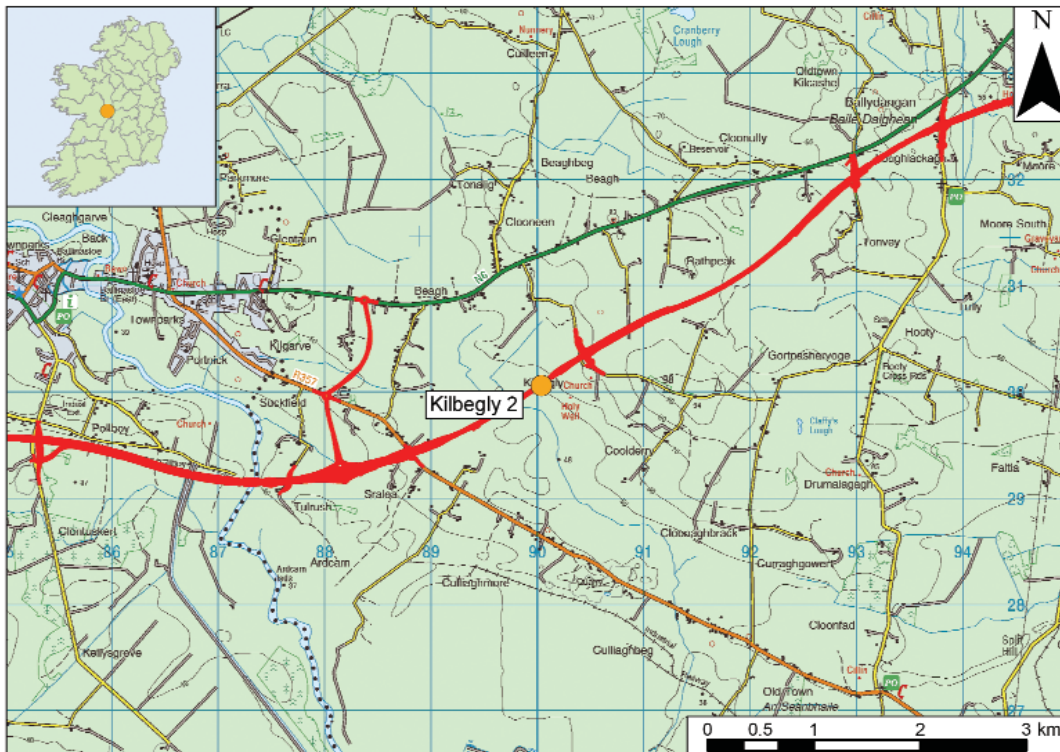


2. Early medieval food-processing technology at Kilbegly, Co. Roscommon: the miller's tale

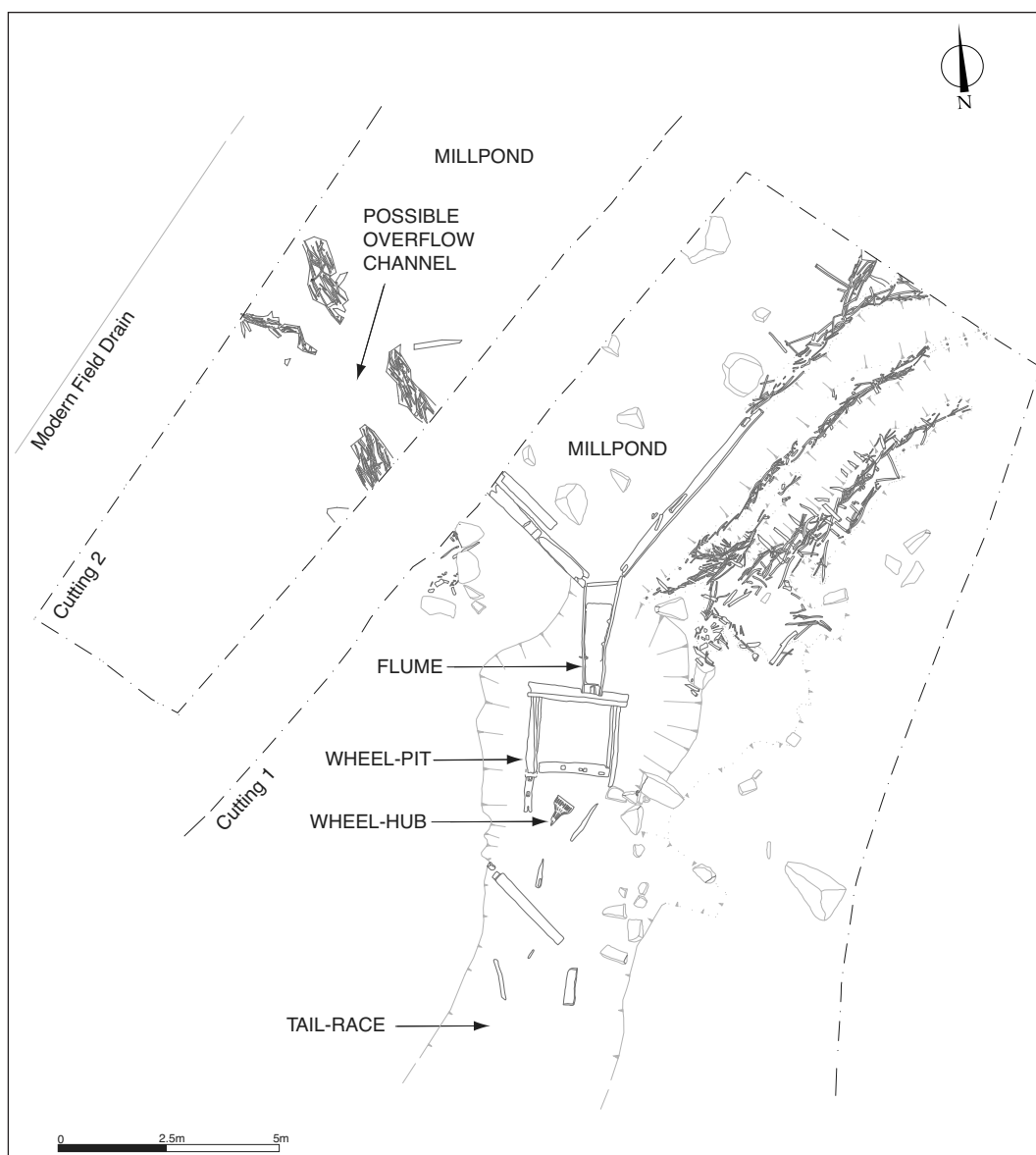
Neil Jackman



Illus. 1—Location of Kilbegly 2, Co. Roscommon (based on the Ordnance Survey Ireland map).

During archaeological testing in advance of the N6 Ballinasloe–Athlone road scheme in April 2007, structural timbers were revealed in a wetland area at the base of a hill in Kilbegly townland, Co. Roscommon, approximately 4 km east of Ballinasloe, Co. Galway (Illus. 1). These timbers were all extremely well preserved in shallow peat deposits. Fortuitously, they lay in a portion of a field used for pasture that had not been subject to significant agricultural works and had been largely unaffected by modern field drains on either side of them. Assessment of the timbers at the time of discovery indicated that they were the remains of a watermill. A full excavation was carried out by the author in conjunction with Caitriona Moore (archaeological woodworking consultant) on behalf of Valerie J Keeley Ltd for Galway County Council, Roscommon County Council and the NRA.¹ This excavation took place between May and September 2007 and a comprehensive post-excavation programme is currently under way. This paper serves as an initial discussion of what we found and highlights what this remarkably well-preserved site may tell us about some of the techniques and technologies used in early medieval milling in Ireland.

The excavation revealed the remains of a previously unknown early medieval horizontal mill (designated as Kilbegly 2), with its wheel-pit (or undercroft), flume (the



Illus. 2—Plan of the site during excavation (Valerie J Keeley Ltd).

wooden chute that carries the water into the wheel-pit), millpond, tail-race and other features preserved in their original locations (Illus. 2 & 3). A horizontal mill is a type of water-powered mill in which the wheel turned by the water rotates on a horizontal axis.

The sides of the millpond were lined with post-and-wattle and large oak timbers, each measuring 5 m long, which may have been salvaged by the millwrights from another early medieval building. The millpond had an estimated area of 340 m², but both its northern and eastern sides had been truncated and destroyed by early modern agricultural drains. A possible post-and-wattle overflow channel was identified running from the millpond, bypassing the wheel-pit and discharging into the tail-race. An overflow channel would have been essential as it allowed any water overflowing the millpond to be safely carried to the tail-race without damaging the mill building; it also enabled the millpond to be drained so that any necessary maintenance work could be carried out on the wheel-pit or flume.



