THE HEATH - PETERSFIELD

GEOLOGY, HYDROLOGY, SOILS AND EDAPHIC RELATIONS WITH SPECIAL REFERENCE TO HEATHLAND RESTORATION

APRIL 1993

Prepared for

HAMPSHIRE COUNTY COUNCIL

by

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1.0 INTRODUCTION

1.1 PROJECT OUTLINE

Petersfield Heath and Pond, the last remnant of Heath Common, is in the ownership of Petersfield Town Council and managed as public open space. The Urban Fringe Environment Team of Hampshire County Council are drawing up a survey and management plan to assist the Town Council in their aim of retaining the area for informal recreation whilst taking opportunities to enhance its qualities and value as wildlife habitat.

As part of the survey, Ron Allen Associates have been commissioned by Hampshire County Council to provide background information on the geology, soils and hydrology of the site and to advise on the suitability of different areas for heathland creation.

The ecology of Petersfield Heath is being assessed by Dr Francis Rose and practical issues of Heathland Creation are being dealt with by Paul Edgar of the North East Hampshire Heathlands Project. An overall landscape strategy is being developed by Plincke Landscapes, Winchester.

1.2 TERMS OF REFERENCE AND BRIEF

This desk study and field investigation has been commissioned from Ron Allen Associates, *Environmental and Ecological Consultants,* by the Urban Fringe Environment Team of Hampshire County Council Planning Department according to Order No Plan/002540 dated 12 October 1992.

The brief has been to provide a description of the physical resources of Petersfield Heath including Geology, Hydrology and Landform but concentrating on Soil Characteristics and their suitability for heathland restoration including taking soil samples for determination of pH and major plant nutrients. We have also considered Archaeological Monuments because they are a controlling factor in any scheme affecting the site.

1.3 SOURCES OF INFORMATION

Geological information has been obtained from 1:10 000 scale geological maps of the British Geological Survey, contours have been obtained from the 1:10 000 scale Ordnance Survey Plans and information on Archaeological Monuments has been obtained from Hampshire County Council.

Ecological information has been summarised from the full supporting report produced by Francis Rose.

All other information about geology, hydrology, landform and soils has been obtained from field observations, and in the case of soils, from an auger investigation.

1.4 SCHEDULED MONUMENT CONSENT

The Bronze Age Barrows on Petersfield Heath are listed as County Monument No:8 and Scheduled Monument Consent has been obtained to undertake soil observations within the setting of the monument.

2.0 LOCATION, LAND USE, ARCHAEOLOGY AND WILDLIFE HABITATS

2.1 LOCATION

Petersfield Heath and Heath Pond is located immediately to the south east of Petersfield in East Hampshire and is contained within the triangle formed by Heath Road in the north, the B2146 Sussex Road in the southwest and Heath Road East in the southeast.

2.2 OWNERSHIP AND LAND USE

The site is owned by Petersfield Town Council and managed as public open space and at present combines a variety of formal and informal recreational facilities. (Drawing 1).

There is part of a golf course with club house and car parking, a formal cricket pitch with pavilion and a variety of informal uses by the public. Heath Pond, a shallow lake (Photograph 1), is used for coarse fishing and for boating and the land adjacent to the Pond incorporates an equipped children's play area, refreshment building and toilets.

There are several well used walking routes and the whole area is open to informal public recreation.

Part of the site was used as temporary bunded storage for dredged lake silt, but this area has now been cleared and landscaped.

2.3 ARCHAEOLOGY

2.3.1 The Barrows

The County Sites and Monuments Record indicates the presence of a Group of Round Barrows on Heath Common Petersfield as follows:

> 'A group of 21 Bronze Age barrows located to the east of Heath Pond. The barrows are predominately of the Bowl barrow type, although Bell, Disc and Saucer forms are also present. The barrows survive as earthworks, although some have been damaged. According to the Sites and Monuments Record, the barrows have never been excavated. Bronze Age flints have been recovered from two of the barrows. The barrows are included in the Scheduled Ancient Monument, Hampshire County Number 84.'

A list of the barrows and their types is provided in the Appendices to this report together with some additional information from which the following notes are derived.

An aerial photograph (in Grinsell, L.V. (1939) Hampshire Barrows PHFC 14) shows the barrows to be set in open countryside unlike the present secondary woodland. A drawing in the same document (c.1939) shows The Heath landscape to be open with trees confined to small woodland patches between the lake and Sussex Road and between the Golf Pavilion and Heath Road. Pine trees are shown on some barrows and the caption suggests that:

> *'The soil is sandy, and the ground is for the most part low and damp. The ground rises near the Golf Pavilion and round about Barrow 13, but parts of the Heath are still swampy in wet weather and would have been more so before the Lake was confined and embanked in the 18th Century.'*

2.3.2 Ancient Soils

However, far more than the Barrows date to the Bronze Age. The soil types found on Petersfield Heath are similar to those dated from the Neolithic to the Bronze Age elsewhere and so are very likely to be the result of nutrient leaching following woodland clearance and cultivation or cropping since that time.

2.3.3 Ancient Plant Communities

Dr Francis Rose in his report on Petersfield Heath indicates that according to early OS Maps the site supported heathland vegetation similar to other commons in the area. It is likely that this style of vegetation came into the area following the abandonment of infertile agricultural soils in Pre-historic times and remained until recent development of secondary woodland and the management of the land for golf. Today only very small areas of heathland vegetation remain.

2.3.4 Lynchets and Heath Pond

Also on Petersfield Heath are linear lynchets probably relating to former field boundaries and of unknown age.

The Heath Pond (Photograph 1) is itself an old feature, having been constructed in the 18th Century.

2.4 WILDLIFE HABITATS

Wildlife Habitats and particularly their floristic characteristics have been described for this study by Dr Francis Rose.

The main wildlife habitats are listed in Table 1

Table 1 Wildlife Habitats on Petersfield Heath
(Adapted from Dr F Rose 1993)

HABITAT	PLANT COMMUNITIES	EXTENT
Open Lake and Sandy Shores	Bur-marigold, Amphibious Bistort and Marsh Pennywort	Heath Pond has little aquatic vegetation but the sandy margins provide some interest
Fen and Reed Swamp	Gipsywort, Reedmace, Common Reed and Reed Sweet-grass	A few small patches around Heath Pond
Heathland	Common Heather with Heath Bedstraw, Tormentil, Purple Moor-grass and Dwarf Gorse	One area only south of the Cricket Pavilion.
Acid Grassland	Smooth Meadow-grass, Common Bent and Fine-leaved Fescue with Buckshorn Plantain and Sand Spurrey, some areas with remnant Heather	On sloping land in the north and used for general amenity and in some wet lying areas. Heather occurs in some areas between Fairways
Improved Grassland	Species poor swards	On golf fairways, tees and greens and recently sown areas
Scrub	Gorse, Hawthorn and Bracken	Small patches between some fairways
Secondary Woodland	Planted Oak woodland with Birch, Bramble and Bracken	In the northeast and as strips between fairways, and around the south and east of Heath Pond (mostly developed this century)

The most important habitats are Acid Grassland and Heathland because these are surviving remnants of formerly extensive habitats, now threatened. Fen and Reed Swamp habitats similarly are survivals of wetland communities thought to have existed prior to creation of Heath Pond and now lost below a relatively barren expanse of open water.

The extent of these habitats is indicated on a plan accompanying the report by Dr Francis Rose (1993).

3.0 LANDSCAPE SETTING, LANDFORM AND RELIEF

3.1 LANDSCAPE SETTING

Petersfield Heath is situated in the south west corner of the Weald, a large area of sandy, loamy and locally clayey land lying between the Chalk escarpments of the North and South Downs which join as the Wealden Edge in East Hampshire and extend to the west as the Hampshire Downs.

The South Downs rise to the south of the site and the Wealden Edge escarpments extend to the north before swinging east into Surrey and Kent as the North Downs. Within that broad sideways arc of the Chalk is the lesser escarpment of the Upper Greensand, then the Clay Vale of the Gault and then a succession comprising sandy land of the Folkestone Beds, clays and loams of the Sandgate Beds and finally in the centre of the district, sands and sandstones of the Higher Weald on the Hythe Beds. Petersfield Heath is on the junction of the sandy Folkestone Beds and the wetter land of the Sandgate Beds.

3.2 LANDFORM AND RELIEF

3.2.1 Landform

Landforms in the general vicinity are complex with surface topography superimposed on an underlying complex geological sequence.

Petersfield Heath is within a small valley eroded into the interfluve between two east flowing tributaries of the River Rother, the Tilmore Brook in the north and the Standbridge Stream in the south. Heath Pond (Photograph 1) is constructed in the head of this small intermediate valley and the outlet stream forms a further east flowing tributary of the Rother.

Drawing 2. shows the principal landforms within the site.

The main feature is the Heath Pond Stream (Photograph 2) flowing east out of Heath Pond through a broad shallow valley. The valley has a narrow bottom either side of the stream but in the north this expands as a broad low lying footslope which rises to a gently undulating area to the north east and rather more steeply rising land in the north which passes to a terraced interfluve along the line of Heath Road.

Gravelly terraces confine the valley and pond system on three sides (like a horseshoe on its side and open to the east) and broadly follow the lines of Heath Road in the north and west and Sussex Road in the South.

South of the stream, the land rises gently to an area of higher land topped with three barrows and known as Music Hill.

This higher land continues to the south as an interfluve separating the broad valley from a small narrow valley head (by the public car park) trending west back towards Heath Pond.

Heath Pond is constructed within the footslopes of this valley system and occupies low land towards the head of the valley and surrounded in the north, west and east by the previously mentioned gravel terrace system.

3.2.2 Relief

Contours taken from the 1:10 000 OS plan are given on Drawing 3.

The main valley bottom is a little below the 55m contour and from where the land rises to the north along Heath Road and to the south at Music Hill to a little over the 60m contour giving a total relief of about 10m. Heath Pond is at about 56m AOD.

4.0 GEOLOGY

4.1 MAP AND BOREHOLE INFORMATION

The geology of the area is complex and baseline information has been taken from 1:10 000 scale sheets of the British Geological Survey.

The geological setting of the area is shown on Drawing 4. and a schematic cross section across the area is provided in Drawing 5.

Two boreholes are located within or near to the site. One borehole is adjacent to the Golf Club House (see Drawing 4) and the other is from the Stanbridge Water Treatment works about 1km distant to the east. Both borehole logs are provided in the Appendices.

The Club House borehole revealed River Terrace Deposits to 1m over Pulborough Sandrock to 8.3m. The Sandrock was shown to comprise brown medium sand changing to yellow brown slightly clayey fine sand with a layer of mottled clayey sand at 5m depth over dense green clayey sand.

The Stanbridge Works borehole passed through Terrace Deposits consisting of soft to firm yellow-brown-grey sandy silty clay with some flint gravel to 3m over very stiff black-green slightly sandy silty clay (Marehill Clay).

4.2 STRATIGRAPHY

While the site is underlain by Cretaceous formations (Solid deposits) dipping at about 2-3 degrees to the south, the superficial deposits (Drift) are more related to topography controlled by an east flowing drainage system.

The geological succession in the area is shown on Table 2.

4.3 DRIFT DEPOSITS

Drift deposits at Petersfield Heath are either Head or Terrace Gravels

4.3.1 Head

Head deposits occur on the valley floor and on the adjacent footslopes and generally lie wet. Most of these deposits are sandy and formed from the erosion of higher sandy slopes. There are local areas of Head on slopes and higher land and these are usually loamy and flinty and derived from erosion of the Terrace deposits.

Table 2 Geological Succession

TYPE/PERIOD	DEPOSIT OR FORMATION			LITHOLOGY
MADE GROUND				Hardcore with brick, metal, glass and pottery fragments infilling low wet areas
DRIFT Recent and Pleistocene	Head			Mostly sandy but with some loam, sandy clay and clay
	River Terrace Deposits			Flinty and cherty clayey coarse sand and gravel
SOLID Cretaceous	Gault			Clay, stiff bluish black when fresh
	Lower Greensand	Folkestone Beds		Sandstone, friable, medium to coarse grained, cross bedded weathering to sand at surface
		Sandgate Beds	Upper Marehill Clay	Clay, silty locally sandy, dark grey or greenish, glauconitic
			Upper Pulborough Sandrock	Sandstone, friable, very fine grained
			Lower Marehill Clay	Clay, silty locally sandy, dark grey or greenish, glauconitic
			Lower Pulborough Sandrock	Sandstone, friable, very fine grained, locally fossiliferous
			Rogate Beds	Sand, poorly graded, much polished ironstone materials
		Hythe Beds		Sand and sandstone, siliceously cemented, medium to coarse grained, locally glauconitic

4.3.2 River Terrace Gravels

Gravel deposits occur on higher land around the north, west and south margins forming a horseshoe shaped terrace open to the east. The gravels are flinty and, where examined were, mostly sandy or loamy. For the most part they were very thin and usually no more than 0.5m thick.

4.4 SOLID DEPOSITS

All Solid deposits are Cretaceous in age and dip very gently to the south. To the north of the site the dip is about 2 degrees and we assume that at the site, there is little difference.

4.4.1 Hythe Beds

The sands and sandstones of the Hythe Beds occur at considerable depth below the site and are not exposed here.

4.4.2 Sandgate Beds

Sands and clays of the Sandgate Beds occur at the surface or below thin layers of Head over the northeast third of the site including much of the woodland and the Cricket Ground.

The Sandgate Beds comprise a sequence of clays and sands of which the upper strata only occur at outcrop on the site. Clay strata predominate, the Marehill Clay being divided into upper and lower parts by an intervening sand development, the Upper Pulborough Sandrock. The Upper Marehill Clay is about 4m thick and the Lower Marehill Clay about 8m thick with the intervening sands probably about 2-3m thick and thinning to the west. The clayey strata contain the mineral glauconite which gives the fresh clays a dark green colour.

4.4.3 Folkestone Beds

Much of the central and southern parts of the site are underlain by soft sandstone of the Folkestone Beds which weathers to form the sandy soil parent materials exposed in banks and eroded land at various places on Petersfield Heath.

4.4.4 Gault

The northern feather edge of the Gault Clay just overlies the Folkestone Beds in the very south of the site where it is overlain by thin gravelly Terrace deposits.

5.0 SURFACE HYDROLOGY AND HYDROGEOLOGY

5.1 SURFACE HYDROLOGY

The main hydrological features are shown on Drawing 6.

These features include Heath Pond, the outlet stream, a series of small seasonal drains, two small seasonal pools and three areas of high groundwater.

5.2 HEATH POND

The dominating wet feature on the site is Heath Pond (Photograph 1), an extensive but shallow lake thought to have been dug in the 18th Century to merge a series of wet pools.

There is an outlet stream but no obvious inlet stream. The pond appears to have been dug into wet soils in sandy Head deposits within a low lying basinal area underlain by waterlogged Folkestone Beds.

Water in the pond has a neutral reaction with pH values of 7.0 to 7.1 when measured during March 1993.

In recent years Heath Pond has been deepened by suction dredging. This will have the effect of increasing water depth, maintaining cooler water during the summer which will aid fish survival and prevent the excessive development of freshwater algae.

5.2.1 Surface Stream, Wetland and Drains, Springs and Surface Water

5.2.2.1 Surface Stream

The outlet stream (Photograph 2) leaves the pond at a sluice in the north and flows through the bottom of a shallow valley towards the east-southeast before passing under Heath Road East and flowing east and then northeast to meet the River Rother just south of the East Hampshire District Council offices at Penns Place.

