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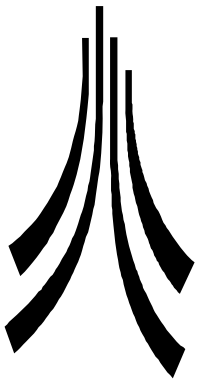

January 1996

DRIGG CHARACTERISATION BOREHOLES

Cumbria

Archaeological Assessment

Commissioned by:

Dixon Webb

for British Nuclear Fuels PLC

Drigg Characterisation Boreholes
West Cumbria

Archaeological Assessment Report

Checked by Project Manager. ..... Date
Passed for submission to client. ..... Date

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This report was compiled by James Wright with Illustrations by Richard Danks. The Fieldwork was carried out by James Wright and Andrew Croft. and the overall project management and editing was undertaken by Jamie Quartermaine.

EXECUTIVE SUMMARY

A rapid archaeological assessment was commissioned on behalf of British Nuclear Fuels 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 assessment was to evaluate the impact of the proposed drilling programme on the archaeological landscape within the defined study area. Documentary research was carried out on 11th January 1996 and the site was visited on the 12th to investigate the archaeological surface evidence in the vicinity of the eight proposed boreholes.

Documentary evidence demonstrates a concentration of occupation on both sides of the Esk estuary starting in the later Mesolithic and continuing until the Early Bronze Age. Although there was occupation along the whole of the coastal fringe of the Lake District the mouth of the Esk was especially favoured, probably because of the geese, ducks, salmon, and sea trout attracted by the confluence of three rivers (Bonsall 1980, 466). The Mesolithic remains show that early man was knapping flint in the area, and suggests that the tools made were for hunting or fishing, and for food processing. In addition to the lithics recovered there are significant organic deposits sealed by sand which could add enormously to our knowledge of a culture that leaves all too few traces. The recording at the nearby site at Eskmeals has revealed hearths, remains of shelters, and other relics of settlements. It has gone some way to interpreting the diet and lifestyle of the early settlers, and started to explain the changes in environment and sea level that took place after the retreat of the ice sheets (Bonsall 1980).

During the site visit no worked lithics were recovered, which was not unexpected as the archaeological sites were originally discovered after damage to the vegetation cover allowed erosion to take place and consequently exposed the archaeological deposits. At the time of the present survey all the sites visited were covered and protected by grass and similar vegetation. Similarly it was not possible to determine the likely depth of archaeological deposits below the present ground surface. Where visible the sand was always fine with no stones, and was probably deposited in its present position by wind at any time before the present. By virtue of the vegetation cover, the surface survey in isolation can not determine if the proposed boreholes will drill through archaeological sites.

It is understood that the main disturbance to the site will be from a series of 1.0m square holes excavated to a depth of 0.5m prior to drilling. Apart from the boreholes the potential damage would be caused by either the preparatory holes or by vehicles driving to and from the sites. All the boreholes visited were under well developed vegetation, and five of the sites, A-D, and F, were adjacent to trackways, which should limit the damage by vehicular traffic. The archaeological deposits are presently protected by archaeologically sterile wind-blown sand and the impact of the drilling programme depends upon a combination of the grass cover and the wind-blown sand, of unknown depth, not being disturbed; areas with thin deposits will be subject to a greater risk of damage.

Although the surface survey generated negative evidence, it should be emphasised that the sites were originally discovered following vehicular damage to the grass binding the sand dunes, and their subsequent erosion. The later benign usage of the site has allowed the conservation of the sites, but has also obscured them.

The area between the Irt and the sea is one of few Mesolithic sites in a part of the country where the Mesolithic period is under represented, and is therefore of national importance. It may also elucidate the development of the Neolithic culture and its industrial use of Langdale stone for axes that were exported through the whole country. The possibility of preserved organic remains adds to this importance, and the assessment overall has demonstrated the enormous archaeological potential of the area.

It is the recommendation of LUAU that a watching brief is undertaken during the excavation of the 1m square test pits and it would be preferable if the excavation were undertaken by archaeologists. A watching brief would provide for an evaluation of the top 0.5m of stratigraphy within the area of each borehole and would enable an assessment of the potential risks to any underlying archaeological stratigraphy from the borehole operations.

It should be stressed that the views of the County Archaeologist, Mr M. Daniells, and the National Park Archaeologist, Mr J Hodgson, should be sought prior to proceeding with any further work on the site as they may wish to amend or make further specific archaeological recommendations relating to the site.

1. INTRODUCTION

Following an application for planning permission to drill boreholes and test the geology and hydrology around the Drigg waste disposal site (NGR SD 047990, fig. 1), a brief for an archaeological evaluation (Appendix 1) was prepared by the Lake District National Park Archaeologist and the Cumbria County Archaeologist. On the basis of this brief an archaeological assessment was commissioned by Dixon Webb, on behalf of British Nuclear Fuels plc, and a project design for this work, submitted by Lancaster University Archaeological Unit (Appendix 2), was accepted.

