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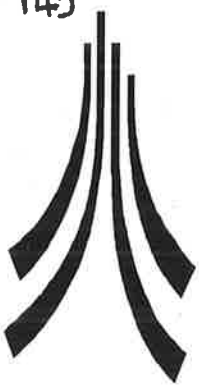

May 1998

DRIGG CHARACTERISATION BOREHOLES

CUMBRIA

Archaeological Watching Brief Report

Commissioned by: BNF plc and Dixon Webb

Drigg Characterisation Boreholes
Cumbria

Archaeological Watching Brief Report

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This report was compiled by Chris Wild with illustrations by Richard Danks. The Fieldwork was carried out by Stuart Elder, Peter Redmayne and Chris Wild, and the overall project management was by Jamie Quartermaine. The report was edited by Jamie Quartermaine and Rachel Newman.

EXECUTIVE SUMMARY

An archaeological evaluation was commissioned on behalf of British Nuclear Fuels (BNFL) plc in conjunction with an application for planning permission to drill eight test boreholes on 100ha of land between Drigg and the sea (NGR SD 147990). The aim of the evaluation was to evaluate the impact of the proposed drilling programme on the archaeological landscape within the defined study area.

The watching brief followed on from an archaeological assessment of the site undertaken by Lancaster University Archaeological Unit (1996), which involved a documentary study combined with a walk-over survey. The assessment demonstrated evidence of occupation on both sides of the Esk estuary from the late Mesolithic, through to the Early Bronze Age. The Mesolithic remains show that early man was knapping flint in the area, and suggest that the tools made were for hunting or fishing, as well as for food processing.

As early habitation sites were known in the vicinity of the boreholes, there was a requirement by the Lake District National Park Archaeologist that a watching brief be undertaken during the initial excavation of the borehole pits which would include an assessment of the artefact content of the topsoil in the immediate area of the boreholes. The site was visited on 27th August 1996, and again on 9th September 1996, to excavate the 1m x 1m trenches in the area of the proposed boreholes.

The watching brief identified a broadly consistent stratigraphy comprising topsoil overlying stone-free pale sand to a depth greater than 0.5m; the sand deposit was consistent with a wind blown origin. Despite sieving, no artefacts were recovered and there was no evidence for any archaeological features. On the evidence of the present watching brief the programme of boring had no impact on an identified archaeological resource at any of the examined borehole sites.

1. INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Following an application for planning permission to drill boreholes and test the geology and hydrology around the Drigg waste disposal site on the West Cumbrian coast (NGR SD 047990, fig. 1), an archaeological assessment of the site was undertaken by Lancaster University Archaeological Unit (LUAU 1996) which involved a documentary study combined with a walk-over survey. The assessment demonstrated evidence of occupation on both sides of the Esk estuary from the later Mesolithic through to the Early Bronze Age. The Mesolithic remains show that early man was knapping flint in the area, and it was suggested that the tools made were for hunting or fishing, as well as for food processing.

1.1.2 As early habitation sites were known in the vicinity of the boreholes, there was a requirement by the Lake District National Park Archaeologist that a watching brief be undertaken by archaeologists during the initial excavation of 1m square test pits for the boreholes and that this be to a maximum depth of 0.5m. The sub-surface examination of the borehole pits was to include an assessment of the artefact content of the topsoil in the immediate area of the boreholes.

1.1.3 LUAU was commissioned by Dixon Webb, on behalf of British Nuclear Fuels (BNFL) plc, to undertake the required watching brief which was completed on 27th August and 9th September 1996.

1.2 TOPOGRAPHICAL AND HISTORICAL BACKGROUND

1.2.1 ***Location:*** the study area comprised *c* 100ha of land which was, for the most part, on the shore side of the Drigg Waste Disposal site, within which eight boreholes may be located. The line of boreholes lies between the shore and the line of the River Irt, which has a confluence with the Rivers Esk and Mite at Ravenglass. The study area is therefore liable to have been affected by both coastal and estuarine action. The bedrock is New Red Sandstone overlain by boulder clay, which in its turn is overlain by sand. The land was generally flat, although there were sand dunes of at least 4m height near the shore, and there were smaller undulations in the sand further inland. There were occasional ponds in the sand, suggesting an impermeable material, such as boulder clay, lay near to the surface.

