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WEST OXFORDSHIRE LOCAL PLAN
Land At Aston
Oxfordshire

Agricultural Land Classification
ALC Map and Report

October 1998

Resource Planning Team
Eastern Region
FRCA Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

WEST OXFORDSHIRE LOCAL PLAN
LAND AT ASTON
OXFORDSHIRE

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 14.0 hectares of land to the east of Aston, West Oxfordshire. The survey was carried out during October 1998.

2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)[1] on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF). The survey was carried out in connection with MAFF's statutory input to the West Oxfordshire Local Plan. This survey supersedes any previous ALC information for this land.

3. The work was conducted by members of the Resource Planning Team in the Eastern 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.

4. At the time of survey the agricultural land had recently been ploughed. The areas mapped as 'Other land' include a recreation ground and residential buildings.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000. It is accurate at this scale but any enlargement would be misleading.

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

7. The fieldwork was conducted at an average density of approximately 1 boring per hectare of agricultural land. In total, 10 borings and three soil pits were described.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
2	4.3	50.6	30.7
3a	4.2	49.4	30.0
Other land	5.5	N/A	39.3
Total surveyed area	8.5	100	60.7
Total site area	14.0	-	100

[1] FRCA is an executive agency of MAFF and the Welsh Office.

8. Just over half of the land surveyed has been classified as Grade 2 (very good quality) with Subgrade 3b (moderate quality) making up the remainder. The main limitation over much of the survey area is soil wetness; with soil droughtiness and/or soil workability being equally or more restricting in places.

9. The land is mapped as Grade 2 and typically comprises fine loamy soil profiles (derived from river terrace deposits) which tend to be moderately well drained. Some profiles are well drained but have heavy textured topsoils which, when combined with the moist climatic regime at this locality gives rise to minor soil workability problems. Soil wetness/workability adversely affects plant growth or imposes restrictions on cultivations or grazing by livestock by reducing the period during which the soils can be cultivated. In addition to this, profile available water is often restricted due to the presence of stones, gravelly horizons and/or sandy textures which reflect the underlying gravels. Soil droughtiness may result in the level and consistency of crop yields being restricted. Occasional borings of better quality are also included in this mapping unit but are too few in number to be mapped separately at this scale.

10. The land mapped as Subgrade 3b unit has soils which are limited by wetness due to the presence of clayey horizons at shallow depths. The soil wetness and workability limitations are more severe than for the land mapped as Grade 2 describe above.

FACTORS INFLUENCING ALC GRADE

Climate

11. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

12. The key climatic variables used for grading this site are given in Table 2 overleaf and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

13. 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.

14. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (AT0, January to June), as a measure of the relative warmth of a locality.

15. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Exposure and frost risk are not believed to have a significant effect on the site. The site is climatically Grade 1.

Site

16. The agricultural land at this site lies at an altitude of 60-66m AOD and is flat or gently undulating. There are no flooding or micro-relief restrictions which adversely affect the land quality.

Table 2: Climatic and altitude data

Factor	Units	Values
Grid reference	N/A	SP 346 030
Altitude	m, AOD	65
Accumulated Temperature	day°C (Jan-June)	1444
Average Annual Rainfall	mm	671
Field Capacity Days	days	145
Moisture Deficit, Wheat	mm	109
Moisture Deficit, Potatoes	mm	101
Overall climatic grade	N/A	Grade 1

Geology and soils

17. The most detailed published geological information (BGS, 1982) maps three main types of geological deposit across the site. The most extensive of these is the alluvium which is shown to occur in the central and eastern parts of the site. River terrace gravel (First and Second Terrace) deposits are mapped in the western section of the survey area together with a very limited area of Oxford Clay which is indicated in the extreme south-west.

18. The most detailed published soil information for the site (at 1:25,000 scale) shows three distinctive soil series which correspond directly to the geological deposits. These are the Kelmscot Series, the Bampton Series, and the Badsey Series (SSEW, 1982). The Kelmscot Series is described as 'Loamy or silty soils developed over calcareous gravelly or sandy gravelly (limestone gravel); drift (river terrace deposits)'. The Bampton Series comprise gleyic brown calcareous earths which are described as 'fine silty or loamy soils developed in drift (head) deposits'. The Badsey Series are described as 'Loamy soils developed over calcareous gravelly or sandy gravelly (limestone gravel); drift (river terrace deposits)'.

AGRICULTURAL LAND CLASSIFICATION

19. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1.

20. The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix II.

Grade 2

21. The western half (totalling 4.3 hectares) of the site has been classified as Grade 2 (very good quality) agricultural land. The land is affected mainly by soil droughtiness in combination with soil wetness/workability.