As early habitation sites were known in the vicinity of the boreholes, the brief required that a variety of evaluation techniques, including examination of maps and air photographs, visual inspection of the site, and an assessment of the artefact content of the topsoil in the immediate area of the boreholes, be used fully to assess the impact of the proposed work.

The Cumbria Sites and Monuments Record (SMR) was consulted for unpublished details of sites and aerial photographs. A search was also undertaken with the aerial photographic library of the Royal Commission for Historic Monuments in England (RCHM(E)) but the photographs could not be made available within the period of the present assessment. Cartographic sources from the Cumbria Record Office were investigated, particularly first edition Ordnance Survey maps and tithe maps. Published records of investigations in the area were consulted, as was Mr Jim Cherry, who has undertaken a considerable number of site surveys in the area.

The site was visited on 12th January 1996 to search for artefacts in topsoil near the proposed boreholes and to assess the likely impact of the proposed work.

The results of the desktop study and the fieldwork are presented below. The assembled information has been plotted onto a 1:10,000 map base, and is presented as Figure 2.

2. METHODOLOGY

2.1 Project design

The work has been carried out in accordance with a project design (*Appendix 2*) submitted by LUAU to Dixon Webb in January 1996.

The project design provided for a concise survey of recorded and published sources of information, and a rapid field scan. The collation of material gathered from all sources resulted in the compilation of a summary gazetteer of archaeological sites. The sites were evaluated in their historical and topographical context, and a strategy was defined on the basis of archaeological potential and anticipated disturbance by the borehole programme.

The documentary work focused primarily on the study area but also examined the broader context around the Drigg disposal site; the broader area of interest will allow for a greater understanding of the historical and prehistoric background of the area. The field survey was limited to an area of 75m radius around each proposed borehole site (Fig. 2).

2.2 Documentary Evidence

The Cumbria Record Office was consulted for cartographic records of the area, which included published works on local topography and local history, together with maps ranging from tithe maps to early editions of the large-scale Ordnance Survey maps, and recent editions at various scales. The maps provide a visible record of changes in the landscape, particularly with regard to roads, structures and property boundaries. Copies of the 6" first edition sheet surveyed in 1860 and published in 1867, and the 6" second edition map of 1900 were investigated and proved to be the most useful cartographic records.

The Cumbria SMR provided print-outs of the records in the vicinity. Oblique aerial photographs held by LUAU were examined and provided an indication of the dune formation within the study area, but did not reveal any archaeological features. A search was also undertaken with the aerial photographic library of the Royal Commission for Historic Monuments in England (RCHM(E)) but the photographs could not be made available within the period of the present assessment.

A prime source of information for this study area and the general prehistory around the Esk estuary was the *Transactions* of the Cumberland and Westmorland Antiquarian and Archaeological Society which incorporates the results of archaeological work in the area going back to 1936; volumes consulted include those from 1936, 1944, 1955, 1963, 1965, 1969, and 1982. Background information to the topography and archaeological context was obtained by examination of publications relating to the adjacent Eskmeals site.

Mr Jim Cherry, who has extensive knowledge of field-walking in Cumbria as well as having written many of the publications referred to above, was personally consulted. He gave valuable details about the sites, how they had been discovered, and much

background information. He was also helpful about unpublished sites recorded with the SMR, particularly the two large hearths: SMR 1394 and 4300.

2.3 Field Survey

A field survey was undertaken around the locations of the proposed borehole sites on 12th January 1996. A general inspection for surface features and surface artefacts was undertaken with an area of 75m radius around each borehole location. The extent of vegetation and the topography were also assessed to try to determine the amount of damage likely to be caused by plant used during the proposed work.

An area 20m x 20m around each individual borehole location was subjected to a more detailed artefact survey, which involved walking along an average of 3m wide transects. However, a flexible approach was applied which entailed examining in greater detail those areas with disturbed dune cover or exposure of underlying subsoil. Although no artefacts were identified, a Global Positioning System (GPS) was used to record the location of the boreholes, which provides locational accuracies of *c* +-1m. Four of the boreholes (A, B, C, and D) were adequately marked with spray paint on the ground, one was marked with a metal cane (F) and three (E, G and H) could only be located by mapping provided by Dixon Webb. Because of the imprecise locations of these three boreholes (E, G and H), they were subjected to a search over a larger area to ensure that an adequate reconnaissance of the proposed boreholes was provided.

2.4 Gazetteer of sites

A gazetteer of 27 sites (section 6) was compiled for the study area. Nine sites were derived from published sources and personal communication and 18 sites were obtained from the Cumbria SMR.

The sites in the gazetteer are identified by name, ascribed site number, and SMR number where applicable. Locations are given as ten-figure National Grid References. A summary description of the site is derived from the Cumbria SMR and fieldwork. Each site has been assessed for its archaeological potential, and recommendations are made for further investigation. The positions of published and unpublished sites were plotted onto a 1:10,000 OS map base and superimposed with the positions of the boreholes from the GPS survey (Fig 2). Although this figure shows all of the sites identified within the extent of the defined study area, three identified sites are located just to the south of the affected study area and are not shown on the attached mapping (10, 14 and 18).

