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DEVON MINERALS PLAN
CONSULTATION DRAFT

AGRICULTURAL LAND CLASSIFICATION
AND
SITE PHYSICAL CHARACTERISTICS

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DEVON MINERALS PLAN CONSULTATION DRAFT

AGRICULTURAL LAND CLASSIFICATION

INCORPORATING SITE PHYSICAL CHARACTERISTICS

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DEVON MINERALS LOCAL PLAN CONSULTATION DRAFT

AGRICULTURAL LAND CLASSIFICATION AND SITE PHYSICAL CHARACTERISTICS SURVEY

SUMMARY

Five sites identified in the Devon Minerals Plan Consultation Draft were surveyed by ADAS on behalf of MAFF as part of its statutory role in the preparation of the above plan The fieldwork covered sites at Hillhead Rockbeare Old Wheatley Bickley Ball and Bovey Basin and was completed in January 1995 at a scale of 1 10 000 Data on climate soils geology and previous ALC Surveys was used and is presented in the report The distribution of grades is detailed below and illustrated on the accompanying ALC maps Information is correct at this scale but could be misleading if enlarged

Distribution of ALC grades Hillhead

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
1	3 0	1 7	1 8	
2	59 8	34 2	35 8	
3a	81 1	46 4	48 5	
3b	20 0	11 4	12 0	
4	3 3	1 9	2 0	
Urban	4 8	2 7		
Non Agricultural	0 8	0 4		
Agricultural Buildings	2 1	1 2		
TOTAL	174 9	100 0	100 0	(167 2 ha)

An area of 143 9 ha (86%) of the agricultural land was found to be best and most versatile mainly Grade 2 and Subgrade 3a Most of these soils experienced a droughtiness limitation

Distribution of ALC grades Old Wheatley

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	9 4	65 3	65 3	
4	2 0	13 9	13 9	
5	3 0	20 8	20 8	
TOTAL	14 4	100 0	100 0	(14 4 ha)

Most of the site occupies moderately sloping land which experiences a 3b gradient limitation Steeper land is graded 4 and 5 The clayey soils also impose a moderate wetness limitation

Distribution of ALC grades Rockbeare Quarry

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
2	4 3	6 1	6 2	
3a	65 0	91 8	93 8	
Urban	0 3	0 4	0 0	
Non Agricultural	0 6	0 7	0 0	
Agricultural Buildings	0 7	1 0	0 0	
TOTAL	70 8	100 0	100 0	(69 3 ha)

All the site is best and most versatile with the predominant limitation being droughtiness The soils are well drained but have high subsoil stone contents

Distribution of ALC grades Bickley Ball

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3a	7 6	33 9	52 1	
3b	4 7	21 0	32 2	
4	2 3	10 3	15 7	
Woodland	7 8	34 8		
TOTAL	22 4	100 0	100 0	(14 6 ha)

Slope is the predominant limiting factor on this site however two areas of gently sloping land experience only moderate wetness limitation and are graded 3a

Distribution of ALC grades Bovey Basin

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
1	6 3	11 1	11 8	
2	18 6	32 9	35 0	
3a	20 1	35 6	37 8	
4	8 2	14 5	15 4	
Urban	0 8	1 4		
Non Agricultural	2 3	4 1		
Agricultural Buildings	0 2	0 4		
TOTAL	56 5	100 0	100 0	(53 ha)

Nearly all the agricultural land is best and most versatile with the predominate limitation on the well drained light textured soils being flooded

1 INTRODUCTION

An Agricultural Land Classification (ALC) Survey was carried out in January 1995 at five sites in East Devon on behalf of MAFF as part of its statutory role in the preparation of the Devon Minerals Local Plan

Land at Hillhead Rockbeare Old Wheatley Bickley Ball and Bovey Basin was surveyed by ADAS at a scale of 1 10 000 with approximately one boring per hectare of agricultural land The findings of the survey and distribution of the grades are detailed below for each area surveyed

The recent surveys supersedes any previous surveys having been carried out at a more detailed level and using the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988) These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose long term limitations on agricultural use The grading takes account of the top 120 cm of the soil profile A description of the grades used in the ALC system can be found in Appendix 2

2 CLIMATE

The grade of the land is determined by the most limiting factor present The overall climate is considered first because it can have an overriding influence on restricting land to a lower grade despite other favourable conditions

Estimates of climatic variables were interpolated from the published agricultural climate dataset (Meteorological Office 1989) Interpolations for each site are shown in later sections

The parameters used for assessing overall climate are accumulated temperature (a measure of the relative warmth of a locality) and average annual rainfall (a measure of overall wetness) Climatic data on Field Capacity Days (FCD) and Moisture Deficits for wheat and potatoes are also shown These data are used in assessing the soil wetness and droughtiness limitations referred to in later sections

3 HILLHEAD

3 1 An area of 174 9 of land at Hillhead near Uffculme was surveyed in December 1994 and January 1995 The published provisional 1 to the mile ALC map of the area (MAFF 1972) shows all but a narrow strip to be Grade 3 A strip on the western edge is Grade 4 During the recent detailed survey a total of 176 borings and 9 soil profile pits were examined

3 2 Climate

Climatic data for the site was interpolated as described in section 2 The results shown in Table 1 indicate that there is no overall climatic limitation for the site

Table 1 Climatic Interpolations Hillhead

Grid Reference	ST 058 143	ST 076 138
Altitude (m)	108	122
Accumulated Temperature (day deg)	1464	1448
Average Annual Rainfall (mm)	978	963
Overall Climatic Grade	1	1
Field Capacity Days	197	195
Moisture Deficit Wheat (mm)	89	90
Moisture Deficit Potatoes (mm)	77	78

