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Dover District Local Plan Land at Sandwich, (Pfizer) Agricultural Land Classification, (Reconnaissance survey) ALC Map and Report October 1994

AGRICULTURAL LAND CLASSIFICATION REPORT

DOVER DISTRICT LOCAL PLAN LAND AT SANDWICH, (PFIZER) RECONNAISSANCE SURVEY

1. Summary

- 1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for a site at Great Stonar in the Dover District of Kent. The work forms part of MAFF's statutory input to the preparation of the Dover District Local Plan.
- 1.2 The site comprises approximately 63 hectares of land to the south-east of the A256 and to the west of existing chemical and industrial works at Great Stonar, near Sandwich in Kent. An Agricultural Land Classification (ALC) survey was carried out during October 1994. The survey was undertaken at a reconnaissance level of approximately one boring every four hectares. A total of 16 borings and two soil inspection pits were described in accordance with MAFF's 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 a long term limitation on its use for agriculture.
- 1.3 The survey work was carried out by the Resource Planning Team of the Guildford Statutory Group of ADAS.
- 1.4 At the time of survey the land use was a mixture of permanent pasture and winter cereals. A road embankment, along the western site boundary, and car park, in the north of the site, have been mapped as urban. A former tip, in the east of the site, and unfarmed areas adjacent to the river are shown as non-agricultural.
- 1.5 The distribution of grades and subgrades is shown on the attached ALC map and the areas and extent are given in the table below. The map has been drawn at a scale of 1:10,000. It is accurate at this scale, but any enlargement would be misleading.

Table 1 : Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site	% of Agricultural Land
3b	54.0	85.9	100.0 (54.0 ha)
Urban	2.7	4.3	
Non-agricultural	<u>6.2</u>	<u>9.8</u>	
Total area of site	62.9	100.0	

1.6 Appendix I gives a general description of the grades, subgrades and land use categories identified in the survey. The main classes are described in terms of the

type of limitation that can occur, the typical cropping range and the expected level and consistency of yield.

1.7 All of the agricultural land surveyed has been classified as Subgrade 3b, moderate quality, because of significant soil wetness and workability limitations. Calcareous clay and heavy clay loam topsoils overlie clay subsoils. These subsoils are slowly permeable and act to significantly impair drainage. The interaction between these topsoil textures and poor soil drainage with the prevailing local climate acts to impose soil wetness and workability restrictions.

2. Climate

- 2.1 The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.
- 2.2 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 (degree days Jan-June), as a measure of the relative warmth of a locality.
- 2.3 A detailed assessment of the prevailing climate was made by interpolation from a 5km gridpoint dataset (Met. Office 1989). The details are given in the table below and these show that there is no overall climatic limitation affecting the site. The crop adjusted soil moisture deficits at this locality are higher than the regional average. High soil moisture deficits increase the likelihood of soil droughtiness limitations, whilst relatively low field capacity days decrease that of soil wetness limitations.
- 2.4 No local climatic factors such as exposure or frost risk are believed to affect the site.

Table 2 : Climatic Interpolation

Grid Reference	TR328592
Altitude (m)	3
Accumulated Temperature	1489
(degree days, Jan-June)	
Average Annual Rainfall (mm)	656
Field Capacity (days)	134
Moisture Deficit, Wheat (mm)	129
Moisture Deficit, Potatoes (mm)	128
Overall Climatic Grade	1

3. Relief

3.1 The site is flat and lies at approximately 3 m AOD. An embankment running through the centre of the site (The Monk's Wall) represents an old flood defence

wall. However, there is no evidence that the site is prone to flooding at the present time.

4. Geology and Soil

- 4.1 British Geological Survey (1977), Sheet 290, shows the entire site to be underlain by drift deposits of clay derived from marine and estuarine alluvium.
- 4.2 The relevant soil map for this site (SSEW, 1980, 1:250,000) shows the entire site to comprise soils of the Newchurch Series. These soils are described as 'calcareous clayey marshland soils affected by fluctuating groundwater' (SSEW, 1980).
- 4.3 Detailed field examination of the soils on the site found poorly drained calcareous heavy textured soils, but with soil wetness problems arising from impeded drainage rather than fluctuating groundwater.