3. TOPOGRAPHICAL AND HISTORICAL EVIDENCE

3.1 Geology and Topography

The study area comprised *c* 100ha of land which for the most part was 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, and 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 that there was an impermeable material, such as the boulder clay, near to the surface.

3.2 Landscape History

Around 8000bc the ice-sheets which had covered the Lake District started to retreat, and the deposition of the boulder clay is attributable 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 11 marine transgressions since *c* 7000bc (Tooley 1974 and 1976), 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* 1981, 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 have also been local coastal effects as a result of estuarine development. At Eskmeals the Mesolithic settlement sites and lithic scatters related to a former shoreline, that is up to a kilometre 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.

Examination of exposed strata on the beach indicates that there was a deposit of organic soils on top of sand deposits which was itself overlain by further sand deposits. A worked flint has been found from this organic deposit within the exposed section and would suggest that the deposit was associated with human activity in the locality. Although it is not known when the sands or the organic soils were deposited at Drigg, at some time vegetation took hold. By the time of the late Mesolithic occupation at Williamson's Moss (Eskmeals) a mixed oak forest was prevalent in the area and 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 (Site 11) which was interpreted as being from a forest that had been submerged at the time of the maximum marine transgression (*c* 4000bc).

4. ASSESSMENT OF ARCHAEOLOGICAL POTENTIAL

Comments on individual sites are provided in the gazetteer (Section 6).

4.1 Documentary evidence

4.1.1 Archaeological Evidence

The evidence for prehistoric activity near Drigg was first identified in 1954. Flint nodules and flakes were seen on the sea shore at the foot of the cliff, and a subsequent search uncovered microliths, proving that there had been Mesolithic activity in the area (Nickson and MacDonald 1955). Further work showed that there were concentrations of worked flints both north of the Esk, between the sea shore and the River Irt (Cherry 1965), and south of the Esk, at Eskmeals (Cherry 1969). The artefacts recovered from both north and south of the Esk date from the late Mesolithic to the Beaker phase of the Bronze Age. The earliest dates for the late Mesolithic in the north of England cluster around 6700bc (Bonsall 1980, 457) and there are dates for Beaker activity of 1800bc and 1670bc from the same area, so a continuity of use over five thousand years is possible.

Of the 13 sites in the former county of Cumberland listed in the Gazetteer of Mesolithic Sites in England and Wales (Wymer 1977, 48) two are at Drigg. The Gazetteer lists about the same number of sites for the former county of Westmorland, and the two counties fill two pages of a total of 250 showing the relative scarcity of Mesolithic remains in Cumbria.

The early settlement of Cumbria was largely on the lowland fringes, and Bonsall (1980) considers the major factor attracting early people to Drigg and Eskmeals was the estuary of the rivers Irt, Mite, and Esk. In addition to the resources of forest and sea were added fish, particularly salmon and sea trout, and water fowl, including wild duck and geese.

The flint occurs naturally on the beach as pebbles (Cherry pers comm). Whilst these are not ideal for knapping, being small and having a tendency to thermal fracturing, they would represent a source for a material that is rare in the North West. It is likely that this source of flint was a major attraction to prehistoric man.

A buried ground surface can be seen in the cliff (site 11 in section 6 and Fig 2) and a series of vertical soil samples were taken for subsequent pollen analysis (Pennington 1965). Twenty yards to the north of the samples and at the base of the cliff was a layer of large tree branches or trunks which was interpreted as being from a forest that had been submerged at the time of the maximum marine transgression. The date of this transgression was given as 4000bc. The buried soil was shown to consist of an accumulation of raw humus that had not been worked by worms. There was a small percentage of *Ulmus* pollen present and it was suggested that the soil formation may have coincided with the elm decline, which is possibly contemporary with the onset of the Neolithic. Above the organic band intercalated layers of sand and dark humus represented the encroachment of blown sand and the replacement of forest by dunes.

The reports lodged with the SMR of a large hearth (Gazetteer site 17) confirm the potential for environmental remains from this area. However, Later Mesolithic hearths are typically less than 0.5m diameter and are defined by stones; it is therefore more

probable that this area of burning may have been attributable to a forest fire. Recent work emphasises that hunter-gatherers were capable of using fire to create clearances in forests and so attract grazing animals (Simmons *et al* 1981, 103-5).

4.1.2 Cartographic Evidence

The tithe and early OS mapping demonstrates the pre-waste disposal site landscape. Prior to the construction of the modern military depot (which became the Drigg low level nuclear disposal site) there were four dispersed agricultural settlements (sites 25 and 27) within the extent of the present Drigg disposal site. These comprised the farms of Wray Head. Sandford/Town End, Mireside and Brown Knott. The fields associated with these demonstrate a radial pattern extending out from the farms, which is particularly distinct around the Town End/ Sandford settlement. The field form is generally irregular with very few straight field boundaries. An intake extending into the area of coastal dunes included a series of three narrow, parallel fields with a slightly sinuous shape which may reflect the enclosure of an open field, the sinuous shape being created by the ploughing pattern. The character of the overall field system suggests that it has had an extended development and may reflect early agricultural exploitation in the area. This western intake survives to the west of the Drigg disposal site and is partly within the present study area (centred on SD 051988 (Boreholes E and D are on either side of the intake)). The present straight boundaries bear little relationship to the earlier field system and it is evident that the area has been subject to considerable development since 1990. The intake extends out from what appears to be an earlier intake associated with Sandford and Mireside farms, and is evidently a later phase of field development. Another intake (centred on SD 056983), which is also partly within the study area has a largely unchanged field pattern to that represented on modern mapping; the fields are large, with straight sided boundaries and enclosed unimproved land. It is very different in character to the northernmost intake and would appear to reflect a parliamentary enclosure.