From the sluice, the stream has been piped below the landscaped area formed from the previous bunded lagoons and then flows across the site in a straightened channel devoid of meanders, shallows or other natural features.

Stream water is slightly acidic with pH values (March 1993) of 6.3. Water in the stream is thus more acidic than that in Heath Pond suggesting that water in the stream arises in part from interception of groundwater as well as directly from Heath Pond via the sluice.

5.2.2.2 Wetland and Drains

Low lying areas on Petersfield Heath are drained by small shallow ditches.

The low lying area between the stream and the golf club house lies waterlogged in the winter and spring and has a network of silted and grassed over drains and shallow pools that today serve little purpose. Such surface water that follows them flows west into a thin woodland strip where it is discharged before reaching Heath Pond.

A further area of low lying land occupies a small valley head by the public car park. Water flows off the surrounding slopes via a series of shallow silted and grassed over drains and pools into a maintained ditch to flow east-north east in a straight channel north of the car park, into a small pond and through a culvert into Heath Pond. Water in the drain in March 1993 had a moderately acidic pH value of 5.2.

There is also a small drain taking water from the north east corner of the site. This dug ditch takes seasonal water from a small shallow pool south along the road to be discharged in the general direction of the Cricket Ground.

5.2.2.3 Springs and Surface Water

Seasonally wet areas occur at the base of sandy slopes, but there is a pronounced seasonal spring at the edge of the terrace to the east of the Golf Club Car Park Photograph 3). Here there is an area of seasonally wet land which may at one time have been a pond but is now an area of peaty secondary woodland with Moor-grass (*Molinia caerulea*). Where this land has been mown, it is mossy and has abundant Heath Rush (*Juncus squarrosus*) and some Heather.

Surface water stands in pools on low-ways when the water table rises and also after heavy rain in areas with impeded soil drainage. These areas most dramatically include land in the southeast corner where open pools develop in shallow low-ways on thin terrace gravel over Gault Clay (Photograph 4.). Waterlogged land also develops along the southern fairways where the soils have clayey layers at depth and also in the north east of the site to the north and east of the Cricket Ground where the soils overlie Marehill Clay.

5.3 HYDROGEOLOGY

The local geology is shown on Drawing 4 and the geological structure (dip exaggerated) is shown on Drawing 5.

The regional dip of the strata is only about 2-3 degrees and so the natural landforms of Petersfield Heath cut through a succession of differing geological materials. Some of these are permeable (usually sandy) and form aquifers and some are slowly permeable (usually clayey) and form aquicludes.

The main aquifer is the Folkestone Beds and water is perched within this formation over the underlying Marehill Clay (Sandgate Beds).

Heath Pond appears to have been dug below the water table level in the Folkestone Beds and its covering Head deposits. The Folkestone Beds here are relatively thin and groundwater is likely be perched over the underlying Marehill Clay. The catchment for water reaching the lake is likely to be the adjacent land on Folkestone Beds to the east and west and also the areas of gravels on the surrounding higher terraces.

Because the base of Heath Pond appears to be permeable, the water level will vary with the rise and fall of groundwater and during dry periods, water levels will be low as water passes down the gently dipping aquifer below the Gault Clay in the south.

6.0 SOILS

Soil conditions at Petersfield Heath are surprisingly varied for a relatively small area.

These variations in soil type occur according to the lithology of parent geological materials and their moisture regimes and also with vegetation change and the effects of man.

Wetter soils are associated with lower valley sides and valley bottoms or with springs at the base of terrace deposits. Seasonally waterlogged soils are associated with areas of impeded drainage and well drained soils occur on deep sands, both types are generally above the water table.

The soil map in Drawing 7 illustrates the broad trends in soil distribution although in reality the fine variation in soil conditions is locally complex.

6.1 SOIL SURVEY

Soils have been surveyed from 43 locations across Petersfield Heath by digging small pits to 25cm depth by spade and hand augering to about 1m depth.

Six distinct soil types have been described according to characteristics of their vertical profiles.

The distribution of the main soil types is shown on Drawing 7 and the location of each individual auger boring is given on Drawing 8. Summary details of each auger boring are provided in the Appendices.

6.2 SOIL CLASSIFICATION

The soils have been classified according to systems described in Avery B W (1980) *Soil Classification for England and Wales (Higher Categories)*, Soil Surv. Tech,Mon. No. 14. Harpenden and in Claydon B and Hollis J M (1984) *Criteria for differentiating Soil Series*, Soil Surv. Tech. Mon No. 17, Harpenden.

In these schemes, soils are classified according to a defined range of diagnostic properties found within the soil profile. A soil profile being a vertical column of soil and consisting of layers known as *horizons* roughly parallel to the ground surface and passing down to relatively unaltered material.

The soil classification operates at 4 levels, major groups, groups, subgroups and soil series. Subgroups are given number codes and these have been used on the soil map (Drawing 7) together with the soil series name given to individual soil types. Soils found on Petersfield Heath are classified on Table 3.

Table 3. Soil Types (as distinguished on Drawing 7).

Symbol	Soil Classification	Name (Soil Series)	Texture (to 100cm depth)	Water Regime
Made Ground			Hardcore and general waste - brick, glass, pottery etc.	Mostly wet low-ways with high groundwater
631	Podzolic soils	Shirrell Heath	Medium sands	Well drained, droughty
642		Sollom	Medium sands	Slight seasonal waterlogging affected by groundwater in subsoil
643		Holidays Hill	Medium sand over sandy clay loam and sandy clay passing to loamy sand	Moderate seasonal waterlogging with impeded drainage at depth
711	Surface-water gley soils	Hedge End	Loamy over glauconitic clay sometimes over sticky sand	Seasonally waterlogged with impeded drainage
821	Ground-water gley soils	Formby	Medium sands	Seasonally waterlogged, affected by high groundwater
861		Fordham	Humose or peaty topsoils over sand	Permanently waterlogged with high groundwater

6.3 SOIL TYPES

Soils on Petersfield Heath range from those that are permeable and well drained through to those that are permanently waterlogged as follows:

Podzolic Soils	Very acid soils in which organic matter, aluminium and iron have been mobilized and redeposited at depth giving rise to a sequence of very pale leached, dark humus enriched and brightly coloured iron and aluminium enriched subsurface horizons. In wetter soils of this type, lower horizons are grey and orange mottled. Podzolisation is thought to be related to the replacement of deciduous woodland by Heather that was increasingly promoted by human activities from Neolithic times onwards.
Surface Water Gley Soils	Seasonally or permanently waterlogged slowly permeable soils usually developed on clayey or very compact substrates.
Groundwater Gley Soils	Seasonally or permanently waterlogged permeable soils affected by high groundwater.

6.3.1 Podzolic Soils

Three types of Podzol are found on Petersfield Heath:

Shirrell Heath soils, *Humo-ferric podzols*, that are well drained to depth;

Sollom soils, *Humo-ferric gley podzols*, that are affected by groundwater and

Holidays Hill soils, *Stagnogley podzols*, that are affected by surface water.

6.3.1.1 Shirrell Heath soils

These well drained sandy Humo-ferric podzols occur on sandy slopes over Folkestone Beds. They are droughty soils with dark surface layers overlying pale bleached sands below which are first a dark layer enriched in humus and then a brighter layer enriched in iron and aluminium.

Profile Description

Depth cm	*Characteristics*	*pH*
00-35	*Very dark brown medium sand with bleached sand grains and occasional small flints*	*4.5*
35-55	*Light grey loose stoneless medium sand*	*5.0*
55-78	*Black humus enriched loamy sand*	*5.0*
78-100	*Yellowish brown loose medium sand*	*5.5*

6.3.1.2 Sollom soils

These soils, Humo-ferric gley podzols, are very similar to Shirrell Heath soils described above but differ in having grey and orange mottled lower horizons where the soils are affected by seasonal waterlogging.

Sollom soils tend to occur on lower slopes over Folkestone Beds where they are affected either by springs or by winter rising groundwater.

Profile Description

Depth cm	*Characteristics*	*pH*
00-06	*Very dark brown medium sand with abundant grass roots*	*5.0*
06-15	*Light grey medium sand with common angular flints and weak coarse angular blocky structure*	*4.7*
15-45	*Light brownish grey and yellowish brown slightly sticky loamy medium sand with yellowish brown and strong brown mottles*	*5.0*
45-100	*Light grey loose medium sand with coarse yellowish brown mottles*	*5.0*

6.3.1.3 Holidays Hill soils

Holidays Hill soils, Stagnogley podzols, differ from the previous types in having slowly permeable layers at depth above which water perches during wet weather. These less permeable layers are generally thin and the soils generally dry during the summer.

Surface layers are generally dark and in the wetter soils may be rich in humus. Bleached and humus enriched podzolic layers occur but below these are sandy clay loam or sandy clay layers, often strongly mottled indicating seasonal waterlogging. These soils usually pass to sticky sand within 1m.

These soils occur on upper and more level slopes where the Folkestone Beds are thinly covered with loamy or clayey Head material.

Profile Description

Depth cm	*Characteristics*	*pH*
00-15	*Very dark greyish brown almost humose loamy medium sand with fine fibrous roots*	*4.5*
15-38	*Grey loamy medium sand*	*4.5*
38-50	*Black humus enriched medium sand*	*5.0*
50-65	*Greyish brown clay and sandy clay with sandy patches with strong brown mottles*	*5.0*
65-100	*Light grey sandy clay loam with inclusions of sandy clay and sand with strong brown mottles*	*6.0*

6.3.2 Surface Water Gley Soils

Two rather similar soils were located, both occurring within woodland in the northeast of the site.

Hedge End soils, *Typical stagnogley soils*, with

a. sandy well drained topsoils over seasonally waterlogged subsoils and
b. loamy poorly drained topsoils over prolonged seasonally waterlogged subsoils.

6.3.2.1 Hedge End Soils

These seasonally waterlogged soils are developed in thin sandy or loamy Head over Marehill Clay in the wooded areas to the northeast of the site. In places the topsoils are sandy and the soils dry out quicker in the summer but in lower lying areas the topsoils are loamy and slightly humose and remain wet for much of the year. All of these soils are strongly mottled within 30-40cm depth and the clayey layers are often dark green in colour with bright yellow mottles where the soils pass down to relatively unaltered Marehill Clay.

Profile Description

Depth cm	*Characteristics*	*pH*
00-12	*Very dark greyish brown humus enriched medium sand*	*<4.5*
12-25	*Dark brown fine sandy loam*	*4.7*
25-55	*Light brownish grey fine sandy clay loam with strong brown mottles*	*4.7*
55-75	*Light brownish grey clay with pale silty partings and strong brown mottles*	*4.7*
75-100	*Olive green sticky loamy sand with light grey and strong brown mottles*	*5.0*

6.3.3 Groundwater Gley Soils

Soils affected by high groundwater occur in the lower parts of the site and are of two types:

Formby soils, *Sandy gley soils*, that dry out in their upper layers in summer and

Fordham soils, *Typical humic sandy gley soils*, that remain wet in their surface layers for most of the year

6.3.3.1 Formby Soils

These are sandy soils on footslopes either around the edges of Heath Pond or on some footslopes to the outlet stream valley. The soils have dark topsoils and lower layers have coarse patches of light grey and orange indicating prolonged seasonal wetness. In March these soils had saturated subsoils.

Profile Description

Depth cm	*Characteristics*	*pH*
00-24	*Very dark brown medium sand with bleached sand grains*	*4.7*
24-45	*Very dark grey loose sand with bleached sand grains*	*5.0*
45-100	*Pinkish grey loose wet medium sand with paler and darker variegation*	*6.2*

6.3.3.2 Fordham soils

These sandy soils occur on broad footslopes especially to the north of the stream and also to the east of the car park. Fordham soils remain waterlogged for most of the year and this is reflected in their very dark or black surface humose layers that are peaty in places.

Subsoil layers tend to be pale or with indistinct grey and ochreous mottles. Surface layers quickly become saturated during wet weather and pools easily occur in low places.

Profile Description

Depth cm	*Characteristics*	*pH*
00-18	*Very dark greyish brown humose loamy sand with coarse organic matter lined prismatic structure*	*4.5*
18-42	*Dark grey loose very moist coarse sand with organic coats to sand grains*	*4.5*
42-62	*Light grey wet loose coarse sand with paler and darker patches*	*4.5*
62-100	*Dark greyish brown loose saturated sand*	*4.5*

6.4 SOIL CHEMISTRY

Topsoils of the main grassland and heathland compartments described by Dr Francis Rose, and areas that could be managed as heathland (especially fairways), have been sampled for nutrient determination. The sample areas have in part been governed by specific vegetation types identified in the report by Dr Francis Rose and in part by the need to sample different sections of the mown fairways, the target areas for heathland restoration.

Samples were taken from a depth of 5cm to 20cm below ground level, so avoiding surface layers rich in roots and including the main area that would be reached by feeding Heather roots. Within each area, seven locations were sampled by soil auger from the points and middle sections of the arms of a letter W and the samples mixed and subsampled before sending to the laboratory for analysis.

Samples were analysed by standard MAFF laboratory techniques for pH and available Phosphorus, available Magnesium and available Potassium, the main plant nutrients.

On the basis of the analytical results the topsoils were classified according to their nutrient status as in the following scheme which is adapted from that used in agriculture for assessing the nutrient status of cultivated soils for cropping, (Ministry of Agriculture, Fisheries and Food Reference Book 209, HMSO 1988).

Twenty such areas were sampled and sample locations are given on Drawing 8. The nutrient analysis classification scheme is given in Table 4 and the results of the analytical determinations are provided in Table 5.

Table 4 Nutrient Level Classification

Nutrient Class	Available Nutrient Determination mg/l			ADAS Index
	Phosphorus	Potassium	Magnesium	
Very Low	0-4	0-30	0-12	0
Low	5-9	31-60	13-25	0
Moderately Low	10-15	61-120	26-50	1
Moderately High	16-25	121-240	51-100	2
High	26-45	241-400	101-175	3
Very High	> 46	> 401	> 175	4

Nutrient Index level 2 is a common target for nutrients in agriculturally productive soils.

Table 5 Topsoil Analyses

Sample N°	Location	Analysis			
		Available Nutrients (mg/l)			pH
		Magnesium Mg	Phosphorus P	Potassium K	
2a	Acid amenity grassland	25 *(low)*	18 *(mod. high)*	31 *(low)*	7.2
2b	Acid amenity grassland	14 *(low)*	44 *(high)*	29 *(v.low)*	6.5
3	Re-seeded grassland	16 *(low)*	32 *(high)*	40 *(low)*	5.4
5a	Acid grassland	12 *(low)*	14 *(mod. low)*	20 *(v.low)*	4.5
5b	Wet acid grassland	53 *(mod. high)*	10 *(mod. low)*	81 *(mod. low)*	4.3
7a	Quarry floor	27 *(mod. low)*	42 *(high)*	49 *(low)*	4.3
7b	Quarry slope	53 *(mod. high)*	59 *(v.high)*	63 *(mod. low)*	4.8
9b	Heathland	63 *(mod. high)*	14 *(mod. low)*	97 *(mod. low)*	3.7
14b	Nutrient enriched grassland	51 *(mod. high)*	7 *(low)*	35 *(low)*	4.8
15	Acid grassland on Fairway	45 *(mod. low)*	12 *(mod. low)*	72 *(mod. low)*	4.1
A	Mown Fairway	100 *(mod. high)*	12 *(mod. low)*	112 *(mod. low)*	6.2
B	Mown Fairway	64 *(mod. high)*	13 *(mod. low)*	79 *(mod. low)*	5.6
C	Mown Fairway	41 *(mod. low)*	6 *(low)*	39 *(low)*	5.1
D	Mown Fairway	71 *(mod. high)*	6 *(low)*	56 *(mod. low)*	5.1
E	Mown Fairway	75 *(mod. high)*	9 *(low)*	122 *(mod. low)*	4.1
F	Mown Fairway	65 *(mod. high)*	9 *(low)*	116 *(mod. low)*	4.3
G	Mown Fairway	75 *(mod. high)*	9 *(low)*	113 *(mod. low)*	4.5
H	Mown Fairway	106 *(high)*	12 *(mod. low)*	148 *(mod. high)*	4.1
I	Mown Fairway	64 *(mod. high)*	7 *(low)*	90 *(mod. low)*	4.3
J	Mown Fairway	54 *(mod. high)*	4 *(v.low)*	86 *(mod. low)*	4.3

NB. Samples 2a-15 are from vegetation areas so numbered in the report and map by Dr Francis Rose. Samples A-J are representative of mown areas managed as various fairways. Sampling locations are shown on Drawing 8.

