COUNTY DURHAM
MINERALS LOCAL PLAN

Agricultural Land Classification (ALC)
Maps and Report

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Resource Planning Team
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AGRICULTURAL LAND CLASSIFICATION REPORT

COUNTY DURHAM MINERALS LOCAL PLAN

1. INTRODUCTION

1.1 This report presents the findings of detailed Agricultural Land Classification (ALC) surveys of eight sites proposed for inclusion in the County Durham Minerals Local Plan. The surveys were carried out between August and October 1997.

1.2 The surveys were carried out by the Farming and Rural Conservation Agency (FRCA) for the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with the County Durham Minerals Local Plan.

1.3 The work was conducted by members of the Resource Planning Team in the Northern Region of FRCA . The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.

2. SUMMARY

2.1 The findings of the survey are shown on the attached ALC maps. They have been drawn at a scale of 1:5,000 (1:10,000 in the cases of Farnley Hill, Baydale Farm and Bradley Burn). They are accurate at the scale at which they have been drawn but any enlargement would be misleading.

2.2 The field work was initially conducted at an average boring density of one per hectare. Additional borings were made where necessary to refine grade boundaries and soil profile pits were dug and described at representative locations at each site. Topsoils were sieved in order to assess stoniness and where heavy metal contamination was suspected a number of spot samples were taken for laboratory analysis. The results of the laboratory analyses for some samples taken from Baydale Farm, Bradley Burn, Farnley Hill, Flatts Farm and High Coniscliffe showed raised lead and zinc levels. Further field work was carried out at these sites which involved collecting bulked samples on a field by field basis using the prescribed methodology. The laboratory analyses of these additional samples showed some raised lead and occasionally raised zinc levels at all of these five sites although only areas subject to flooding were affected. However, the levels are not considered sufficiently high to merit downgrading the land.

2.3 The area of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

Table 1: Area (ha)

Site	Grade 1	Grade 2	Subgrade 3a	Subgrade 3b	Grade 4	Grade 5	Other land
Cope Hole Quarries	-	7.3	-	3.7	0.8	1.1	1.8
Baydale Farm	27.9	23.5	7.3	-	-	-	1.0
Todhills	-	-	5.5	32.9	-	-	0.3
Bradley Burn	-	8.2	30.7	29.0	-	9.0	4.4
Plawsworth	-	-	2.2	0.1	0.4	-	0.2
Farnley Hill	-	8.0	5.3	32.2	11.2	-	17.0
Flatts Farm	-	10.7	14.6	9.9	-	-	1.7
High Coniscliffe	-	24.0	18.0	5.6	9.9	-	2.2

3. COPE HOLE QUARRIES

3.1 Land Use

At the time of survey the north of this site was in cereal stubble while in the south one field had been recently ploughed and two consisted of permanent grass. Other, non-agricultural, land accounts for 12% of the total site area and consists of an access road and woodland.

3.2 Climate

Climate affects the grading of land through the assessment of an overall climatic limitation and through interactions with soil characteristics. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5 km grid datasets using the standard interpolation procedures (Met Office, 1989).

Table 2: Climatic and altitude data, Cope Hole Quarries

Factor	Units	Values
Grid reference	N/A	NZ 381336
Altitude	m, AOD	135
Accumulated Temperature	day°C (Jan-June)	1218
Average Annual Rainfall	mm	689
Field Capacity Days	days	171
Moisture Deficit, Wheat	mm	86
Moisture Deficit, Potatoes	mm	70
Overall climatic grade	N/A	Grade 2

3.3 Site

Most of the land is level to moderately sloping (0-5°) with variable altitude. Slope does not limit the ALC grade of these areas. However, on the site of the disused Cope Hole Quarries in the south-west the land is moderately steeply to very steeply sloping (15-28°) and this area is limited to either Grade 4 or Grade 5 depending on whether the slope is more than 18° or not. Flood risk is not of significance on this site but complex microrelief in the bottom of the disused quarries also limits some areas to Grade 4.

3.4 Geology and soils

This site is underlain by Magnesian Limestone (BGS, Sheet No. 27) which outcrops in the south. The east and north of the site is overlain by till. Where the soils are derived from limestone profiles are well drained and consist of medium clay loam topsoils overlying medium to heavy clay loam subsoils. Weathering bedrock is found below 60 cm depth where the soil is undisturbed but on the site of the disused quarries bedrock

is found at depths of 5 to 20 cm. Where till overlies the limestone the soils are generally poorly drained and consist of medium clay loam topsoils and, in some cases, upper subsoils, overlying heavy clay loam or clay. The soils have been mapped as Dunkeswick association (Soils of England and Wales, Sheet 1), although the well drained soils are more akin to the Aberford association.