Illus. 3—Archaeologists excavating and recording the horizontal mill at Kilbegly (Valerie J Keeley Ltd).

Two other post-and-wattle channels were identified to the east of the millpond. These had a north-east-south-west alignment and were approximately 8 m long and 1.2 m wide, with a varying depth of 0.45–0.65 m. They were constructed from varying-sized posts with up to 10 wattle rods woven around them. There was also evidence for the use of moss as a caulking agent on the interior of the channels, and compacted soil was piled around them to make them more watertight. These channels did not appear to be aligned with either the flume or the mill building, and at one point they connect to form a V-shape, so they are unlikely to have been mill-races. They may have served as a flood barrier, catching excess water before it damaged the mill building.

The millpond fed directly into the wooden flume, which was found in an excellent state of preservation (Illus. 4). It was a large piece of oak carved into a rectilinear box shape that narrowed towards the end. It had a separate lid secured in place by six wooden pegs. The flume measured 2.75 m in length and was wider at the end (0.65 m) where the millpond fed directly into it, narrowing at the end within the wheel-pit (0.45 m). It had an even height of 0.55 m and sloped at a 20° angle from the millpond to the wheel-pit. The end of the flume within the wheel-pit had a wooden plated aperture secured by iron rivets. The aperture had a subcircular opening with an approximate diameter of 0.2 m. The aperture plate was carved out of yew wood; as yew is a significantly harder wood than oak, it would have been more resistant to erosion. The aperture would have served primarily as a method of both directing and increasing the power of the flow of water onto the wheel-hub within the wheel-pit, in addition to the jet-deflector. The jet-deflector was a wooden wedge above the flume aperture that branched into two elements. Perforations were clearly evident on both of these and it is possible that a wooden bar suspending a flap ran through the



Illus. 4—The complete wooden flume (Valerie J Keeley Ltd).



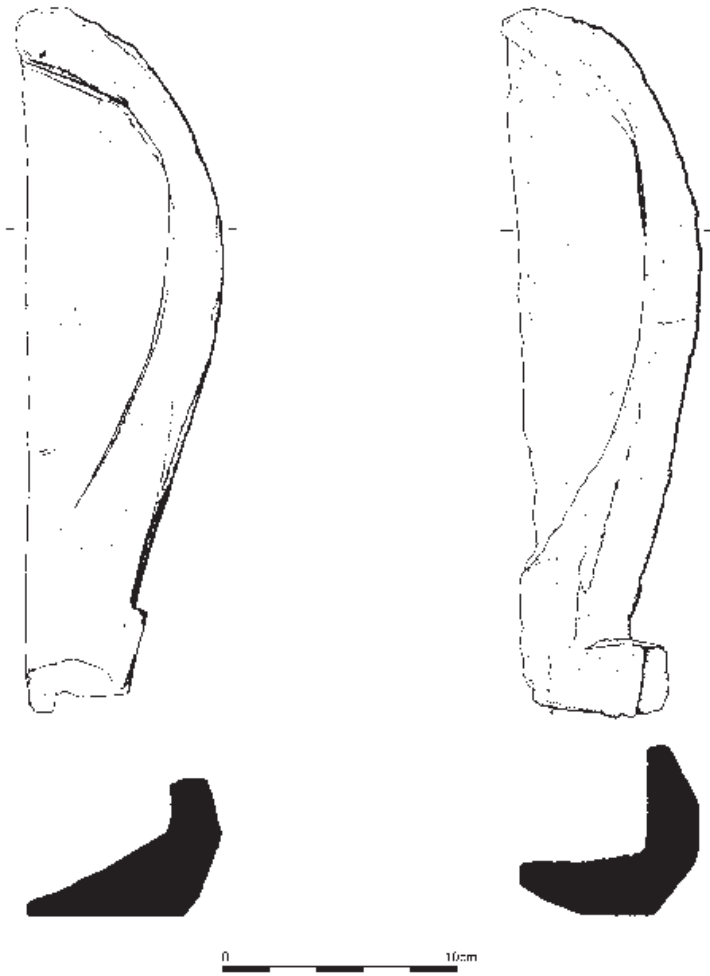
Illus. 5—Remains of the wheel-pit, with the plated flume aperture at the back and the jet-deflector above it (Valerie J Keeley Ltd).