3 3 Relief and Landcover

The altitude ranges from 91 to 137 m AOD Slopes are mainly gentle (2 3) to moderate (4 7) and not limiting However small areas of moderately steep (8 11) land are found at the north east and extreme south edges of the area At the time of survey landcover was mainly grass and winter cereals with smaller areas of maize winter cabbage and approximately 16 ha of parsnips

3 4 Geology and Soils

The published 1 50 000 scale solid and drift geology map sheet (Institute of Geological Sciences 1974) shows nearly all the site to be underlain by Pebble Beds The lower slopes of the north western part of the site comprise Lower Marls and valley gravels A small area of Upper Sandstone is mapped around Appledore

The Soil Survey of England and Wales mapped the soils in 1981 at scale of 1 25 000 and at 1 250 000 in 1983 The principle soil on the site is shown as the stony phase of Bromsgrove Series This is described as deep permeable reddish light loams passing to soft pebbly sandstone or sand at depth Small areas of Uplowman Series soils are also shown on the 1 25 000 map These have a similar description but with slowly permeable stony clay at depth A small area of Whimple Series is shown at the west of the site These are described as slightly stony slightly mottled moderately permeable medium loams over slowly permeable reddish clays passing to soft blocky mudstone at depth There is also a fringe of Wigton Moor Series around the lower southern edges of the western block These are described as slightly stony clay loams which are seasonally waterlogged affected by fluctuating groundwater This distribution was largely borne out by the recent ALC survey

3 6 Agricultural Land Classification

The distribution of ALC grades identified in the survey is shown on the accompany ALC map and areas are summarised in the table below The information is correct at the scale shown but any enlargement would be misleading

The principle limitation at this site is droughtiness the distribution of which is determined by a fluctuating depth of upper loamy horizons over sand and gravel and by the highly variable textures and stone contents

Table 2 Distribution of ALC grades Hillhead

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
1	3 0	1 7	1 8	
2	59 8	34 2	35 8	
3a	81 1	46 4	48 5	
3b	20 0	11 4	12 0	
4	3 3	1 9	2 0	
Urban	4 8	2 7		
Non Agricultural	0 8	0 4		
Agricultural Buildings	2 1	1 2		
TOTAL	174 9	100 0	100 0	(167 2 ha)

Grade 1

A single small area of Grade 1 is shown where the stone content is relatively slight and heavier subsoil textures mean there is no droughtiness or any other significant limitation Similar isolated Grade 1 profiles have been found elsewhere but have been included in other mapping units

Grade 2

Most of the land shown as Grade 2 has a minor limitation due to droughtiness Typical profiles have medium sandy loam topsoils and upper subsoil with approximately 20 30% small and very small stones A small area around Higher Houndaller Farm and at other scattered points have a minor workability limitation due to medium clay loam topsoil However even in such cases generally there are enough stones to cause a similar droughtiness limitation This mapping unit contains occasional profiles of a lower grade mainly due to isolated pockets of stone

Subgrade 3a

This grade denotes land with a moderate limitation due to droughtiness Compared to the Grade 2 described above Subgrade 3a profiles have less available water because of higher stone contents up to 30 and 40% in the subsoil or because of shallower loamy horizons over sand or loamy sand subsoils Since these characteristics show considerable local fluctuation this mapping unit contains several isolated profiles of both higher and lower grades

Smaller areas of subgrade 3a particularly in the southern part of the western block towards Waterloo Cross suffer a moderate wetness limitation frequently Wetness Class III (see appendix 3) with medium clay loam topsoil and a slowly permeable layer in the lower subsoils

Subgrade 3b

Areas shown as Subgrade 3b mainly suffer a gradient limitation with moderately steep slopes of between 8 and 11 and are found mainly at the edge of the area Isolated profiles have been graded 3b because of droughtiness due to a higher stone content particularly in the subsoil where stone contents of up to 60% have been measured at pit sites Because these are isolated single profiles they have been included within larger areas of Subgrade 3a

Grade 4

The small areas of Grade 4 at this site comprises an area east of Lower Penslade Farm which suffers prolonged high ground water levels assessed as Wetness Class IV and two very small areas of Grade 4 due to gradient (12 18)

Other Land

The small areas of other land include farm buildings urban areas such as roads and domestic buildings and two small areas of non agricultural land wasteland and woodland

3 6 Soil Resources

Three soil units have been identified mainly on the basis of subsoil characteristics These are described in greater detail below

Topsoil

Topsoil is defined as the organic rich surface horizon

Table 3 Topsoil Resources

Unit	Av Depth cm	Area ha	Texture	Stone %	Volume m³
1 and 2	35	138 1	MSL	10 20	483 350
3	30	36 8	MSL/MCL	10 20	110 400
					593 750

Unit 1 and 2 topsoils are generally medium sandy loam reddish brown to a depth of 30 40 cm average 35 cm Measured stone contents range from 10 25% small stones Topsoil structure is commonly a weakly developed coarse to angular blocky friable and in moderate or good structural condition and well rooted A total topsoil resource of 483 350 m³ is available in this unit

Unit 3 topsoils tend to be slightly heavier medium sandy loam to medium clay loams which are mid brown to a depth of around 30 cm There is no evidence of wetness in this horizon and many of the profiles are still moderately stony with up to 20% small stones A total topsoil resource of 110 400 m³ is available in this unit

Subsoil

Table 4 Subsoil Resources Hillhead

Unit	Av Depth cm	Area ha	Texture	Stone %	Volume m³
1	35 110	84 5	MSL	10 20	633 750
	110 120	84 5	LMS/S	10 50	84 500
2	35 60	53 6	MSL/SCL	20 30	134 000
	60 120	53 6	LMS/S	10 60	321 600
3	30 50	36 8	HCL/SCL	10 30	73 600
	50 120	36 8	C/SC	5 30	257 600
			Total subsoil		1505 050