3.5 Agricultural Land Classification

3.5.1 Grade 2

The north-west and south-east of the site fall in Grade 2. The soils are well drained (Wetness Class I) and consist of medium clay loam topsoils overlying medium or heavy clay loam subsoils. Weathering limestone bedrock occurs at 60 to 70 cm depth in places. The ALC grade of this land is limited by the overall climate of the area, and, in places, by soil droughtiness.

3.5.2 Subgrade 3b

Land in this subgrade occurs in the north and east. The soils are typically poorly drained (Wetness Class IV) and consist of medium clay loam topsoils and, in places, upper subsoils overlying gleyed and slowly permeable heavy clay loam or clay. The slowly permeable layers begin at between 30 cm and 40 cm depth and soil wetness is the factor which limits the ALC grade of this land.

3.5.3 Grade 4

A small area of Grade 4 land occurs in the south-west on the site of the disused Cope Hole Quarries. Thin medium clay loam topsoils overlie weathering limestone at around 20 cm depth. Some areas are limited to Grade 4 by slopes of around 15° whilst others are limited to this grade by complex microrelief, soil depth and soil droughtiness.

3.5.4 Grade 5

Land in Grade 5 also occurs on the site of the disused Cope Hole Quarries. Slopes of 28° limit some areas to Grade 5, whilst others are limited to this grade by soil depths of less than 10 cm, below which lies limestone bedrock.

3.5.5 Other land

Other land on this site consists of an access road and two areas of woodland in disused quarries.

4. BAYDALE FARM

4.1 Land Use

At the time of survey 98% of this site was in agricultural use, principally either as arable land or ley grassland, although small areas of permanent grassland occur in the far south close to the River Tees.

4.2 Climate

Climate affects the grading of land through the assessment of an overall climatic limitation and through interactions with soil characteristics. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality. The key climatic variables used for grading this site are given in Table 3 and were obtained from the published 5 km grid datasets using the standard interpolation procedures (Met Office, 1989).

Table 3: Climatic and altitude data, Baydale Farm

Factor	Units	Values
Grid reference	N/A	NZ 265133
Altitude	m, AOD	38
Accumulated Temperature	day°C (Jan-June)	1341
Average Annual Rainfall	mm	625
Field Capacity Days	days	155
Moisture Deficit, Wheat	mm	102
Moisture Deficit, Potatoes	mm	91
Overall climatic grade	N/A	Grade 1

4.3 Site

The land on this site is level (0-1°) and neither gradient nor microrelief restrict ALC grade at any point. Information obtained from both the farmer and the Environment Agency suggests that land in the south and south-west may be subject to occasional or frequent flooding and this land is therefore restricted to Subgrade 3a. No other parts of the site are at risk from flooding.

4.4 Geology and soils

Alluvium overlies Middle Magnesian Limestone (in the west), Middle Permian Marl (in the centre) and Upper Magnesian Limestone (in the east) on this site (BGS, Sheet 32). The soils are well drained and typically consist of sandy loam, sandy silt loam or medium clay loam topsoils and subsoils. Sand or loamy sand occurs below 40 cm depth in places. The soils have been mapped as belonging to the Alun association (Soils of England and Wales, Sheet 1).

Laboratory analysis of initial spot samples showed raised lead and zinc levels on some parts of the site. Subsequent work was then carried out in order to better define the extent and degree of the problem. The site was divided into blocks based on field boundaries, flood risk or, where fields exceeded 10 ha in size, on proximity to the river. The blocks varied in size between approximately 2 ha and 10 ha. Within each block 25 sub-samples were collected from the topsoil. The sub-samples were bulked together and mixed, and a sample sent to the laboratory for analysis. The results showed that the lead and zinc levels varied, with the highest being close to the river in the south and south-west, and the lowest in the north. Although some areas exceed threshold levels (levels above which expert advice is sought) it is considered that good management of the land will prevent any significant problems in terms of lead entering the food chain or affecting livestock health, or the zinc causing toxicity problems in crops. For this reason the ALC grade of the land is not affected by the presence of the raised heavy metal levels.

