West Winch Housing Access Road

Environmental Statement Chapter 12: Appendix 12.4: ALC Assessment

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Contents

1 Introduction

1.1.1 This document contains an investigation of the Agricultural Land Classification (ALC) and soil resources of land east of West Winch, Kings Lynn, Norfolk, by means of a detailed survey of soil and site characteristics, produced by Reading Agricultural Consultants Ltd (RAC). Some users may not be able to access all technical details. If you require this document in a more accessible format please contact westwinchhar@norfolk.gov.uk.

READING AGRICULTURAL CONSULTANTS

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WSP

Agricultural Land Classification and Soil Resources

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Table of Contents

1 Introduction

1.1 Reading Agricultural Consultants Ltd (RAC) is instructed by WSP on behalf of Norfolk County Council to investigate the Agricultural Land Classification (ALC) and soil resources of land east of West Winch, Kings Lynn, Norfolk, by means of a detailed survey of soil and site characteristics. The land is proposed for an access road to the West Winch housing area and as a bypass for the A10 road which currently runs through West Winch village.

1.2 Guidance for assessing the quality of agricultural land in England and Wales is set out in the Ministry of Agriculture, Fisheries and Food (MAFF) revised guidelines and criteria for grading the quality of agricultural land[1], and summarised in Natural England's Technical Information Note (TIN) 049[2].

1.3 Agricultural land in England and Wales is graded between 1 and 5, depending on the extent to which physical or chemical characteristics impose long-term limitations on agricultural use. The principal physical factors influencing grading are climate, site conditions and soil which, together with interactions between them, form the basis for classifying land into one of the five grades.

1.4 Grade 1 land is excellent quality agricultural land with very minor or no limitations to agricultural use. Grade 2 is very good quality agricultural land, with minor limitations which affect crop yield, cultivations or harvesting. Grade 3 land has moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield, and is subdivided into Subgrade 3a (good quality land) and Subgrade 3b (moderate quality land). Grade 4 land is poor quality agricultural land with severe limitations which significantly restrict the range of crops and/or level of yields. Grade 5 is very poor quality land, with very severe limitations which restrict use to permanent pasture or rough grazing.

1.5 Land which is classified as Grades 1, 2 and 3a in the ALC system is defined as best and most versatile (BMV) agricultural land.

1.6 As explained in Natural England's TIN049, the whole of England and Wales was mapped from reconnaissance field surveys in the late 1960s and early 1970s, to provide general strategic

[1] **MAFF (1988).** *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land*. MAFF Publications.

[2] **Natural England (2012).** *Technical Information Note 049 - Agricultural Land Classification: protecting the best and most versatile agricultural land*, Second Edition.

guidance on agricultural land quality for planners. This Provisional Series of maps was published on an Ordnance Survey base at a scale of One Inch to One Mile (1:63,360). The Provisional ALC map shows the site as mostly Grade 2, surrounded by Grade 3 land. However, TIN049 explains that:

> *"These maps are not sufficiently accurate for use in assessment of individual fields or development sites, and should not be used other than as general guidance. They show only five grades: their preparation preceded the subdivision of Grade 3 and the refinement of criteria, which occurred after 1976. They have not been updated and are out of print. A 1:250 000 scale map series based on the same information is available. These are more appropriate for the strategic use originally intended …"*

1.7 TIN049 goes on to explain that a definitive ALC grading should be obtained by undertaking a detailed survey according to the published guidelines, at an observation density of one boring per hectare. This survey follows the detailed methodology set out in the ALC guidelines.

2 Site and climatic conditions

General features, land form and drainage

2.1 The survey area extends to 68.8ha of land, of which 48.7ha is agricultural land. In the north, the survey area runs parallel to the A47 (Constitution Hill) then runs west of North Runcton village to join the A10 north of Setchey village.

2.2 The land is mainly arable and at the time of survey was in sugar beet, cereal stubble, maize, ploughed or ridged (ready to grow row crops). A small field was in grass and one area was set aside. Two locations were tall grass surrounded by wood west of the A47 and not in agricultural use.

2.3 The topography is characterised by a plateau of about 20m above Ordnance Datum (AOD), with gentle slopes to the north-west, north or west adjoining the A47 and an overall very gentle slope (1^{o}) towards the south where altitudes are at 12m AOD.

