THE GEOLOGY AROUND DRUMMINOR CASTLE

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This geological report and accompanying map is based on the author's observations in the immediate vicinity of Drumminor Castle, reference to the British Geological Survey Mapping available online and a brief literature search of geological reports. A site survey investigating drainage undertaken by Peter Stephen & Partners between 1997 and 2002 provided useful test pit and borehole data close to the castle. This brief report is designed to help archaeologists working in the area to understand the geological setting and assist in their excavations (see interim excavation report, this volume).

In keeping with much of north east Scotland the Drumminor area is blanketed with Quaternary glacial till with few exposures of bedrock. Along the

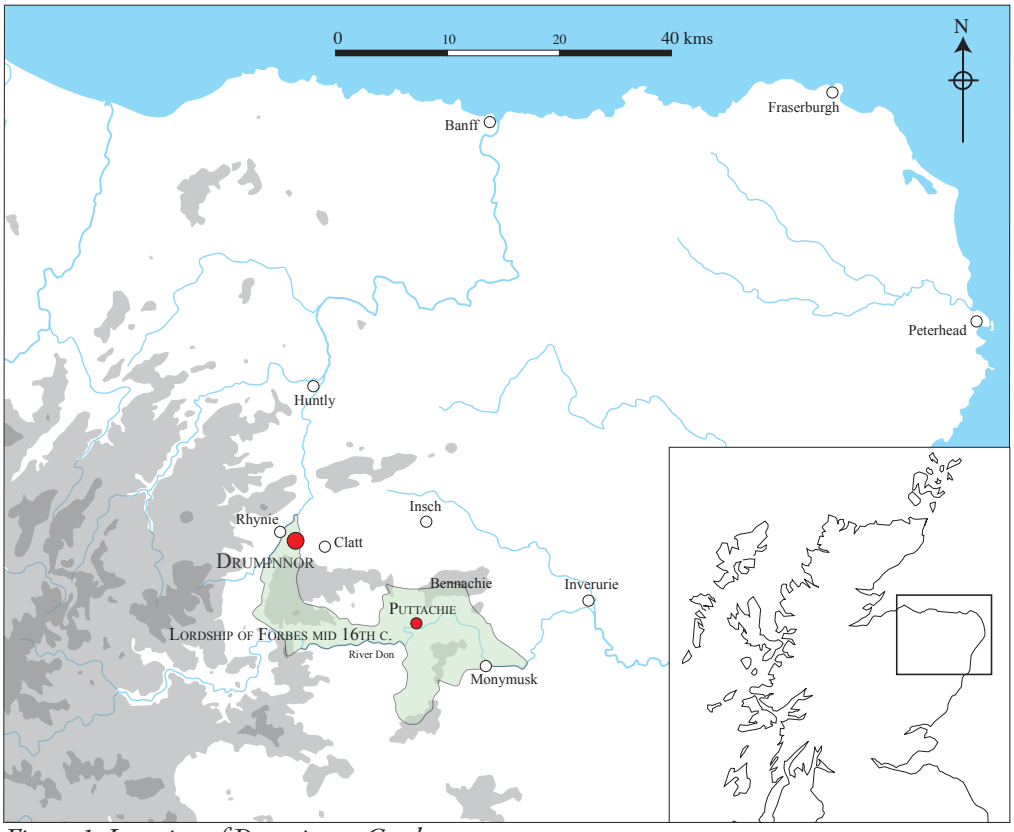

Figure 1. Location of Druminnor Castle

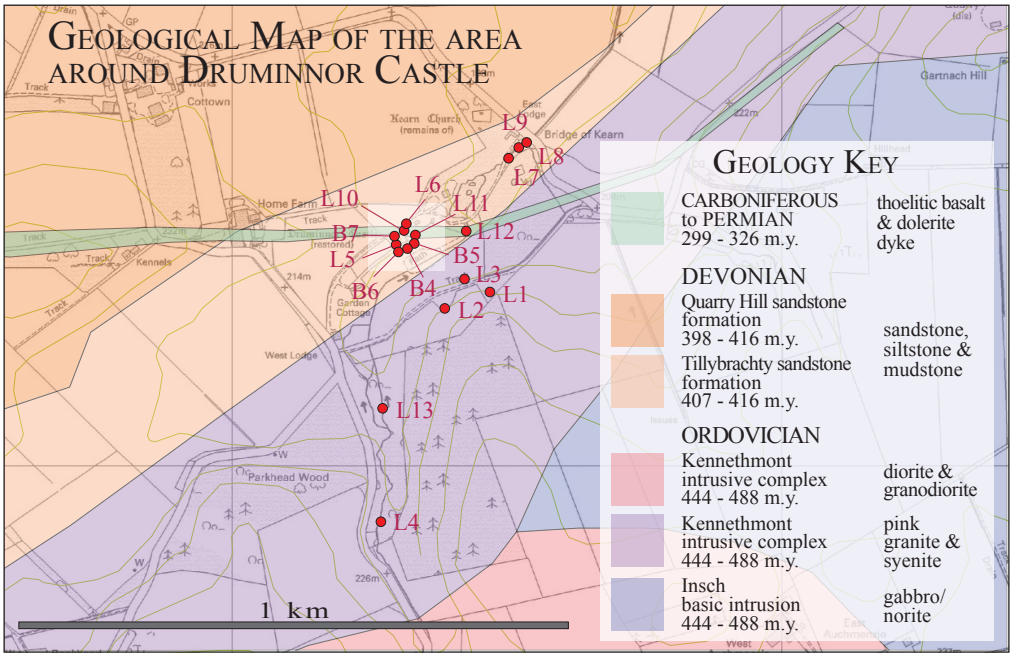

Figure 2. Geological map showing location and borehole references centred on the castle.

Cannie Burn valley just to the south of the castle a thick layer of Quarternary alluvial deposits and peat, up to 3m thick from boreholes (B1 to B7 on Figure 2) and Cannie Burn river exposures (L13), also hides the older bedrock geology. However a few exposures can be found in nearby disused quarries, stream exposures and archaeological excavations. No actual contacts are observed between any of the older formations described below.

The oldest rocks are the Ordovician (444-488 m.y. [million years before present]) gabbros and norite of the Insch Basic Intrusive complex. No exposure of this rock is found close to the castle although boulders of these dark, medium to coarse grained basic igneous rocks are found in the glacial drift and also used as building material. Slightly younger than the Insch Basic gabbros, but still part of that intrusive complex, are the more intermediate and acid intrusive rocks of the Kennethmont Complex. Exposures of these very dark to