4.5 Agricultural Land Classification

4.5.1 Grade 1

Much of the centre and west of the site falls in Grade 1. The soils are well drained (Wetness Class I) and consist of medium sandy loam, fine sandy loam, medium sandy silt loam or fine sandy silt loam topsoils and subsoils. Loamy sand occurs below 60 cm depth in some places. Both topsoils and subsoils are stoneless in most cases. The combination of climate and soil type means that soil droughtiness is not a limiting factor in these areas. This land, therefore, has no or very minor limitations to agricultural use and falls in Grade 1.

4.5.2 Grade 2

Land in this grade occurs in the south-west, north and east. The soils are well drained (Wetness Class I) and consist of sandy loam, sandy silt loam or medium clay loam topsoils and subsoils in most cases. Horizons of loamy medium sand or medium sand occur below 60 cm depth in places. Topsoils vary between stoneless and slightly stony, with up to 6% total stones in most cases. Subsoils vary from stoneless to very stony (up to 40% hard stones) and some profiles were impenetrable below around 70 cm depth. Soil droughtiness is the factor which limits this land to Grade 2.

4.5.3 Subgrade 3a

Subgrade 3a land is found in the south-western corner of the site. The soils are similar to those on the Grade 2 land but these areas are subject to occasional or frequent short to medium-term flooding. It is this flood risk which further limits the ALC grade to Subgrade 3a.

4.5.4 Other land

Other land on this site consists of Baydale Farm and its access road, and a small area of scrub in the west.

RPT File: 20,226

5. TODHILLS

5.1 Land Use

At the time of survey most of the site was in arable use, mostly cereal stubble. A short section of dismantled railway made up 0.3 ha of Other land in the south east.

5.2 Climate

Climate affects the grading of land through the assessment of an overall climatic limitation and through interactions with soil characteristics. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality. The key climatic variables used for grading this site are given in Table 4 and were obtained from the published 5 km grid datasets using the standard interpolation procedures (Met Office, 1989).

Table 4: Climatic and altitude data, Todhills

Factor	Units	Values
Grid reference	N/A	NZ 213339
Altitude	m, AOD	100
Accumulated Temperature	day°C (Jan-June)	1262
Average Annual Rainfall	mm	696
Field Capacity Days	days	181
Moisture Deficit, Wheat	mm	88
Moisture Deficit, Potatoes	mm	72
Overall climatic grade	N/A	Grade 2

5.3 Site

Most of the land is level to moderately sloping (0-5°) with altitude ranging from 139 m AOD in the south to 65 m AOD in the north. Aspect is mostly north to north east.

5.4 Geology and soils

Carboniferous Coal Measures underlie the whole site. These are covered with thick deposits of boulder clay (BGS, Sheet 26). Soils reflect the boulder clay parent material and have medium textured topsoils usually over clayey, gleyed, slowly permeable subsoils (Wetness Class IV). Upper subsoils are occasionally ungleyed and medium textured (Wetness Class III). Soils on the site correspond to those of the Brickfield III association.

5.5 Agricultural Land Classification

5.5.1 Subgrade 3a

Two small areas of Subgrade 3a land were mapped towards Todhills village. In both cases topsoils and upper subsoils were medium textured and ungleyed, over gleyed, slowly permeable lower subsoils. Profiles were assessed as imperfectly drained (Wetness Class III) and the land is subject to a soil wetness and workability limitation.

5.5.2 Subgrade 3b

All remaining agricultural land was Subgrade 3b. Topsoils were medium textured over clayey, slowly permeable subsoils. Profiles are poorly drained (Wetness Class IV) and the land is subject to a more severe soil wetness and workability limitation than the adjoining Subgrade 3a land.

5.5.3 Other land

This comprises a small area of dismantled railway in the south of the site.

RPT File: 20,227

6. BRADLEY BURN

6.1 Land Use

Most of the site was in arable use at the time of survey, with cereals, potatoes and oilseed rape. Permanent grass occurs in the centre of the site. Non-agricultural land is found in the south of the site where a sewage works is located, and in the north-east, south-east and south-west, where belts of woodland occur.

6.2 Climate

Climate affects the grading of land through the assessment of an overall climatic limitation and through interactions with soil characteristics. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality. The key climatic variables used for grading this site are given in Table 5 and were obtained from the published 5 km grid datasets using the standard interpolation procedures (Met Office, 1989).