22. The soil profiles within this unit comprise calcareous, very slightly or slightly stony (up to 8% total flint), medium or heavy clay loam (or silty clay loam) topsoils. These overlie heavy clay loam upper subsoils which are stoneless or very slightly stony (containing up to 5% total flint

fragments). Lower subsoils are variable in nature as a result of the interbedded gravelly deposits that they are derived from. Soil textures vary from medium clay loam to clay (sometimes containing sand lenses in places) and often become more stony with depth (containing up to 20% total flint). Where soil droughtiness is limiting, the combination of soil texture and the amount of hard rock (gravel) restricts the water available to crops such that there is a very slight risk of drought stress to the plants in most years. This will result in a reduction in the level and consistency of yields. Soil pit 2P (see Appendix II) is representative of this soil type which is permeable (Wetness Class I) but shows somw indication of groundwater in the form of gleying in the lower subsoil. Where soil wetness/workability is equally limiting to soil droughtiness, profiles show either evidence of restricted drainage in the form of gleying (within 40cm depth) or have heavy clay loam or heavy silty clay loam textured topsoils. These soils are again permeable but tend to show signs of fluctuating groundwater higher in the soil profile. In this climatic regime, the degree of waterlogging, alone or in combination with the heavy topsoil textures, places these soils in Wetness Class I or II, Wetness Grade 2. Soil pit 3P is representative of these soil types. Soil wetness has the effect of causing waterlogging which will restrict seed germination and growth as well as limit the timing of cultivations. Soils such as these (especially when combined with the heavy topsoil textures), are also susceptible to structural damage through trafficking by agricultural machinery and grazing livestock. Very occasional borings of better quality occur within the Grade 2 mapping unit but were too sporadic to be mapped separately at this scale.

Subgrade 3b

23. The remaining half of the site (totalling 4.2 hectares) has been classified as Subgrade 3b (moderate quality agricultural land) on the basis of a significant soil wetness limitation.

24. The profiles comprise calcareous, stoneless or very slightly stony (0-3% total flint), medium or heavy clay loam (or occasionally heavy silty clay loam) topsoils. At shallow depths within the profile (28–35cm), clay or calcareous silty clay subsoils are encountered which impede soil drainage. Soil inspection pit 1P (see Appendix II) reveals these shallow clay upper subsoils to be poorly structured and slowly permeable. Given such evidence of wetness, these soils are placed in Wetness Class IV; when combined with the topsoil textures and the local climatic regime, this land is limited to Subgrade 3b on the basis of the poor drainage conditions which will form a significant limitation on the versatility of this land. Very occasional borings of better quality again occur within the Subgrade 3b mapping unit but were too few and far between to be mapped separately at this scale.

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SOURCES OF REFERENCE

British Geological Survey (1982) *Sheet No. 236, Witney.*
BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.*
MAFF: London.

Met. Office (1989) *Climatological Data for Agricultural Land Classification.*
Met. Office: Bracknell.

Soil Survey of England and Wales (1983) *Sheet 6, Soils of South East England.*
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England.*
SSEW: Harpenden.

Soil Survey Record No. 77 (1982) *Soils In Oxfordshire I, Sheet SP30 (Witney South).*
SSEW: Harpenden.

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.

APPENDIX II

SOIL DATA

Contents:

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	**OTH**	Other
DCW:	Deciduous woodland	**BOG:**	Bog or marsh	**SAS:**	Set-Aside
HTH:	Heathland	**HRT:**	Horticultural crops	**PLO:**	Ploughed

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 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	**ST**:	Topsoil Stoniness
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
EX:	Exposure				

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. **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	**FSST**:	soft, fine grained sandstone
ZR:	soft, argillaceous, or silty rocks	**CH**:	chalk
MSST:	soft, medium grained sandstone	**GS**:	gravel with porous (soft) stones
SI:	soft weathered igneous/metamorphic rock	**GH**:	gravel with non-porous (hard) stones

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

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

SAMPLE NO.	GRID REF	ASPECT USE	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
1	SP34500310	PLO		32		2	2	124	15	113	12	2				WD	2	IMP93 SEE 2&3P
2	SP34790308	PLO		48	SL	1	1	154	45	118	17	1					1	SEE 3P
3	SP34500300	PLO				1	1	142	33	115	14	1					1	ANOMALY
4	SP34600300	PLO		35	35	4	3B	150	41	117	16	1				WE	3B	SEE 1P
5	SP34700300	PLO		35		2	3A	133	24	104	3	2				WK	3A	SEE 3P
6	SP34800300	PLO		28	28	4	3B	0	0	0	0					WE	3B	IMP 105 SEE 1P
7	SP34500290	PLO		50		1	1	138	29	108	7	2				DR	2	WK SEE 2P
8	SP34590290	PLO		38		2	2	124	15	116	15	2				WD	2	IMP90 SEE 3P
9	SP34690290	PLO		29	29	4	3B	118	9	99	-2	2				WE	3B	SEE PIT 1
10	SP34790290	PLO		35	35	4	3B	145	36	108	7	2				WE	3B	SEE 1P
1P	SP34600300	PLO		34	34	4	3B	98	-11	108	7	3A				WE	3B	
2P	SP34500290	PLO		59		1	2	134	25	107	6	2				DR	2	ALSO WK
3P	SP34590290	PLO		32		2	2	123	14	114	13	2				WD	2	IMP90 HR

