



## South Wales RIGS Group Site Record

### RIGS Description

**SECTION A**

General	South Wales
<b>Site Name:</b> Dyffryn Mawr	<b>File Number:</b> AH_21
<b>RIGS Number:</b> 779	<b>Surveyed by:</b> AJ Humpage
<b>Grid Reference:</b> SO 25139 15709	<b>Date of Visit:</b> 9 February 2011
<b>RIGS Category:</b> Scientific	<b>Date Registered:</b> Unknown
<b>Earth Science Category:</b> Geomorphological, Sedimentological	
<b>Site Nature:</b> Pasture farmland and woodland, some housing.	<b>Documentation prepared by:</b> AJH
<b>Unitary Authority:</b> Monmouthshire CC	<b>Documentation last revised:</b> 19 August 2011
<b>OS 1:50,000</b> Sheet: 161	<b>Photographic Record:</b> See images attached to this report
<b>OS 1:25,000</b> Explorer Sheet: OL 13	
<b>BGS 1:50,000</b> Sheet: 232 (Abergavenny)	

**RIGS Statement of Interest:** This site forms part of a network of important scientific sites within the South Wales RIGS area associated with ice front stillstand and readvance in glaciated valleys and post-glacial fluvial development.

This site comprises three components:

- moraine feature and section;
- glaciofluvial outwash fan and river terrace sequence
- kettle hole with post glacial organic sedimentation

This site may mark the location of a small scale re-advance of the Usk valley glacier, upstream of the major Nevill Hall moraine. The site is part of a complex which marks the interaction between the main Usk valley glacier and possible influence from the north flowing tributary of the Clydach. Downstream of the moraine is the remnants of a sandur outwash surface whilst a late glacial or post glacial fan has spread from the Clydach burying some of the glacial features. The whole complex has been dissected by the River Usk and two fluvial terrace surfaces are preserved above the modern floodplain.

A section exposing the glacial sediments is present on the north bank of the River Usk, but is extremely difficult to access and is potentially dangerous, and may be best viewed from the river.

### **Geological setting/context:**

The glacial evolution of the middle and lower Usk valley is not well understood, but as this area lies on the margin of the Devensian ice sheet, it is increasingly being recognised as an important area to research system responses to environmental change (Carr et al 2007).

Extensive glacial deposits have been mapped (BGS 1990) and a series of cross-valley morainic features, indicating minor re-advances or stillstands of the ice front have been identified (Lewis and Thomas 2005), following on from work by Elis-Gruffydd (1972, 1977). However, without absolute dating, the exact correlation and chronology of deglaciation is still poorly understood.