7.0 EDAPHIC RELATIONS

The habitats described by Dr Francis Rose vary greatly in their soil characteristics and the soils of each habitat are described here.

7.1 COMPARTMENT 1 Woodland adjacent Sussex Road

The soils here are sandy with high groundwater adjacent to the shore, but the woodland area has disturbed soils with evidence of both podzolisation and impeded drainage. While the woodland topsoils are rich in flint and brick fragments the subsoils are sandy over sandy clay and very similar to those of undisturbed Holidays Hill soils.

Topsoils are acidic but the soils become only slightly acidic at 30-35cm (pH 6.2) and become almost neutral (pH 6.5) at depth.

7.2 COMPARTMENT 2 Amenity Grassland

The upper slopes have rather gravelly versions of sandy Shirrell Heath soils but the footslopes have sandy Formby soils with high groundwater. Sandy topsoils drain rapidly and allow recreational use of the land but groundwater is met at shallow depth (Photograph 5).

In compartment 2a, the most trampled area of acid grassland the soil pH of 7.2 was slightly alkaline suggesting that the soils had been limed at some time to promote better growth of grass. Phosphorus levels were moderately high suggesting some fertilising but Potassium levels were low.

In compartment 2b, the less trampled area, pH levels were also high at 6.5 and Phosphorus levels were high and equivalent to agricultural soils again suggesting liming and fertilising.

7.3 COMPARTMENT 3 Re-seeded Grassland

This area formerly held tennis courts and has been reseeded. While Phosphorus levels were high the soil was only moderately acid (pH 5.4) suggesting some fertilising but without extensive liming.

7.4 COMPARTMENT 4

Soils in this compartment under scrub were not examined but it would be expected that well drained acidic podzols would occur.

7.5 COMPARTMENT 5 Acid Grassland and Wet Acid Grassland

This large compartment can be divided into two parts:

5a Rising land in the north of the compartment

5b Low lying land in the south of the compartment.

7.5.1 Sub-compartment 5a Rising land in the north of the compartment

This land has well drained deep sandy Shirrell Heath soils, *Humo-ferric podzols*, on the slopes over Folkstone Beds with Heather (Photograph 6) immediately below the areas of scrub and the golf club house. But lower down the slope near the footpath and to the east below the car park, the land becomes wetter with deep sandy Sollom soils, *Humo-ferric gley soils*, affected by seasonally high groundwater. Some of this water appears to be groundwater while some appears to be subsurface seepage from the Terrace Deposits higher up passing over the Marehill Clay which is here at shallow depth.

The soils are acidic with pH values in the drier soils of 4.5 down to 100cm depth and with those soils affected by groundwater becoming slightly less acidic (pH 5.0) in the saturated subsoil layers. Magnesium, Phosphorus and Potassium nutrients are low, moderately low and very low respectively as would be expected from a species rich acidic turf.

Subsurface humus enriched podzol layers occur at considerable depth (85-105cm) in this sub-compartment.

7.5.2 Sub-compartment 5b Low lying land in the south of the compartment

This land forms a broad waterlogged footslope sweeping gently from the footpath down towards the outlet stream in the south.

Fordham soils, *Typical humic-sandy gley soils*, occur throughout this area and are characterised by dark humose and slightly peaty topsoils and deep waterlogged sandy subsoils developed in sandy Head over Marehill Clay at depth.

All four profiles examined in this area had waterlogged sandy soils that were very acidic (pH 4.5) to depth. Topsoils had a laboratory measured pH of only 4.3.

Topsoils were humose and locally peaty and had strongly prismatic structures suggesting drying of the normally wet topsoils during the recent drought years. The upper 2-7cm of these soils was typically root bound with fewer roots below but there was seldom evidence of a surface mat of dead grass.

Plant nutrients were all moderately low apart from Magnesium which was moderately high but this is not unusual in semi-natural soils. Topsoil pH was 4.3.

It is likely that at one time this was very marshy ground with acidic mire plant communities, but that construction of Heath Pond allowed a certain amount of drainage to be undertaken. There still remains a dendritic pattern of shallow silted drains and small winter wet pools in this area (Drawing 6).

7.6 COMPARTMENT 6 Site of bunded lagoons

Soils in this disturbed area were not examined but are known to contain the remains of humose silt from lake dredgings and the remnants of the sandy bunds and sandy subsoils over Folkestone Beds and Marehill Clay.

7.7 COMPARTMENT 7 Disturbed Area

This compartment is adjacent to that landscaped after removal of the bunded lagoons created during the recent dredging of Heath Pond and has been proposed as a heathland creation area.

The land is disturbed and true soils do not occur but this area has deep brown well drained sands that have pH values of about 4.5.

Soil materials were sampled in the lower part of this comparment near Heath Pond and in the upper part.

Topsoils in the lower part were very acidic with pH values of 4.3, low levels of Potassium and Magnesium but high levels of Phosphorus. The upper part of the compartment had moderately acid soils with pH values of 4.8, moderately high Magnesium values and very high Phosphorous values.

Phosphorus levels were higher than that maintained on productive agricultural land and the soils are not well suited to nutrient poor habitat creation schemes, although drought might be a compensating controlling factor.

7.8 COMPARTMENT 8 Heathland Remnant

This area of land with Heather is on sandy Shirrell Heath and Sollom podzol, in part affected by high groundwater. Soils had very deep loose sandy profiles with very acid pH values of about 4.5.

7.9 COMPARTMENT 9 Heathland

This hummocky area of tussocky heathland (Photograph 7) has both well drained Shirrell Heath soils and seasonally waterlogged Holidays Hill soils so explaining the mixture of dry and humid heathland plant communities located here.

Topsoil pH values of 3.7 indicated extremely acidic conditions and the lowest found on Petersfield Heath. It is likely that this low pH relates particularly to the presence of heathland vegetation which has very acidic litter. Phosphorus and Potassium levels were moderately low but interestingly Magnesium levels were moderately high but this is not unusual in heathland soils.

7.10 COMPARTMENT 10 Scrub

Not examined in detail, but this area is expected to have very acidic well drained Shirrell Heath podzols.

7.11 COMPARTMENT 11 Scrub and Spring

This area has a high groundwater table and after rain in early April was lying very wet. The soils here have peaty topsoils and sandy subsoils and are formed at a spring site and part of the area may be a silted pond. Vegetation here includes Heather, Moor-grass and Heath Rush, the latter two indicating permanently wet conditions.

7.12 COMPARTMENT 12 Woodland

This large area of Oak and Birch woodland (Photograph 8) is mainly on seasonally waterlogged Hedge End soils developed on thin loamy and sandy flinty Drift over Marehill Clay and Pulborough Sandrock. The soils have thick layers of humus and decomposing litter (mor humus). On Sandrock there are areas of deeper sandy soils affected by groundwater, not distinguished on the soilmap, that support Bracken (Photograph 9).

The soils are acidic throughout and typically with pH values of about 4.7. An area of Bracken near to Heath Road East had a surface pH value of 7.0 but this was probably the result of local soil contamination.

7.13 COMPARTMENT 13 Grassland

Not examined in detail, but expected to contain seasonally waterlogged gravelly over clayey soils on flinty Head over Marehill Clay. The area contains two small seasonal pools drained by a ditch.

7.14 COMPARTMENT 14 Enriched Grassland

This is a variable area of well drained and less well drained podzols and groundwater gley soils on Folkestone Beds. The profile examined was of a Shirrell Heath soil on loose sand and acidic throughout (pH 4.5-5.0).

Interestingly, nutrient levels from the topsoil samples were not high and indeed lower than in the Heathland. It is possible that increased fertility is from applied nitrogen but additional analyses would be needed to check this.

7.15 COMPARTMENT 15 Mown Acid Grassland.

There is a substantial area of remnant Heather (Photograph 10) here on seasonally waterlogged Holidays Hill soils but the compartment extends onto the adjacent fairway. Soil profiles are sandy to about 60cm where they become clayey and pass to sandy at about 85cm depth. pH values are about 4.5 in upper layers and 5.0 in lower layers.

Topsoil samples from the fairway were extremely acidic (ph 4.1) and had moderately low levels of Magnesium, Phosphorus and Potassium.

7.16 COMPARTMENT 17 Woodland

This large area of secondary woodland on this Head over Folkestone Beds has very acidic podzolic soils. Holidays Hill soils, with impeded drainage, occur on upper slopes and Sollom soils, affected by groundwater, occur on lower slopes.

8.0 SOILS OF THE FAIRWAYS

Mown fairways north and south of the stream have been examined and are distinguished by the sample letters on Drawing 9.

8.1 FAIRWAY AREA A

Fordham soils here have high groundwater and humose topsoils similar to land to the east. The grass is lush and bright green (Photograph 11, middle distance) suggesting a higher fertility than elsewhere and/or recent reseeding. Topsoil samples showed the area to be moderately low in Phosphorus and Potassium but to have an only slightly acidic pH value of 6.2 suggesting additions of lime in the past.

8.2 FAIRWAY AREA B

This fairway is on the slope between Music Hill and the stream where the podzols are affected at depth by groundwater (Sollom soils). The lower part of the fairway has disturbed soils made up with hardcore. Phosphorus and Potassium levels are moderately low and pH is only is 5.6, moderately acid (Photograph 12).

8.3 FAIRWAY AREAS C AND D

Soils on this broad valley side and footslope range from Holidays Hill soils with impeded drainage on the upper slope, well drained Shirrell Heath soils on the middle slope and wet Formby soils on the lower slope adjacent to the stream (Photograph 13).

The wetter Formby soils on the footslope had acidic surface layers but pH values rose to 6.2 in waterlogged lower layers. The drier Shirrell Heath soils were very acidic in their upper layers (pH 4.5) but moderately acidic at depth (pH 5.5).

Topsoil samples C and D both had pH values of 5.1 and low or moderately low nutrient levels.

8.4 FAIRWAY AREAS E, F AND G

This is the long southern fairway to the south of Music Hill (Photograph 14). Upper slopes have Holidays Hill soils and middle slopes have Sollom soils. An area of valley bottom has very wet Formby soils.

Acidity and nutrient levels were almost identical in these three parts of the fairway and very similar to those in Compartment 15, the nearby acid grassland. Magnesium was moderately high, Phosphorus was low and Potassium was moderately low. pH values were low at 4.1, 4.3 and 4.5 for samples E, F and G respectively.

8.5 FAIRWAY AREAS H AND I

Most of this fairway is on Sollom soils, sandy podzols affected by groundwater. Nutrient and pH values were very similar to those in samples E, F and G described above.

8.6 FAIRWAY AREA J

This area is in the north of the site to the southwest of the golf club house car park. The soils here have impeded drainage and are developed in Drift over Marehill Clay but pH levels are very acidic (4.3) and Phosphorus values are extremely low (the lowest levels found during the survey). Potassium levels are moderately low.

9.0 HEATHLAND RESTORATION

Apart from providing the technical background to the site, the information previously given is intended to provide an indication of the extent to which Petersfield Heath could be restored to Heathland habitat resembling that thought to have occurred in the historic past.

Judging by the range of soils available and taking further clues from the existing vegetation, it would appear that the full range of common southern heathland types could have existed. Valley mire and wet heath could easily have occurred in the low areas with Fordham and Formby soils respectively. Holidays Hill soils are typical of many areas with humid heath communities, and Shirrell Heath soils occur under large areas of classic dry heath in the Western Weald.

For the most part, the fairways remain acidic and have the low levels of Potassium and Phosphorus associated with semi-natural heathland habitat. However some areas are better suited to different habitats.

9.1 LAND BEST SUITED TO DRY HEATHLAND

Dry Heathland communities naturally develop on Shirrell Heath soils and these are not widely represented on the fairways.

The most extensive area of these soils is on the valley side to the south of the stream and to the east and west of sample area 14b. This area may have local nutrient enrichment derived from gorse litter which is rich in nitrogen, but light topsoil stripping to about 5cm and removal of all scrub litter would make these soils ideal for establishing with Common Heather, *Calluna vulgaris*.

There is a further area of dry soils on higher land in the south of the site on the interfluve (Drawing 2).

Some areas of Holidays Hill soils have well drained upper layers and would probably provide a substrate for dry heathland communities.

9.2 LAND BEST SUITED TO HUMID HEATHLAND

The relatively extensive areas of Holidays Hill and Sollom soils have either impeded drainage or are affected by high groundwater and so would provide soils suited to humid heathland. The degree of wetness in these varies from place to place and so some areas would tend to encourage the development of drier heath swards and some areas may tend towards wetter communities.

Humid heathland communities could also develop along the drier fringes of Fordham soils to the south of the footpath that runs in front of the golf club house.

9.3 LAND BEST SUITED TO WET HEATHLAND AND VALLEY MIRE

Careful excavation of Formby soils in the low-way between the northern footpath and the stream would provide ideal conditions for wet heath and the initiation of valley mire communities. This area could easily be converted into a very interesting acidic wetland complex of open pools, mire and wet heath of considerable benefit to wildlife conservation and not currently represented on Petersfield Heath, although it can be assumed that they occurred at one time and probably in this same area and on the site of the present Heath Pond.

9.4 LAND BEST SUITED TO NEUTRAL MARSH AND POOR FEN

This is the land corridor along the valley bottom immediately adjoining the stream. Water in the stream is only slightly acidic at pH 6.3 and this probably reflects a mixing of neutral surface-water from Heath Pond with more acidic groundwater.

Altering the bank profile as Dr Francis Rose has suggested would allow water to saturate larger areas of soil and create ideal wetland conditions for a wide range of aquatic and marginal plants and for insects (such as dragonflies, stoneflies and mayflies) that require this sort of habitat. It would not be difficult to re-instate meanders and to create small pools alongside.

Such a wetland area would be less acidic than any ponds created to the north in the area of peaty soils but such habitat variety is common place in semi-natural heathland and an important part of semi-natural habitats diversity.

9.5 LAND POORLY SUITED TO HEATHLAND CREATION

Land with soils least suited to heathland creation include those with either a high pH value (greater than 6) or those with a high nutrient load especially of Phosphorus.

The highest pH values were found on the amenity grassland in the north of the site that currently supports rich acidic grassland communities. Should liming occur here to improve the sward, it should clearly be stopped.

The next highest pH value (5.6) was around fairway sample B but this is not excessive for heathland.