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
1	0-32	MCL	10YR32						0	0	HR	7						Y	
	32-70	HCL	10YR53	75YR46	C	F		Y	0	0	HR	2		M				Y	
	70-93	MCL	10YR53	10YR4658	C	F		Y	0	0	HR	5		M				Y	IMP DRY/HARD
2	0-35	MCL	10YR43						0	0	HR	2						Y	
	35-48	HCL	25Y56						0	0		0		M				Y	
	48-58	HCL	25Y56	10YR68	C	D		S	0	0		0		M				Y	MIXED S & C
	58-75	MCL	25Y64	10YR56	C	F		Y	0	0		0		M				Y	MIXED S & C
	75-96	SCL	10YR56						0	0		0		M				Y	VARIABLE TEX.
	96-120	MCL	10YR63	10YR56	M	D		Y	0	0	HR	10		M				Y	
3	0-35	MZCL	10YR42						2	0	HR	7						Y	
	35-55	HCL	10YR44						0	0	HR	5		M				Y	
	55-68	C	75YR43	75YR46	F	D			0	0	HR	5		M				Y	LOOSE
	68-120	HCL	10YR54						0	0	HR	20		M				Y	POROUS
4	0-35	HZCL	10YR42						0	0	HR	2						Y	
	35-65	ZC	25Y 5262	10YR58	M	D		Y	0	0	HR	2		M	Y		Y	Y	DENSE, SEE 1P
	65-95	MCL	25Y 52	10YR5658	M	D		Y	0	0	HR	3		M				Y	SEE 3P
	95-120	CSL	10YR64	10YR58	M	F		Y	0	0	HR	10		M				Y	WET W/T 95 CM
5	0-35	HCL	10YR43						0	0	HR	2							
	35-75	HCL	10YR61	10YR68	M	D		Y	0	0		0		M			Y		
	75-95	HCL	05Y62	10YR68	M	D		Y	0	0	HR	5		M			Y	Y	
	95-120	SCL	10YR54						0	0	HR	10		M				Y	WET W/T 110 CM
6	0-28	MCL	10YR43						0	0	HR	2							
	28-65	C	05Y62	10YR68	M	D		Y	0	0		0		M			Y	Y	DENSE, SEE 1P
	65-105	LMS	10YR54						0	0	HR	15		M				Y	WET W/T 100 CM
7	0-30	HCL	10YR42						0	0	HR	8						Y	
	30-50	HCL	10YR4353						0	0	HR	5		M				Y	
	50-60	HCL	10YR53	05YR46	C	D		Y	0	0	HR	10		M				Y	VARIABLE TEX.
	60-120	HCL	10YR53	05YR46	C	F		Y	0	0	HR	20		M				Y	VARIABLE TEX.
8	0-38	HZCL	10YR4142						0	0	HR	5						Y	
	38-58	HCL	25Y6162	10YR5658	M	D		Y	0	0	HR	5		M				Y	MIXED S & C
	58-90	SCL	25Y62	10YR5868	M	D		Y	0	0	HR	10		M				Y	IMP HR & W/T
9	0-29	HCL	10YR43						0	0	HR	2						Y	
	29-46	C	05Y62	10YR68	M	D		Y	0	0		0		M	Y		Y	Y	TOO SHALLOW
	46-75	HCL	05Y62	10YR68	M	D		Y	0	0	HR	10		M			Y	Y	DENSE
	75-110	HCL	10YR63	10YR68	M	D		Y	0	0		0		M				Y	VARIABLE TEX.
10	0-35	MCL	10YR43						0	0	HR	2						Y	
	35-65	C	05Y62	10YR68	M	D		Y	0	0		0		M	Y		Y	Y	
	65-80	MCL	10YR68						0	0	HR	10		M				Y	MIXED S & C
	80-120	MSL	10YR54						0	0	HR	10		M				Y	VARIABLE TEX.

				----MOTTLES-----			PED		----STONES----			STRUCT/	SUBS				
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC	
1P	0-34	HZCL	10YR3242						0	0	HR	3						Y	
	34-65	ZC	25Y 61	75Y 46	M	D		Y	0	0	HR	2	MDVCAB	FR	M	Y	Y	Y	DENSE
2P	0-30	HCL	10YR42						1	0	HR	7						Y	
	30-49	HCL	10YR43						0	0	HR	6	MDCSAB	FR	M			Y	LOOSE, VARIABLE
	49-59	C	10YR56						0	0	HR	12	MDCSAB	FR	M			Y	POROUS
	59-120	MCL	25Y62	10YR68	C	D		Y	0	0	HR	24	MDCSAB	FR	M			Y	LOOSE
3P	0-32	HZCL	10YR42						0	0	HR	3						Y	
	32-50	HCL	25Y5262	75YR46	M	D		Y	0	0	HR	5	MDCSAB	FR	M			Y	POROUS, MIXED S&C
	50-90	SCL	25Y71	10YR5868	M	D		Y	0	0	HR	10	MDCSAB	FR	M			Y	IMP HR, MIXED S&C