Unit 1 Subsoil textures are highly variable but are generally medium sandy loam or heavier to a depth of 120 cm The stone content is highly variable but frequently 20 30% The structure is a moderately developed coarse angular blocky with common fine roots The lowest horizon in these soils tend to have a weaker structure and few visible roots A total subsoil resource of 718 250 m³ is available in this unit

Unit 2 generally has an upper subsoil of reddish medium sandy loam or heavier The stoney loamy sand subsoils are found at approximately 60 cm Stone contents in the upper subsoil range from 10 30% whereas those in the lower subsoil may be much higher up to 50 or 60% small stones Where it is possible to recognise a structure this is generally weakly developed and the peds are friable or very friable Rooting deteriorates down the profile from common fine roots to virtually absent A total subsoil resource of 455 600 m³ is available in this unit

Unit 3 has an upper subsoil This is a brownish sandy clay loam or heavy clay loam with a weakly developed coarse structure and moderately well rooted The lower subsoil is a pale grey sandy clay or clay Roots are few or absent and the structure weakly developed coarse angular blocky or weakly developed coarse prismatic with a moderate or poor structure condition The subsoils in Unit III are wetter and will remain plastic for

longer than those elsewhere on the site Therefore they will require careful handling if long term damage is to be avoided A total subsoil resoure of 331 200 m^3 is available in this unit

4 ROCKBEARE

4 1 An area of 70 8 ha of land at Rockbeare near Ottery St Mary was surveyed in January 1995 The published 1 to the mile ALC map (MAFF 1972) shows the entire site to be Grade 3 During the recent survey a total of 73 borings and 4 soil profile pits were examined

4 2 Climate

The results from a climatic interpolation are shown in Table 5 and indicate there is no overall climatic limitation

Table 5 Climatic Interpolation Rockbeare

Grid Reference	ST 069 959
Altitude (m)	135
Accumulated Temperature (day deg)	1441
Average Annual Rainfall (mm)	968
Overall Climatic Grade	1
Field Capacity Days	194
Moisture Deficit Wheat (mm)	91
Moisture Deficit Potatoes (mm)	79

4 3 Relief and Landcover

The site has a gentle break of slope running north south through the middle as it gains height from 120 m AOD in the east to 162 m AOD on the western edge At the time of survey the land was being used for permanent pasture ley grassland cereal cultivation maize cultivation and outdoor pigs

4 4 Geology and Soils

The published 1 50 000 scale drift edition geology map (Institute of Geological Sciences 1986) shows the site is underlain by valley gravels except for a small area of Marl with occasional sandstone in the east of the site

The Soil Survey of England and Wales mapped the soils in 1983 at a scale of 1 250 000 and in 1972 at a scale of 1 63 360 The more recent map shows the majority of the soils to comprise the Newham Association which are described as well drained reddish coarse and fine loamy soils over gravel locally deep The north eastern quarter of the site is mapped as Brockhurst 1 Association These soils are described as slowly permeable seasonally waterlogged reddish fine loamy over clayey soils Some similar soils with slowly permeable subsoils and slight seasonal waterlogging may occur

The soils found during the recent survey were stony clayey soils The topsoils are medium clay loam and occasionally sandy loam topsoils The field to the south of Birdcage Farm had sandy loam topsoils that continued into sandy loam and loamy sand subsoils

4 5 Agricultural Land Classification

The distribution of ALC grades is shown in Table 6 and on the accompanying ALC map This information could be misleading if shown at a larger scale

Table 6 Distribution of ALC grades Rockbeare Quarry

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
2	4 3	6 1	6 2	
3a	65 0	91 8	93 8	
Urban	0 3	0 4	0 0	
Non Agricultural	0 6	0 7	0 0	
Agricultural Buildings	0 7	1 0	0 0	
TOTAL	70 8	100 0	100 0	(69 3 ha)

Grade 2

The small area of Grade 2 land experiences a minor workability limitation The profiles are well drained and are assessed as Wetness Class I where the medium clay loam topsoil overlies sandier subsoils The stone content of the profiles is variable but it does not impose an overall limitation

Subgrade 3a

The majority of the site has been mapped as Subgrade 3a with a moderate wetness limitation and in places a moderate droughtiness limitation There are also small areas of slightly better quality land In general the profiles have a medium clay loam topsoil over heavy clay loam and clay subsoils The lower subsoils are slowly permeable layers and the profiles are assessed as either Wetness Class II or Wetness Class III depending on the depth to a gleyed horizon above the slowly permeable layer and the depth to the slowly permeable layer itself

The stone contents in the horizons are moderately high with 10 30% hard rocks in the topsoil 20 49% hard rocks in the upper subsoil and 18 40% hard rocks in the lower subsoil These lead to a moderate droughtiness limitation of Subgrade 3a but in places where the lower contents were found there was only a minor droughtiness limitation Within the mapping unit there were also slightly better quality areas where a slowly permeable layer was not present or the topsoil was a sandy loam

Other Land

A small area of woodland has been mapped as non agricultural land while roads and houses are shown as urban Agricultural buildings are so marked

4 6 Soil Resources

Topsoil

Topsoil is defined as the organic rich surface horizon The topsoils across the site have been mapped as two units

Table 7 Topsoil Resource Rockbeare

Unit	Av Depth cm	Area ha	Texture	Stone %	Volume m³
1	0 30	4 3	MCL	5 10 HR	12900
2	0 25	65 0	MCL	10 30 HR	162500
				Total Topsoil	175 400