2.4 The land is crossed by several deep ditches to aid drainage and the arable land likely contains underdrains where the soil profiles are slowly permeable.

Agro-climatic conditions

2.5 Agro-climatic data have been interpolated from the Meteorological Office's standard 5km grid point data set at a representative altitude of 20m AOD, and are given in Table 1. The site is dry

and moderately warm. Moisture deficits are large, but smaller than many other (drier) parts of East Anglia. The number of Field Capacity Days is below average for lowland England (150) and providing ample opportunities for agricultural field work. There is no overriding climatic limitation to agricultural land quality.

Table 1: Local agro-climatic conditions

Parameter	Value
Grid Reference	TF638161
Average Annual Rainfall	638 mm
Accumulated Temperatures >0°C	1,415 day°
Field Capacity Days	123 days
Average Moisture Deficit, wheat	112 mm
Average Moisture Deficit, potatoes	106 mm

Soil parent material and soil type

2.6 The underlying geology is mapped by the British Geological Survey[3] mainly as Lower Greensand (Mintlyn, Roxham and Runcton Members) which comprise grey and green sands with layers of clay-ironstone. On the northernmost and southernmost fields the geology is Kimmeridge Clay.

2.7 Superficial deposits of Glacial Till or Head occur in some of the middle fields and Tottenhill Sand and Gravel in the south.

2.8 The Soil Survey of England and Wales soil association mapping[4] (1:250,000 scale) indicates mostly Downham association, which are deep, permeable, sandy and coarse loamy often ferruginous soils, which are variably affected by groundwater. They are well drained on higher ground and in Wetness Class (WC) I, provided groundwater is controlled. The soils on the Glacial Till are shown as Burlingham 2 association which are deep, fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging, and in WC II or III[5].

[3] **British Geological Survey (2023).** *BGS Geology Viewer*, https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/

[4] **Soil Survey of England and Wales (1984).** *Soils of Eastern England* (1:250,000), Sheet 4.

[5] **Hodge, C.A.H. et al (1984).** *Soils and Their Use in Eastern England.* Soil Survey of England and Wales Bulletin 13.

3 Agricultural land quality

Soil survey methods

3.1 In total, 46 soil profiles were examined using narrow gouge augers capable of penetrating moderately stony layers. Observation density was approximately one per hectare in accordance with the established recommendations for ALC surveys[2]. Five soil pits were also excavated to at least 60cm depth to examine soil structure; at one location topsoil and subsoil were measured for stone content. The locations of observations are shown on Figures RAC/9940/1.1 and 1.2. At each observation point the following characteristics were assessed for each soil horizon up to a maximum of 120cm or any impenetrable layer:

- soil texture;
- stone content;
- colour (including localised mottling);
- consistency;
- structural condition;
- free carbonate; and
- depth.

3.2 Samples from three topsoils and one subsoil were submitted for laboratory determination of particle size distribution, pH, organic matter content and nutrient contents (P, K, Mg). Stone content was measured by sieving, drying and wet sieving samples to determine weights of moisture and stones. All results are in Appendix 1.

3.3 Soil Wetness Class (WC) was determined from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling, and slowly permeable subsoil layers at least 15cm thick, in relation to the number of Field Capacity Days at the location.

3.4 Soil droughtiness was investigated by the calculation of moisture balance equations (as shown in Appendix 2). Crop-adjusted Available Profile Water (AP) is estimated from texture, stoniness and depth, and then compared to a calculated moisture deficit (MD) for the standard crops wheat and potatoes. The MD is a function of potential evapotranspiration and rainfall. Grading of the land can be affected if the AP is insufficient to balance the MD and droughtiness occurs.

Soil types

3.5 The topsoils are deep, and generally of 35-40cm and typically of sandy loam texture except on the heavier land at locations 17-22. Subsoil varies from sand to clay, locally gravely, giving rise to

differences in drainage and crop available water. Generic descriptions of the soil types are given below.