Table 5: Climatic and altitude data, Bradley Burn

Factor	Units	Values
Grid reference	N/A	NZ 104360
Altitude	m, AOD	130
Accumulated Temperature	day°C (Jan-June)	1230
Average Annual Rainfall	mm	688
Field Capacity Days	days	192
Moisture Deficit, Wheat	mm	86
Moisture Deficit, Potatoes	mm	70
Overall climatic grade	N/A	Grade 2

6.3 Site

Most of the site is level (0-1°) with a southerly aspect but some areas alongside Bradley Burn and Gallows Beck are strongly to very steeply sloping (9-30°). These areas are limited to Subgrade 3b, Grade 4 or Grade 5 depending on the exact slope measurement. Some land in the centre of the site (alongside Bradley Burn and Gallows Beck close to its confluence with Bradley Burn) has a very complex and hummocky microrelief which would effectively prevent ploughing of these areas. For this reason the land is limited to Grade 5.

Information obtained from both the landowner and the Environment Agency suggests that the southern and eastern parts of the site are subject to flooding. Although generally short-term winter flooding it occurs occasionally to frequently in these areas and they are, therefore, limited by flood risk to Subgrade 3a.

6.4 Geology and soils

Carboniferous Coal Measures underlie this site and there is a drift cover of river alluvium in the south and east and river terrace in the west and north (BGS, Sheet 26). Field survey work also suggests the presence of boulder clay in parts of the north of the site. The soils over most of the site are well drained and consist of light to medium-textured topsoils and subsoils. In most parts of the north-west the soils are imperfectly or poorly drained and consist of medium-textured topsoils overlying medium to heavy-textured subsoils. The soils on this site have been mapped as belonging to the Alun and East Keswick 2 associations (Soils of England and Wales, Sheet 1).

Laboratory analysis of initial spot samples taken from the south of this site showed raised lead concentrations. Subsequent work was then carried out to determine the degree and extent of this. The site was divided into blocks based on field boundaries or, where marked differences in relief occurred in a field, on flood risk. The blocks varied in size between approximately 2 ha and 10 ha. Within each block 25 sub-samples were collected from the topsoil. The sub-samples were bulked together and mixed, and some of the mixed soil sent to the laboratory for analysis. The results showed that lead levels varied, with the highest levels close to the River Wear in the south of the site. Although five blocks exceeded threshold levels (levels above which expert advice is sought) it is considered that good management of the land will prevent any significant problems in terms of lead entering the food chain or affecting livestock health. For this reason the ALC grade of the land is not affected by the presence of the raised lead levels.

6.5 Agricultural Land Classification

6.5.1 Grade 2

Grade 2 land occurs in the east of the site. The soils are well drained (Wetness Class I) and consist of sandy loam, sandy silt loam, sandy clay loam, medium clay loam or medium silty clay loam topsoils and subsoils. Horizons of loamy sand occur below 40 cm depth in places. Both topsoils and subsoils are very slightly to slightly stony, containing 3% to 11% hard stones (2-4% larger than 2 cm in the topsoil), although moderately stony (20% hard stones) horizons occur below 40 cm depth in a few places. The ALC grade of this land is limited by the climate of the area, and, in places, by slight soil droughtiness and topsoil workability limitations.

6.5.2 Subgrade 3a

Subgrade 3a land occurs in the south of the site and in a small block in the north-west. The soils in the south are well drained (Wetness Class I) with medium sandy loam topsoils in most cases overlying medium sandy loam or loamy medium sand subsoils. The topsoils are stoneless to slightly stony, containing up to 15% stones of different lithologies (up to 8% greater than 2 cm in size). Subsoils are very slightly to very stony, containing between 5% and 50% stones. Much of the land east of the sewage works is subject to

frequent or occasional short to medium-term flooding and it is this flood risk which limits this land to Subgrade 3a. To the west of the sewage works the subsoils are somewhat lighter-textured and this gives rise to a soil droughtiness limitation in this area.

In the north-west of the site the soils vary between well and imperfectly drained (Wetness Classes I to III). Two main soil types exist in this area. The first consists of well drained profiles consisting of slightly stony sandy loam or sandy clay loam topsoils (with 8-15% stones) overlying slightly to moderately stony sandy loam or sandy clay loam subsoils (15-18% stones). Many of these profiles were impenetrable by auger below 45 cm or 50 cm depth and soil droughtiness is the grade-limiting factor. The second soil type in the north-west is imperfectly drained (Wetness Class III) and consists of medium clay loam topsoils, gleyed upper subsoils and gleyed and slowly permeable lower subsoils. These occur where boulder clay drift occurs and soil wetness is the grade-limiting factor.