dark grey, fine to medium grey diorite and granodiorite may be seen in the small quarries south of the Cannie Burn (L1, 2 and 3). These rocks are typically strongly weathered and rotten, easily crumbling away although the finer grained igneous rocks are less weathered. A final stage in the Kennethmont Complex was the instrusion of pink granite/syenite.

There is no major outcrop in the Drumminor area but fine pink granitic veins (2-4cm thick) can be seen to cut through the diorite and granodiorite. It is also commonly seen in dry-stone dykes and building stones in the area.

The castle sits on the Devonian age Tillybrachty Sandstone Formation (407-416 m.y.). This is composed of finely bedded reddish and greenish grey sandstones, siltstones and mudstones. Around the castle these deposits are typically highly weathered and soft causing difficulties in recognising disturbed ground and *in situ* bedrock. It is important to continue digging through any soft, reddish brown sediment to confirm it is not reworked Devonian sediment. Devonian bedrock will typically display a laminated or bedded appearance.

A 5-10m wide, east-west trending igneous dyke of Late Carboniferous-Permian age (299-326 m.y.) intrudes both the Kennethmont Complex intrusives and Devonian sediments. This is composed of a fine grained, very dark grey to black basalt (thoellitic) and fine to medium grained, dark grey dolerite. It at first glance appears similar to the Kennethmont Complex rocks but is strongly magnetic. This identification can be further complicated by the presence of xenoliths (or inclusions) of the older Insch basic rocks within the dyke.

Post-Cretaceous during the Palaeogene period, 65-23 m.y., Scotland lay in sub-tropical regions and the land was uplifted and subjected to deep tropical weathering which accounts for the weathered nature of in particular the basic and intermediate rocks of the Kennethmont and Insch intrusions. Quaternary glacial activity (starting 2.6 m.y.) blanketed the region in glacial till.