Depth (cm)	**Sandy loams over sandstone** – example locations 10-12, 15, 26-28, 32
0-38	Dark greyish brown (7.5YR4/2 in the Munsell soil colour charts[6]) sandy loam, slightly stony, friable weak blocky fragments and granular. @2.5% organic matter.
38-75	Reddish-yellow (7.5Y6/8) loamy medium sand with grey and organic matter mottles. Weak angular blocky structure. Slightly stony.
75-120	Yellow (2.5Y7/8) or white (10YR8/2) loamy fine sand, fine sand or sandstone. Mottled.

Depth (cm)	**Sandy loams over gravel layer** – example locations 3, 4, 7, 29 , 30, 41
0-38	Dark greyish brown (7.5YR4/2) sandy loam, slightly stony, friable weak blocky fragments and granular. @2.6% organic matter.
38-48	Pale yellowish brown (10YR5/3-4) sandy loam with common iron and organic matter mottles. Loose. Moderately stony.
48-80	Very stony, loamy medium sand (>55% stone by volume), angular flint, ironstones.
80-120	Greyish sandy (clay) loam with common mottles. Slightly or moderately stony.

Depth (cm)	**Sandy loams on sandy drift** – example locations 9, 16, 23, 24, 36, 40, 45-47
0-38	Dark greyish brown (7.5YR4/2) sandy loam, slightly stony, friable, weak blocky fragments and granular. @2.6% organic matter.
38-48	Pale yellowish brown (10YR5/3-4) sandy loam with common iron and manganese matter mottles and organic coats. Very friable. Slightly stony.
48-75	Slightly or moderately stony, loamy medium sand, often grey with distinct red mottles.
75-120	Texture varies from medium sand to sandy loam, locally gravely. Mottled.

Depth (cm)	**Sandy loams on clay-and-sand** – example locations 1, 5, 6, 25, 31, 33-35, 37, 39
0-38	Brown (10YR4/3) sandy loam, friable subangular fragments and some clods. Slightly stony. Deficient in organic matter (<2%).
38-55	Pale yellowish brown (10YR5/3-4) sandy loam with common iron and organic matter coats. Friable weak platy or angular blocky structure. Slightly stony.
55-120	Reddish-yellow sandy loam, sandy clay loam or sandy clay with many grey mottles, locally grey chalky clay. Slowly permeable within 80cm. Slightly stony.

Depth (cm)	**Heavy soils on Glacial Till** – example locations 8, 17-22
0-40	Brown (2.5Y4/3) heavy sandy clay loam, slightly stony. Mixture of firm coarse subangular and fine friable fragments soil (deep ploughed). Trace calcareous. Sticky, deficient in organic matter (3.0%).
40-60	Light brownish yellow (2.5Y6/3) clay or sandy clay with common iron, manganese and organic matter mottles. Moderate coarse angular blocky structure. Some flint, non-calcareous. Slowly permeable.
60-120 cm	Light brownish grey (10Y6/2) or grey (N6/1) clay or clay loam. Many chalk stones and flints. Weak very firm coarse blocky structure. Very calcareous.

[6] **Munsell Color (2009).** *Munsell Soil Color Book*. Grand Rapids, MI, USA

3.6 The lighter soils are very high in phosphorus (in the topsoil and subsoil) and low in potassium and magnesium. The heavier land is moderate in phosphorus and magnesium but also low in potassium. However, as these factors are rectifiable, they are not taken into account in ALC.

Agricultural land classification and site limitations

3.7 Assessment of agricultural land quality has been carried out according to the revised ALC guidelines[1]. Soil profiles have been described according to Hodgson[7] which is the recognised source for describing soil profiles and characteristics according to the revised ALC guidelines.

3.8 In the topsoil, stones larger than 2cm do not exceed 5% by volume and so do not affect ALC, although significant amounts of smaller stone were found in the topsoil (up to 7%). The total stone in topsoil and subsoil substantially reduces the crop available water in the profiles.

3.9 Droughtiness restricts land to Subgrade 3a where the subsoil contains loamy medium sand or sand and/or a high stone content, although drought is less restrictive on deeper rooted than shallow rooted crops. In other cases Grade 2 applies.