6.5.3 Subgrade 3b

Subgrade 3b land covers 29 ha of the site. In the north-west the soils are poorly drained (Wetness Class IV) and consist of medium clay loam topsoils overlying gleyed and slowly permeable sandy clay loam or heavy clay loam subsoils at between 20 cm and 30 cm depth. Soil wetness is the grade-limiting factor in this area. Elsewhere on the site the Subgrade 3b land consists of well drained profiles (Wetness Class I) with medium sandy loam topsoils overlying medium sandy loam or loamy medium sand upper subsoils and loamy sand lower subsoils. The topsoils in these areas are slightly to moderately stony, containing between 10% and 25% stones of mixed lithology (5%-17% greater than 2 cm in size). The subsoils vary between slightly and very stony (15-60% stones) and many profiles were impenetrable to auger below topsoil level. The ALC grade of this land is limited by soil droughtiness and/or topsoil stoniness.

6.5.4 Grade 5

The land alongside Gallows Beck and Bradley Burn is limited to Grade 5 either by slopes of greater than 18° or a complex and hummocky system of microrelief which effectively prevents ploughing of this land.

6.5.5 Other land

Other land on this site consists of the sewage works in the south and belts of woodland in the north-east, south-east and south-west.

RPT File: 20,228

7. PLAWSWORTH QUARRY

7.1 Land Use

Most of this land was in set-aside although the south-west consisted of permanent grass/rough grazing and an area in the west consisted of non-agricultural land.

7.2 Climate

Climate affects the grading of land through the assessment of an overall climatic limitation and through interactions with soil characteristics. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality. The key climatic variables used for grading this site are given in Table 6 and were obtained from the published 5 km grid datasets using the standard interpolation procedures (Met Office, 1989).

Table 6: Climatic and altitude data, Plawsworth Quarry

Factor	Units	Values
Grid reference	N/A	NZ 267478
Altitude	m, AOD	85
Accumulated Temperature	day°C (Jan-June)	1271
Average Annual Rainfall	mm	677
Field Capacity Days	days	170
Moisture Deficit, Wheat	mm	90
Moisture Deficit, Potatoes	mm	76
Overall climatic grade	N/A	Grade 2

7.3 Site

Most of the land is gently to moderately sloping (2-5°) and gradient does not limit ALC grade. However, slopes of around 8° in the north-western corner and around 15° in the south-western corner limit these areas to Subgrade 3b and Grade 4 respectively. Neither microrelief nor flood risk are grade-limiting factors on this site.

7.4 Geology and soils

Carboniferous Middle Coal Measures underlie deposits of glacial sand and gravel (BGS, Sheet 26). The soils are well drained and consist of sandy loam topsoils and upper subsoils overlying loamy sand or sand lower subsoils. The soils have been mapped as belonging to the Newport 1 association (Soils of England Wales, Sheet 1).

7.5 Agricultural Land Classification

7.5.1 Subgrade 3a

Most of the site falls in this subgrade. The soils are well drained and consist of medium sandy loam topsoils and upper subsoils overlying loamy medium sand or medium sand lower subsoils. Topsoils and subsoils are very slightly to slightly stony, with 4-7% hard stones in the topsoil and 5-8% hard stones in the subsoil. The ALC grade of this land is limited by soil droughtiness.

7.5.2 Subgrade 3b

A small area of Subgrade 3b land occurs in the west of the site. The soils are similar to those on the adjoining Subgrade 3a land but a slope of approximately 8° limits this area to Subgrade 3b.

7.5.3 Grade 4

Grade 4 land occurs in the south-western corner. Slopes of around 15° in this area severely restrict the safe and efficient use of agricultural machinery and it is this factor which limits the land to Grade 4.

7.5.4 Other land

Other, non-agricultural, land consisting of part of the existing quarry occurs in the far west.

RPT File: 20,229

8. FARNLEY HILL

8.1 Land Use

The land at Farnley Hill was in mixed arable and grassland use at the time of survey, with winter cereals and grassland in the north of the site, and recently ploughed land in the south. Other land on the site consists of woodland in the north and north-east, the farmhouse and outbuildings at Farnley, an embankment and woodland in the south-east, and an area of derelict industrial land north of the River Wear.

8.2 Climate

Climate affects the grading of land through the assessment of an overall climatic limitation and through interactions with soil characteristics. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality. The key climatic variables used for grading this site are given in Table 7 and were obtained from the published 5 km grid datasets using the standard interpolation procedures (Met Office, 1989).

