area, is marked on the 1841 edition Ordnance Survey 6-inch map. The remains of a bank had been visible when the site was inspected in 1991. This site is now visible only at certain angles from the air as a cropmark (Illus. 7). The second site in this part of the townland was identified through aerial photography conducted by the Cambridge University Committee for Air Photography and is recorded as a cropmark of sub-circular conjoined enclosures (LA034-023). This site was not visible from the ground when inspected by the ASI in 1990 and was not visible from the air when the archaeological aerial survey was conducted for the route selection in 2001. However, during the 2002 aerial survey a site in an adjacent field to the east was identified as a double enclosure (Illus. 8). This site was previously unknown. The benefits of carrying out this second aerial survey were further highlighted by the fact that despite the availability of excellent, 1:3000-scale, vertical aerial photographs, taken for engineering and survey purposes by BKS Survey Ltd in 2001, none of the recorded or newly revealed archaeological features could be identified from this source.



Illus. 8—Newly identified double enclosure in Parknahown townland to the east of an enclosure site (RMP LA034-023), February 2002 (Margaret Gowen & Co. Ltd)



Illus. 9—Three newly identified cropmark sites in Oldtown townland from the north-west, August 2001 (Margaret Gowen & Co. Ltd)

Although the main alignment of the M7/M8 route avoids all previously recorded monuments, the archaeological potential of the area suggested by the concentration of recorded and newly identified sites in Parknahown was borne out by the identification of three circular or oval cropmarks in the neighbouring townland of Oldtown (Illus. 9). The cropmarks were in a large cultivated field; the northern half of which was relatively level. The southern half of the field was dominated by three knolls, each of which, on aerial survey, revealed the cropmark of an enclosure, including a bivallate (double ditch) enclosure on the central rise. The two univallate (single ditch) enclosures measured 38 m by 38 m (Site C) and 38 m by 39 m (Site A); the bivallate enclosure measured 61 m by 58 m (Site B). The ringfort (LA034-02801) in Parknahown, to the north, and a ringfort (LA034-034) in Oldtown, to the south-west, are both visible from the summit of the knolls and may be contemporary with the enclosures. Alternatively, the enclosures may pre-date the early medieval period or may have been used over an extended period.

Geophysical survey was undertaken by John Nicholls to confirm the extent of the cropmarks in Oldtown and to identify potentially associated features or additional sites. This survey identified a fourth (Site D) and possibly a fifth partial enclosure (Site E), along with numerous linear and pit-type features that may be archaeological (Illus. 10). The scheme was successfully redesigned to avoid direct impact on all of the newly identified enclosure sites.