3.10 Wetness class II applies to profiles which are slowly permeable within 80cm or mottled throughout and medium or heavy textured. This does not affect the grade where the topsoil is sandy loam but limits the heavier soils to Grade 2. Where profiles are imperfectly drained, assessed as WC III, and have a sandy clay loam topsoil, they are restricted to Subgrade 3a.

3.11 A few poorly drained areas are classified as Subgrade 3b: location 2 is on a springline and profiles 13, 43 and 44 appear to be on disturbed/compacted land.

3.12 The ALC distribution within the site is shown in Figures RAC/9940/2.1 and 2.2 and the areas of each grade are given in Table 2.

Table 2: ALC areas

Grade	Description	Area (ha)	%
Grade 2	Very good quality	23.9	35
Subgrade 3a	Good quality	23.0	33
Subgrade 3b	Moderate quality	1.8	3
Non-agricultural		20.1	29
Total		68.8	100

[7] **Hodgson, J. M. (Ed.) (1997).** *Soil survey field handbook.* Soil Survey Technical Monograph No. 5, Silsoe.

Re-use of soil resources

3.13 The topsoil should be stripped to 40cm depth and stockpiled separately to subsoil. The subsoil stockpiles could be classed as clayey sandy, loamy or gravelly as each has different re-use potential.

3.14 The sandy loam topsoils are very high in available phosphorus so precautions are necessary when stockpiling to prevent run-off into ditches or road drains. The topsoils will generally not be suitable for re-use in the creation of species-rich habitats.

3.15 Where reinstatement to agricultural land occurs, topsoil should be spread to original depth following vigorous subsoiling, with any broken drains repaired.

Appendix 1: Laboratory Data

Determinand	A 0-25cm	A 35-60cm	B 0-25cm	C 0-25cm	D 0-25cm	Units
Coarse Sand 2-0.6 mm		13		4		% w/w
Medium Sand 0.6-0.2mm		44	55	43	75	% w/w
Fine Sand 0.2-0.1mm		18		24		% w/w
Very fine Sand 0.1-0.063mm		6		7		% w/w
Silt 0.063-0.002 mm		7	18	6	13	% w/w
Clay <0.002 mm		12	27	16	12	% w/w
Organic Matter	2.5	0.7	3.0	2.6	1.9	% w/w
Total Nitrogen	0.14	0.06	0.20	0.17	0.14	% w/w
Calcium Carbonate	0.5	< 1	< 1	< 1	< 1	% w/w
Texture	Sandy loam	Medium sandy loam	Heavy sandy clay loam	Medium sandy loam	Sandy loam	

Determinand	A 0-25cm	A 35-60cm	B 0-25cm	C 0-25cm	D 0-25cm	Units
Soil pH	7.7	7.4	7.8	6.7	6.9	
Phosphorus (P)	78	92	17	72	55	mg/l (av)
Potassium (K)	139	82	98	80	98	mg/l (av)
Magnesium (Mg)	29	23	51	40	42	mg/l (av)

Determinand	A 0-25cm	A 35-60cm	B 0-25cm	C 0-25cm	D 0-25cm	Units
Phosphorus (P)	5	5	2	5	4	ADAS Index
Potassium (K)	2-	1	1	1	1	ADAS Index
Magnesium (Mg)	1	0	2	1	1	ADAS Index
Organic Matter (SOM)	Low		Moderate	Low	Low	SSEW [4]

Notes: Sandy soils do not require the same organic matter levels as medium or heavy soils. Even so SOM levels on the D and B samples are inadequate.
Samples are composites of 15-20 cores taken to 25cm depth (other than upper subsoil in Pit A).
Particle size by Pipette method, Carbon by Skalar machine.

Organic Matter = Total Organic Carbon/0.58. Reported on 30°C dry sample basis.
Calcium carbonate = Total Inorganic Carbon/0.12.

