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Winchester District Local Plan
Site 208 Hook Pit Farm
Kings Worthy
Agricultural Land Classification
ALC Map and Report
August 1994

AGRICULTURAL LAND CLASSIFICATION REPORT

WINCHESTER DISTRICT LOCAL PLAN SITE 208 HOOK PIT FARM KINGS WORTHY

1 Summary

- 1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for a number of sites in the Winchester District of Hampshire. The work forms part of MAFF's statutory input to the preparation of the Winchester District Local Plan.
- 1.2 Site 208 comprises 8.8 hectares of land bounded to the west by the Eastleigh Basingstoke railway line, to the south by a dismantled railway line and to the north and east by residential buildings in Kings Worthy, Hampshire. An Agricultural Land Classification (ALC) survey was carried out during July 1994. The survey was undertaken at a detailed level of approximately one boring per hectare of agricultural land surveyed. A total of 11 borings and one soil inspection pit 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 At the time of the survey the land use on the higher flatter land was oilseed rape. The remaining area, which is not agriculturally managed, is overgrown and suffers from trespass. The non agricultural land mapped comprises an area of blackberry bushes and elderberry trees. The urban mapped consists of a gravelly track.
- 1.4 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
3a	8.2	93.2	100.0 (8.2 ha)
Urban	<0.1	0.2	
Non Agricultural	<u>0.6</u>	<u>6.6</u>	
Total area of site	8.8	100.0	

- 1.5 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 6 All of the agricultural land surveyed has been classified as Subgrade 3a good quality because of a soil droughtiness restriction. Calcareous medium silty clay loam topsoils overlie similar textured or occasionally heavy silty clay loam upper subsoils above underlying chalk at varying depth. The profile available water for extraction by crop roots at this site is limited because of restricted rooting into the chalk and relatively shallow soil depth thereby giving rise to a moderate risk of drought stress.

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.

2 4 No local climatic factors such as exposure or frost risk are believed to affect the site.

Table 2 Climatic Interpolation

Grid Reference	SU487336
Altitude (m)	65
Accumulated Temperature (degree days Jan June)	1472
Average Annual Rainfall (mm)	814
Field Capacity (days)	177
Moisture Deficit Wheat (mm)	103
Moisture Deficit Potatoes (mm)	96
Overall Climatic Grade	1

3 Relief

3 1 Most of the site is flat and lies at approximately 70m AOD. The site falls through gradients of 2.5 to lie at approximately 60m AOD along the northern and eastern boundaries. Neither gradient nor relief impose any limitation to agricultural land quality.

4 Geology and Soil

- 4 1 British Geological Survey (1975) Sheet 299 Winchester shows the entire site to be underlain by Upper Chalk described as soft white chalk with many flint nodules
- 4 2 The published Soil Survey map (SSEW 1983 1 250 000) maps the Andover 1 association at this site These soils are described as shallow well drained calcareous silty soils over chalk on slopes and crests Deep calcareous and non calcareous fine silty soils in valley bottoms Striped soil patterns locally (SSEW 1983)
- 4 3 Detailed field examination found well drained calcareous silty soils overlying chalk at varying depth

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 3a

- 5 3 Good quality land is mapped across the site and is restricted by a moderate soil droughtiness limitation caused by relatively shallow profiles over chalk Topsoils typically comprise calcareous medium silty clay loams These range from being very slightly stony to moderately stony containing approximately 0.9% flints >2cm by volume and approximately 1.30% total chalk fragments and flints by volume Upper subsoils generally comprise calcareous medium silty clay loams though calcareous heavy silty clay loams also occur Where the latter occur the upper subsoils tend to be slightly stony containing approximately 8.10% total flints by volume The medium silty clay loam upper subsoils tend to be moderately to very stony containing approximately 30.60% total chalk by volume Where it was possible to auger into the lower subsoils it was found the soil profiles overlie chalk at approximately 40cm depth However due to the dry and stony subsoil conditions at the time of survey all of the borings proved impenetrable to an auger between approximately 25.60cm depth Consequently a soil pit was dug to assess conditions at depth Three separate profile descriptions (1P 2P 3P) have been recorded to account for the variation in the profiles observed in the pit dug From the pit it could be seen that the chalk occurs at approximately 35.56cm depth with common rooting observed to 78cm depth Below this the chalk became harder and more compact and it is thus likely that crop roots would be unable to extract water from below this depth The effect of this restricted rooting profile stone contents and relatively shallow soil depth in combination with the prevailing climate at this site is to reduce the available water for crops in the profile This reduces the range of crops which can be grown and gives rise to a moderate risk of drought stress for

those crops which are grown thereby affecting yield potential. Consequently the land can be graded no higher than Subgrade A.