Illus. 6—The baseplates of the wheel-pit and flume following removal of the upper timbers (Valerie J Keeley Ltd).

perforations immediately in front of the flume's aperture. This would have been operated by a lever or rope so that the miller could start, adjust or cut off the water flow.

The wheel-pit was the lower floor of the mill building. Typically, the structure of an early medieval horizontal mill was separated into two floors; the upper floor is known as the mill-house, which contained the millstones and the grain hopper. Kilbegly, like every other early medieval horizontal mill excavated in Ireland, had no *in situ* remains of this floor; a possible wall or roof brace (also known as a cruck) was, however, recovered within the tail-race near to the building and may provide an indication of the building design of the mill-house. The wheel-pit housed the waterwheel, which was connected to the millstones in the upper floor by means of a wooden shaft. At Kilbegly the wheel-pit was extremely well preserved (Illus. 5), having three upstanding walls existing to a height of over 1 m. The walls were plank-built and set within large grooved baseplates (foundation timbers) (Illus. 6). The southern side of the wheel-pit appeared to have been left open; this would have facilitated the flow of water into the tail-race. The walls were directly above six floorboards of ash, which were



Illus. 7—The two paddle forms recovered from the wheel-pit (illustrated by Eamonn Russell, Valerie J Keeley Ltd).

Illus. 8 (below)—The deeper of the two 'scoop-type' paddles (Studio Lab).

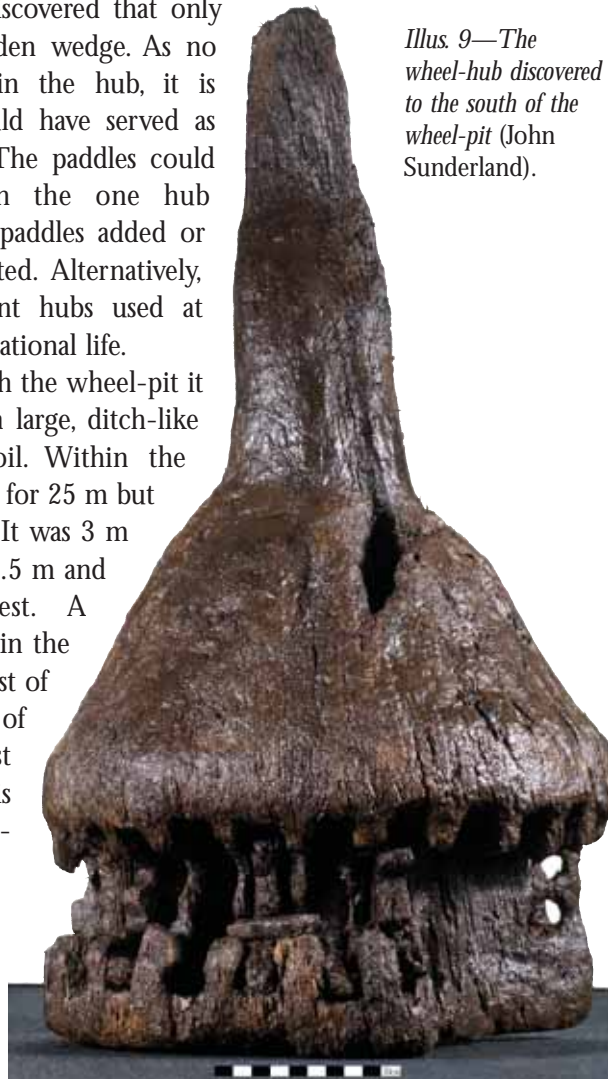


particularly poorly preserved, in marked contrast to the more robust oak timbers recovered from the site. Two wooden wheel-paddles and a bell-shaped wheel-hub were retrieved from within the wheel-pit area, as were various wooden pegs and wedges and a possible stone gaming piece. The paddles and wheel-hub, in particular, are significant discoveries.

The paddles (Illus. 7) are of the 'scoop-type', and one is distinctly shallower than the other. It is possible that the deeper scooped paddle (Illus. 8) may have maximised the kinetic energy from a low water flow, whereas it would have been subject to far more pressure from a high water flow. In the latter case a shallow paddle would have been more efficient, creating less stress and wear on the paddle end and wheel-hub. This variance in paddle forms raises the question of technological choices. Were the paddles from different wheels? Were they constructed by different craftsmen, or were they fitted to the mill-wheel in response to two different water flows?