1.2.2 ***Historical Background:*** around 8000bc the ice-sheets which had covered the Lake District started to retreat, and the deposition of the boulder clay can be attributed to this event. Ireland was still connected to mainland Britain, and the sea level was *c*20m lower in the North West than now (Simmons *et al* 1981, Fig 3.1). There have been as many as eleven class marine transgressions since *c* 7000bc (Simmons *et al* 1980), the most significant being between 5800-4980bc when the sea level relative to the land rose by more than 10m. Other less significant transgressions occurred between 4800-4300bc and 4000-3800bc associated with the retreat of marine conditions between these episodes. At the end of the Mesolithic period (by 3500-3000bc) sea level was rising, but later fell again by 0.8m (Simmons *et al* 1980, 85-6). Despite the inevitable fluctuations

there has, however, been an overall steady increase in sea level in the North West since *c*6000bc. Around the confluence of the three rivers there has also been local coastal change as a result of estuarine development. At Eskmeals the Mesolithic settlement sites and lithic scatters related to a former shoreline that is up to 1km inland from the present shoreline and is attributable to the estuarine migration of the River Esk (Bonsall 1980). The identification of surface lithics in this area has also demonstrated that there is a relationship between the age of assemblages and their separation from the present shoreline; the lithic assemblages most remote from the shore are generally Mesolithic in date, those closer to the present shore are Mesolithic/Neolithic and those closest to the shore are Bronze Age in date (Cherry pers comm), reflecting the migration of settlement in conjunction with shoreline change. The migration of the shoreline on the north side of the estuary is not so well documented, but is likely to have been subject to a similar degree of estuarine shore migration, particularly towards the south of the study area.

1.2.3 Examination of exposed strata on the beach indicates that there was a sequence of deposits of sand lying below organic soils which were within overlain by further sand deposits. By the time of the late Mesolithic occupation at Williamson's Moss (Eskmeals), a mixed oak forest was prevalent in the area , which was then subject to alternating periods of clearance and recovery into and through the Neolithic (Bonsall *et al* 1986). On the north side of the estuary (near the Drigg disposal site) a layer of large tree branches or trunks was exposed in a cliff section which has been interpreted as being from a forest that had been submerged at the time of the maximum marine transgression (*c* 4000bc) (Cherry 1965).

2. METHODOLOGY

2.1 PROJECT DESIGN

2.1.1 The work has been carried out in accordance with a project specification submitted by LUAU to Dixon Webb in January 1996.

2.2 FIELD EVALUATION

2.2.1 Seven trenches were excavated, each centred on a proposed borehole. The projected area of maximum disturbance was determined to be 1m x 1m x 0.5m in depth. All trenches were therefore excavated to a size of 1m x 1m, and only to a depth of 0.5m to minimise disturbance to the site. Two of the trenches (A and B) were excavated separately from the rest to enable their supervision by a zoologist who was required to identify and protect any Natterjack toads that may have been domiciled in the excavation areas.

2.2.2 Trenches were all excavated by hand. Where possible, the excavated material was sieved using a 0.005m mesh size; however, due to the wetness of the sand, this was impractical in many of the trenches. In these circumstances the material was excavated in 3mm - 4mm spits, using either a shovel or a trowel, and the excavated material was then sorted through to recover any artefacts that may have been present. After backfilling, all trenches were returfed by hand.

2.2.3 All excavation was carried out stratigraphically, and recorded in the appropriate manner. The recording methods employed by LUAU accord with those recommended by English Heritage's Central Archaeology Service (CAS). Recording was in the form of *pro forma* Trench Sheets for each trench, which documented the orientation, length, and depth of excavation, and described the nature of the topsoil, subsoil (where applicable), and geological deposits. Where potential features were observed they were manually sampled, with a full textual, drawn, and photographic record being maintained.

2.3 HEALTH AND SAFETY

2.3.1 Both Lancaster University and LUAU maintain Safety Policies, the latter based on the SCAUM (Standing Conference of Unit Managers) Health and Safety Manual (1991). In keeping with current Health and Safety at Work Regulations, prior to commencing on-site work, a risk assessment for each activity was compiled.

2.4 Archive

2.4.1 A full archive of the desk top survey and field inspection has been produced to a professional standard in accordance with current English Heritage guidelines (English Heritage 1991). The archive will be deposited with the County Record Office (Kendal) and a copy of the report will be given to the SMR. A copy of

the archive will also be available for deposition with the National Monuments Record in Swindon.

3. RESULTS

3.1 A total of seven trenches was excavated on two visits to the site; trenches sited on boreholes C, D, E, F, and H, were excavated on 27th August 1996, whilst the trenches on boreholes A and B, were excavated on 9th September 1996 under supervision from a qualified handler of Natterjack toads.