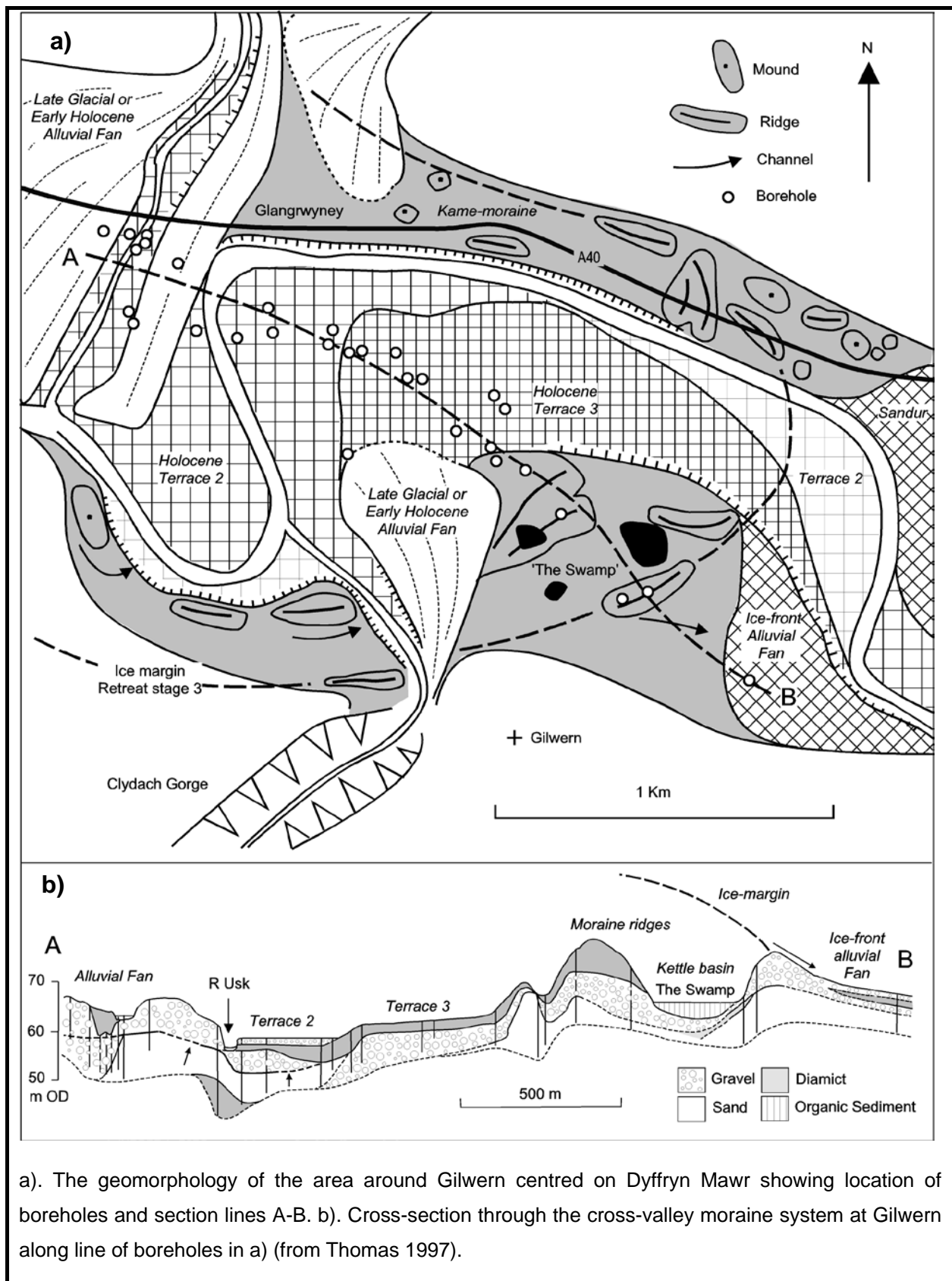
Traditionally, the Usk valley glacier was assumed to reach its maximum extent c 20-22ka and to have disappeared, along with the Welsh ice cap by c.16ka (Thomas 1997). However, more recently, doubt has been cast on this model based on dating evidence from the uplands around Abergavenny, which suggests deglaciation may have been initiated earlier than traditionally thought. Coleman and Parker (2007) suggest ice free conditions may be prevailing in the uplands above Abergavenny as early as 19420+/-64 Cal BP

The geomorphology of the area around Gilwern [SO 245 145], and centred on Dyffryn Mawr is shown in the figure below (Thomas 1997). This is typical of the sediment-landform assemblages surrounding the various cross-valley moraine sequences identified throughout the Usk valley. East and west of the town a wide strip of kame-moraine topography flanks the southern side of the valley and carries arcuate moraines that loop across the valley to further moraine fragments on a similar strip of kame-moraine topography bordering the northern side, marking an ice-marginal retreat position (Stage 3 in Thomas 1997). On the south side, the kame-moraine topography is cut through by a large alluvial fan draining northeast from the Clydach Gorge, a major entrenchment into the face of the Carboniferous Limestone escarpment. In contrast to other alluvial fans in the area, which often partially bury kame-moraine topography towards their toes, this fan is cut through the kame-moraine surface and is thus wholly later rather than penecontemporaneous with the formation of the cross-valley moraine. Two further large alluvial fans drain the northern side of the Usk valley and bury-out part of the kame-moraine topography.

To the east of the Clydach Gorge fan is a complex area of kame-moraine topography that includes arcuate ridges running across valley and some large, water-filled, kettle basins, including the aptly named 'The Swamp' [SO 251 155]. This topography is, in turn, cut by two extensive Holocene river terraces that border the present course of the Usk (Terraces 3 and 2, see figure below). On the opposite, northern bank of the Usk a high-level sandur terrace extend east towards Abergavenny while on the southern side its equivalent grades off the down-ice flank of the cross-valley moraine ridges. A river-cut section north-east of Gilwern (SO 262148) has been described earlier and shows characteristically dirty, clast-supported, sub-rounded, pebble to cobble gravel in stacked, sub-horizontal sets typical of high-energy, upper fan braid-bar environments.