5. Agricultural Land Classification

- 5.1 Table 1 provides the details of the area measurements for each grade and the distribution of each grade is shown on the attached ALC map.
- 5.2 The location of the soil observation points are shown on the attached sample point map.

Subgrade 3b

5.3 All of the agricultural land surveyed has been classified as moderate quality because of significant soil wetness and workability limitations. All topsoils are calcareous and typically comprise clays, though in the north and west of the site heavy clay loams also occur. These overlie calcareous clay subsoils which, as shown by Pit 2, are poorly structured. The slowly permeable characteristics of such subsoils act to significantly impede drainage. This results in seasonal waterlogging as evidenced by gleying below, and occasionally within, the topsoil. Such profiles are assigned to Wetness Class IV. Adjacent to the river, in the west of the site, subsoils are also poorly structured but sometimes contain lenses of fine sand. Pit 1 typifies such soils. These profiles are also placed into Wetness Class IV. The interaction between these poor soil drainage conditions and the heavy topsoil textures with the relatively dry climatic regime prevailing at this site means that this land can be classified as no better than moderate quality. This land is subject to significant restrictions on its use, in terms of workability, opportunities for cultivations and grazing by livestock. Crop growth and yield will also be adversely affected by such soil wetness.

ADAS Ref: 2004/254/94 MAFF Ref: EL20/856 Resource Planning Team Guildford Statutory Group ADAS Reading

SOURCES OF REFERENCE

British Geological Survey (1977), Sheet No. 290, Dover, 1:50,000 Series (solid and drift edition).

MAFF (1988), Agricultural Land Classification of England and Wales : Revised guidelines and criteria for grading the quality of agricultural land.

Meteorological Office (1989), Climatological Data for Agricultural Land Classification.

Soil Survey of England and Wales (1980), Soil Survey Bulletin No. 9, Soils of Kent and accompanying map at 1:250,000.

APPENDIX I

DESCRIPTION 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 (eg. 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.

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religous buildings, cemetries. 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 parkland, public open spaces, sports fields, allotments and soft-surfaced areas on airports. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Woodland

Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm woodland.

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, eg. buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will be shown.

APPENDIX II

FIELD ASSESSMENT OF SOIL WETNESS CLASS

SOIL WETNESS CLASSIFICATION

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

Definition of Soil Wetness Classes

Wetness Class	Duration of Waterlogging ¹							
Ι	The soil profile is not wet within 70 cm depth for more than 30 days in most years. ²							
п	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 only wet within 40 cm depth for 30 days in most years.							
ш	The soil profile is wet within 70 cm depth for 91-180 days in most years or, if there is no slowly permeable layer present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years.							
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years or , if there is no slowly permeable layer present within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.							
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.							
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.							

Soils can be allocated to a wetness class on the basis of quantitative data recorded over a period of many years or by the interpretation of soil profile characteristics, site and climatic factors. Adequate quantitative data will rarely be available for ALC surveys and therefore the interpretative method of field assessment is used to identify soil wetness class in the field. The method adopted here is common to ADAS and the SSLRC.

¹The number of days specified is not necessarily a continuous period.

²'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

SOIL PIT AND SOIL BORING DESCRIPTIONS

Contents :

Soil Abbreviations - Explanatory Note

Soil Pit Descriptions

Database Printout - Boring Level Information

Database Printout - Horizon Level Information

SOIL PROFILE DESCRIPTIONS : EXPLANATORY NOTE

Soil pit and auger boring information collected during ALC fieldwork is held on a computer database. This uses notations and abbreviations as set out below.

Boring Header Information

- 1. GRID REF : national 100 km grid square and 8 figure grid reference.
- 2. USE : Land use at the time of survey. The following abbreviations are used.