The highest Phosphorus levels occur in the old quarry where values of 59 mg/l are much higher than those needed for agricultural cropping and nearly 15 times as high as the lowest levels found on Petersfield Heath. How such high levels came to be here is a mystery, but it could be that the site has been fertilised or that Phosphorus rich silt was deposited here as part of the dredging operation.

The next lowest Phosphorus levels are on the northern amenity grassland and in the reseeded land in the vicinity of the old tennis courts suggesting past fertiliser application.

PHOTOGRAPHS

1. Heath Pond.

2. The Heath Pond Stream.

3. Wet Heathland on spring in Compartment 11 near golf club car park.

4. Surface pools on thin Terrace Deposits over Gault Clay.

5. Species rich Acid Grassland around and beyond play area.

6. Mown Heathland near Golf Club House.

7. Heathland in Compartment 9b.

8. Oak Woodland on seasonally waterlogged Hedge End soils.

9. Bracken on sandy soils over Upper Pulborough Sandrock.

10. Heathland and Barrow in Compartment 15.

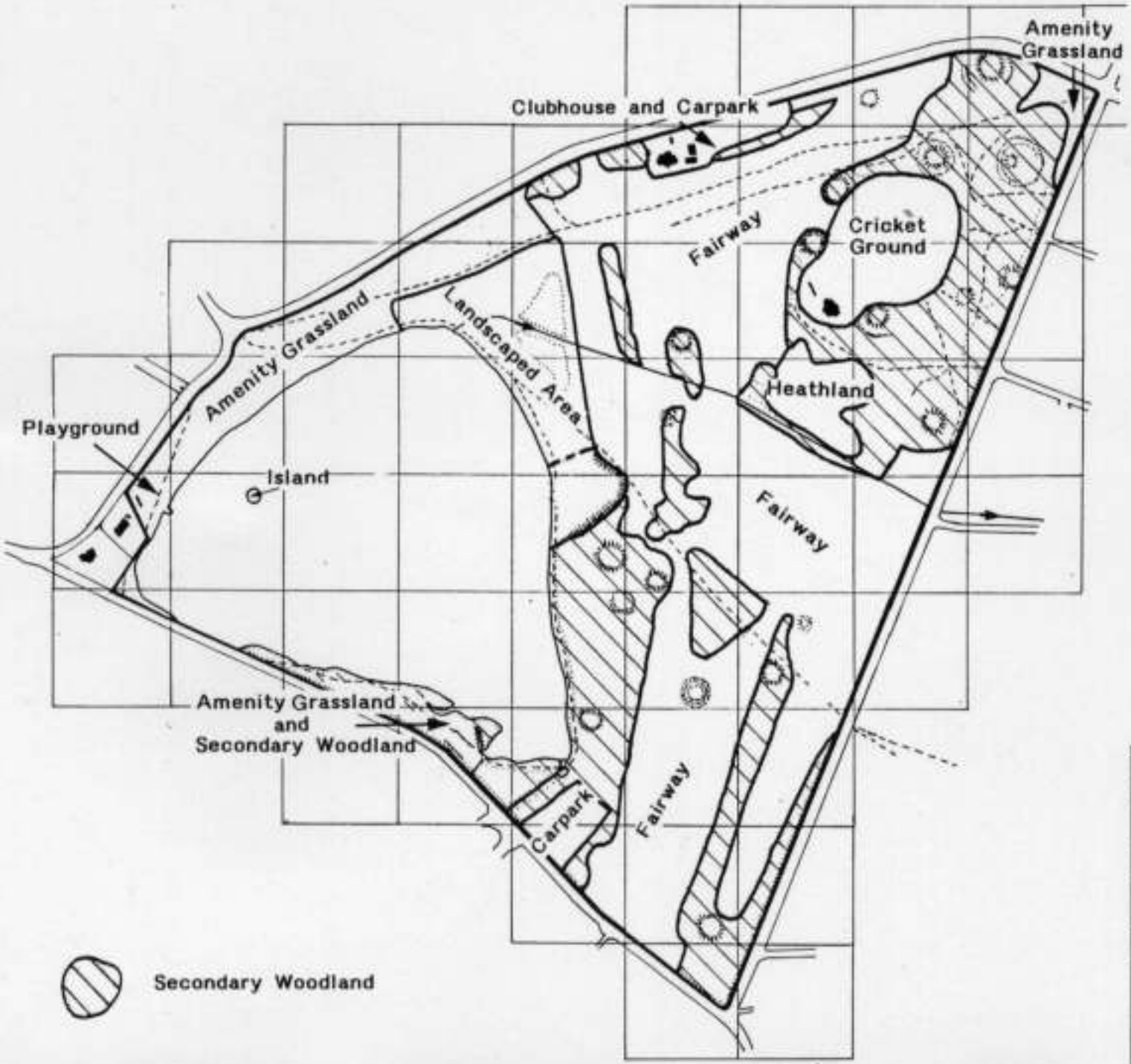
11. Fairways viewed north from Music Hill.

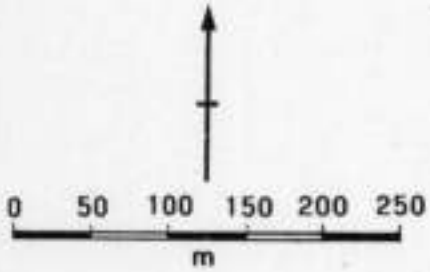
12. Recreation Petersfield Heath, golf and dog walking.

13. Seasonally waterlogged valley side and footslope soils from Music Hill.

14. Seasonally waterlogged soils in south of Petersfield Heath.

DRAWINGS





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CLIENT:	HAMPSHIRE COUNTY COUNCIL
DATE:	APRIL 1993
DRAWN: RA, IL	DRAWING N°: 1

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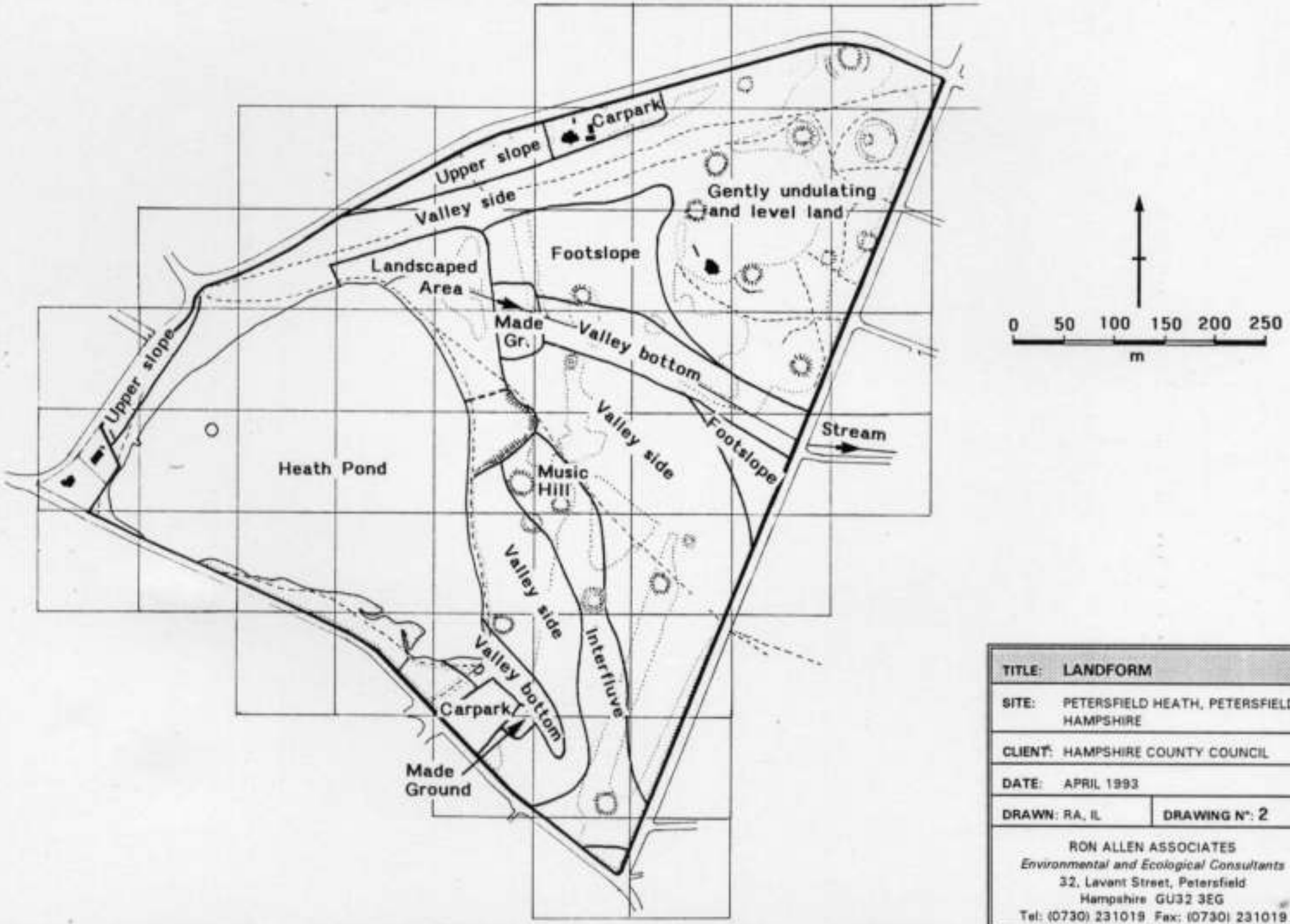

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CLIENT:	HAMPSHIRE COUNTY COUNCIL
DATE:	APRIL 1993
DRAWN: RA, IL	DRAWING N°: 2

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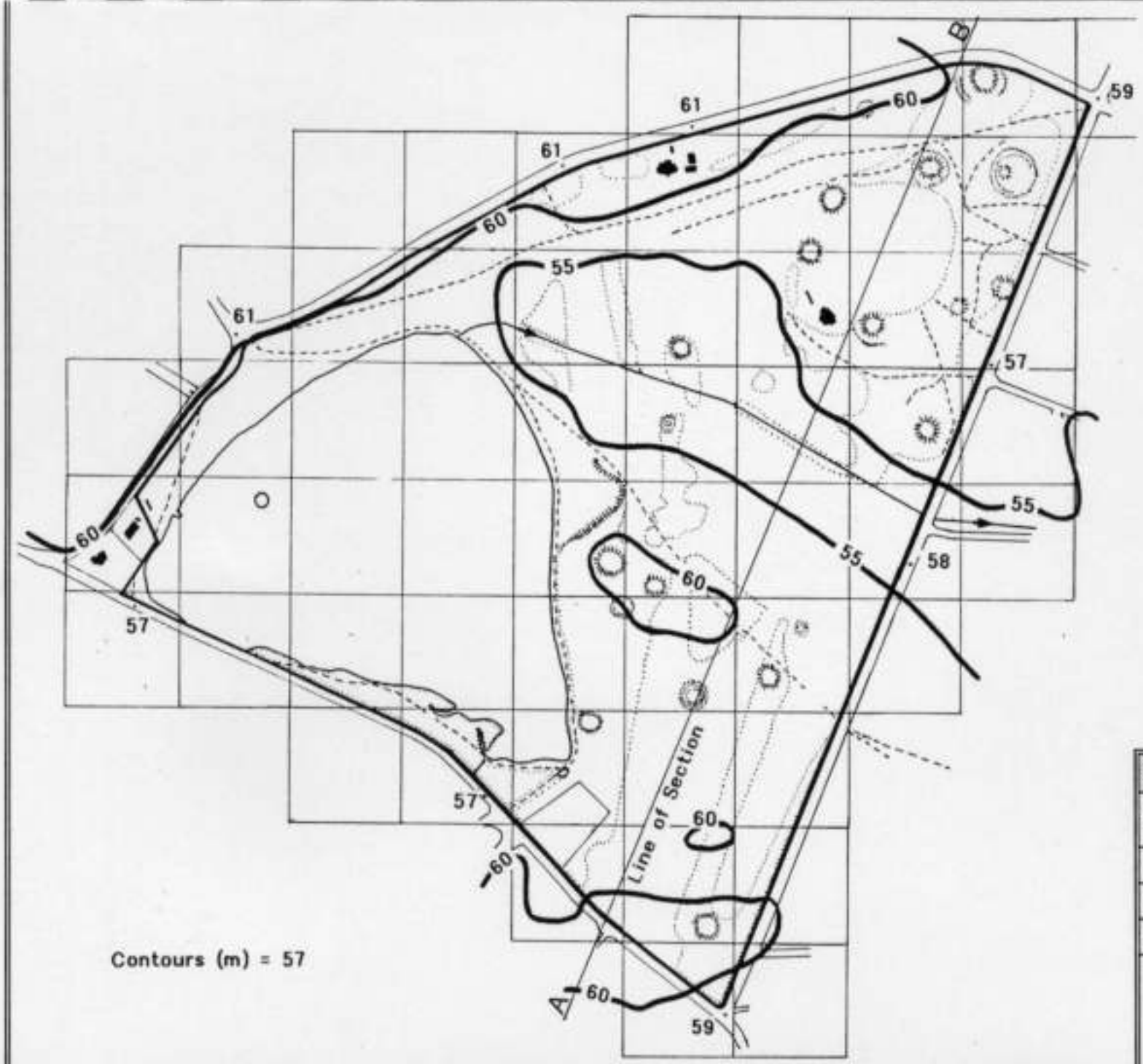

0 50 100 150 200 250
m

Contours (m) = 57

TITLE:	CONTOURS
SITE:	PETERSFIELD HEATH, PETERSFIELD, HAMPSHIRE
CLIENT:	HAMPSHIRE COUNTY COUNCIL
DATE:	APRIL 1993
DRAWN: RA, IL	DRAWING N°: 3