3.2 TRENCH DESCRIPTIONS

3.2.1 ***Trench A*** was positioned at the southern end of the site in an area of marram grass to the east of the main dunes (Fig 2). The topsoil extended to a depth of 0.08m and contained large amounts of roots. This overlay 0.32m of fine, pale grey sand which contained many marram roots and was stone-free. Underlying this was 0.20m of damp dark brown organic sand containing decomposing roots. Some narrow vertical bands of sand were observed within this layer, and patches of sand were also observed in plan during excavation.

3.2.2 A small sondage was excavated in the south-west corner of the trench to determine the depth of this deposit, and any underlying material; it was observed that the dark organic sandy layer overlay pale grey sand similar to that described above.

3.2.3 ***Trench B*** was situated in an area of marram grass to the east of the main dunes (Fig 2). The trench was excavated slightly to the east of the centre of the borehole (*c* 0.5m), to avoid damage and disturbance to an ant-hill situated to the west. The topsoil extended to a depth of 0.1m and contained many roots; this overlay a pale grey sand, similar to that in Trench A, but containing fewer roots, and of a drier nature. Occasional narrow dark bands were observed within the sand, but none extended for more than 0.3m in plan. This layer of sand extended to the bottom of the trench at 0.5m in depth.

3.2.4 ***Trench C*** lay within the enclosed land to the north-east of the proposed borehole location, and within a sheep scrape (Fig 2). Excavation of the trench revealed a single layer of pale grey, almost stone-free, fine sand, which was observed to a depth of 0.5m where excavation was halted.

3.2.5 ***Trench D*** was immediately to the north of the shore road. The turf and topsoil comprised the upper 0.15m of the trench and overlay a layer of coarse orange / brown sand containing occasional rounded stones up to 0.17m in diameter. Below the sand was a layer of dark grey coarse sand containing some medium-sized rounded cobbles between 0.08m and 0.21m in diameter. The layer was between 0.1m and 0.12m in depth, with a further horizon of orange brown sand below.

3.2.6 ***Trench E*** was situated towards the northern end of the enclosed land. The turf and topsoil was 0.13m in depth, and overlay a layer of gritty yellow / brown, almost stone-free, sand, 0.27m deep. Underlying the sand was a deposit of dark brown / grey, gritty, sand containing rounded stones of around 0.12m in diameter. This layer continued below the limit of excavation.

3.2.7 ***Trench F*** was positioned at the northern end of the study area, in an area of modern disturbance (Fig 2). The topsoil was 0.12m thick and overlay 0.14m of modern rubbish in a gritty black matrix. Below this was 0.22m of almost stone-free yellow / brown silty sand. Underlying the sand was a deposit of dark grey grit sand which extended below the limit of excavation.

3.2.8 ***Trench H*** was excavated on the edge of the enclosed land in the south-eastern part of the study area (Fig 2). The turf and topsoil of 0.1m in depth overlay a single layer of pale brown silty sand, which continued below the extent of excavation.

3.3 FINDS

3.3.1 The evaluation did not recover any artefacts.

4. DISCUSSION

4.1 The results of the watching brief show that there is a difference between lower and higher-lying areas within the study area. The lower-lying area to the north, comprised Trenches D, E and F, and that to the south comprised Trench A; these have similarities in their stratigraphy which were not observed in the higher lying central part of the study area, which comprised Trenches B, C and H.

4.2 The three trenches on the higher central area (B, C and H) have a very similar stratigraphy; in all cases topsoil overlay a single deposit of fine, almost stone-free, pale sand, to a depth greater than 0.5m. Due to the lack of stone within this sand, and its fine nature, it is most likely that it is a wind-blown deposit. It would then follow that this higher area may be the result of a greater depth of such a deposit. If deeper excavation were undertaken, it is probable that deposits similar to those found in the lower-lying trenches would be revealed.

4.3 Similar layers of dark grey, coarse sand were observed within the three northern trenches (D, E and F). The depth of these did, however, vary from 0.32m below the surface in Trench D (south), to 0.48m below the surface in Trench F (north). These layers are presumed to represent buried ground surfaces comprising layers of sand exposed prior to the build-up of wind-blown deposits, and may even represent the same surface.

4.4 Trench A revealed a further dark sandy layer, but were it had a much greater organic content than the other trenches. Once again, it probably represents a surface exposed prior to the wind-blown deposits, but it appears to have been an area of vegetation within an environment damper than that within the trenches to the north.