ARA :	Arable	WHT :	Wheat	BAR : Barley
CER :	Cereals	OAT :	Oats	MZE : Maize
OSR :	Oilseed rape	BEN :	Field Beans	BRA : Brassicae
POT :	Potatoes	SBT :	Sugar Beet	FCD: Fodder Crops
LIN :	Linseed	FRT :	Soft and Top Fruit	FLW : Fallow
PGR :	Permanent Pasture	EEY :	Ley Grass	RGR : Rough Grazing
SCR :	Scrub	CFW:	Coniferous Woodland	DCW : Deciduous Wood
HTH :	Heathland	BOG :	Bog or Marsh	FLW : Fallow
PLO :	Ploughed	SAS :	Set aside	OTH : Other
HRT :	Horticultural Crop	s		

- 3. GRDNT : Gradient as estimated or measured by a hand-held optical clinometer.
- 4. GLEY/SPL : Depth in centimetres (cm) to gleying and/or slowly permeable layers.
- 5. AP (WHEAT/POTS) : Crop-adjusted available water capacity.
- 6. MB (WHEAT/POTS) : Moisture Balance. (Crop adjusted AP crop adjusted MD)
- 7. DRT : Best grade according to soil droughtiness.
- 8. If any of the following factors are considered significant, 'Y' will be entered in the relevant column.

MREL : Microrelief limitationFLOOD : Flood riskEROSN : Soil erosion riskEXP : Exposure limitationFROST : Frost proneDIST : Disturbed landCHEM : Chemical limitationFROST : Frost proneDIST : Disturbed land

9. LIMIT : The main limitation to land quality. The following abbreviations are used.

OC: Overall Climate	AE : Aspect	EX :	Exposure
FR: Frost Risk	GR : Gradient	MR :	Microrelief
FL : Flood Risk	TX : Topsoil Texture	DP :	Soil Depth
CH: Chemical	WE :Wetness	WK :	Workability
DR : Drought	ER : Erosion Risk	WD :	Soil Wetness/Droughtiness
ST: Topsoil Stonines	S		

Soil Pits and Auger Borings

1. **TEXTURE** : soil texture classes are denoted by the following abbreviations.

S : SZL :	Sand Sandy Silt Loam		Loamy Sand Clay Loam		Sandy Loam Silty Clay Loam
ZL :	Silt Loam	SCL:	Sandy Clay Loam	C :	Clay
SC :	Sandy Clay	ZC :	Silty Clay	OL :	Organic Loam
P :	Peat	SP :	Sandy Peat	LP :	Loamy Peat
PL :	Peaty Loam	PS :	Peaty Sand	MZ :	Marine Light Silts

For the sand, loamy sand, sandy loam and sandy silt loam classes, the predominant size of sand fraction will be indicated by the use of the following prefixes:

- **F**: Fine (more than 66% of the sand less than 0.2mm)
- M: Medium (less than 66% fine sand and less than 33% coarse sand)
- C: Coarse (more than 33% of the sand larger than 0.6mm)

The clay loam and silty clay loam classes will be sub-divided according to the clay content: M: Medium (<27% clay) H: Heavy (27-35% clay)

- 2. MOTTLE COL : Mottle colour using Munsell notation.
- 3. MOTTLE ABUN : Mottle abundance, expressed as a percentage of the matrix or surface described.

F: few <2% C: common 2-20% M: many 20-40% VM: very many 40% +

- 4. **MOTTLE CONT** : Mottle contrast
 - F: faint indistinct mottles, evident only on close inspection
 - D: distinct mottles are readily seen
 - **P**: prominent mottling is conspicuous and one of the outstanding features of the horizon
- 5. **PED. COL** : Ped face colour using Munsell notation.
- 6. GLEY: If the soil horizon is gleyed a 'Y' will appear in this column. If slightly gleyed, an 'S' will appear.
- 7. **STONE LITH** : Stone Lithology One of the following is used.
 - **HR**: all hard rocks and stones **SLST**: soft oolitic or dolimitic limestone

CH: chalk FSST: soft, fine grained sandstone

ZR : soft, argillaceous, or silty rocks GH : gravel with non-porous (hard) stones

MSST : soft, medium grained sandstone GS : gravel with porous (soft) stones

SI: soft weathered igneous/metamorphic rock

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Stone contents (>2cm, >6cm and total) are given in percentages (by volume).