Table 7: Climatic and altitude data, Farnley Hill

Factor	Units	Values
Grid reference	N/A	NZ 205326
Altitude	m, AOD	65
Accumulated Temperature	day°C (Jan-June)	1302
Average Annual Rainfall	mm	677
Field Capacity Days	days	179
Moisture Deficit, Wheat	mm	92
Moisture Deficit, Potatoes	mm	78
Overall climatic grade	N/A	Grade 2

8.3 Site

In general terms the south and centre of the site is level to gently sloping (0-3°) with variable aspect. Gradient is not a grade-limiting factor in this area. In the north and north-west much of the land is moderately sloping to steeply sloping (4-25°). Slopes in this area of between 7° and 11° limit the land to Subgrade 3b, land with slopes greater than 11° is restricted to Grade 4, and land with slopes greater than 18° is limited to Grade 5.

Much of the south and centre of the site is subject to periodic flooding. Information obtained from the landowner and the Environment Agency suggests that parts of the south of the site are limited to Subgrade 3a as a result of occasional to frequent short-term winter flooding. Some parts of the centre of the site which flood somewhat less frequently are limited to Grade 2 by flood risk. Microrelief is not a grade-limiting factor on this site.

8.4 Geology and soils

The area is underlain by Carboniferous Coal Measures and there is a drift cover of river alluvium in the centre, south and north-western corner, river terrace in the centre, and till in the north and along the western edge of the site (BGS, Sheet 26). The soils vary between poorly drained medium to heavy-textured soils and well drained very light to light-textured soils.

Laboratory analysis of initial spot samples taken from the areas at risk from flooding showed raised lead and zinc concentrations in some cases. Subsequent work was then carried out to determine the degree and extent of this. The site was divided into blocks based on field boundaries or, where marked differences in relief occurred in a field, on flood risk. The blocks varied in size between approximately 2 ha and 7 ha. Within each block 25 sub-samples were collected from the topsoil. The sub-samples were bulked together and mixed, and some of the mixed soil sent to the laboratory for analysis. The results showed that lead and zinc levels varied, with the highest levels close to the River Wear in the south and east of the site. Although two blocks exceeded threshold levels (levels above which expert advice is sought) it is considered that good management of the land will prevent any significant problems in terms of lead entering the food chain or affecting livestock health, or zinc causing toxicity in crops. For this reason the ALC grade of the land is unaffected by the presence of the raised lead and zinc levels.

8.5 Agricultural Land Classification

8.5.1 Grade 2

Grade 2 land is found in the east and in the north-western corner on river terrace and alluvium. The soils are well drained (Wetness Class I) and consist of medium sandy loam, sandy clay loam, medium clay loam or medium silty clay loam topsoils and subsoils in most cases. Alongside the river in the east loamy sand subsoils typically occur below 50 cm depth. The ALC grade of this land is limited by the climate of the area, by a topsoil workability restriction where medium-textured topsoils occur, by flood risk close to the river, and by slight soil droughtiness close to the river in the east.

8.5.2 Subgrade 3a

Land in this subgrade occurs in the south. The soils are typically well drained (Wetness Class I) and consist of loamy sand, sandy loam or medium silty clay loam topsoils and subsoils. Most of this area is limited to Subgrade 3a by flood risk although some areas are also restricted by soil droughtiness where loamy medium sand topsoils overlie similar subsoils.

8.5.3 Subgrade 3b

This is the dominant grade on the site, covering 32 ha. Most of the soils are imperfectly or poorly drained (Wetness Classes III and IV) and consist of medium clay loam or heavy clay loam topsoils and, in places, upper subsoils,

overlying gleyed and slowly permeable heavy clay loam, clay or silty clay. The combination of soil wetness and topsoil workability restrictions limits the ALC grade of this land. Some parts of the north and west are also restricted to Subgrade 3b by slopes of between 7° and 11°.

8.5.4 Grade 4

Three areas of Grade 4 occur in the north of the site. In most cases heavy clay loam topsoils overlie gleyed and slowly permeable clay or silty clay subsoils at between 15 cm and 30 cm depth. The combination of poorly drained (Wetness Class IV) soils and heavy-textured topsoils is what limits this land to Grade 4. Some areas in the north-west and on a terrace in the east are limited to Grade 4 by slopes of between 11° and 14°.

8.5.5 Grade 5

Two small areas of Grade 5 land occur in the north of the site. Slopes of between 20° and 24° are the grade-limiting factor in these cases.

8.5.6 Other land

Other land on this site consists of the farmhouse and outbuildings at Farnley, woodland in the north-east, woodland on an embankment in the south-east, and an area of derelict industrial land north of the River Wear.

RPT File: 20,230

9. FLATTS FARM

9.1 Land Use

With the exception of some farm buildings and associated land in the centre of the site all of this site was growing potatoes at the time of survey.