ADAS Ref 1513/124/94
MAFF Ref EL15/00594

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

British Geological Survey (1975) Sheet No 299 Winchester 1 50 000 (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 (1985) Sheet 6 Soils of South East England 1 250 000 and accompanying legend

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 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 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
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years ²
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 only wet within 40 cm depth for 30 days in most years
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 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	LEY 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 Crops		
- 3 **GRDNT** Gradient as estimated or measured by a hand held optical clinometer
- 4 **GLEYSPL** 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 limitation	FLOOD Flood risk	EROSN Soil erosion risk
EXP Exposure limitation	FROST Frost prone	DIST Disturbed land
CHEM Chemical limitation		
- 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 Stoniness		

Soil Pits and Auger Borings

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

S	Sand	LS	Loamy Sand	SL	Sandy Loam
SZL	Sandy Silt Loam	CL	Clay Loam	ZCL	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 **GLEYS** 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		

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 **MD** moderately developed
 ST strongly developed

ped size **F** fine **M** medium
 C coarse **VC** very coarse

ped shape **S** single grain **M** massive
 GR granular **AB** angular blocky
 SAB sub angular blocky **PR** prismatic
 PL platy

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 WINCHESTER LP SITE 208 Pit Number 1P

Grid Reference SU48703360
 Age A 1 R f 11 814 mm
 Accumulated Temperature 1472 degree days
 Field Capacity Level 177 days
 Land Use Rough Grazing
 Slope and Aspect 02 degrees E

HORIZON	TEXTURE	COLOUR	STONES	TOT STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0 25	MZCL	10YR43 00	9	15	HR					Y
25 53	HZCL	10YR44 46	0	8	HR		MDCSAB	FM	M	Y
53 78	CH	10YR81 00	0	8	HR				P	Y

Wetness Grade 2
 Wetness Class I
 Gleying cm
 SPL No SPL

Drought Grade 3A
 APW 099mm MBW 4 mm
 APP 101mm MBP 5 mm

FINAL ALC GRADE 3A
 MAIN LIMITATION Drought stress

SOIL PIT DESCRIPTION

Site Name WINCHESTER LP SITE 208 Pit Number 2P

Grid Reference SU48703360 Average Annual Rainfall 814 mm
 Accumulated Temperature 1472 degree days
 Field Capacity Level 177 days
 Land Use Rough Grazing
 Slope and Aspect 02 degrees E

HORIZON	TEXTURE	COLOUR	STONES	TOT STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0 25	MZCL	10YR4.3 0/0	9	15	HR					Y
25 56	MZCL	10YR6.4 0/0	0	30	CH		MDCSAB	FR	M	Y
56 78	CH	10YR8.1 0/0	0	8	HR				P	Y

Wetness Grade 2 Wetness Class I
 Gleying cm
 SPL N SPL

Drought Grade 3A APW 0.98mm MBW 5 mm
 APP 100mm MBP 4 mm

FINAL ALC GRADE 3A
 MAIN LIMITATION Drought stress

SOIL PIT DESCRIPTION

Site Name WINCHESTER LP SITE 208 P t N mber 3P

Grid Reference SU48703360 A e g A 1 R f 11 814 mm
 Acc m lated Tempe t e 1472 deg d ys
 F eld C pacity Le 1 177 d ys
 La d Use R gh G z g
 Slope and Aspect 02 deg ees E

HORIZON	TEXTURE	COLOUR	STONES	2	TOT STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0 25	MZCL	10YR43 00	9		15	HR					Y
25 36	HZCL	10YR44 46	0		8	HR		MDCSAB	FM	M	Y
36 78	CH	10YR81 00	0		8	HR				P	Y