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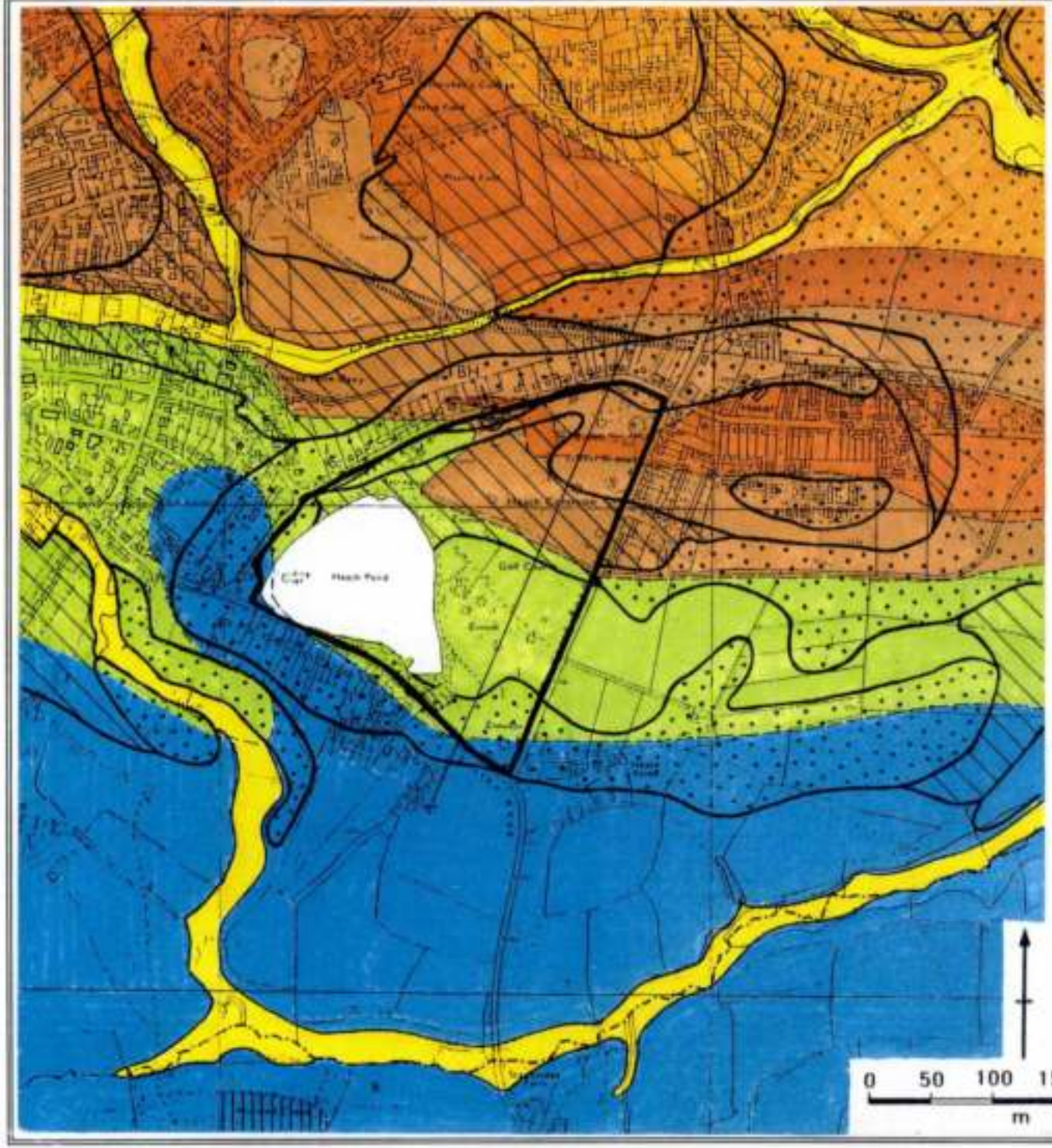

DEPOSIT OR FORMATION			LITHOLOGY
DRIFT	Alluvium		Clay, organic
Recent and Pleistocene	Head		Sand, loam & clay
	River Terrace Deposits		Flint gravel
SOLID	Gault		Clay
Gault and Lower Greensand (Cretaceous)	Folkestone Beds		Sandstone, weathering to sand at surface
	Sandgate Beds	Upper Marehill Clay	Clay, silty locally sandy, greenish
		Upper Pulborough Sandrock	Sandstone, fine grained
		Lower Marehill Clay	Clay, silty locally sandy, greenish
		Lower Pulborough Sandrock	Sandstone, friable, very fine grained
		Rogate Beds	Sand, poorly graded
	Hythe Beds *		Sand and sandstone

* Not exposed at Petersfield Heath but underlying site at depth

TITLE: GEOLOGICAL SETTING

SITE: PETERSFIELD HEATH, PETERSFIELD, HAMPSHIRE

CLIENT: HAMPSHIRE COUNTY COUNCIL

DATE: APRIL 1993

DRAWN: RA, IL **DRAWING N°:** 4

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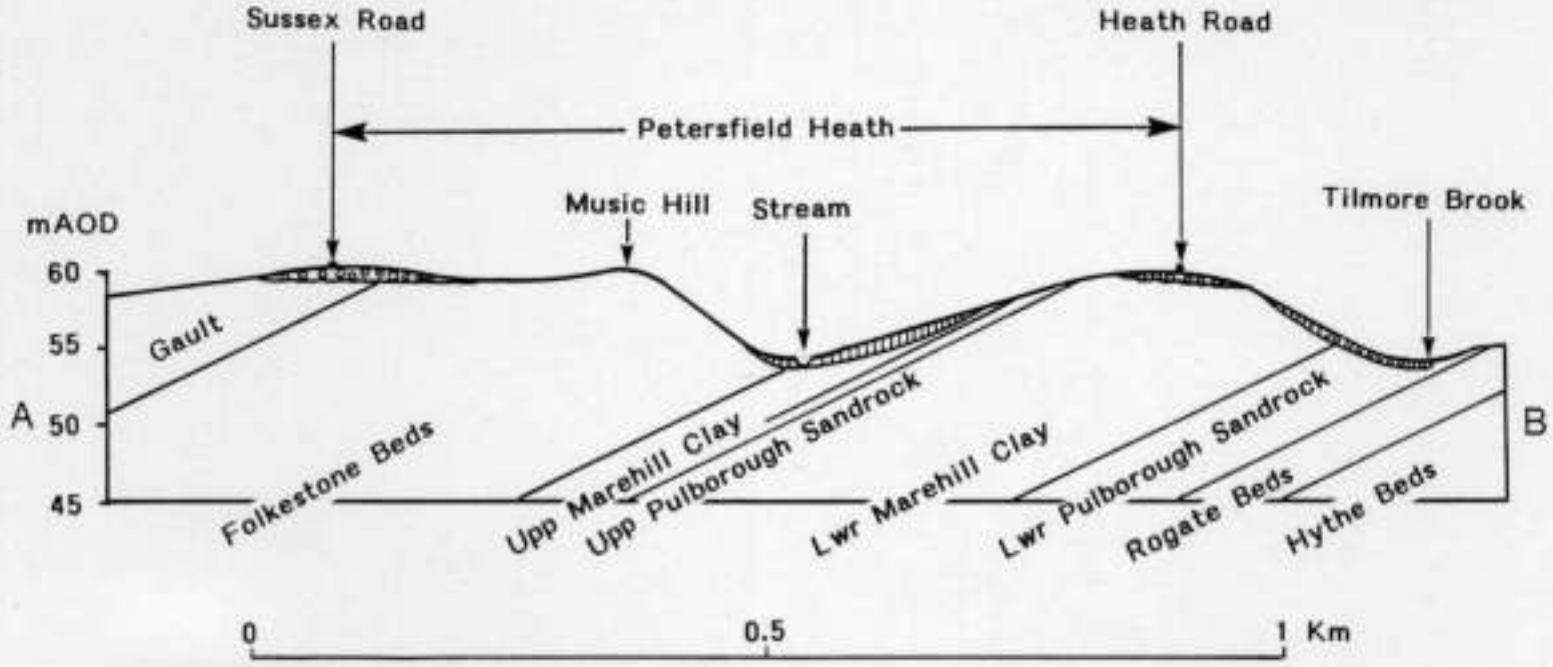

Vertical scale exaggerated

True dip c.3 degrees

Terrace Deposits

Head

Line of Section is indicated on Drawings 3 and 4

TITLE:	SCHEMATIC CROSS-SECTION
SITE:	PETERSFIELD HEATH, PETERSFIELD, HAMPSHIRE
CLIENT:	HAMPSHIRE COUNTY COUNCIL
DATE:	APRIL 1993
DRAWN: RA, IL	DRAWING N°: 5

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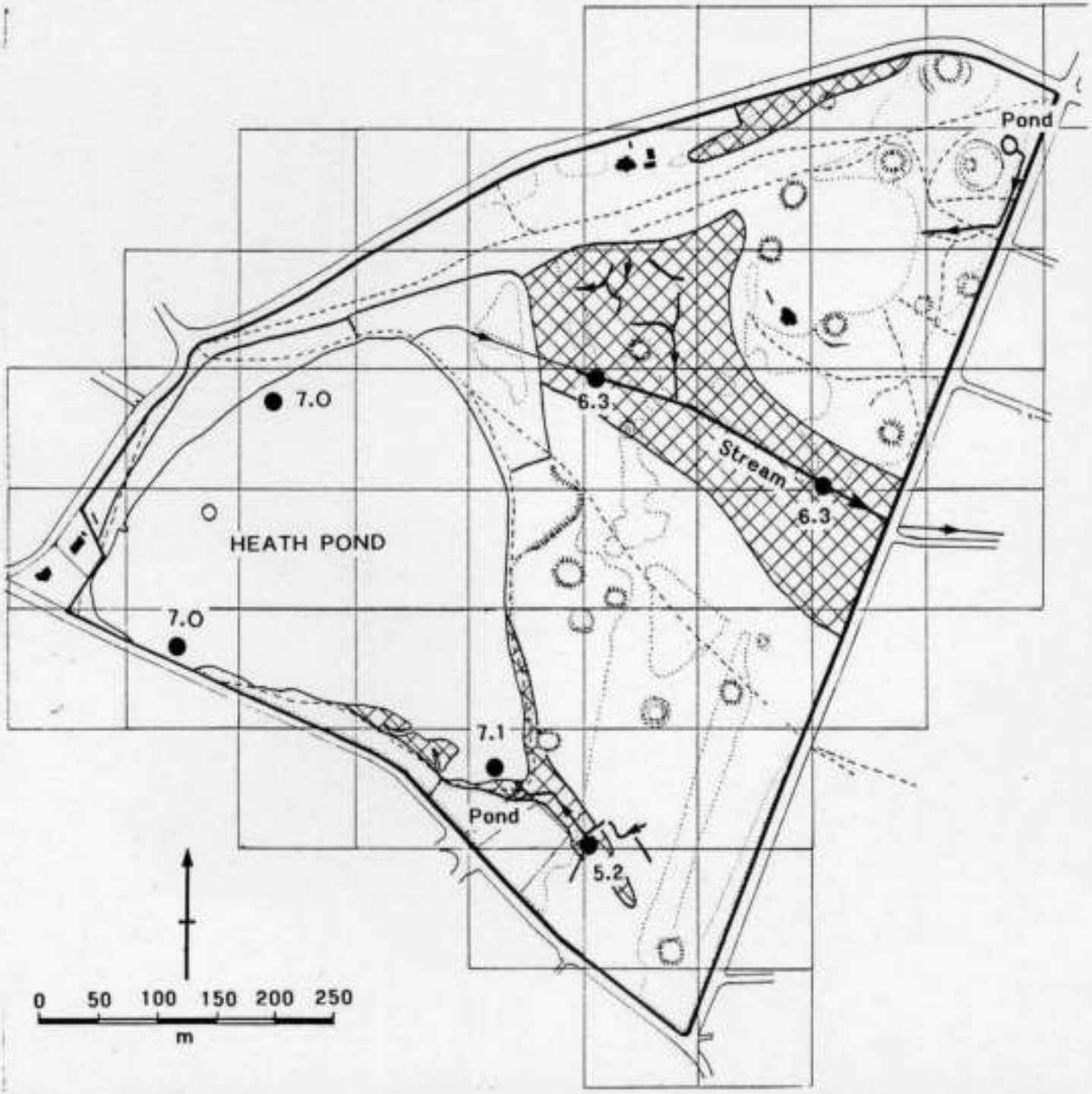

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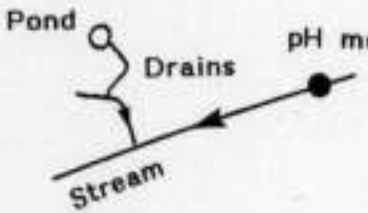

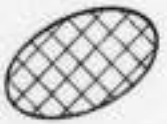

Area of high Ground-water

TITLE:	HYDROLOGY
SITE:	PETERSFIELD HEATH, PETERSFIELD, HAMPSHIRE
CLIENT:	HAMPSHIRE COUNTY COUNCIL
DATE:	APRIL 1993
DRAWN: RA, IL	DRAWING N°: 6

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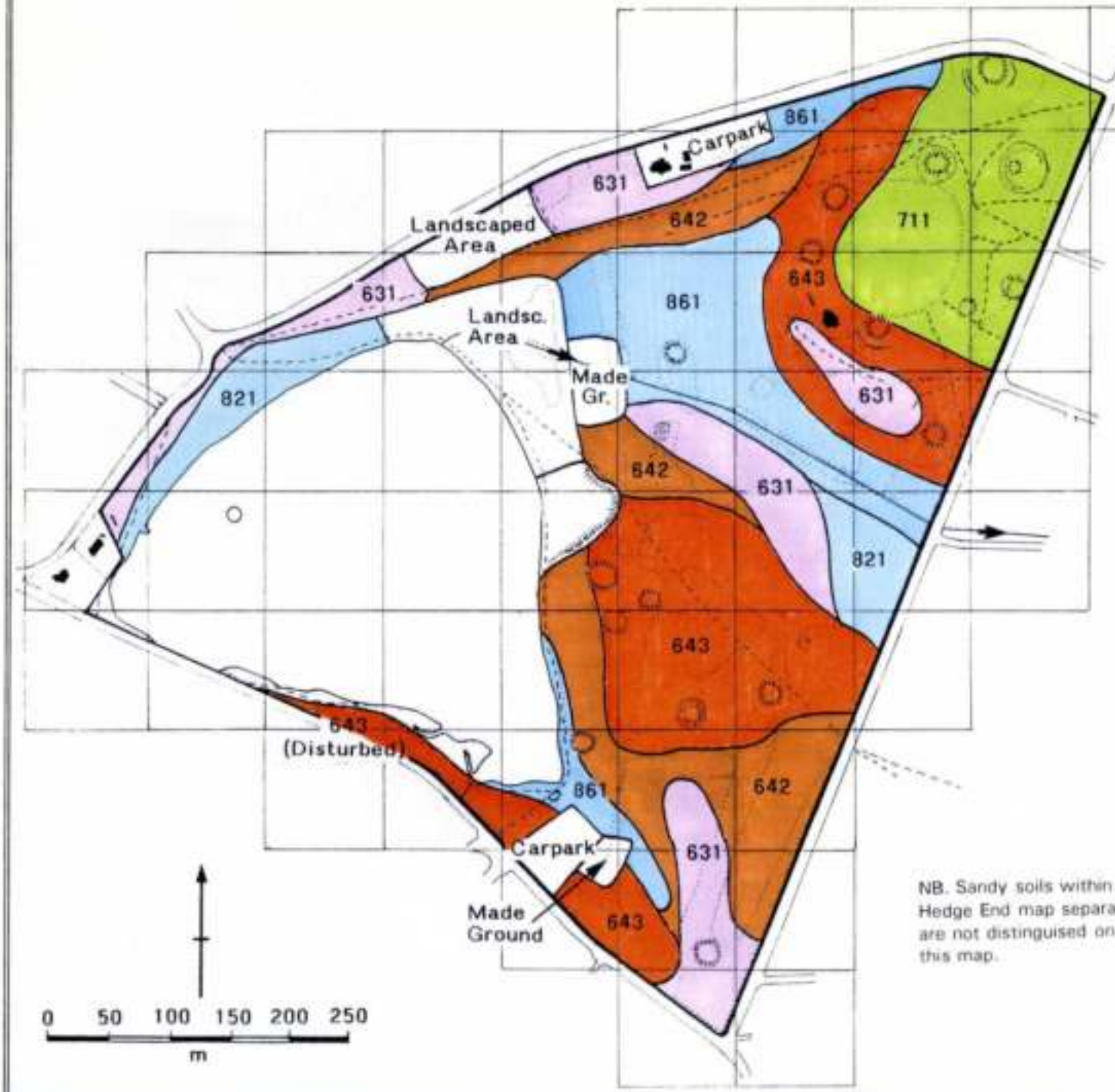

SYMBOL	SOIL TYPE	NAME (SOIL SERIES) AND CHARACTERISTICS
Made Ground		Hardcore and general waste - brick, glass, pottery etc, mostly wet low-ways with high groundwater.
631	Podzolic soils	SHIRREL HEATH Medium sands, well drained, droughty.
642		SOLLOM Medium sands, slight seasonal waterlogging affected by groundwater in subsoil.
643		HOLIDAYS HILL Medium sand over sandy clay passing to sand, moderate seasonal waterlogging with impeded drainage at depth.
711	Surface-water gley soils	HEDGE END Loamy over glauconitic clay, seasonally waterlogged with impeded drainage.
821	Ground-water gley soils	FORMBY Medium sands, seasonally waterlogged, affected by high groundwater.
861		FORDHAM Humose or peaty topsoils over sand, permanently waterlogged with high groundwater.