9.2 Climate

Climate affects the grading of land through the assessment of an overall climatic limitation and through interactions with soil characteristics. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality. The key climatic variables used for grading this site are given in Table 8 and were obtained from the published 5 km grid datasets using the standard interpolation procedures (Met Office, 1989).

Table 8: Climatic and altitude data, Flatts Farm

Factor	Units	Values
Grid reference	N/A	NZ 209307
Altitude	m, AOD	65
Accumulated Temperature	day°C (Jan-June)	1303
Average Annual Rainfall	mm	679
Field Capacity Days	days	182
Moisture Deficit, Wheat	mm	92
Moisture Deficit, Potatoes	mm	78
Overall climatic grade	N/A	Grade 2

9.3 Site

Most of the site is level (0°) although some gently sloping land (2-3°) occurs in the north-west and south-west. As such gradient does not restrict ALC grade at any point on this site, and nor is microrelief a significant factor. Information obtained from the Environment Agency shows that parts of the north and east of the site are at risk from flooding. Occasional short to medium-term winter flooding appears to be the main risk and so this land is restricted to Subgrade 3a.

9.4 Geology and soils

Alluvium or, in the south-west and north-west, river terrace, overlie Carboniferous Coal Measures at Flatts Farm (BGS, Sheet 26). With the exception of the north-western corner (where imperfectly or poorly drained soils consisting of light to medium textured topsoils overlying medium to heavy textured subsoils occur), the soils are well drained. In most cases sandy loam or sandy silt loam topsoils overlie sandy loam, sandy silt loam, sandy clay loam, loamy sand or sand subsoils.

Laboratory analysis of initial spot samples taken from across the site showed raised lead (and in one case zinc) levels in the centre and west. Subsequent work was then carried out to determine the degree and extent of this. The whole site was divided into six blocks which varied in size between approximately 4 ha and 8 ha. Within each block 25 sub-samples were collected from the topsoil. The sub-samples were bulked together and mixed, and some of the mixed soil sent to the laboratory for analysis. The results showed that lead and zinc levels varied, with the highest levels in the west and north. Lead exceeded threshold levels (levels above which expert advice is sought) in five out of the six blocks and zinc exceeded threshold levels in one block. However, it is considered that good management of the land will prevent any problems in terms of lead entering the food chain or affecting livestock health, or zinc causing toxicity in crops. For this reason the ALC grade of the land remains unaffected.

9.5 Agricultural Land Classification

9.5.1 Grade 2

Much of the south of the site falls in Grade 2. The soils are well drained (Wetness Class I) and consist of fine or medium sandy loam topsoils overlying medium sandy loam or fine sandy loam subsoils. Horizons of loamy medium sand or sandy clay loam occur below around 60 cm depths in places. Both topsoils and subsoils are very slightly stony in most cases, containing 2-4% hard stones. The factors limiting the land to Grade 2 are climate and, in a few places, slight soil droughtiness.

9.5.2 Subgrade 3a

Much of the north of the site is limited to Subgrade 3a by flood risk although the soils are very similar to those on the Grade 2 land. The Subgrade 3a land in the north-western corner consists of very slightly stony to slightly stony medium sandy loam topsoils and medium sand subsoils. In this area soil droughtiness also limits the land to Subgrade 3a.

9..5.3 Subgrade 3b

Land in this subgrade occurs in the centre and north-west and two distinct soil types occur. The first is found along the north-western edge of the site where soils are imperfectly or poorly drained (Wetness Classes III and IV) and consist of sandy loam or heavy clay loam topsoils overlying sandy clay loam, heavy silty clay loam or clay subsoils. These soils become gleyed and slowly permeable at between 30 cm and 55 cm depth and soil wetness is the grade-limiting factor. The remaining Subgrade 3b land is well drained (Wetness Class I) with slightly to moderately stony sandy loam topsoils overlying sandy loam or loamy sand subsoils which are also slightly to moderately stony. The ALC grade of this land is limited by soil droughtiness and, west of Flatts Farm, topsoil stoniness.

9.5.4 Other land

Other land on this site consists of Flatts Farm and adjoining areas.

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10. HIGH CONISCLIFFE

10.1 Land Use

Most of High Coniscliffe was in ley and permanent grass although an area of rough grazing occurred in the far west and one field was growing potatoes in the south-east. Non-agricultural land on the site consisted of a plantation in the south-east.