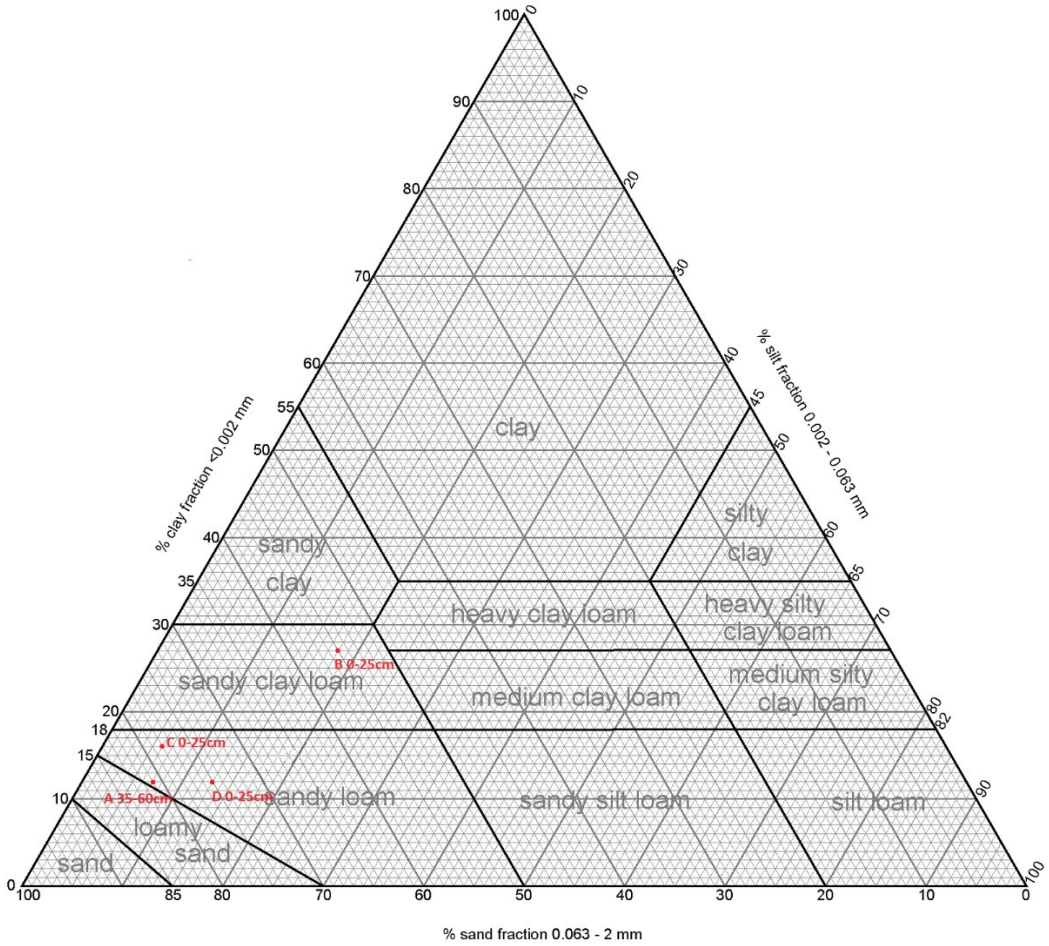
Stone measurement

Location	sample depth cm	Gravimetric measurements (oven dry) > 6cm	2-6cm	2mm-2cm	moisture %	Hand texture	Measured <2mm density g / cm³	Measured stone density g / cm³	Volumetric calculations 2-6cm %	5mm-2cm %	2mm-5mm %	Total stone %
			% w/w	% w/w								
Pit C	**0-25**	0	8.4	13.4	10	SL	1.14	2.38-2.48	4.6	6.4	0.8	**12**
Pit C	**37-50**	0	46.2	21.5	6.2	LS	*1.40*	2.43-2.56	37	15	2	**54**