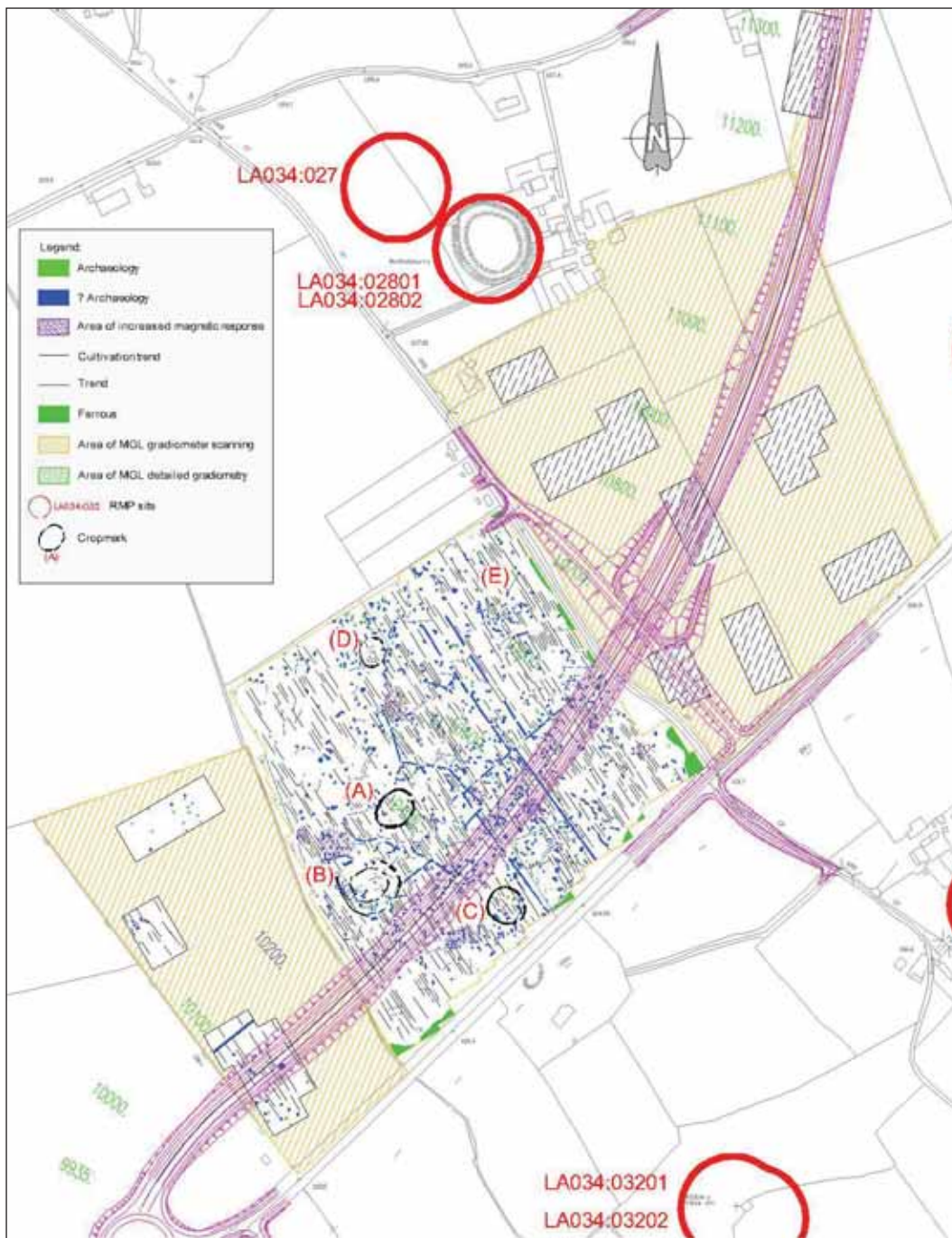
The results of the geophysical survey were used to determine a test excavation strategy to assess the nature, complexity and extent of the potential archaeological features in the area affected by the motorway scheme. With the application of a specialised testing strategy devised for this sensitive landscape, the new road alignment was topsoil stripped under archaeological supervision and then investigated. No further archaeological sites were revealed, confirming the results of the aerial and geophysical surveys.

Conclusion

The benefits of archaeological aerial survey as an important research tool have long been recognised by archaeologists. For large-scale, linear infrastructural projects such as road schemes, aerial survey is an ideal technique to examine the potential impact of a proposed scheme on the cultural heritage of an area. By providing a more holistic perspective on the extent and location of sites and monuments, this method allows the broader landscape to be examined during the route selection phase and the EIA. The cost-effective, rapid collection and presentation of these visual data allow project archaeologists to understand and appreciate the archaeological potential of a proposed scheme to a greater degree.

While the benefits of using this technique are many, it must be realised that there are limiting factors. Aerial survey is weather dependent, and it can prove difficult to schedule a flight to tie in with other work on the scheme and general project time constraints. There is great potential to reveal additional sites in pasture or arable land at certain times of year; however, the survey can be of limited use in other terrain such as bogland, forestry or land with heavy vegetation. Furthermore, the true status of the features and cropmarks identified during the aerial survey can be revealed only through further archaeological examination on the ground.

In the case of the M7 Portlaoise–Castletown/M8 Portlaoise–Cullahill Motorway scheme the use of aerial survey has led to a greater knowledge of the extent of recorded



Illus. 10—Final route alignment through Oldtown townland with geophysical interpretative drawing (Margaret Gowen & Co. Ltd, based on the Ordnance Survey Ireland map)

archaeological sites and to the identification, recording and avoidance of a number of previously unidentified archaeological sites and complexes. Importantly, this work at the design stage of the project avoided the need for archaeological excavation in some key areas.

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