Unit 1 the topsoil comprises slightly stony medium clay loams to a depth of 30 cm The stone content varies between 5% and 10% hard rocks The soil is well rooted and non calcareous and was under permanent pasture at the time of survey A total topsoil resource of 12900 m³ is available in this unit

Unit 2 the topsoil in this unit comprises stony medium clay loams and occasional sandy loams The stone content generally varies between 20% and 30% hard rocks although there are a few places where it is as low as 10% The structure of the topsoil is weakly and moderately developed medium and coarse sub-angular blocky with a friable consistence giving a moderate structural condition The soil is well rooted and non calcareous The unit was under permanent and ley pasture and cultivation at the time of survey

Subsoil

The subsoils have been split into a lower and an upper horizon for each unit

Table 8 Subsoil Resources Rockbeare

Unit	Av Depth cm	Area ha	Texture	Stone %	Volume m³
1	30 50	4 3	MCL	10 20 HR	8 600
1	50 120	4 3	MSL/LMS	20 HR	30 100
2	25 45	65 0	MCL	20 55 HR	130 000
2	45 120	65 0	HCL/C	18 42 HR	487,500
				Total Subsoil	656 200

Unit 1 the upper subsoil extends to an average depth of 50 cm comprising medium clay loam with between 10% and 20% hard rocks The soil has a moderate structural condition and is well rooted and porous The lower subsoil comprising of medium sandy loams and loamy soils extends to a depth of 120 cm They are slightly stony with 20% hard rocks The soil has a good structural condition and is porous with a few roots observed to depth A total subsoil resource of 38 700 m³ is available in this unit

Unit 2 the upper subsoil taken to an average depth of 45 cm comprises stony medium clay loam The stone contents vary between 20% and 55% hard rocks The soils have friable moderately developed coarse and medium sub angular blocky structures giving moderate structural conditions In places the high stone content inhibits the development of a structure They are porous and well rooted The lower subsoil taken to 120 cm comprises stony heavy clay loams and clay The stone content varies between 18% and 42% hard rocks which can inhibit the development of a structure in places Elsewhere the soil has a weakly and weakly adherent coarse sub-angular blocky structure of firm consistency This leads to a poor structural condition A few roots were observed to depth and the soil is generally not porous A total subsoil resource of 617 500 m³ is available in this unit

5 OLD WHEATLEY

5 1 An area of 14 4 hectares of land to the west of Exeter was surveyed in January 1995 The published 1 to the mile ALC map (MAFF 1972) shows much of the site to comprise Grade 4 land with the tops of the hill shown as Grade 3 During the recent survey a total of 12 auger borings and 1 soil profile pit were examined

5 2 Climate

The results from a climatic interpolation are shown in the Table 9 and indicate there is no overall climatic limitation

Table 9 Climatic Interpolation Old Wheatley

Grid Reference	SX 894 923
Altitude (m)	75
Accumulated Temperature (day deg)	1515
Average Annual Rainfall (mm)	916
Overall Climatic Grade	1
Field Capacity Days	188
Moisture Deficit Wheat (mm)	99
Moisture Deficit Potatoes (mm)	90

5 3 Relief and Landcover

The site occupies a steeply sloping spur the highest point being 108 m AOD with land falling to 35 m AOD by the edge of the Nadder Brook Over much of the site steep slopes limit the ALC grades leaving very small areas with less than 7 slopes At the time of survey much of the land was in grass leys with a large area of maize stubble on the western edge The steepest banks were in permanent grass and scrub

5 4 Geology and Soils

The published 1 50 000 scale drift geology map (Institute of Geological Sciences 1986) shows the entire site to be underlain by Grit and Shales of the Coal Measures

The Soil Survey of England and Wales mapped the soils in 1983 at a scale of 1 250 000 and in 1974 at a scale of 1 63 360 The more recent map shows the site to be entirely underlain by Denbigh 1 Association These soils are described as well drained fine loamy and fine silty soils over rock Some similar soils with slowly permeable subsoils and slight seasonal waterlogging occur

During the recent survey soils were predominantly found to comprise deep clayey profiles with medium clay loam topsoils Within this occasional patches of very shaley subsoils were found at shallow depths

5 5 Agricultural Land Classification

The distribution of ALC grades identified in the survey area is detailed in Table 10 and shown on the accompanying ALC map The information is correct at this scale but any enlargement would be misleading

Table 10 Distribution of ALC grades Old Wheatley

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	9 4	65 3	65 3	
4	2 0	13 9	13 9	
5	3 0	20 8	20 8	
TOTAL	14 4	100 0	100 0	(14 4 ha)

Subgrade 3b

A total of 9 4 hectares of land has been graded as moderate quality These clayey soils are generally poorly drained with slowly permeable layers starting at approximately 30 cm These Wetness Class IV soils exhibited a moderately severe wetness limitation However much of the land shown as 3b also has a slope limitation Gradients of between 7 and 11 inhibit the safe use of some types of agricultural machinery

Grade 4 and 5

A total of 2 hectares of land has been identified as Grade 4 and 3 ha as Grade 5 The steepest slopes on the site which exceed 18 are limited to Grade 5 Such slopes impose severe limitation on the use of agricultural machinery

5 6 SOIL RESOURCES

The soils across the site can be treated as one unit

Topsoil

Topsoil is defined as the organic rich surface horizon Topsoils across the whole site can be treated as one soil handling unit of medium clay loam to a depth of 30 cm The depth of topsoil may be slightly thinner on the steeper slopes The topsoil is well rooted and porous with moderately developed coarse and medium sub-angular blocky structure There are few stones and peds have a friable consistence A total topsoil resource of 43 200 m^3 is available