The hub of the mill-wheel is an outstanding example of early medieval woodworking technology (Illus. 9). It was carved from a block of oak into a bell shape that would have been far more hydrodynamically efficient than a simple disc. A total of 24 slots indicate that the hub may have held a maximum of 24 paddles. While cleaning the hub, however, it was discovered that only every second slot contained a wooden wedge. As no complete paddles were recovered in the hub, it is unknown whether the wedges would have served as supports or braces for the paddles. The paddles could have been interchangeable within the one hub depending on the water flow, with paddles added or removed as the circumstances dictated. Alternatively, they may have come from different hubs used at different phases during the mill's operational life.

Once the water had passed through the wheel-pit it drained into the tail-race. This was a large, ditch-like feature cut into the natural subsoil. Within the excavation area the tail-race extended for 25 m but continued beyond the road corridor. It was 3 m wide and had a maximum depth of 1.5 m and ran roughly north-east-south-west. A wooden platform was identified within the tail-race approximately 5 m south-west of the wheel-pit. This was comprised of seven planks, with the largest seemingly bracing the other six. This feature may have served as an anti-erosion device, as it was situated next to a distinct downward fall within the tail-race, or it could possibly have been a fording point. A number of roughly dressed wooden poles discovered lying directly on top of



Illus. 9—The wheel-hub discovered to the south of the wheel-pit (John Sunderland).



Illus. 10—Well-preserved wooden spade (John Sunderland).

the platform may have been the collapsed remains of a hand ropeway or other safety device. A fording point would have been necessary as the millpond, a working wheel-pit and the tail-race would have been significant obstacles to traverse.

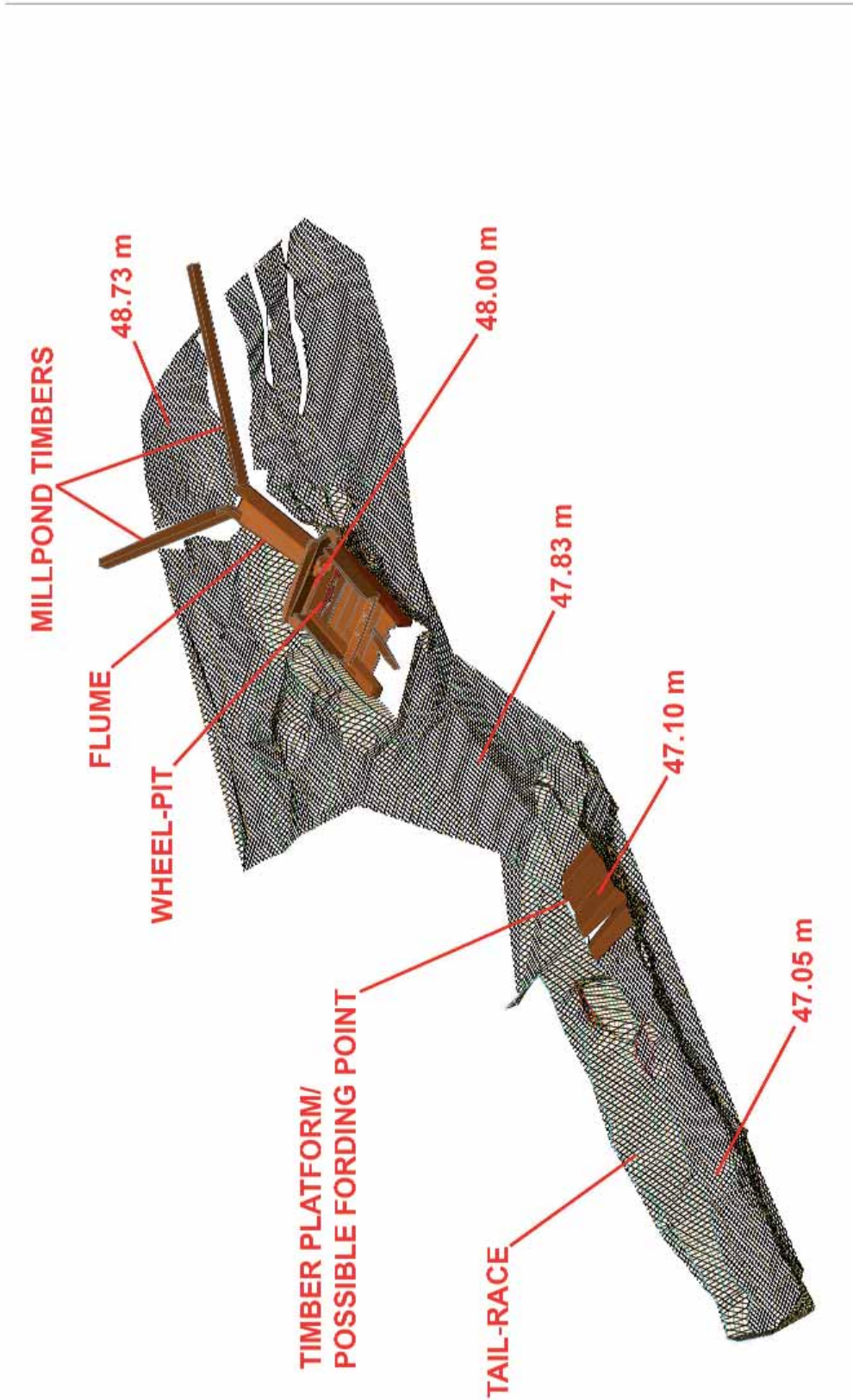
A number of other clearly early medieval artefacts were recovered from the site, and not only inform our understanding of early medieval mill technology but also give a clear insight into diet, daily lives, agricultural implements and dress in the period. Finds include a copper-alloy ring-pin, withy ropes, fragments of leather (possibly from a bag or shoe), a whetstone, a wooden spade (Illus. 10), the previously mentioned gaming piece and bracelet fragments made from locally sourced shale.