The 1st and 2nd edition OS maps show a number of sand pits within the extent of the present disposal site, hence the modern place name 'Sandy Acre' for a house to the west of the disposal site. The existence of the sand pits demonstrate that there is a considerable depth of sand at a distance of up to a kilometre inland from the present shore line.

4.2 Results of Field work

4.2.1 General

All the putative borehole sites were visited, the position of each site was recorded by GPS and a visual inspection of an area of *c*75m around the borehole was undertaken to locate any surface finds, the positions of which would be recorded by GPS. A more detailed artefact survey was undertaken within a 20m x 20m area around the centre of each proposed borehole location. As flints recovered by Cherry have almost exclusively eroded from the sand where the vegetation cover was disturbed (Cherry pers comm) a record was made of the vegetation in the area of each borehole. Mole hills *etc,* were inspected for any flints brought to the surface. At all the sites the sand, where visible, was fine and stoneless.

The survey areas associated with each borehole were covered by relatively uniform vegetation obscuring the sand and the artefact surveys revealed no worked material, although fragments of unworked flint were identified (remote from any of the borehole locations). This negative result contrasts with the surveys undertaken in the late 1950s and 1960s predominantly by Mr J Cherry, which revealed a significant number of lithic scatters. The terrain at that time was extensively disturbed by military vehicular traffic associated with the nearby Drigg depot, exposing many of the lithic scatters (Cherry pers comm). A subsequent more benign treatment of the landscape has resulted in the regeneration of surface vegetation and has enabled the protection of the lithic scatters but has at the same time obscured them from surface view. Field walking by Mr J Cherry in 1995 in this Drigg locality resulted in a completely negative lithic recovery, which was attributed to the regeneration of the vegetation (Cherry pers comm).

4.2.2 Borehole A

The area was covered in grass, some of it marram. There were high sand dunes to the west and the high tide line of the Esk to the south. A metalled track provided access but this ended close to the site of the borehole; there was erosion to the south of the end of this track. No finds were recovered.

4.2.3 Borehole B

There were sand dunes towards the sea and the ground gently sloped to the south-west towards the Esk. The area was covered by grass and moss with little exposed sand. No finds were recovered.

4.2.4 Borehole C

The ground sloped to the south and was covered by marram grass and moss, with no exposed sand. No finds were recovered.

4.2.5 Borehole D

There were slight undulations in the ground. The vegetation was a mixture of grass and moss with cropped heather and some gorse. There were some patches, smaller than 0.5m, of sand which was yellowish brown and fine. There were no stones in the sand and no finds were recovered.

4.2.6 Borehole E

The land was mostly flat and covered by grass and moss with some gorse, cropped heather, and reeds. There was virtually no exposed sand. The field was grazed by sheep and cattle, and no finds were recovered.

4.2.7 Borehole F

This site was to the north of a trackway to the shore, and at the top of the slope to the beach. To the east the ground undulated and was covered half by grass and half by heather. There was considerable erosion by the track through the sand dunes to the sea but there were no finds. There was no cliff here, only sloping grass-covered dunes and it was not possible to see the buried soil of sites 1 and 7 (see Section 6 - gazetteer below). No finds were recovered.

4.2.8 Borehole G

This site was in a field to the east of the main coast road, and the position of the borehole was not marked. The ground was flat, covered in grass, and had sheep grazing.

A pit in the edge of the field showed the soil to be a sandy loam. No finds were recovered.

4.2.9 Borehole H

There was no mark on the ground for this site. The area was flat and covered with short tufty coarse grass as well as some short heather and gorse. There were two pools of standing water, but there was no exposed sand. No finds were recovered.

5. ARCHAEOLOGICAL IMPACT AND RECOMMENDATIONS

5.1 Impact

The area between the Irt and the sea is one of the few identified Mesolithic sites in a part of the country where the Mesolithic period is under represented; it is therefore of national importance. The area may also elucidate the development of the Neolithic culture and its industrial use of Langdale stone (group VI) for axes that were exported through the whole country. The possibility of preserved organic remains adds to this importance, and the assessment overall has demonstrated the enormous archaeological potential of the area.

During the site visit no lithics were recovered because of dense grass and other vegetation cover and it was also not possible to establish on the basis of the present surface examination if any of the boreholes will drill through archaeological deposits that have not yet been identified. The wide-spread distribution of the documented archaeological sites suggests that there is the potential for discovery of buried deposits of archaeological significance anywhere within the extent of the study area. However, the majority of the lithic scatters have been found close to the present shoreline, which would suggest that this has not changed significantly since their deposition. Whilst this may suggest a reduced likelihood of finding lithic sites further inland in the vicinity of the proposed boreholes, there is also the possibility that, in part, the documented distribution reflects the greater possibility of exposure on the shoreline than inland, which has therefore artificially biased the site distribution.