Subsoil

Subsoil is defined as the less organic rich lower horizon All the subsoils between 30 and 120 cm across this site can be handled as one unit A deep clay profile comprises poorly structured weakly developed coarse sub-angular blocky soils which have a firm consistence and poor porosity Common roots occur to approximately 45 cm There are few stones and these increase to approximately 15% hard rock below 45 cm Within this soil handling unit there are stony patches which could not be mapped accurately at this scale These should be included in the soil resource A total subsoil resource of 129 600 m^3 is available across the site

6 BICKLEY BALL

6 1 An area of 23 hectares of land at Bickley Ball to the north east of Kingsteignton were surveyed in January 1995 The published provisional 1 to the mile national ALC map (MAFF 1972) shows the area marked Whitelands to be non agricultural and the remainder of the site to be Grade 2 and 3 During the recent survey a total of 16 auger borings and 1 soil profile pit were examined

6 2 Climate

The results of the climatic interpolation are shown in Table 11 and indicate that there is no overall climatic limitation

Table 11 Climatic Interpolation Bickley Ball

Grid Reference	SX 882 742
Altitude (m)	85
Accumulated Temperature (day deg)	1512
Average Annual Rainfall (mm)	975
Overall Climatic Grade	1
Field Capacity Days	199
Moisture Deficit Wheat (mm)	94
Moisture Deficit Potatoes (mm)	84

6 3 Relief and Landcover

Much of the site is on a steep sloping ground the highest point being 101 m from which land falls to below 70 m AOD near the present tip workings Some of the slopes are limiting to agricultural use The northern part of the site is in coniferous plantation the remainder being in permanent grassland

6 4 Geology and Soils

The published 1 50 000 scale sold and drift geology map (Institute of Geological Sciences 1976) shows the site to be underlain by limestone with small areas of upper green sand and Aller gravel on the higher ground

The Soil Survey of England and Wales mapped the soils in 1983 at a scale of 1 250 000 and in 1972 at a scale of 1 63 360 The more recent map shows the site to comprise Nordrach Association These soils are described as well drained fine silty over clayey soils stoneless and often deep but with shallow silty soils over limestone in places During the recent survey a slightly variable soil type was found this predominantly comprised deep clayey profiles with few stones However areas of silty sandy loam and sandy loam subsoils are found in the southern part of the site Topsoil textures across the site are medium clay loams

6 5 Agricultural Land Classification

Distribution of ALC grades identified in the survey area detailed in Table 12 below and shown on the accompanying ALC map The information is correct at the scale shown but any enlargement would be misleading

Table 12 Distribution of ALC grades Bickley Ball

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3a	7 6	33 9	52 1	
3b	4 7	21 0	32 2	
4	2 3	10 3	15 7	
Woodland	7 8	34 8		
TOTAL	22 4	100 0	100 0	(14 6 ha)

Subgrade 3a

The flat area of land on the western part of the site and the gently sloping land in the valley floor is Grade 3a This land comprises moderately well drained Wetness Class II profiles with medium clay loam topsoils This soil experiences a slight workability limitation imposing it to Subgrade 3a Some stonier Wetness Class 1 soils are also included in this mapping unit

Subgrade 3b

A total of 4 7 hectares of 3b land corresponds to slope of between 7 and 11 This land is considered unsafe for some types of agricultural machinery

Grade 4

Land with a gradient of between 11 and 18 has a moderately severe slope limitation which limits this land to Grade 4

Woodland

Over a third of this site is used for woodland and is shown on the accompanying map as such

6 6 Soil Resources

The soils across the whole site can be treated as one unit

Topsoil

The topsoils across the site are medium clay loams with the occasional sandy clay loam The topsoils occur to a depth of 30 cm although they are slightly deeper and more organic rich under Whitelands wood The structure of the topsoil is moderately developed coarse subangular blocky which is friable and well rooted A total topsoil resource of 67 200 cm^3 is available across the site

Subsoils

There are some variations in subsoils across the site however these are limited to a stony area in the valley floor immediately north and west of the present tip workings These subsoils can be handled with the upper subsoils of the rest of the site Subsoils should be split into upper and lower horizons The upper horizon between 30 60 cm depth comprises of slightly stoney (approximately 2 5% hard rock) dark red subsoil This horizon shows little evidence of mottling or pale colours and has a moderate structural condition with moderately developed peds of a coarse subangular blocky shape which are friable

Below a depth of approximately 65 cm the clay soils are poorly structured with moderately developed coarse angular blocky ped which are friable There are few roots and pores This horizon should be stripped and stored separately to the better structured horizon described above

7 BOVEY BASIN

7 1 The published provisional one inch to the mile ALC map of the area (MAFF1972) shows all the land to be grade 3a During the recent survey the total of 56 auger borings and 4 soil profile pits were examined

7 2 Climate

The results of the Climatic data for the site was interpolation for the site are shown in table 13 and indicate there is no overall climatic indication

Table 13 climate Interpolation Bovey Basin

Grid Reference	SX 845755
Altitude (m)	10
Accumulated Temperature (day deg)	1598
Average Annual Rainfall (mm)	989
Overall Climatic Grade	1
Field Capacity Days (FCD)	201
Moisture Deficit Wheat (mm)	101
Moisture Deficit Potatoes (mm)	92

7 3 Relief and Landcover

Most of the site occupies a level valley floor position bounded by the rivers Bovey and Teign To the west of Summer Lane land rises slightly to a maximum altitude of 20 m AOD near the railway line At the time of survey the southern part of the site near Preston was in permanent grassland whilst the northern part was in grass leys and fodder crops