4.5 These darker former surface layers were shown, where excavated, to overlay further fine sand deposits (Trenches A and D). This suggests that the layers observed beneath were also wind-blown.

4.6 No archaeological artefacts were identified in the course of the watching brief and no archaeological sub-surface features were recorded.

5. ARCHAEOLOGICAL IMPACT

5.1 IMPACT

5.1.1 The watching brief did not identify any archaeological features or artefacts at any of the investigated borehole sites and it established that the underlying stratigraphy was a product of natural depositional processes. The proposed boreholes will not have an impact upon an identified archaeological resource. However, the trenches were only excavated to a maximum depth of 0.5m for into the most part wind-blown deposits and it is possible that deposits of some archaeological significance exist below this depth. If this were the case, however, the drilling of the 0.1m wide boreholes would have only a very limited impact upon any archaeological stratigraphy.

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ILLUSTRATIONS

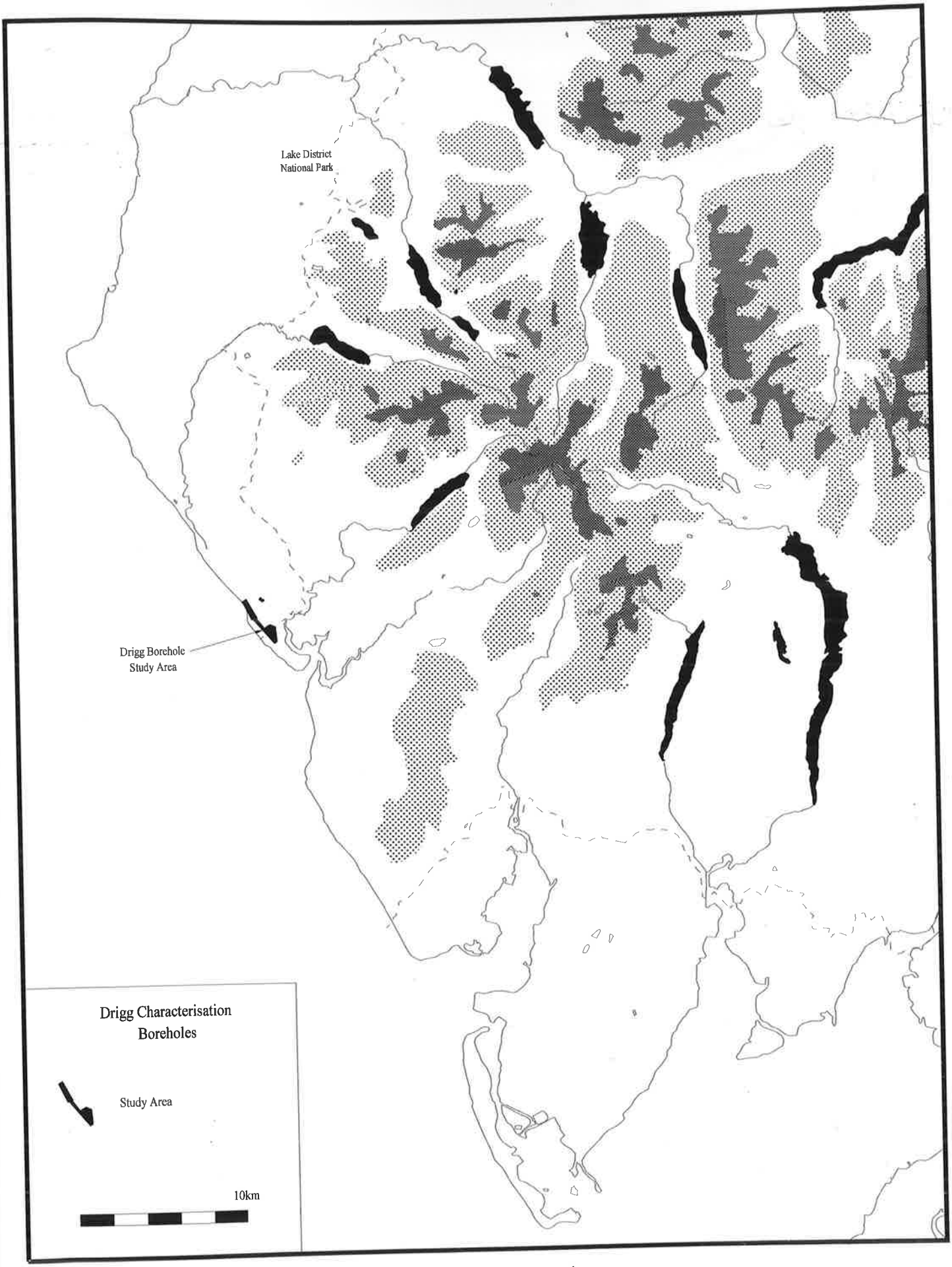

Fig. 1 Study area location plan

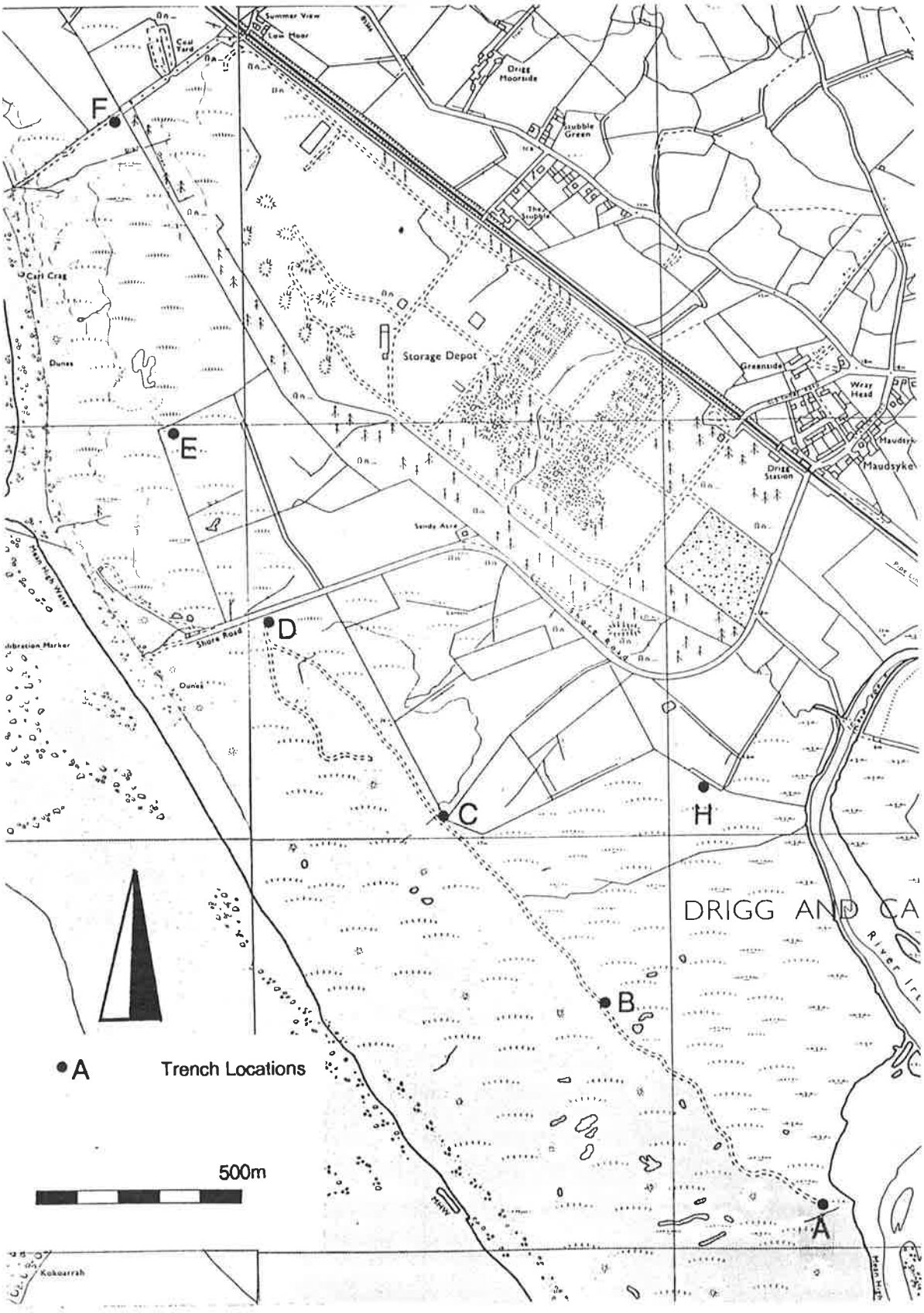

Fig 2 Trench Location Plan