Although there is a significant possibility that the boreholes will be sunk through archaeologically sensitive deposits, this will not inevitably result in excessive damage to the underlying stratigraphy; the borehole itself (*c*100mm diameter) will only have a minimal impact upon the underlying sites. Archaeological material is presently protected by an unknown depth of wind blown sand; the survival of this material is dependent upon the depth of the protective sand and the depth to which the activities peripheral to the drilling will impact into them. To an extent the Ground Probing Radar survey commissioned by BNF plc may assist in determining the depth of the organic deposit, but the accuracy of the technique can be susceptible to surface undulation. In any case lithics have been identified in sand deposits that are stratified above this organic layer and consequently the depth of archaeologically sensitive strata can not be reliably determined by the use of this survey technique.

It is understood that an area of 10m x 20m will be impacted around each borehole in the course of the drilling and that care will be taken to minimise the surface damage by the drilling rig and associated vehicles. All the boreholes visited were under well developed vegetation, and five of the sites, A-D, and F, were adjacent to trackways, which should minimise the extent of disturbance from vehicular traffic. Although vehicular activity could potentially cause the most widespread damage around the borehole, this is unlikely to be particularly intrusive and would not necessarily penetrate the protective windblown sand deposits. However, it should be remembered that the sites were originally discovered following vehicular damage to the grass binding the sand dunes, causing erosion; it is therefore possible that vehicular activity may expose lithics. The drill will create a *c* 100mm diameter intrusion into the underlying strata, but the most

significant disturbance would be a 1m x 1m x 0.5m deep trench which would be excavated prior to the drilling. During the surveys of the 1960s lithics were discovered within shallow exposures into the dune surface and if the boring is undertaken at the lowest point of dune undulations there is a possibility that archaeologically sensitive material will be exposed within a depth of 0.5m from the surface.

5.2 Recommendations

It is anticipated that the impact of each borehole would be limited and would cause less damage than an intrusive archaeological evaluation in each location. Non-intrusive survey techniques (eg ground probing radar) may be able to determine physical features but would be unable to locate lithic scatters. The most effective and least destructive archaeological technique for the mitigation of the proposed work would be to undertake a watching brief during the excavation of the 1m square test pits. The excavation should be under the supervision of an archaeologist who should have the authority to suspend excavation if necessary, while archaeological deposits are recorde. An alternative and potentially cost-effective option is that the excavation of the test pits is undertaken by archaeologists. A watching brief would provide for an evaluation of the top 0.5m of stratigraphy within the area of each borehole and would enable an assessment of the potential risks to any underlying archaeological stratigraphy from the borehole operations. Although the test pits would not necessarily extend to sufficient depth to identify any archaeological stratigraphy or lithics on the site, but would provide an indication of the depth of protective windblown sand.

It should be stressed that the views of the County Archaeologist, Mr M. Daniells, and the National Park Archaeologist, Mr J Hodgson, should be sought prior to proceeding with any further work on the site as they may wish to amend or make further specific archaeological recommendations relating to the site.

6. GAZETTEER OF SITES

Site number **1**
SMR number -
Site Name Barn Scar
Period Late Mesolithic
NGR SD 04809860
Source Cherry 1965, 66

'Site I'. Microliths and a reused core found. Nearby in the adjacent cliff face is a buried land surface, dated to the elm decline of about 3000BC. This is covered and protected by windblown sand of varying depths. The sites in this area were only discovered after vehicles disturbed the vegetation and allowed erosion to take place.

Site number **2**
SMR number -
Site Name Drigg Dunes
Period Early Bronze Age
NGR SD 05209790
Source Cherry 1965, 68
Summary

'Site II'. In a sandy hollow where boulder clay was partially exposed. A flint knife and a barbed and tanged arrowhead was found.

Site number **3**
SMR number -
Site Name Drigg Dunes
Period Prehistoric
NGR SD 05809710
Source Cherry 1965, 68
Summary

'Site III'. A flaking surface was found on clay and stones. Only undiagnostic waste flakes were recovered.

Site number **4**
SMR number -
Site Name River Irt
Period Early Bronze Age
NGR SD 06409660
Source Cherry 1965, 68

'Site IV'. Both leaf shaped and petit tranchet derivative arrow-heads were found in some number, as well as a knife and a scraper. The site covers several acres, and lies on the edge of a raised beach.

Site number **5**

SMR number -
Site Name Drigg Dunes
Period Mesolithic/Neolithic
NGR SD 05309820
Source Cherry 1965, 69
'The sand-pits'. Contained microliths, leaf arrowheads, and a barbed and tanged arrowhead, all possibly in disturbed positions.

Site number **6**
SMR number -
Site Name Summer View
Period Prehistoric
NGR SD 04709960
Source Cherry 1965, 69
A few square yards of clay and gravel contained undiagnostic waste flakes and some scrapers.