8. **STRUCT** : the degree of development, size and shape of soil peds are described using the following notation:

degree of development	WK : weakly developed ST : strongly developed	MD : moderately developed
<u>ped size</u>	F : fine C : coarse	M : medium VC : very coarse
<u>ped shape</u>	S : single grain GR : granular SAB : sub-angular blocky PL : platy	M : massive AB : angular blocky PR : prismatic

9. **CONSIST** : Soil consistence is described using the following notation:

L : loose VF : very friable FR : friable FM : firm VM : very firm EM : extremely firm EH : extremely hard

- 10. SUBS STR : Subsoil structural condition recorded for the purpose of calculating profile droughtiness : G : good M : moderate P : poor
- 11. **POR**: Soil porosity. If a soil horizon has less than 0.5% biopores >0.5 mm, a 'Y' will appear in this column.
- 12. IMP : If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropriate horizon.
- 13. SPL : Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.
- 14. CALC : If the soil horizon is calcareous, a 'Y' will appear in this column.

15. Other notations

- APW : available water capacity (in mm) adjusted for wheat
- **APP**: available water capacity (in mm) adjusted for potatoes
- MBW : moisture balance, wheat

MBP : moisture balance, potatoes

SOIL PIT DESCRIPTION

Site Name : DOVER LP-LAND AT	PFIZER F	Pit Number	: 1P							
Grid Reference: TR32605900	Average Annua Accumulated Te Field Capacity Land Use Slope and Aspe	emperature y Level	: 656 mm : 1489 degree days : 134 days : Permanent Grass : degrees							
HORIZON TEXTURE COLOUR 036 HCL 10YR32 00 36-55 C 10YR52 00	0 0	TOT.STONE O O	LITH MOTTLES C	STRUCTURE MDCAB	CONSIST FM	SUBSTRUCTURE	CALC Y Y			
Wetness Grade : 3B	Wetness Class Gleying SPL	: IV :036 (:036 (
Drought Grade :	APW: mm APP: mm		0mm 0mm							
FINAL ALC GRADE : 3B										

MAIN LIMITATION : Wetness

SOIL PIT DESCRIPTION

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Site Name : DOVER LP-LAND AT	PFIZER Pit Number	: 2P							
Grid Reference: TR32435900	Average Annual Rainfall Accumulated Temperature Field Capacity Level Land Use Slope and Aspect								
HORIZON TEXTURE COLOUR 0-32 C 10YR32 C 32-65 C 10YR52 C		LITH MOTTLES STRUCTURE CONSIST SUBSTRUCTURE CALC Y C MDCAB FM P Y							
Wetness Grade : 3B	Wetness Class : IV Gleying :032 SPL :032								
Drought Grade :		Omm Omm							
FINAL ALC GRADE : 3B									

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MAIN LIMITATION : Wetness

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LIST OF BORINGS HEADERS 25/11/94 DOVER LP-LAND AT PFIZER -----

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	ampi	.E	ASPECT				WETI	NESS	WHE	AT-	-P0	TS-	. M.	REL	EROSN	FR	DST	CHEM	ALC		
	ю.	GRID REF	USE	GRDNT	GLE	y spl	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	I	EXP	DIST	LIMIT		COMMENTS	
	1P	TR32605900	PGR		036	036	4	3B		0		0						WE	ЗB	SAND LENS	28
	2P	TR32435900	PGR		032	032	4	3B		0		0						WE	3B		
	5	TR32805960	PGR		028	028	4	3B		0		0						WE	38		
	7	TR33005960	PGR		035	035	4	3B		0		0						WE	38		
	13	TR32415940	PGR		026	026	4	3B		0		0						WE	3B	SAND LENS	26
	15	TR32605940	PGR		030	030	4	3B		0		0						WE	3B		
	17	TR32805940	STB		030	030	4	3B		0		0						WE	3B		
	19	TR33005940	STB		032	032	4	3B		0		0						WE	ЗB		
-	32	TR32605920	PGR		030	030	4	3B		0		0						WE	3B		
	34	TR32805920	CER		027	027	4	3B		0		0						WE	3B		
	36	TR33005920	CER		028	028	4	3B		0		0						WE	3B		
_	47	TR32435900	PGR		0	030	4	3B		0		0						WE	ЗB		
	49	TR32605900	PGR		035	035	4	3B		0		0						WÉ	ЗB	SAND LENS	35
	51	TR32805900	PGR		033	033	4	3B		0		0						WE	3B	SAND LENS	33
	53	TR33005900	CER		032	032	4	3B		0		0						WE	38		
	55	TR33205900	CER		030	030	4	3B		0		0						WE	3B		
	64	TR33005880			-	040	3	3A		0		0						WE	3A		
	65	TR33205880			-	024	4	3B		0		0						WE	38		