7 4 Geology and Soils

The published 1 50 000 geology map (Institute of Geological Sciences 1976) shows all the valley floor alluvium with the slightly higher around ground to be undifferentiated deposits of mainly Blatchford sands The Soil Survey of England and Wales mapped the soils the area at a scale of 1 63 360 in 1972 and again at 1 250 000 in 1983 These maps show soils of the Wickham 2 and Teme Associations The former are described as slowly permeable seasonally waterlogged fine loamy over clay and fine silty soils The Teme Association soils are described as deep stoneless permeable silty soils with similar soils variably affected by ground water and gravelly in places During the recent survey soils similar to the Teme Association were found over much of the site these comprised fine and medium sandy loam topsoils over deep sandy loam and sandy silt loam subsoils these were generally stone free although in localised areas there were gravelly patches at depth Some heavier clay soils were found on the higher ground

7 5 Agricultural Land Classification

Distribution of grades found are shown in table 14 and on the accompanying map The information is are correct at the scale shown but any enlargement may be misleading

Table 14 Distribution of ALC grades Bovey Basin

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
1	6 3	11 1	11 8	
2	18 6	32 9	35 0	
3a	20 1	35 6	37 8	
4	8 2	14 5	15 4	
Urban	0 8	1 4		
Non Agricultural	2 3	4 1		
Agricultural Buildings	0 2	0 4		
TOTAL	56 5	100 0	100 0	(53 ha)

Grade 1

An area of 6 3 hectares of grade 1 agricultural land has been mapped in the northern part of the site This relates to deep well drained medium sandy loam soils with only small amounts of stone These very workable soils experience no or very minor limitations and are unaffected by flooding

Grade 2

Much of the valley floor in the northern part of the site is mapped as grade 2 These soils are very similar to the grade 1 soils being deep sand loams however the main limitation here is flooding Information supplied by the NRA indicates this area is prone to flooding at least once in 10 to 14 years The duration of the floods is between 2 and 4 days this flooding imposes a limitation as to the types of agricultural practice which can be carried out on this land An area of Grade 2 and south of Brock Farm experiences a slight wetness limitation imposed by clay at subsoils at depth These soils are assessed as Wetness Class II and graded 2 with medium sandy loam topsoils

Subgrade 3a

There are 2 areas of 3a land The northern block relates to moderately well drained soils which are gleyed from a shallow depth These soils are assessed as Wetness Class III which combined with sandy loam topsoils imposes a moderate workability limitation The second area of 3a land in the valley floor is bounded by the river Teign This area is prone to flooding of a similar nature to that described in the grade 2 section however it is as likely to occur in the summer months as the winter thus imposing a greater restriction on agricultural practice

Grade 4

This land experiences more severe restrictions due to regular floods Information supplied by the NRA indicates that these areas are prone to flooding annually for short periods at a time and this may occur during periods between March and November

Other Land

A small area of soil tipping included in the site is shown as non agricultural Farm building and a lane are also shown on the map

7 6 **Soil Resources**

Table 15 Topsoil Resource Bovey Basin

Unit	Av Depth cm	Area ha	Texture	Stone %	Volume m³
1	30	47 6	MSL	neg	142 800
2	25	8 9	MSL/MCL	3	22 250
			Total topsoil		165 050

Topsoil

Unit 1 topsoil textures are medium sandy loams with occasional medium clay loams These topsoils extend to a depth of 25 cm Peds are moderately developed coarse subangular blocky which are generally friable Topsoils are well rooted porous and have negligible stones

Unit 2 topsoils are generally medium sandy loam and occasionally medium clay loam with approximately 3% small stones An area of compacted topsoil was found in this unit where moderately developed coarse subangular peds were firm in consistance but were well rooted and porous

Subsoils

Table 16 Subsoil Resource Bovey Basin

Unit	Av Depth cm	Area ha	Texture	Stone %	Volume m³
1	30 120	47 6	MSL	neg	428 400
2	25 120	8 9	C/MSL/MCL	2 35	84 550
			Total subsoil		512 950

Unit 1 subsoils cover most of the site The full depth of subsoil to 120 cm could be handled as one unit These soils are medium sandy loams and occasional medium silty clay loams and are generally stone free However there are small areas in the northern part of the site where approximately 40 % small stones are found below 80 cm These profiles have a good and medium structural conditions with moderately developed peds of a coarse subangular shape The upper horizons in the southern site have a tendency towards a coarse prismatic ped shape soils are friable well rooted and porous a total subsoil resource of 508 500 m³

Unit 2 subsoils are shown on the accompanying soil resource map are much more variable and comprise of a clayey horizon This clay occurs in lenses between a stoney sandy matrix which affects the full depth of subsoil and extends from 25 cm to 120 cm However there are areas within this where stony sandy loam soils occur at approximately 80 cm These are part of the soil resource and should be stored accordingly The clay is generally pale in colour and has a moderately developed weak adherent coarse subangular blocky structure which is friable porous and well rooted to a depth of 70 cm

Resource Planning Team
Taunton Statutory Unit
January 1995

APPENDIX 1

REFERENCES

INSTITUTE OF GEOLOGICAL SCIENCES (1974) Sold and Drift Edition Sheet 310 and 311 Tiverton and Wellington 1 50 000

INSTITUTE OF GEOLOGICAL SCIENCES (1986) Drift Edition Sheet 325 Exeter 1 50 000

MAFF (1972) Agricultural Land Classification Map Sheet 176 Provisional 1 63 360 scale

MAFF (1988) Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for grading the quality of agricultural land) Alnwick

METEOROLOGICAL OFFICE (1989) Climatological Data for Agricultural Land Classification

SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 5 Soils of South West England 1 250 000 scale

SOIL SURVEY OF ENGLAND AND WALES (1981) Soil Survey Record No 110 Soils in Devon Sheet ST01 1 25 000

SOIL SURVEY OF ENGLAND AND WALES (1972) Sheet 325 and 339 Exeter and Newton Abbot 1 63 360