Site number **7**
SMR number -
Site Name Barn Scar
Period Late Mesolithic
NGR SD 04709870
Source Nickson and MacDonald 1955, 17-29
Material recovered from an area of 50yds by 80yds. The flint is worked from beach pebbles, although there was also some chert. Over 100 cores, some re-used as scrapers, 40 other scrapers, 30 microliths, some microburins, many blades, and waste flakes.

Site number **8**
SMR number 3968
Site Name Drigg Well
Period Medieval/Post medieval ?
NGR SD 39006800
Source 2nd edition OS map 1900 / McIntire 1944
Holy well, shown as 'Drigg Well (Chalybeate Spring)' on the 2nd edition OS map. It was a Chalybeate spring resorted to for sickness cures.

Site number **9**
SMR number 16875
Site Name Barn Scar
Period World War II
NGR SD 04899850
Source Henry Wills Pillboxes, 1985

A pill box located on the head of a dune overlooking the shore. It was inadequately defended and was intended as an observation post.

Site number **10**
SMR number 1390
Site Name Saltings, Drigg
Period Bronze Age
NGR SD 06909640
Source Hyam 1958
Crawford and George 1983

A possible tumulus reported in 1958, but not found in 1983 by Crawford and George.

Site number **11**
SMR number 1394
Site Name Barn Scar
Period Neolithic/Bronze Age
NGR SD 04709850
Source Cherry 1965, 82-5

An exposure of organic soil exposed in a cliff section near to Site 1. The organic deposit was associated with lithic material. Pennington undertook pollen analysis at the site and dated the deposit to between the marine transgression of *c* 4000bc and the elm decline *c* 3000bc.

Site number **12**
SMR number 1396
Site Name Drigg Dunes
Period Mesolithic to Bronze Age
NGR SD 05409730
Source Cherry 1965, 68-9

Flint chipping sites covering several acres. The artefacts included barbed and tanged, leaf and triangular arrowheads, knives, and scrapers. The sites were discovered in 1958 and investigated from 1959-64. Some of the finds were from the dunes and some were from a grassy area on the river bank.

Site number **13**
SMR number 1397
Site Name Drigg Dunes
Period Prehistoric
NGR SD 05909680
Source Cherry 1965, 68-9

This is a part of a group of lithic scatters identified on the western edge of the Drigg dunes; other lithic scatters within this group include sites 12 and 14. The group was discovered in 1958 and investigated from 1959-64. Some of the finds were from the dunes and some were from a grassy area on the river bank.

Site number **14**
SMR number 1398
Site Name Drigg Dunes
Period Mesolithic to Bronze Age (mainly Neolithic)
NGR SD 06309640
Source Cherry 1965, 68-9

This is a part of a group of lithic scatters identified on the western edge of the Drigg dunes; other lithic scatters within this group include sites 12 and 13. The group was discovered in 1958 and investigated from 1959-64. The artefacts included barbed and tanged, leaf and triangular arrowheads, knives, and scrapers. Some of the finds were from the dunes and some were from a grassy area on the river bank.

Site number **15**
SMR number 1461
Site Name Barn Scar
Period Prehistoric
NGR SD 04909830
Source Crawford and George 1983, 41

Undated flint flakes and a quernstone fragment were found from a surface exposure.

Site number **16**
SMR number 1392
Site Name: Sandy Acre
Period Romano-British
NGR SD 07209600
Source Cherry 1974

A trial excavation by Mr J Cherry of a scatter of boulders arranged eccentrically in a sand hollow revealed fragments of pottery, bone and part of a Roman mortaria. West of the boulders lay a circular hearth, with a saucer shaped cross-section. This was dated by remnant magnetism to 1st century AD.

Site number **17**

SMR number 4300
Site Name Barn Scar
Period Bronze Age/Neolithic
NGR SD 04509860
Source Cherry 1982, 1-6

A large Bronze Age or Neolithic hearth associated with lithic material and a timber structure. The hearth was exposed in a cliff section and has been subject to coastal erosion since. Radiocarbon dates have been produced from charcoal on the hearth: 3780+-55BP and 4135+-55BP. A square timber structure was identified on the peaty surface, secured by pegs, one of which was discovered.

Site number **18**
SMR number 4428
Period Romano-British
NGR SD 06799660
Source Cherry 1968, 27-30

The site comprises iron slag scattered over a large area. There was no evidence of a hearth and the associated habitation debris seems to be Romano-British.

Site number **19**
SMR number 12155
Site Name Drigg
Period 19th century
NGR SD 06509877
Source OS 1st edition 25" sheet LXXXII, 2

An old railway siding and coal depot at Drigg. The siding has now gone but the coal depot building may still be standing.

Site number **20**
SMR number -
Site Name Drigg Dunes
Period 19th century
NGR SD 04859835
Source OS 2nd edition 25" sheet LXXXII, 2 (1900)

A boat house and landing stage shown on the OS 2nd edition map of 1900 but not on the Os 1st edition map. It is not on present day mapping.