Figure b) shows a cross-section running 2 km down-valley through the assemblage of

landforms at Gilwern and is based on a series of boreholes for the proposed A40 diversion through the area. The line of section runs across the toe of the Grwyne Fawr alluvial fan on the northern side of the valley, across the Holocene river terraces bordering the Usk, through the cross-valley moraine topography and out onto its fronting alluvial fan. Of the 25 boreholes in the area none reaches the bedrock. Two boreholes, both immediately adjacent to the River Usk penetrated a stony, red diamict that would appear to underlie most of the area. This diamict is overlain by thick and extensive red quartz sand that everywhere coarsens upwards into dirty pebble and cobble gravel. Upstream of the moraine ridges these gravels are overlain by a stony red diamict that terminates against the rear of the moraine ridges and is replaced on the down-ice side by thickening ice-front alluvial fan gravels that include sheets and lenses of thin diamict of probable debris flow origin. The upward-coarsening signature underlying this particular cross-valley moraine might suggest that it was built not during a temporary still-stand in the retreat of the Usk glacier, but by a small-scale, localised readvance in which basal diamict was emplaced across a floor of former valley-sandur sediment. At the maximum of this minor readvance subsequent melt of dead-ice created irregular kettle basins, now filled by organic sediment in the water-filled basin of 'The Swamp'.



## References:

British Geological Survey (1990). *Abergavenny. England and Wales Sheet 232. Solid and Drift Geology. 1:50,000*. British Geological Survey, Keyworth, Nottingham.

Carr, S.J., Coleman, C.G., Humpage, A.J. and Shakesby, R.A. (2007). *Quaternary of the Brecon Beacons: Field Guide*. Quaternary Research Association, London.

Coleman C.G and Parker A.G (2007) Waun Ddu Bog. In: S.J. Carr, C.G. Coleman, A.J. Humpage and R.A. Shakesby (Eds). *Quaternary of the Brecon Beacons: Field Guide*. Quaternary Research Association, London.

Elis-Gruffydd, I.D. (1972). *The Glacial Morphology of the Upper Usk Basin (South Wales) and its right-bank Tributaries*. Unpublished Ph.D. Thesis. University of London.

Elis-Gruffydd, I.D. (1977). Late Devensian glaciation in the Upper Usk Basin. *Cambria*. 4 46-55.

Humpage, A.J. (2007). Cross-valley moraine and sandur sediments, Nevill Hall. In: S.J. Carr, C.G. Coleman, A.J. Humpage and R.A. Shakesby (Eds). *Quaternary of the Brecon Beacons: Field Guide*. Quaternary Research Association, London.

Lewis, C.A. and Thomas, G.S.P. (2005) The Upper Wye and Usk Regions. In: C.A. Lewis and A.E. Richards (Eds). *The Glaciations of Wales and Adjacent Regions*. Logaston Press, Logaston, Herefordshire.

Thomas, G.S.P. (1997). Geomorphology of the Middle Usk valley. In: S.G Lewis and D. Maddy (Eds). *The Quaternary of the South Midlands and Welsh Marches: Field Guide*. Quaternary Research Association, London.

Thomas, G.S.P. and Humpage, A.J. (2007). The glacial geomorphology of the lower and middle Usk valley. In: S.J. Carr, C.G. Coleman, A.J. Humpage and R.A. Shakesby (Eds). *Quaternary of the Brecon Beacons: Field Guide*. Quaternary Research Association, London.

## SECTION B

### PRACTICAL CONSIDERATIONS:

Please score Accessibility and Safety Red Amber or Green

#### Accessibility:

X

Comment: Private property except where crossed by minor roads. Permission will be required to view The Swamp and other features.

#### Safety:

X

South bank features readily viewed from roadside but beware of traffic. The exposure on the north bank of the River Usk is difficult to access, steep and potentially unstable and should not be accessed.

#### Conservation status:

The river banks are part of the Usk River SSSI, otherwise there are no other known conservation designations on this RIGS.

### OWNERSHIP/PLANNING CONTROL:

**Owner/tenant:** Unknown / various

**Planning Authority:** Monmouthshire County Council

**Planning status/constraints/opportunities:** There are no known planning constraints or opportunities

### CONDITION, USE & MANAGEMENT:

**Present use:** Farmland/ private woodland

**Site condition:** Generally good

**Potential threats:** Potential redevelopment on outskirts of Gilwern, particularly around Lower Common. River erosion of terraces and north bank section

**Site Management:** stabilisation of river channel may be required where features are being eroded.

### SITE DEVELOPMENT:

**Potential use (general):** detailed scientific research and geomorphological mapping, would benefit this site

**Potential use (educational):** Good accessible site to view section through morainic deposits

### Other comments:

## Photographic Record



View looking north from Cae Meldon showing the morainic ridges surrounding "The Swamp".