The mill was situated in a wetland area at the base of a large hill. On the summit of the hill, approximately 600 m ENE of the mill, are the remains of an early medieval churchyard (Record of Monuments and Places Nos RO054-027001, -027002 & -027003). Another newly discovered site (Kilbegly 1), also excavated by the author, was identified on the slope of the hill, approximately 300 m north-east of the mill site.² This consisted of a number of small burnt pits and the shallow remains of an early medieval cereal-drying kiln. A kiln would have been an important part of the milling process, being used to dry the grain prior to grinding. Kilbegly 1 and the church may well be associated with the mill remains and may be indicative

of the wider working landscape and agricultural practices of an ecclesiastical site.

The topographical positioning of the mill at Kilbegly indicates that the millwrights had a high level of surveying skill (for local site topography see Illus. 11). The site was not located on or by a river; instead, the millpond appears to have been fed by natural springs and the high water-table of the area. This is not the first early medieval horizontal mill in Ireland to be identified as non-riverine or non-tidal. Sites at Ballykilleen, Co. Offaly, and Ballygarriff and Coolnaha, Co. Mayo (C Rynne, pers. comm.), were also discovered to have been fed by natural springs and groundwater, and this certainly opens the possibility of more mills being discovered in marginal wetland areas near large secular or ecclesiastical sites.

The remains of up to nine early medieval watermills (vertical and horizontal) have been excavated recently on national road schemes (Murphy & Rathbone 2006; Seaver 2006) but the mill at Kilbegly 2 is the most outstanding example yet identified. The soil conditions, water-table and low-impact agricultural practices in the area since the site was abandoned



Illus. 11—A 3D representation of the local site topography at Kilbegly 2 (Valerie J Keeley Ltd).

meant that otherwise fragile structural elements and artefacts were excellently preserved and still in their near-original locations. Not only does the site inform us about early medieval milling technology, it also gives a wealth of information on carpentry techniques, being one of the best-preserved assemblages of worked wood from the period discovered in Ireland. Further analysis of this site should help to answer many questions about the techniques and technologies of early medieval milling, and the practice of cereal-processing generally. The excellent preservation conditions allow a range of palaeoenvironmental analysis and the results of this will be included in detail in forthcoming publications. Kilbegly 2 will be the subject of a full publication in due course, and all of the structural mill timbers and artefacts are currently undergoing a conservation programme with the aim of having a full reconstruction of the site on public display in the near future.

Acknowledgements

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Notes

1. Kilbegly 2: NGR 190038, 230053; height 49 m OD; excavation reg. no. E3369; ministerial direction no. A034.
2. Kilbegly 1: NGR 190147, 230150; height 57–62 m OD; excavation reg. no. E3329; ministerial direction no. A034.