NB. Sandy soils within Hedge End map separate are not distinguised on this map.

TITLE: SOILS

SITE: PETERSFIELD HEATH, PETERSFIELD, HAMPSHIRE

CLIENT: HAMPSHIRE COUNTY COUNCIL

DATE: APRIL 1993

DRAWN: RA, IL **DRAWING N°:** 7

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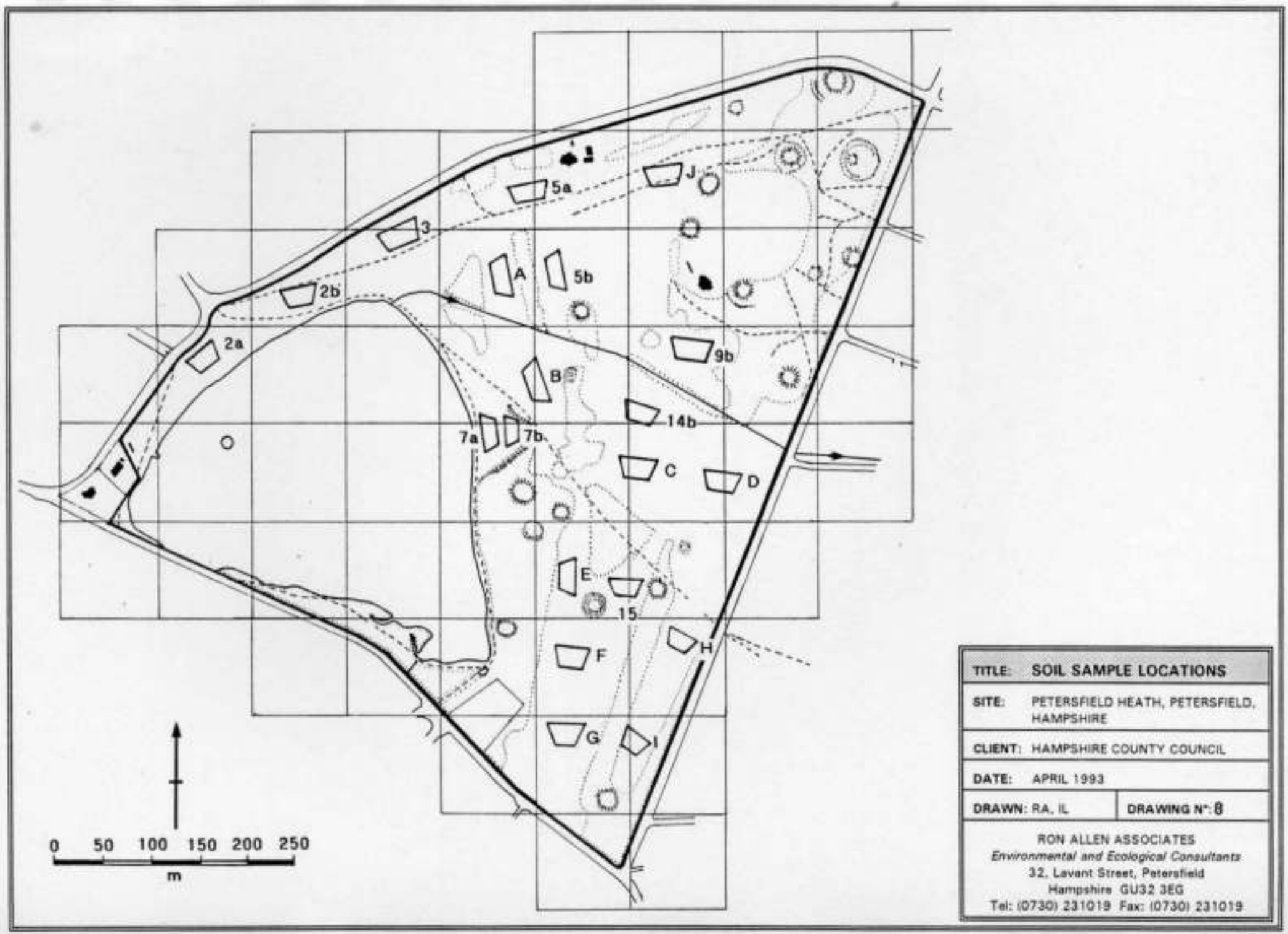

TITLE:	SOIL SAMPLE LOCATIONS
SITE:	PETERSFIELD HEATH, PETERSFIELD, HAMPSHIRE
CLIENT:	HAMPSHIRE COUNTY COUNCIL
DATE:	APRIL 1993
DRAWN: RA, IL	DRAWING N°: 8

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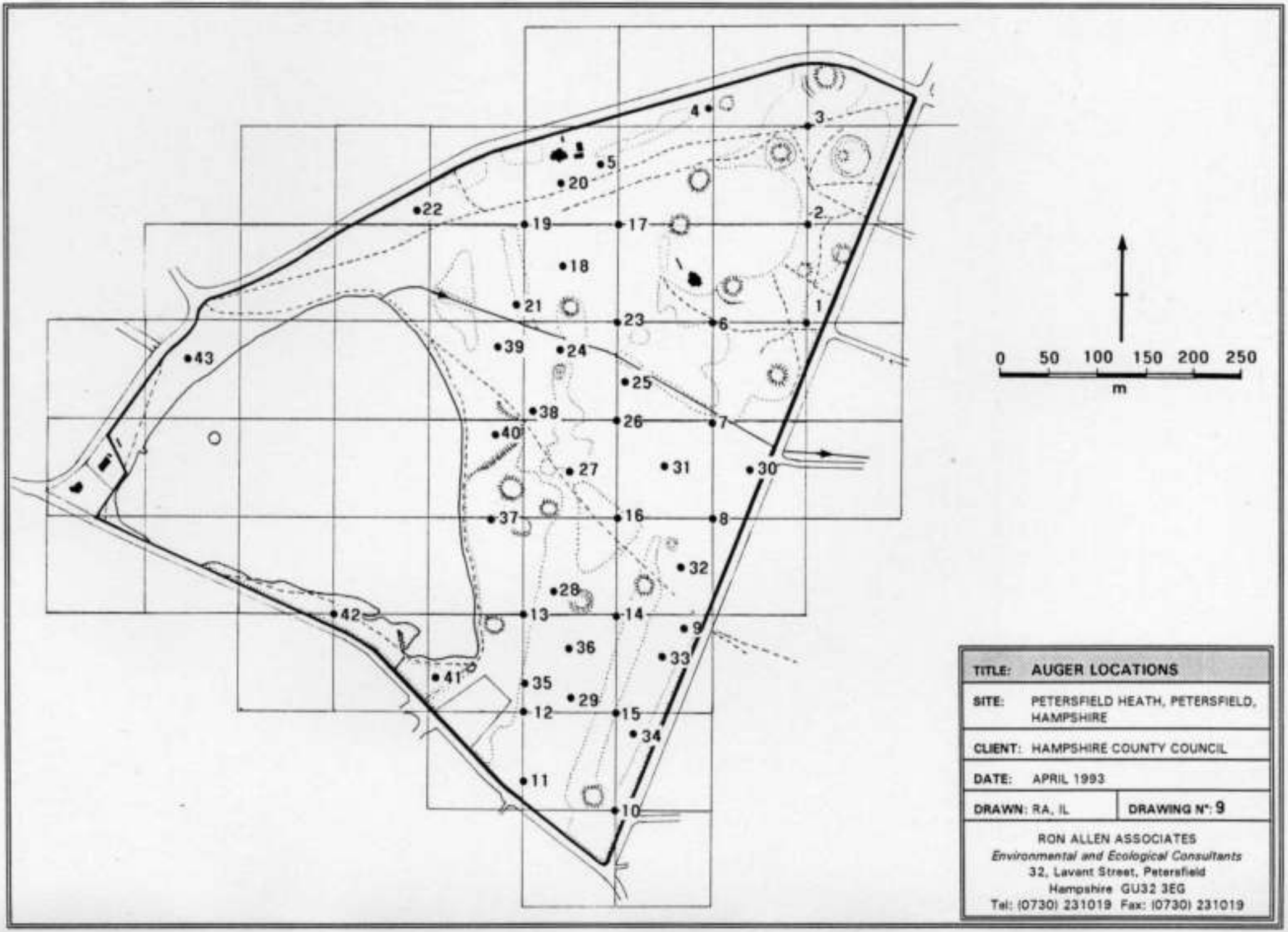

TITLE:	AUGER LOCATIONS
SITE:	PETERSFIELD HEATH, PETERSFIELD, HAMPSHIRE
CLIENT:	HAMPSHIRE COUNTY COUNCIL
DATE:	APRIL 1993
DRAWN: RA, IL	DRAWING N°: 9

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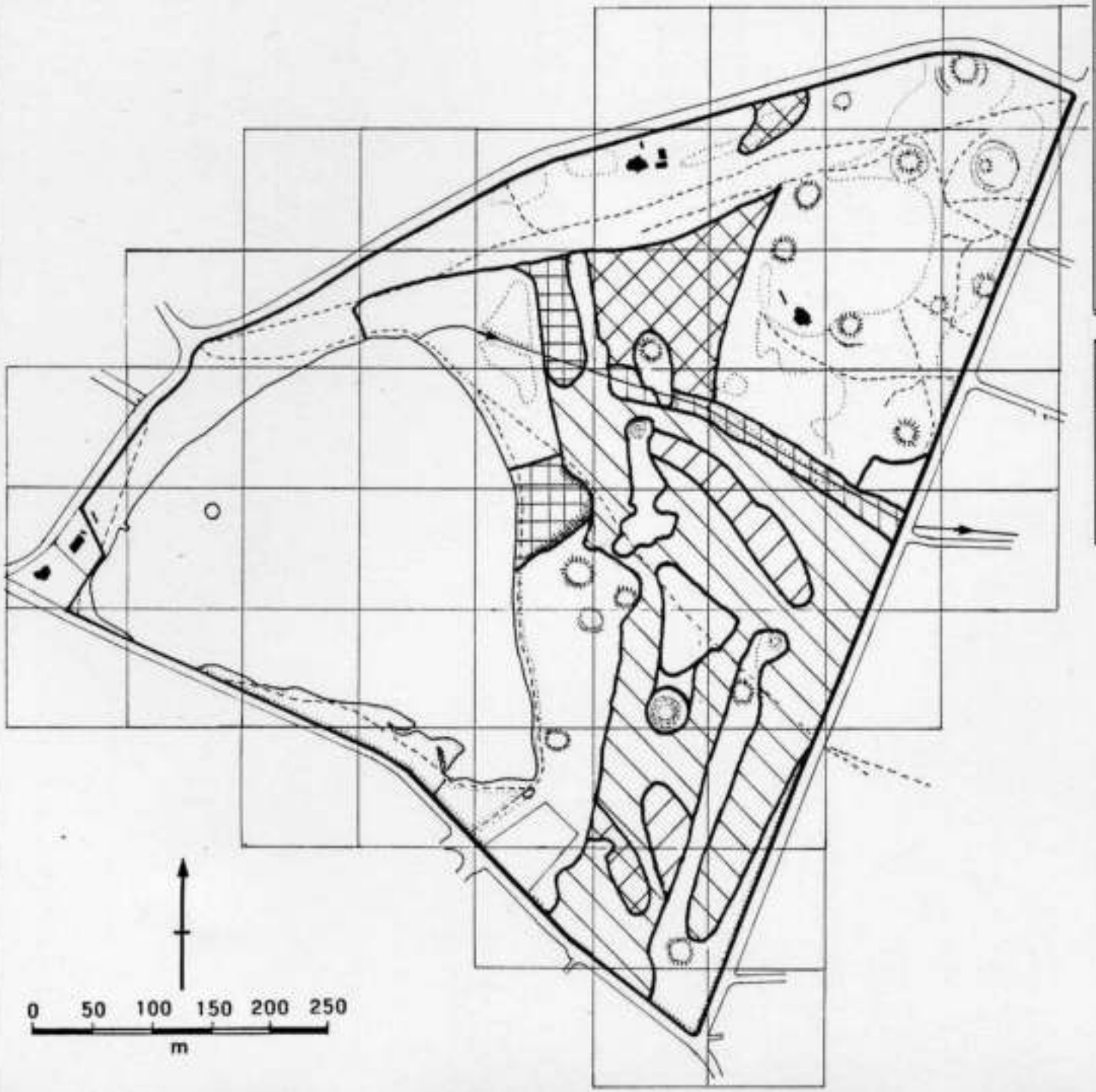

SYMBOL	LAND WITH SOILS SUITABLE FOR HEATHLAND CREATION:
	Dry Heathland
	Humid Heathland with some Dry Heathland
	Wet Heathland, Valley Mire and acidic pools
	Neutral Marsh (along Stream)

SYMBOL	LAND NOT SUITABLE FOR HEATHLAND CREATION:
	Land poorly suited to nutrient poor acidic habitat creation
	Woodland, Amenity Grassland, Lake and Disturbed / Landscaped Ground

TITLE: SOILS SUITED TO HEATHLAND CREATION

SITE: PETERSFIELD HEATH, PETERSFIELD, HAMPSHIRE

CLIENT: HAMPSHIRE COUNTY COUNCIL

DATE: APRIL 1993

DRAWN: RHA, IL **DRAWING N°:** 10

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APPENDIX 1

Archaeological Information

List copied from that supplied by Hampshire County Council
Drawing showing location of listed barrows adapted from that supplied by Hampshire County Council

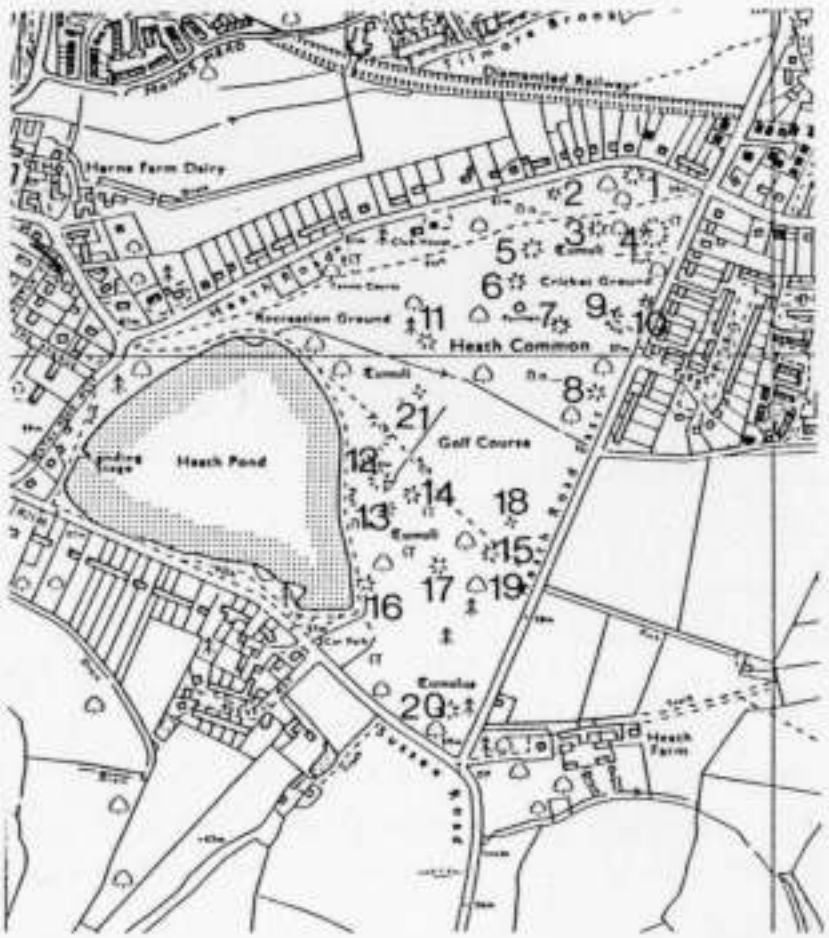
Additional material is from:

Grinsell, L V 1940 Hampshire Barrows
Proceedings Hampshire Field Club 14

GROUP OF ROUND BARROWS ON HEATH COMMON, PETERSFIELD

A group of 21 Bronze Age barrows located east of Heath Pond. The barrows are predominately of the bowl barrow type, although Bell, Disc and Saucer forms are also present. The barrows survive as earthworks, although some have been damaged. According to the Sites and Monuments Record, the barrows have never been excavated. Bronze Age flints have been recovered from 2 of the barrows. The barrows are all Scheduled Ancient Monuments, Hampshire County Number 84.