APPENDIX 2

DESCRIPTION OF GRADES AND SUBGRADES

Grade 1 excellent quality agricultural land

Land with no or very minor limitations to agricultural use A very wide range of agricultural and horticultural crops can be grown and commonly include top fruit soft fruit salad crops and winter harvested vegetables Yields are high and less variable than on land of lower quality

Grade 2 very good quality agricultural land

Land with minor limitations which affect crop yield cultivations or harvesting A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops The level of yield is generally high but may be lower or more variable than Grade 1

Grade 3 good to moderate quality agricultural land

Land with moderate limitations which affect the choice of crops timing and type of cultivation harvesting or the level of yield Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2

Subgrade 3a good quality agricultural land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops especially cereals or moderate yields of a wide range of crops including cereals grass oilseed rape potatoes sugar beet and the less demanding horticultural crops

Subgrade 3b moderate quality agricultural land

Land capable of producing moderate yields of a narrow range of crops principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year

Grade 4 poor quality agricultural land

Land with severe limitations which significantly restrict the range of crops and/or level of yields It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yields of which are variable In most climates yields of grass may be moderate to high but there may be difficulties in utilisation The grade also includes very droughty arable land

Grade 5 very poor quality agricultural land

Land with very severe limitations which restrict use to permanent pasture or rough grazing except for occasional pioneer forage crops

Descriptions of other land categories used on ALC maps

Urban

Built up or hard uses with relatively little potential for a return to agriculture including housing industry commerce education transport religious buildings cemeteries Also hard surfaced sports facilities permanent caravan sites and vacant land all types of derelict land including mineral workings which are only likely to be reclaimed using derelict land grants

Non-agricultural

Soft uses where most of the land could be returned relatively easily to agriculture including private park land public open spaces sports fields allotments and soft surfaced areas on airports/airfields Also active mineral workings and refuse tips where restoration conditions to soft after uses may apply

Agricultural buildings

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses Temporary structures (eg polythene tunnels erected for lambing) may be ignored

Open water

Includes lakes ponds and rivers as map scale permits

Land not surveyed

Agricultural land which has not been surveyed

Where the land use includes more than one of the above landcover types eg buildings in large grounds and where may be shown separately Otherwise the most extensive cover type will usually be shown

Source MAFF (1988) Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for Grading the Quality of Agricultural Land) Alnwick

APPENDIX 3

DEFINITION OF SOIL WETNESS CLASSES

Wetness Class I

The soil profile is not wet within 70 cm depth for more than 30 days in most years

Wetness Class II

The soil profile is wet within 70 cm depth for 31 90 days in most years or if there is no slowly permeable layer within 80 cm depth it is wet within 70 cm for more than 90 days but not wet within 40 cm depth for more than 30 days in most years

Wetness Class III

The soil profile is wet within 70 cm depth for 91 180 days in most years or if there is no slowly permeable layer within 80 cm depth it is wet within 70 cm for more than 180 days but only wet within 40 cm depth for between 31 and 90 days in most years

Wetness Class IV

The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years or if there is no slowly permeable layer within 80 cm depth it is wet within 40 cm depth for 91 210 days in most years

Wetness Class V

The soil profile is wet within 40 cm depth for 211 335 days in most years

Wetness Class VI

The soil profile is wet within 40 cm depth for more than 335 days in most years

Notes The number of days specified is not necessarily a continuous period In most years is defined as more than 10 out of 20 years

Source Hodgson J M (in preparation) Soil Survey Field Handbook (revised edition)

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bovey Basin	Pit 2	0°	Ley	Av Rainfall 989 mm ATO 1598 day °C	Undifferentiated beds
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 201 Climatic Grade 1 Exposure Grade 1	SOIL SAMPLE REFERENCES
127/94	17/1/95	SX 843 755	HLJ/NAD		

Horizon No	Lowest Av Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness Size Type and Field Method	Mottling Abundance Contrast Size and Colour	Mangan Concs	Structure Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots Abundance and Size	Calcium Carbonate Content	Horizon Boundary Distinctness and form
1	25	MSL	10YR33	3% HR			MDCSAB	Firm		G	Many Fine + V Fine	None	Abrupt/ smooth
							V compact layer between topsoil and subsoil						
2	55	MSL	10YR53	25% HR (Vis)	cdom 10YR56	C	MDCSAB	Firm	M	G	Few	None	Clear/wavy
3	70	C	25Y52	2% HR	cdom 10YR68	C	WDACSAB	Friable	M	G	Common	None	Clear/wavy
4	120	MSL	10YR62	35% HR (Vis)	cdom 10YR68	None	WCMSAB	Friable	G	G	None	None	

Profile Gleyed From 25

Depth to Slowly Permeable Horizon

Wetness Class III

Wetness Grade 3a

Available Water	Wheat	120 mm
	Potatoes	91 mm
Moisture Deficit	Wheat	101 mm
	Potatoes	92 mm
Moisture Balance	Wheat	+19 mm
	Potatoes	1 mm
Droughtiness Grade		2 (Calculated to 120 cm)

Final ALC Grade 3a

Main Limiting Factor(s) Wet

Remarks

NL336k

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bovey Basin	Pit 2	0°	Ley	Av Rainfall 989 mm ATO 1598 day °C FC Days 201 Climatic Grade 1 Exposure Grade 1	Undifferentiated beds
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
127/94	17/1/95	SX 843 755	HLJ/NAD		