Wet ess Gr d 2 Wetness Clas I
 G1 y g cm
 SPL No SPL

Dro ght Gr d 3A APW 089mm MBW 14 mm
 APP 090mm MBP 6 mm

FINAL ALC GRADE 3A
 MAIN LIMITATION D o ght es

SAMPLE NO	GRID REF	ASPECT USE	WETNESS		WHEAT		POTS		M REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB					
1	SU48503370	RGR N	05		1	2			0					DR 3A	Imp 40 Re p ts
1P	SU48703360	RGR E	02		1	2	099	4 101	5	3A				DR 3A	Most Ap p ofle
2	SU48603370	RGR E	01		1	2			0					DR 3A	Imp 41 Re p ts
2P	SU48703360	RGR E	02		1	2	098	5 100	4	3A				DR 3A	Weatherd h lk
3	SU48703370	RGR E	04		1	2			0					DR 3A	Imp 35 Re pits
3P	SU48703360	RGR E	02		1	2	089	14 090	6	3A				DR 3A	Least Ap profl
4	SU48503360	OSR			1	2			0					DR 3A	Imp 50 Re pits
5	SU48603360	OSR			1	2			0					DR 3A	Imp 40 R p t
6	SU48703360	RGR E	02		1	2			0					DR 3A	Imp 40 Re pits
7	SU48403350	OSR S	02		1	2			0					DR 3A	Imp 22 Re p ts
8	SU48503350	OSR			1	2			0					DR 3A	Imp 35 Re p ts
8A	SU48503352	OSR			1	2			0					DR 3A	Imp 60 Re p ts
9	SU48703350	RGR E	03		1	2			0					DR 3A	Imp 40 Re pits
10	SU48603351	OSR E	02		1	2			0					DR 3A	Imp 40 Re p ts

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES			PED		GLEYS	STONES			STRUCT/ CONSIST	SUBS			SPL	CALC
				COL	ABUN	CONT	COL	COL		2	6	LITH		TOT	STR	POR		
1	0 15	mzc1	10YR53 00							0	0	CH	30					Y
	15 30	mzc1	10YR63 00							0	0	CH	50		M			Y
	30 40	mzc1	10YR62 00							0	0	CH	60		M			Y Impen 40cm
1P	0 25	mzc1	10YR43 00							9	0	HR	15					Y
	25 53	hzc1	10YR44 46							0	0	HR	8	MDCSAB	FM	M		Y
	53 78	ch	10YR81 00							0	0	HR	8			P		Y Root g t 78cm
2	0 27	mzc1	10YR43 00							0	0	CH	5					Y
	27 41	mzc1	10YR53 00							0	0	CH	50		M			Y Impe 41cm
2P	0 25	mzc1	10YR43 00							9	0	HR	15					Y
	25 56	mzc1	10YR64 00							0	0	CH	30	MDCSAB	FR	M		Y
	56 78	ch	10YR81 00							0	0	HR	8			P		Y Rooting to 78cm
3	0 28	mzc1	10YR43 00							0	0	HR	8					Y
	28 35	mzc1	10YR44 00							0	0	CH	20		M			Y Impen 35cm
3P	0 25	mzc1	10YR43 00							9	0	HR	15					Y
	25 36	hzc1	10YR44 46							0	0	HR	8	MDCSAB	FM	M		Y
	36 78	ch	10YR81 00							0	0	HR	8			P		Y Root ng 78cm
4	0 27	mzc1	10YR43 00							2	0	HR	4					Y
	27 50	ch	10YR81 00							0	0	HR	1			P		Y Impen 50cm
5	0 25	mzc1	10YR43 00							7	0	HR	12					Y
	25 40	mzc1	10YR64 00							0	0	CH	30		M			Y
	40 50	ch	10YR81 00							0	0	HR	1			P		Y Impe 40cm
6	0 28	mzc1	10YR54 00							0	0	HR	8					Y
	28 39	mzc1	10YR44 00							0	0	HR	8		M			Y
	39 40	ch	10YR81 00							0	0	HR	8			P		Y Impe 40cm fl i ty
7	0 22	mzc1	10YR44 00							2	0	HR	10					Y Impen 22cm fl nty
8	0 20	mzc1	10YR43 00							5	0	HR	7					Y
	20 25	mzc1	10YR43 44							0	0	HR	10		M			Y Impen 25cm fl nty
8A	0 28	mz 1	10YR43 00							3	0	HR	5					Y
	28 45	mzc1	10YR43 81							0	0	CH	50		M			Y
	45 58	mzc1	10YR54 81							0	0	CH	50		M			Y Impe 60cm fl ty
9	0 10	mc1	10YR54 00							0	0	CH	10					Y
	10 30	mzc1	10YR43 00							0	0	CH	10		M			Y
	30 40	mzc1	10YR54 00							0	0	CH	50		M			Y Impe 40cm fl ty
10	0 20	mzc1	10YR43 00							0	0	HR	1					Y
	20 40	hzc1	10YR44 00							0	0	HR	8		M			Y Impe 40cm fl ty