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COMPLETE LIST OF PROFILES 25/11/94 DOVER LP-LAND AT PFIZER

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					OTTLES	5	PED			-ston	ES	- STRUCT,	/ SUB	s					
SAMPLE	DEPTH	TEXTURE	COLOUR												IMP SPL	CALC			
-																			
1P	0-36	hc]	10YR32 00						0	0	0	_				Y	_		_
	36-55	с	10YR52 00	10YR58	00 C			Y	0	0	0	MDCAB	FM P	Y	Ŷ	Y	fine sa	nd	lens
2P	0-32	с	10YR32 00						0	0	0					Y			
		c	10YR52 00	10YR56	00 C			Ŷ	0		Ő	MDCAB	FM P	Ŷ	Ŷ				
5	0-28	hc]	10YR32 00						0	0	0					Y			
	28-65	с	10YR52 00	10YR58	68 M			Ŷ	0	0	0		Ρ		Y	Y			
	0.25	67	10/040.00	10/050	00 F				~	•	•								
7	0-35	hc1	10YR42 00					v	0	-	0				Ŷ	Y			
	35-60	С	25Y 52 00	751600	5 UU M			Ŧ	U	U	0		Р		Ŷ	Y			
13	0-26	hc1	10YR42 00						0	0	0					Y			
	26-38	с	10YR53 54	10YR58	00 C			Ŷ	0	0	0		P		Ŷ	Y	fine sa	nd	lens
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	30-70	Ċ	10YR52 00	10YR68	8 00 M			Y	0	0	0		P		Y	Y			
17	0-30	с	10YR42 00	10YR56	00 F				0	0	0					Y			
_		c	10YR53 00					Y	0	-	0		Р		Y	Ŷ			
												-							
19	0-32	c	10YR42 00	10YR56	00 F				0	0	0					Y			
_	32-50	с	10YR53 00					Y	0	0	0		P		Y	Y			
	50-120	c	10YR62 61	10YR56	00 M			Y	0	0	0		P		Ŷ	Y			
32	0-30	hc]	10YR42 00						0	0	0					Y			
	30-60	c	10YR62 00	10YR68	71 M			Y	0		0 0		Р		Y	Y Y			
34	0-27	с	10YR32 00						0	0	0					Y			
	27-75	С	10YR52 00	75YR58	00 C	1	0YR61	00 Y	0	0	0		Ρ		Y	Y			
36	0-28	с	10YR32 00						0	ΟN	0					Y			
50	28-70	c	10YR52 00	75YR58	00 C	1	0YR61	00 Y	0		0		Р		Ŷ	Y			
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47	0-30	с	10YR42 00	10YR56	00 C			Y	0	0	0					Y			
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53	0-32	c	10YR42 00						0		0					Y			
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COMPLETE LIST OF PROFILES 11/11/94 DOVER LP-LAND AT PFIZER

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SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES	S PED CONT COL.				STRUCT/ TOT CONSIST	SUBS STR POR IM	1P SPL (CALC
55	0-30	c	10YR32 31				0	0	0			Y
	30-80	c	10YR52 00	75YR58 00 C	10YR61	00 Y	0	0	0	Р	Y	Y
64	0-32	hc]	10YR32 00				0	0	0			Y
	32-40	c	10YR33 00				0	0	0	м		Y
	40-80	c	10YR52 00	75YR58 00 C		Y	0	0	0	Р	Y	Y
65	0-24	c	10YR42 00	10YR56 00 F			0	0 HR	3			Y
	24-45	с	10YR53 00	10YR56 00 M		Y	0	0	0	Р	Y	Y
	45-60	с	10YR53 00	10YR56 62 M		Y	0	0	0	Ρ	Y	Y

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