Site number **21**
SMR number 6498
Period ?Roman
NGR SD 06009800

Source Tullie House Museum accession No. R6.1948.5

A pebble with a face carved on it, of uncertain authenticity. Mr J Cherry believes that the pebble was discovered near to the River Irt and it would appear that the quoted coordinates are inaccurate.

Site number **22**
SMR number 16874
Site name Drigg Waste Site
Period World War II
NGR SD 04809950
Source Henry Wills Pillboxes 1985

A Second World War pill box has been recorded at this location.

Site number **23**
SMR number 16876
Period World War II
NGR SD 05509700
Source Henry Wills Pillboxes 1985

A Second World War pill box has been recorded at this location.

Site number **24**
SMR number 16924
Site Name Drigg Dunes
Period Neolithic
NGR SD 06009700
Source Tullie House Museum accession no. TH73-1978.1,2

An axe rough-out of dark green tuff, which may be group VI rock. A flint barbed and tanged arrowhead was found in the same area although its precise location is unknown.

Site number **25**
SMR number 12192 and 12197
Site Name Sandiford, Wray Head and Mireside
Period Post-medieval
NGR SD 06129896, 06009878, 054995
Source OS 2nd edition 25" sheet LXXXII, 2 (1900)
OS 1st edition 6" sheet LXXXII (1860)

Three settlements: Wray Head, Sandiford and Mireside which are shown on the 1st edition and 2nd edition OS mapping. They are no longer in existence and are within the extent of the Drigg Waste Storage site.

Site number **26**
SMR number -
Site Name The Bungalow
Period 19th century
NGR SD 0455098750
Source OS 2nd edition 25" sheet LXXXII, 2 (1900)

A building shown as roofed on the 2nd edition OS map (1900) and described as the bungalow. The building is not show on the 1st edition map (1860) and was presumably constructed between 1860 and 1900. It is not shown on the modern OS mapping.

Site number **27**
SMR number -
Site Name Brown Knott
Period Post-medieval
NGR SD 05209965
Source OS 2nd edition 25" sheet LXXXII, 2 (1900)
OS 1st edition 6" sheet LXXXII (1860)

A small settlement shown on the 1st and 2nd edition OS maps, which is now destroyed. It is within the extent of the Drigg waste site.