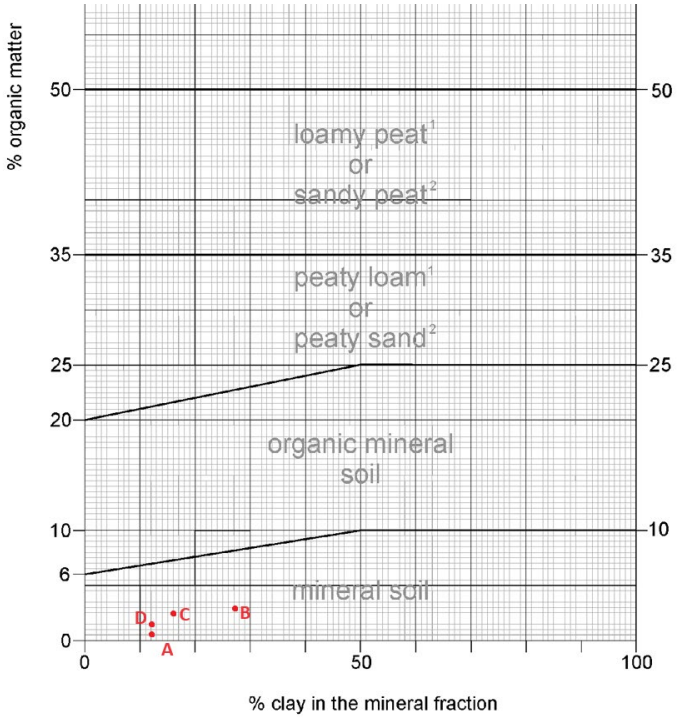
Hole was 21 x 26 x 25cm = 13.65 litres

No stones >6cm
Angular flint with ironstone concretions attached or loose

Soil Texture by Particle Size Analysis



Organic Matter Class



Appendix 2: Soil Profile Summaries and Droughtiness Calculations

Wetness / workability limitations are determined according to the methodology given in Appendix 3 of the ALC guidelines, MAFF 1988

Droughtiness calculations are made according to the methodology given in Appendix 4 of the ALC guidelines, MAFF 1988.

Grades are shown for drought, wetness and any other soil or site factors which are relevant. The overall Grade is set by the most limiting factor and shown on the right.

Stone types		
%	TAv	EAv
hard	1	0.5
chalk	10	7

hard flints and ironstone

Climate Data	
MDwheat	112
MDpotato	106
FCD	123
AAR	638

Wetness Class Guidelines	*II*	*III*	*IV*	*V*
SPL within 80cm, gleying within 40cm	>61 cm	< 61cm		
SPL within 80cm, gleying at 40-70cm	>40 cm	<40cm		
No SPL but gleying within 40cm	coarse subsoil	*I*	other cases	*II*

Maximum depth of auger penetration is underlined

Climate
1415 D°
Limitation
Grade 1
21 m

Site No.		Depth cm		Texture	$CaCO_3$	Colour	Mottle colour	abund-ance	stone% hard	stone% chalk	Struct-ure	APwheat mm	AP potato mm	Gley	SPL	WC	Wetness grade WE	Final Grade	Limiting Factor(s)
1	T	0	32	SL+	n	10YR4/2			8		-	50	50			*I*	1	**2**	DR
		32	55	SL		10YR5/1	red	many	10		good	34	35	y					
		55	102	LS		10YR6/8	MnRed	many	10			26	12	y					
		102	120	C	n	N4/1	Fe	many	0			14	0	y	y				
											Total	**124**	**98**		Sugar beet (good)				
						Kimm.					MB	12	-8						
						Clay			**Droughtiness grade (DR)**			2	2						
2	T	0	40	SCL	n	10YR3/2			8		-	63	63			*II*	2	**3b**	GW
		40	120	SCL		N6/1	Fe	com	8			79	42	y					
						May be					Total	**141**	**105**		Gradient			1o	N
						oSCL					MB	29	-1		Groundwater			3b	
									Droughtiness grade (DR)			2	2		Set Aside (springline?)				
3	T	0	25	SL+	n	10YR4/3			10		-	39	39			*I*	1	**3a**	DR
		25	50	SL		7.5YR6/6			20		good	35	35	y					
		50	80	LS					55			9	9						
		80	120	SL/SCL					15		m/poor	31	0						
						Uncertain					Total	**113**	**82**		Sugar beet				
						depth of					MB	1	-24						
						gravel			**Droughtiness grade (DR)**			3a	3a						