It can be difficult during archaeological excavations to distinguish between the glacial deposits and ground reworked by man. This author believes that no glacial deposits have survived in the immediate vicinity of the current excavations and that all chaotic material be considered manmade until the laminated Devonian sediments are exposed or the very dark grey to black basalt is encountered.

Druminnor Geology Location Notes (L1 - L13 on Figure 2)

Kennethmont Complex Outcrops

L1
NJ 51474 26309 – Kennethmont Complex (diorite/granodiorite).
Quarry – no outcrop. Loose boulders of medium grained, biotite rich diorite/granodiorite.

L2
NJ 51386 26287 – Kennethmont Complex (diorite/granodiorite).
Quarry. Large outcrop (10x10m) south side.
Predominantly dark grey-black, fine grained basic rock (diorite). Horizontal layer (0.75m thick) of very rotten (weathered), crumbly, medium grained lighter coloured diorite/granodiorite.
Thin (2-4cm) veins of later pink granite/syenite.

L3
NJ 51418 26333 – Kennethmont Complex (diorite/granodiorite).
Quarry. Outcrop (4m high) of very rotten diorite/granodiorite with thin (1-2cm) bifurcating veins of pink granite/syenite.
Walking south from localities, 1-3 boulders of pink granite/syenite are frequently seen in dry-stone dykes. Approaching the pink granite/syenite of the Kennethmont Complex.

L4
NJ 51286 25892 – Kennethmont Complex (diorite/granodiorite).
Outcrop in stream bank beneath tree roots. Very rotten diorite/granodiorite with occasional pink granite/syenite blocks in overlying soil.

Devonian Outcrops

L5
NJ 51296 26394 – Devonian, Tillybrachty Formation.
Outcrop in base of excavation of Victorian Simpson House of reddish/green grey finely bedded sandstone/siltstone/mudstones. Initial soft, weathered rock become firmer deeper into excavation.

L6
NJ 51311 26417 - Devonian, Tillybrachty Formation.
Probable outcrop of soft, weathered Devonian on north side of large excavation.

L7
NJ 51504 26547 - Devonian, Tillybrachty Formation.
Outcrop in stream bed of greenish grey, silty sandstone.

L8
NJ 51525 26572 - Devonian, Tillybrachty Formation.
Outcrop in stream bed of greenish grey, silty sandstone.

L9
NJ 51542 26579 - Devonian, Tillybrachty Formation.
Outcrop in stream bed by Bridge of Kearn. Banded red and greenish grey sandstone and siltstone.

Later Carboniferous-Permian Dyke Outcrops

L10
NJ 51311 26417 – Late Carboniferous-Permian dyke.
Outcrop of very dark grey to black very fine grained basalt (thoelliite) and dark grey, fine-medium grained dolerite. Very magnetic.

L11
NJ 51334 26409 – Late Carboniferous-Permian dyke.
Probable outcrop of dark grey, medium-fine grained basic (dolerite) rock and black very fine basalt. Could be large boulders but impression is it is outcropping.

L12
NJ 51432 26428 – Late Carboniferous-Permian dyke?
Probable outcrop at convergence of two streams. Dark, fine grained basic basalt/dolerite.

Recent Superficial Deposits

L13
NJ 51279 26105 – Quarternary alluvial deposits.
Deep cutting in stream showing typical glacial/post-glacial alluvial deposits. Here there is a 2m high exposure with a weakly consolidated conglomerate/river gravel at base. Overlain by a 2m thick peaty soil (peat bog environment). Overlain by another river conglomerate/gravel deposit.

Site Survey Boreholes (B1 - B7 on figure 2)

A site survey to investigate drainage around Drumminor Castle was undertaken by Peter Stephen & Partners between 1997 and 2002. Several test pits were dug and boreholes drilled in the immediate vicinity of the castle. The boreholes were drilled to depths of 2-4m. Boreholes on the current excavation level around the car park all penetrated weathered Devonian sandstones, siltstones and clays. Boreholes drilled on the flood-plain of the Cannie Burn below the castle drilled through disturbed ground and alluvial and peat deposits with possible Devonian sediments beneath.