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ILLUSTRATIONS

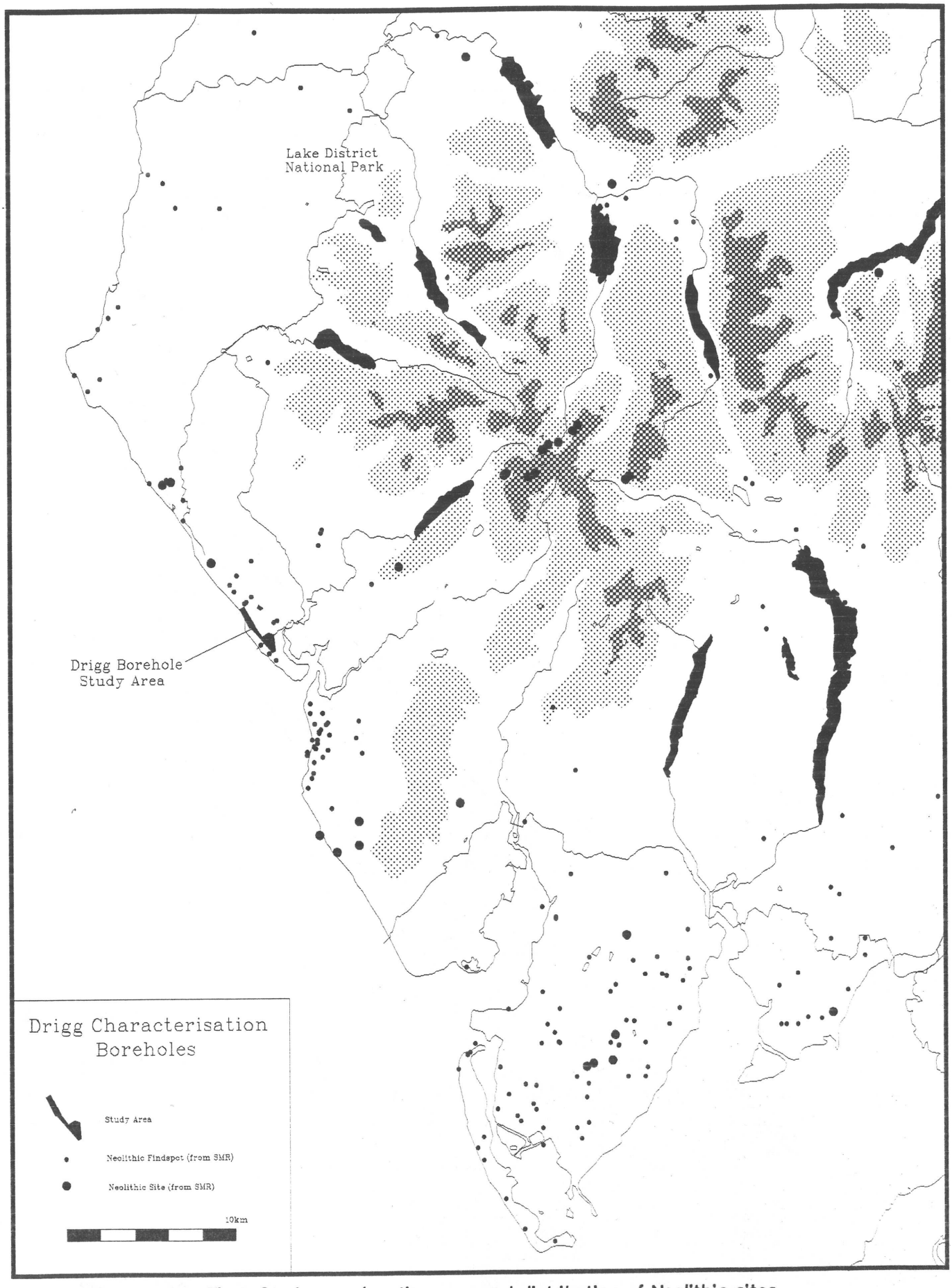

Fig.1 Study area location map and distribution of Neolithic sites (after Cumbria SMR)

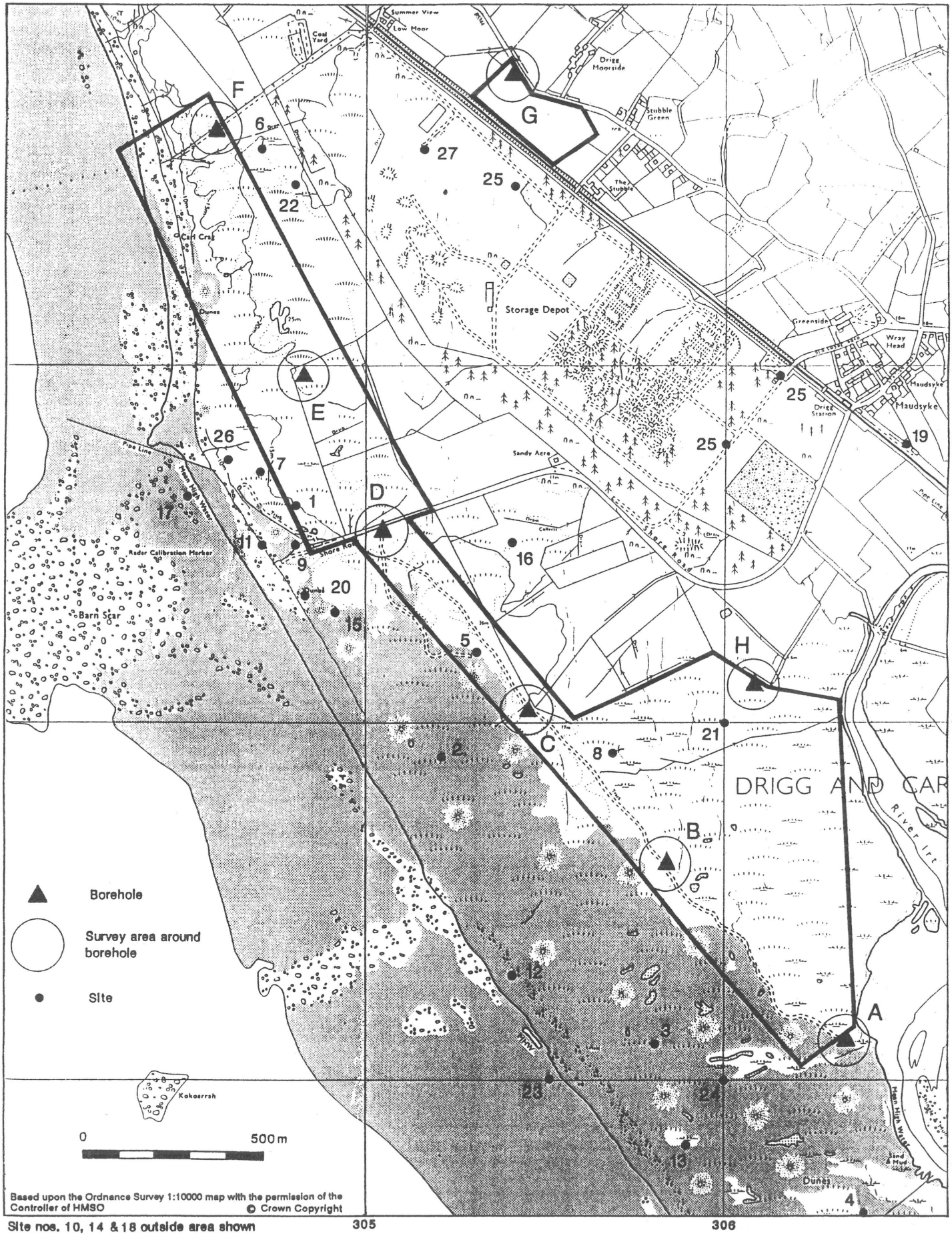

Fig.2 Site map

APPENDIX 1 PROJECT BRIEF

APPENDIX 2 PROJECT DESIGN