Horizon No	Lowest Av Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness Size Type and Field Method	Mottling Abundance Contrast Size and Colour	Mangan Concs	Structure Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots Abundance and Size	Calcium Carbonate Content	Horizon Boundary Distinctness and form
1	25	MSL	10YR53	3% HR			MDCSAB	Firm		G	Many Fine + V Fine	None	Abrupt/ smooth
							V compact layer between topsoil and subsoil						
2	55	MSL	10YR53	25% HR (Vis)	cdom 10YR56	C	MDCSAB	Firm	M	G	Few	None	Clear/wavy
3	70	C	25Y52	2% HR	cdom 10YR68	C	WDACSAB	Friable	M	G	Common	None	Clear/wavy
4	120	MSL	10YR62	35% HR (Vis)	cdom 10YR68	None	WCMSAB	Friable	G	G	None	None	

Profile Gleyed From 25

Depth to Slowly Permeable Horizon

Wetness Class III

Wetness Grade 3a

Available Water	Wheat	120 mm
	Potatoes	91 mm
Moisture Deficit	Wheat	101 mm
	Potatoes	92 mm
Moisture Balance	Wheat	+19 mm
	Potatoes	1 mm
Droughtiness Grade		2 (Calculated to 120 cm)

Final ALC Grade 3a

Main Limiting Factor(s) Wet

Remarks

NL336k

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bovey Basin	Pit 1	0°	Grass Ley	Av Rainfall 989 mm ATO 1598 day °C FC Days 201 Climatic Grade 1 Exposure Grade 1	Alluvium
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
127/94	17/1/95	SX 847 756	N A Done		

Horizon No	Lowest Av Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness Size Type and Field Method	Mottling Abundance Contrast Size and Colour	Mangan Concs	Structure Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots Abundance and Size	Calcium Carbonate Content	Horizon Boundary Distinctness and form
1	30	MSL	10YR34	<1%			WDCSAB	Friable		Good	Many Fine + V Fine	None	Gradual/ smooth
2	60	MSL	10YR44	None	None	None	MDCSAB	Friable	M	Good	Common Fine + V Fine	None	Clear/ smooth
3	80	MSL	10YR46	5% HR (Vis)	None	None	WDCSAB	Friable	G	Good	Few Fine + V Fine	None	Clear/ smooth
4	120	LMS	10YR46/56	41% HR (S+D)	None	None	WDMG	V Friable	G	Good	None	None	

Profile Gleyed From

Depth to Slowly Permeable Horizon

Wetness Class I

Wetness Grade 1

Available Water	Wheat	134 mm
	Potatoes	112 mm
Moisture Deficit	Wheat	101 mm
	Potatoes	92 mm
Moisture Balance	Wheat	33 mm
	Potatoes	20 mm
Droughtiness Grade		1 (Calculated to 120 cm)

Final ALC Grade 2

Main Limiting Factor(s) Flood

Remarks

NL336k

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bovey Basin	Pit 2	0	Ley	Av Rainfall 989 mm ATO 1598 day °C FC Days 201 Climatic Grade 1 Exposure Grade 1	Undifferentiated beds
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
127/94	17/1/95	SX 843 755	HLJ/NAD		

Horizon No	Lowest Av Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness Size Type and Field Method	Mottling Abundance Contrast Size and Colour	Mangan Concs	Structure Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots Abundance and Size	Calcium Carbonate Content	Horizon Boundary Distinctness and form
1	25	MSL	10YR53	3% HR			MDCSAB	Firm		G	Many Fine + V Fine	None	Abrupt/ smooth
							V compact layer between topsoil and subsoil						
2	55	MSL	10YR53	25% HR (Vis)	cdom 10YR56	C	MDCSAB	Firm	M	G	Few	None	Clear/wavy
3	70	C	25Y52	2% HR	cdom 10YR68	C	WDACSAB	Friable	M	G	Common	None	Clear/wavy
4	120	MSL	10YR62	35% HR (Vis)	cdom 10YR68	None	WCMSAB	Friable	G	G	None	None	

Profile Gleyed From 25

Depth to Slowly Permeable Horizon

Wetness Class III

Wetness Grade 3a

Available Water	Wheat	120 mm
	Potatoes	91 mm
Moisture Deficit	Wheat	101 mm
	Potatoes	92 mm
Moisture Balance	Wheat	+19 mm
	Potatoes	1 mm
Droughtiness Grade		2 (Calculated to 120 cm)

Final ALC Grade 3a

Main Limiting Factor(s) Wet

Remarks

NL336k

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE			PARENT MATERIAL
Bovey Basin	Pit 3	0	Permanent Pasture	Av Rainfall	989 mm	Alluvium
				ATO	1598 day °C	
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days	200	SOIL SAMPLE REFERENCES
127/94	17/1/95	SX 851 747	NAD	Climatic Grade	1	
				Exposure Grade	1	

Horizon No	Lowest Av Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness Size Type and Field Method	Mottling Abundance Contrast Size and Colour	Mangan Concs	Structure Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots Abundance and Size	Calcium Carbonate Content	Horizon Boundary Distinctness and form
1	35	MSL	10YR34	None	None	None	MDC+ MSAB	Friable		G	Many Fine + V Fine		Gradual/ smooth
2	75	FSL	10YR44	None	None	None	MDCP	Friable	M	G	Many Fine + V Fine		Gradual/ smooth
3	120	MZCL	10YR53	None	cdom 10YR56	None	MDCSAB	Friable	M	G	Many Fine + V Fine		

Profile Gleyed From 25

Depth to Slowly Permeable Horizon

Wetness Class 1

Wetness Grade 1

Available Water	Wheat	164 mm
	Potatoes	123 mm
Moisture Deficit	Wheat	101 mm
	Potatoes	92 mm
Moisture Balance	Wheat	63 mm
	Potatoes	31 mm
Droughtiness Grade		1 (Calculated to 120 cm)

Final ALC Grade 4

Main Limiting Factor(s) Flood

Remarks

NL336k