10.2 Climate

Climate affects the grading of land through the assessment of an overall climatic limitation and through interactions with soil characteristics. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality. The key climatic variables used for grading this site are given in Table 9 and were obtained from the published 5 km grid datasets using the standard interpolation procedures (Met Office, 1989).

Table 9: Climatic and altitude data, Flatts Farm

Factor	Units	Values
Grid reference	N/A	NZ 229148
Altitude	m, AOD	50
Accumulated Temperature	day°C (Jan-June)	1327
Average Annual Rainfall	mm	640
Field Capacity Days	days	162
Moisture Deficit, Wheat	mm	100
Moisture Deficit, Potatoes	mm	89
Overall climatic grade	N/A	Grade 1

10.3 Site

Most of the land on this site is level (0-1°) and in these areas slope does not restrict ALC grade. Only in the far north are slopes sufficient (9°-10°) to limit small areas to Subgrade 3b. Information obtained from the Environment Agency shows that parts of the south and west of the site are subject to flooding. Occasional short to medium-term flooding appears to be the main risk and this land is therefore restricted by flood risk to Subgrade 3a.

The western part of the site consists of a complex series of dry river channels which would effectively prevent this area becoming productive arable land. For this reason the land in this area has been mapped as Grade 4.

10.4 Geology and soils

River terrace (or in the west alluvium) overlie Magnesian Limestone at High Coniscliffe. The soils are well drained and consist of medium sandy loam, fine sandy loam, medium clay loam or sandy clay loam topsoils and subsoils in most cases, with

loamy sand occurring at depth in places. Laboratory analysis of initial spot samples taken from across the site showed raised lead and zinc levels in some areas. Subsequent work was carried out to determine the degree and extent of this. The site was divided into eight blocks which varied in size between approximately 4 ha and 8 ha. The blocks were based on field boundaries or, where marked, differences in relief occurred in a field, on flood risk. A sample from each block (made up of 25 sub-samples, collected in a 'W' pattern across the block) was sent to the laboratory for analysis. The results showed that lead and zinc levels varied, with the highest levels in the south and west. Five blocks exceeded the threshold level (above which expert advice is sought) for lead and two for zinc. However, it is considered that good management of the land will prevent any significant problem in terms of lead entering the food chain or affecting livestock health, or zinc causing toxicity problems in crops. For this reason the ALC grade of the land is unaffected by the raised lead and zinc levels.

10.5 Agricultural Land Classification

10.5.1 Grade 2

A total of 24 ha in the centre of the site falls in Grade 2. The soils are well drained (Wetness Class I). Medium sandy loam, fine sandy loam, medium clay loam or sandy clay loam topsoils and subsoils occur over most of the area although horizons of loamy medium sand occur below 50 cm depth in places. Topsoils and subsoils are typically very slightly to slightly stony, containing up to 10% hard stones, but lower subsoils are moderately to very stony in places, with between 25% and 45% hard stones. Slight soil droughtiness is the grade-limiting factor in this area.

10.5.2 Subgrade 3a

Two areas of Subgrade 3a land are found on this site. In the south the soils are similar to those on the adjoining Grade 2 land (although sandy silt loam topsoils and subsoils also occur) but this land is subject to frequent or occasional short-term winter flooding which further limits the ALC grade to 3a. In the north slightly stony sandy loam or medium clay loam topsoils overlie slightly to moderately stony sandy loam, medium clay loam or loamy medium sand subsoils. In some areas stones greater than 2 cm exceed 10% in the topsoil thus limiting the land to Subgrade 3a, while in other areas the land is limited by soil droughtiness.

10.5.3 Subgrade 3b

Subgrade 3b occurs in the far north. The soils are well drained and light to medium-textured (sandy loam or medium clay loam) but topsoils are moderately stony, with between 15% and 23% stones greater than 2 cm in size. Topsoil stone contents of this level prevent the land being graded higher than Subgrade 3b.

10.5.4 Grade 4

Grade 4 land was mapped in the south and west where a complex series of dry river channels effectively prevent the area from becoming productive arable land. Typically very slightly to slightly stony sandy loam topsoils overlie very slightly to very stony sandy loam or loamy sand subsoils, but microrelief is the grade-limiting factor.

10.5.5 Other land

Other land on this site consists of a plantation in the south-east.

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SOURCES OF REFERENCE

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APPENDIX I

DESCRIPTIONS OF THE 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 includes 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 or horticultural crops can usually be grown but on some land of this 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 land.

Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the timing and type of cultivation, harvesting or the level of yield. When 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 the level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist 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 severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.