NO ON MAP	BARROW TYPE AND DESCRIPTION
1	Bell barrow; slightly damaged.
2	Bowl barrow.
3	Bowl barrow; slightly damaged.
4	Disc barrow; slightly damaged.
5	Bowl barrow.
6	Bowl barrow.
7	Bowl barrow. Bronze Age worked flint has been recovered from this barrow.
8	Bowl barrow.
9	Bowl barrow.
10	Bowl Barrow; slightly damaged.
11	Bowl barrow.
12	Bowl barrow.
13	Saucer barrow.
14	Bowl barrow.
15	Saucer barrow; slightly damaged.
16	Bowl barrow.
17	Bowl barrow; slightly damaged. Bronze Age flints have been recovered from this barrow.
18	Saucer barrow; severely damaged.
19	Bowl barrow.
20	Bowl barrow.
21	Saucer barrow; severely damaged.



GROUP OF ROUND BARROWS ON HEATH COMMON, PETERSFIELD

away, leaving a segment of a circle about 35 paces in diameter, which may have originally been a disc or saucer-barrow. First noted by Mr. Crawford.

51 S.W. Millbarrows (One of). Lat. 51° 0' 53".
Long. 1° 11' 3" W.

A most interesting site, immediately S. of the large barrow. The central mound, 42ft. in diameter and 2 ft. high, stands on a platform 73ft. in diameter, outside of which is a ditch 15ft. wide and 1ft. deep, with the earth thrown outwards to form a bank 15ft. wide and 1ft. high. But the remarkable thing about this barrow is that it is overlapped and bisected by a later entrenchment, as shown in the plan (Fig. 4E).

53 S.W. Petersfield Heath. Lat. 51° 0' 9".
Long. 0° 55' 8" W.

Situated in N.E. corner of the heath. It differs from the normal disc-barrow in that (1) the ditch, which is very vague, appears to be outside the bank; and (2) although there are two mounds in the central area, neither is in the centre; the latter is very unusual for an exactly circular disc-barrow, but it occurs in oval disc-barrows which were of course originally constructed for the reception of two mounds. The present example consists of a central area 70ft. in diameter bordered by a bank 25ft. wide and 2ft. high, outside of which is, on S.W., a very slight ditch 10ft. wide and only a few inches deep. The overall diameter, allowing for a ditch on one side only, is about 130ft. The western mound is 30ft. in diameter and 2ft. high, and the eastern is 25ft. in diameter and 1ft. high and is somewhat vague. Both mounds have dips in their centres. Mr. Stuart Piggott has kindly permitted me to publish his plans of the Petersfield Heath barrows (Figs. 6 and 7). See also Plate IX.

54 N.W. Rockbourne Down. Lat. 50° 59' 15".
Long. 1° 50' 54" W.

A most interesting barrow, the ditch and outer bank of which are broken by the presence of an oval mound on W., as shown in the plan (Fig. 4C). The disc-barrow consists of a mound 44ft. in diameter and 1ft. high placed on a platform 79ft. in diameter, which is surrounded by a ditch having an average width of 16ft. and depth of 6in., the material from which was thrown outwards to form an outer bank 21ft. wide and 1ft. high.

80 N.W. Setley Plain (Single). Lat. 50° 47' 47".
Long. 1° 34' 37" W.

Situated S.E. of the twin barrow described below. The mound, 30ft. in diameter and 3ft. high, is placed on a platform 46ft. in diameter, enclosed in a ditch 10ft. wide and 1ft. deep, outside of

6" O.S. Map	Lat. N.	Long. W.	Parish	Diam. (paces)	Height (feet)	Other Details
52 S.W.	1' 2"	1° 0' 40"	Langrish*			O.G.S.C. (L.V.G.).
52 S.W.	1' 2"	1° 0' 39"	"	26	8	
52 S.W.	0' 58"	1° 0' 37"	" *	Large		O.G.S.C. (L.V.G.).
52 S.W.	0' 55"	1° 0' 13"	" *			Probable (O.G.S.C.—L.V.G.)
52 S.W.	1' 22"	0° 59' 31"	Froxfield*			(?) Barrow or lynchet-corner (O.G.S.C.—L.V.G.).
52 S.W.	0' 36"	1° 1' 24"	East Meon*			Spread (O.G.S.C.).
52 S.W.	0' 48" (approx.)	1° 1' 15"	" " *			Barrows? Air-photo 96:17.

PETERSFIELD HEATH GROUP (6" O.S. 52 SE/53 SW).

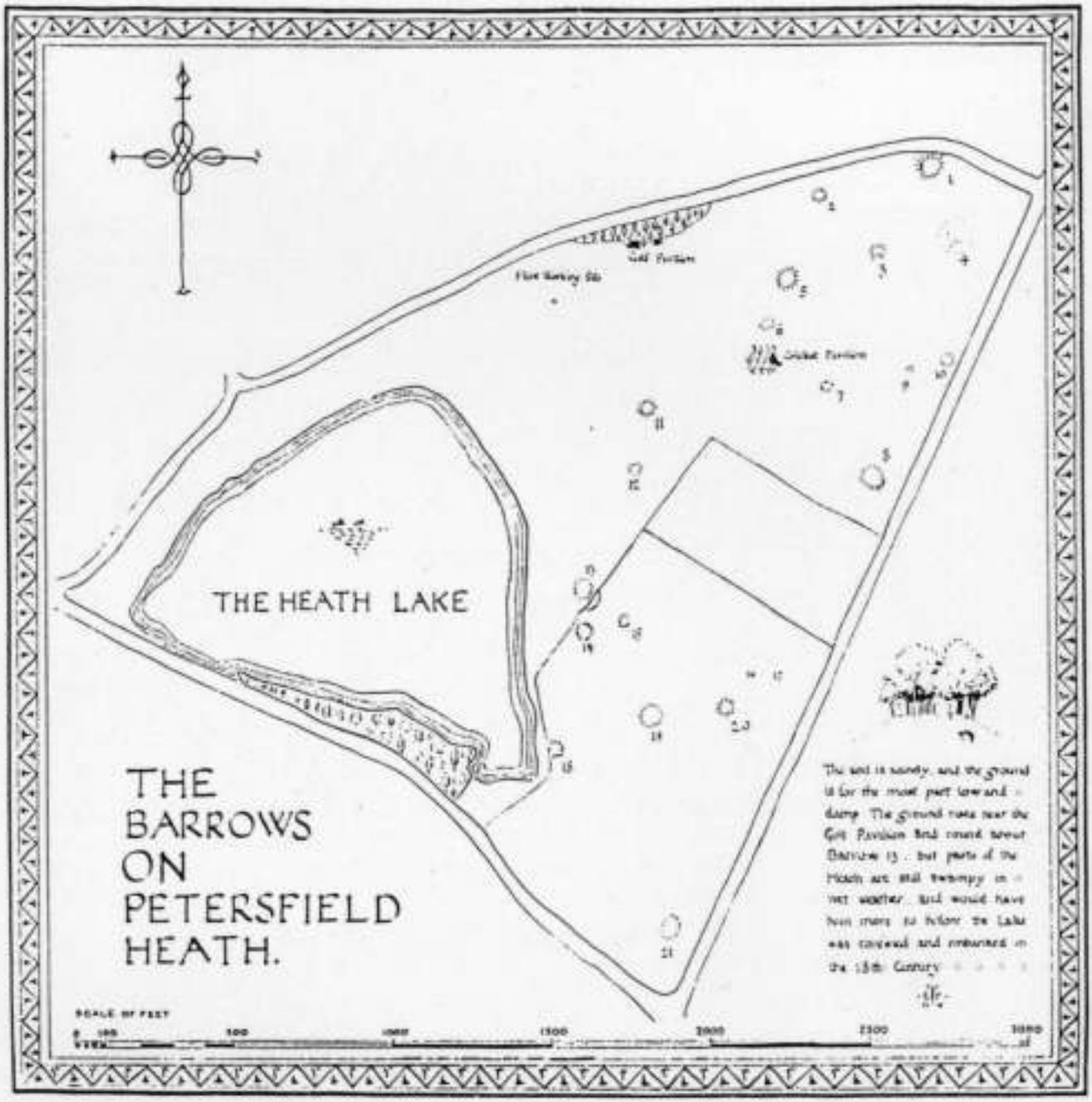
(Numbered as on plan, Fig. 7).

No.	Diam. (paces)	Height (feet)	Details
1.	(Bell; Part II, p. 210.)		
2.	23	4½	Trees.
3.	33	8	D. H/C.
4.	(Disc; Pt. II, p. 231.)		
5.	35	10	Trees. D.
6.	32	6	Trees.
7.	35	7½	Trees.
8.	48 by 30	7	Oval.
9.	30	6	
10.	32	6	
11.	33	6½	Trees.
12.	(Saucer; Pt. II, p. 228.)		
13.	36	8	
14.	(Saucer; Pt. II, p. 228.)		
15.	25	4	Trees.
16.	(Saucer; Pt. II, p. 228.)		
17.	(Saucer; Pt. II, p. 228.)		
18.	25	2½	Trees.
†19.	26	1½	D.
20.	30	4½	Trees.
21.	44 by 25.2		Oval.

NOTES.—7. Worked flints therefrom in Piggott collection. 8. Perhaps a bell: berm on S.E. 13. Known as Music Hill, from bandstand formerly thereon. 19. Worked flints in Piggott collection; mound truncated.

Several more barrows appear on O.S. 1" map, 1st Edn., 1873; also on Ms. 2" map. See *Arch. Journal*, XIII, p. 412; Evans, *Stone Imp.*, 2nd Edn., p. 468; *Hants F.C.*, IX, p. 411.

6" O.S. Map	Lat. N.	Long. W.	Parish	Diam. (paces)	Height (feet)	Other Details
54a N.W.	59' 21"	1° 57' 20"	Martin*			Not visible. Pt. I, p. 34.
54a N.E.	58' 48"	1° 56' 40"	" *	16	3	L.V.G.
54a N.E.	58' 41"	1° 56' 48"	" *	11	1½	"
54a N.E.	58' 32"	1° 56' 18"	" *	16	1	" Doubtful.
54a N.E.	58' 11"	1° 55' 46"	"			† Air-photos NAUA 280. Search-ed for in vain by L.V.G., 1938.
54a N.E.	58' 11"	1° 55' 45"	"			
54a N.E.	58' 10"	1° 55' 31"	"	9	2	H/C., exposing flints.
54a N.E.	58' 9"	1° 55' 21"	"	20	4	Ditch on S. H/C.
54a N.E.	58' 8"	1° 55' 21"	"	20	3	
54a S.E.	57' 43"	1° 55' 16"	"	20	4	D. H/C.
54a S.E.	57' 42"	1° 55' 15"	"	20	6	
54a S.E.	57' 42"	1° 55' 8"	"	14	3½	D. and outer bank. H/C.
54a S.E.	57' 42"	1° 55' 3"	"	13	3	D. H/C.
54a S.E.	57' 33"	1° 54' 51"	"	15	3½	Slight ditch.
54a S.E.	57' 31"	1° 54' 37"	"	14	3	D.
54a S.E.	57' 31"	1° 54' 36"	"	10	2	H/C.
54a S.E.	57' 33"	1° 54' 27"	"	30	10	H/C. A fine example.
54 N.W.	58' 45"	1° 52' 40"	Toyd Farm	Large		Fine.
54 N.W.	58' 47"	1° 52' 25"	" " *	Small		L.V.G. Hoare, *Anc. Wilts*, Sen. VII.
54 N.W.	58' 48"	1° 52' 25"	" "	Large		
54 N.W.	58' 18"	1° 52' 26"	Damerham*	Large		L.V.G. Hoare, *Anc. Wilts*, Sen. VII.
54 N.W.	58' 20"	1° 52' 25"	"	Large		
54 N.W.	58' 19"	1° 52' 23"	" *	Small		L.V.G. Hoare, *Anc. Wilts*, Sen. VII.
54 N.W.	58' 18"	1° 52' 24"	" *	Small		L.V.G. Hoare, *Anc. Wilts*, Sen. VII.
54 N.W.	58' 17"	1° 52' 21"	"	Large		
54 N.W.	58' 3"	1° 52' 15"	"	15	3	H/C.
54 N.W.	50' 34"	1° 51' 30"	Rockbourne*	12	2	L.V.G.
54 N.W.	50' 43"	1° 50' 46"	"	(Site only)		
54 N.W.	50' 43"	1° 50' 45"	"	" "		B.A. urn (part of) and barbed and tanged arrow-head from ditch: Sumner, *Excav. on Rockbourne Down*, pp. 15-16.


THE HEATH LAKE
THE BARROWS ON PETERSFIELD HEATH.
SCALE OF FEET
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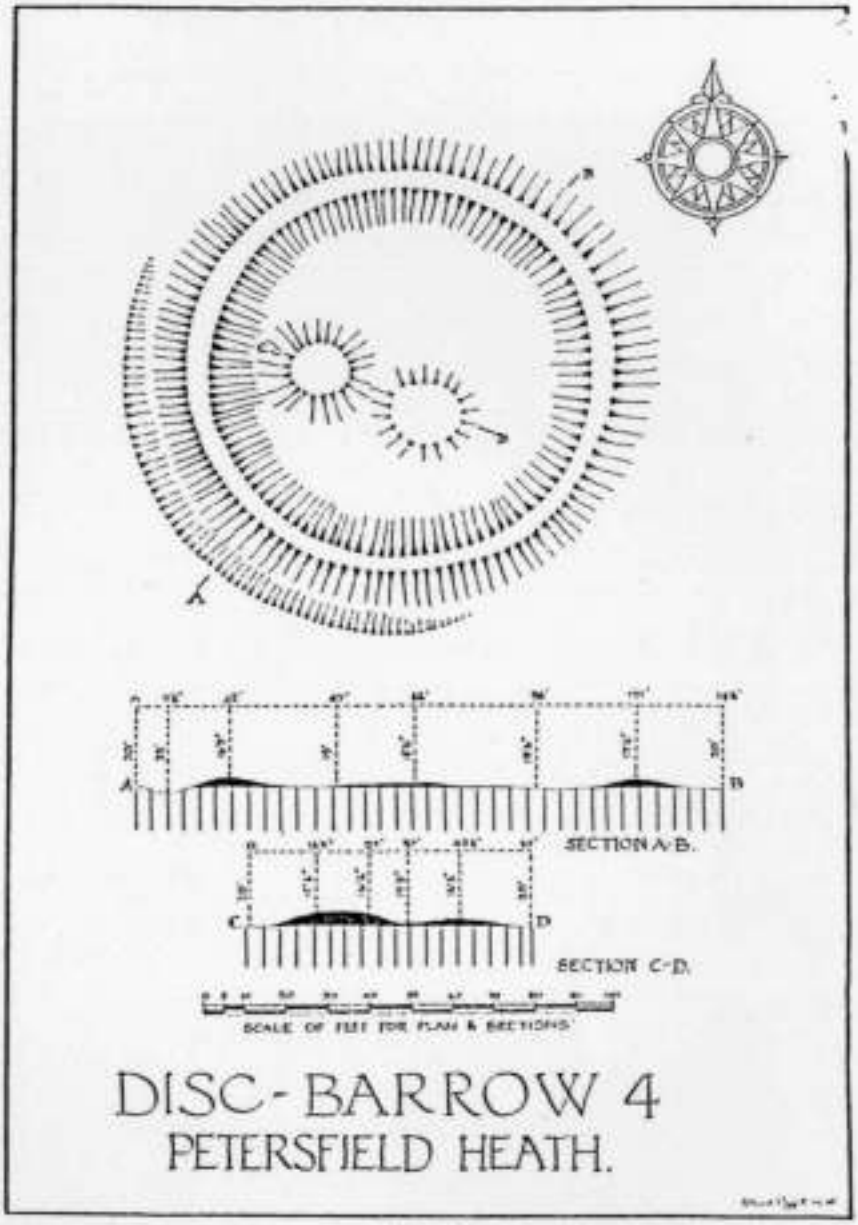
SECTION A-B.
SECTION C-D.
SCALE OF FEET FOR PLAN & SECTIONS
DISC-BARROW 4
PETERSFIELD HEATH.

FIG. 6.

APPENDIX 2

Borehole Data

04 7555 2319

CLIFTON, BRISTOL 8.

JOB No. ...

SW 72 SE/15

BOREHOLE RECORD

JOB ... DATE STARTED 5/2 ... FINISHED ...
BOREHOLE No 6 ... OPERATOR DELLA ...
ORDNANCE DATUM LEVEL ... TYPE OF PENETRATION TEST SPT ...
TYPE OF BORING S/A ... WEIGHT 140 lbs ... DROP 30" ...
DIAMETER OF BORING 6" ... STANDING WATER LEVEL Nil ...
REMARKS: Adjacent Golf Club House

DEPTH FEET	O.D. LEVEL	TYPE & No OF SAMPLE	BORING DETAILS: PENETRATION	BORING DETAILS: LINING	BORING DETAILS: WATER	LEGEND	DESCRIPTION OF MATERIAL AND OBSERVATIONS
		D - G.L.					TOP SOIL, TREE ROOTS ETC.
		D - 1'-3"					RIVER TERRACE GRAVELS (AT TOP) BROWN MEDIUM SAND CHANGING TO YELLOW
		D - 3'-0"					BROWN SLIGHTLY CLAYEY FINE SAND.
5'							
		D - 6'-0"					PULBOROUGH SANDS (AT BOTTOM)
		D - 9'-0"					
10'							
		D - 14'-0"					DENSE YELLOW BROWN MOTTLED CLAYEY SAND
15'		D - 15'-0"					
		D - 17'-0"					DENSE BROWN MOTTLED CLAYEY SAND
20'							
25'							
							BOREHOLE COMPLETE
30'							

SU 7686 2289

SU 72 SE/13

EUROPA HOUSE, QUEEN'S ROAD,
CLIFTON, BRISTOL 8.

JOB No. 5450.

BOREHOLE RECORD

JOB PETERSFIELD U.D.C. DATE STARTED 3/2 FINISHED 3/2/65
BOREHOLE No 2 OPERATOR DELLA
ORDNANCE DATUM LEVEL — S.Stn. TYPE OF PENETRATION TEST SPT
TYPE OF BORING S/A WEIGHT 140 lbs. DROP 30 in.
DIAMETER OF BORING 6" STANDING WATER LEVEL 3'-0"
REMARKS: Adjacent site bridge Treatment Works

DEPTH FEET	O.D. LEVEL	TYPE & No OF SAMPLE	BORING DETAILS: PENETRATION	BORING DETAILS: LINING	BORING DETAILS: WATER	LEGEND	DESCRIPTION OF MATERIAL AND OBSERVATIONS
		D – G.L.					YELLOW-BROWN TOPSOIL
		D – 1'6"					RIVER TERRACE DEPOSITS
			U4				YELLOW-BROWN MOTTLED SANDY SILTY CLAY
		U4 – 3'-0"	18" – 16 U4				SOFT TO FIRM YELLOW-BROWN-GREY SANDY SILTY CLAY WITH SOME FLINT GRAVEL
5'		U4 4'-6"	18" – 40 SPT				
		D – 6'-0"	12" – 20				
		D – 9'-0"	U4				
10'		U4 – 10'-0"	18" – 30 U4				MARCHILL CLAY.
		U4 – 11'-6"	18" – 120				VERY STIFF BLACK-GREY SLIGHTLY SANDY SILTY CLAY
		D – 13'-0"	SPT				
		D – 13'-3"	12" – 57				
15'							BORE-OLE COMPLETE
20'							
25'							
30'							

APPENDIX 3

Summary Data from Soil Auger Borings

SUMMARY OF SOIL PROFILE OBSERVATIONS FROM AUGER BORINGS

Site No	Classification (Avery 1980)	Lithology	Soil Series	pH		Vegetation	Notes
				Top soil	Sub soil		
1	642 Humo-ferric gley-podzol	Thin organic humose layer over medium sand	SOLLOM	7.0	4.5	Sec. Birch-Oak woodland with Rowan and occ. Gorse over Bramble and Bracken	Mottled at 60cm
2	711 Typical stagnogley soil	Fine loamy and clayey over fine sand	HEDGE END	4.5	4.7	Sec. Oak woodland with Birch and occ. Yew and Rowan over Bramble and Bracken	Mottled at 25cm
3	711 Typical stagnogley soil	Sandy over fine loamy and clayey over olive sand	HEDGE END	4.5	4.5/5.0	Sec. Birch-Oak woodland with Rowan and Holly, occ. Gorse over Honeysuckle, Bramble and Bracken	Mottled at 35cm
4	643 Stagnogley podzol	Fine sandy over clay loam, sandy clay and sandy clay loam	HOLIDAYS HILL	4.5	5.0	Mown Molinia/Festuca grassland with Agrostis	Mottled at 55cm
5	642 Humo-ferric gley-podzol	Medium sandy	SOLLOM	4.7	4.7/5.0	Agrostis/Rye-grass at edge of Gorse clump	Very moist at 35cm wet at 70cm mottled at 70cm
6	631 Humo-ferric podzol	Medium sandy over mottled sandy clay loam at 105cm	SHIRRELL HEATH	4.5	4.5	Sec. Birch-Oak woodland over Holly and Bramble	Loose unmottled sand
7	861 Typical Humic-sandy gley soil	Medium sand	FORDHAM	4.7	5.0/6.0	Coarse tussocky grassland with Bracken, Yarrow and Ribwort Plantain	Wet at 45cm
8	821 Typical sandy gley soil	Medium sandy over sticky strong brown sand below 113cm	FORMBY	4.7	5.0/6.2	Coarse grassland with Molinia/Agrostis coarse grassland with Dandelion, Ribwort Plantain and Yarrow	Wet at 65cm
9	642 Humo-ferric gley podzol	Medium sandy	SOLLOM	4.5	4.5	Mown fairway near woodland edge	Wet at 38cm

Site No	Classification (Avery 1980)	Lithology	Soil Series	pH		Vegetation	Notes
				Top soil	Sub soil		
10	631 Humo-ferric podzol	Medium sandy	SHIRRELL HEATH	4.5	4.5/5.3	Sec. Oak woodland with Birch over Holly Rowan Bramble and Bracken	Loose unmottled sand
11	643 Stagnogley-podzol	Sandy to 92cm over sandy clay loam and sandy clay	HOLIDAYS HILL	5.2	5.2/6.6	Mown fairway, slight low way	Very moist at 37cm becoming wet at 54cm
12	Made ground	Humose sand to 60cm over mixed sand, slate, flint and charcoal	MADE GROUND	4.5	4.7/6.0	Mown semi rough grassland	Wet below 60cm
13	643 Stagnogley-podzol	Humose sand to 50cm over sand to 70cm over clay loam and silty clay with silty partings	HOLIDAYS HILL	4.5	4.6/5.0	Sec. Oak woodland over Rowan, Holly, Birch over Bramble and Soft Rush	Mottled below 70cm
14	643 Stagnogley-podzol	Humose sand to 18cm over sand to 60cm over clay to 84cm over medium sand	HOLIDAYS HILL	7.0	6.6/4.5	Sec. Pine woodland over Oak with Birch, Rowan, Holly and Gorse	Calcareous clay loam disturbed layer to 5cm
15	642 Humo-ferric gley podzol	Humose sand over medium sand	SOLLOM	4.5	4.5	Mown semi rough	Mottled at 52cm wet below 100cm
16	643 Stagnogley-podzol	Medium sand to 92cm over sandy clay and sandy clay loam	HOLIDAYS HILL	4.7	5.2/6.0	Mown grassland	Mottled and very moist below 6.5cm occ. small flints to 20cm
17	861 Typical humic-sandy gley soil	Coarse sandy	FORDHAM	4.5	4.5	Mown fairway	Strong prismatic structure to 20cm with organic head coatings, very moist and bleached below 26cm wet below 80cm
18	861 Typical humic-sandy gley soil	Coarse sandy	FORDHAM	4.5	4.5	Mown fairway with irregular surface drains	Strong prismatic structure to 18cm mottled and very moist at 24cm wet below 60cm
19	861 Typical humic-sandy gley soil	Humose loamy sand over coarse sandy	FORDHAM	4.5	4.5	Mown fairway	Weak prismatic structure very moist at 20cm mottled at 40cm wet below 60cm
20	631 humo-ferric podzol	Loamy sand to 22cm over medium sand	SHIRRELL HEATH	4.5	4.5	Mown fairway	Unmottled

Site No	Classification (Avery 1980)	Lithology	Soil Series	pH		Vegetation	Notes
				Top soil	Sub soil		
21	Disturbed 821 Typical sandy gley soil	Sandy loam with flint, charcoal and glass fragments to 38cm over medium sand	MADE GROUND	4.5	5.5/5.0	Sec. Oak and Birch woodland with Gorse, Bramble and Molinia Tussocks	Made ground wet below 65cm
22	Disturbed 631 humo-ferric podzol	Medium sand	SHIRRELL HEATH	7.0	4.5/6.2	Reseeded grassland	Limed, site of tennis courts
23	861 Typical humic-sandy gley soil	Humose sand over medium sand	FORDHAM	4.5	4.5/5.0	Mown fairway	Prismatic structure to 18cm wet at 45cm
24	631 humo-ferric podzol	Medium sand	SHIRRELL HEATH	4.5	4.5	Festuca with Calluna heathland	Unmottled
25	631 humo-ferric podzol	Medium sand	SHIRRELL HEATH	4.5	4.5/5.0	Rough grass with Yarrow	Unmottled
26	551 Typical brown sand	Medium sand	FRILFORD	4.5	5.0/6.5	Mown grassland with Agrostis, Luzula and Moss	Occ. pebbles to 26cm
27	643 Stagnogley-podzol	Medium sand to 40cm over sandy clay loam over sand with clay inclusions	HOLIDAYS HILL	4.5	5.0/6.2 /5.0	Mown grassland	Mottled below 40cm iron rich below 75cm
28	643 Stagnogley-podzol	Loamy sand to 32cm over sandy clay loam and clay with sand to 60cm over sand with sandy clay loam and clay inclusions	HOLIDAYS HILL	4.5	5.0	Mown fairway	Mottled at 32cm, surface algal layer
29	631 Humo-ferric podzol	Medium sand	SHIRRELL HEATH	4.5	4.5	Mown fairway	Occ. flints to 20cm
30	821 Typical sandy gley soil	Medium sand	FORMBY	5.0	4.6/6.2	Mown fairway	Occ. flints to 42cm
31	631 Humo-ferric podzol	Medium sand (sandy clay loam inclusions 55-78cm)	SHIRRELL HEATH	4.5	5.0/5.5	Mown fairway	Occ. flints to 35cm
32	643 Stagnogley-podzol	Humose sand to 10cm over medium sand to 45cm over sandy clay loam and sticky sandy loam	HOLIDAYS HILL	4.5	4.5	Mown fairway	Surface algal layers mottled below 10cm

Site No	Classification (Avery 1980)	Lithology	Soil Series	pH		Vegetation	Notes
				Top soil	Sub soil		
33	642 Humo-ferric gley-podzol	Medium sand	SOLLOM	4.5	4.5/5.0	Mown fairway with Heath Rush	Very moist below 11cm wet below 59cm, occ. flints to 20cm
34	555 Gleyic argillic brown sands	Medium sand to 56cm medium sand and loam sand to 70cm over medium sand	DOWNHAM MARKET	4.5	4.7/5.0	Mown fairway	Common flints to 25cm, mottled at 56cm
35	861 Typical humic-sandy gley soil	Humose and peaty sand to 38cm over sand	FORDHAM	4.5	4.5	Mown fairway	Occ. flints to 18cm, very moist at 18cm wet at 38cm, in low way near ditch
36	641 Typical gley-podzol	Humose sand to 10cm over medium and coarse sand	SOLLOM	4.5	4.5	Mown fairway	Very moist at 18cm wet at 54cm
37	642 Humo-ferric gley-podzol	Medium sand	SOLLOM	4.5	4.5	Sec. Birch woodland with Holly, Bramble and occ. Bracken	Slightly mottled below 42cm
38	642 Humo-ferric gley-podzol	Medium sand	SOLLOM	4.5	4.5	Mown fairway	Slightly mottled at 38cm
39	Disturbed 555 Gleyic argillic brown sands	Medium sand to 10cm over sandy clay loam with artifacts to 35cm over medium sand	DISTURBED	5.5	6.5	Mown fairway	Artifacts include carbon rod, stone ware fragments, charcoal, glass fragments and copper sheet
40	Disturbed sand	Medium sand	DISTURBED	4.5	4.5/5.2	Quarry bottom with bare sand, grass tussocks, Rushes, Docks and young Gorse	Proposed heathland landscape area
41	Disturbed 643 Stagnogley-podzol	Sandy loam and sandy clay loam over medium sand to 80cm over fine sandy clay	DISTURBED HOLIDAYS HILL	4.7	6.2/6.5	Amenity grassland below Oak tree	Flint and brick fragments to 30cm
42	Disturbed 643 Stagnogley-podzol	Medium sand to 90cm over fine sandy clay	DISTURBED HOLIDAYS HILL	4.5	6.2/6.5	Amenity grassland below Pine, Oak and Yew	Brick and iron fragments to 20cm
43	821 Typical sandy gley soils	Medium sand to 23cm, sticky loamy sand to 45cm over medium sand	FORMBY	5.0	5.0	Mown amenity grassland	Mottled below 15cm, common flints to 23cm