4	T	0	25	SL+	n	10YR4/3			10	-	39	39			*I*	1	**3a**	DR
		25	50	SL		10YR5/3	Fe	com	15	good	37	37	y					
		50	80	LS					60		8	8						
		80	120	SL/SCL					15	m/poor	31	0						
						Uncertain				Total	**114**	**83**		Sugar beet				
						depth of				MB	2	-23						
						gravel			**Droughtiness grade (DR)**		3a	3a						
5	T	0	30	SL+	n	10YR4/3			10	-	46	46			*II*	1	**2**	DR
		30	80	SCL/SL		2.5Y6/2	FeMn	com	10		56	58	y					
		80	100	SC		5YR4/6	Green	many	10	poor	15	0	y	y				
		100	120	SC		10YR8/8	Fe	many	30	poor	12	0						
										Total	**128**	**104**		Sugar beet (good)				
										MB	16	-2						
									Droughtiness grade (DR)		2	2						
6	T	0	28	SL	n	10YR4/3			8	-	44	44			*II*	1	**2**	DR
	T	28	40	SL		10YR4/3			12		18	18						
		40	70	SL		10YR5/4			12		33	40						
		70	80	SL-		10YR8/8	Fe	many	10		10	0	y					
		80	100	SC		10YR5/8	grey	many	10	poor	15	0	y	y				
		100	120	SC					30	poor	12	0	y	y				
										Total	**131**	**102**		Sugar beet (good)				
										MB	19	-4						
									Droughtiness grade (DR)		2	2						
7	T	0	25	SL	n	10YR4/3			10	-	39	39			*I*	1	**3a**	DR
		25	50	SL		10YR5/3			10	good	39	39						
		50	80	LS		5YR4/6			50		10	10						
		80	120	SL/SCL					15	m/poor	31	0						
						Uncertain				Total	**118**	**87**		Sugar beet				
						depth of				MB	6	-19						
						gravel			**Droughtiness grade (DR)**		2	3a						
8	T	0	32	SCL	n	10YR3/2			8	-	50	50			*III*	3a	**3a**	WE

		32	40	SCL		10YR5/3	FeMn		8		11	11	y						
		40	60	C		N6/1	Fe	many	10	poor	18	24	y	y					
		60	75	SL		5YR4/6	grey	many	10		15	14	y						
		75	120	SC		BG6/1	red		15	poor	31	0	y	y					
										Total	**125**	**99**		Gradient				2o	W
										MB	13	-7		Sugar beet (good)					
									Droughtiness grade (DR)		2	2							
9	T	0	20	SL	n	10YR4/3			8	-	31	31			*I*	1	**3a**	DR	
	T	20	32	SL		10YR4/3			12		18	18							
		32	45	SL					25	good	17	17							
		45	80	LS		10YR8/4	FeMn	many	15		19	20	y						
		80	110	LS					55		9	0							
		110	120	SL/SCL					15	m/poor	8	0							
										Total	**103**	**86**		Sugar beet					
										MB	-9	-20							
									Droughtiness grade (DR)		3a	3a							
10	T	0	32	SL+	n	2.5Y4/2	Mn	few	8	-	50	50			*II*	1	**2**	DR	
		32	65	SL+		5YR6/8	Grey	many	8		40	46	y						
		65	95	LS					60		8	2	y						
		95	120	SL/SCL					15	m/poor	19	0	y						
										Total	**118**	**98**		Gradient				1o	N
										MB	6	-8		Groundwater				?	
									Droughtiness grade (DR)		2	2		Sugar beet (footslope)					
11	T	0	32	SL	n	10YR4/3			4	-	52	52			*I*	1	**2**	DR	
		32	45	SL-		2.5Y5/4	Fe	few	4		19	19							
		45	60	LS		7.5YR6/8			10		10	12							
		60	80	LfS		10YR8/8	Fe	com	0		26	15	y						
		80	110	SL			Fe	com	0	poor	24	0	y						
		110	120	fSst					0		3	0	y						
										Total	**134**	**98**		Gradient				2o	N
										MB	22	-8							

								Droughtiness grade (DR)			2	2		Sugar beet							
12	T	0	30	SL-		10YR4/2			12		-	45	45				*I*	1	**NonAg**		
		30	50	SL-		10YR4/3	Fe	com	12		good	30	30	y							
		50	90	LS		10YR5/2	red	many	20			20	15	y							
		90	120	LS					35			12	0								
						Red &					Total	**107**	**90**		Clearing (tall grass)						
						yellow					MB	-5	-16		Groundwater					3a	
						mottles			**Droughtiness grade (DR)**			3a	3a								
13	T	0	25	SCL	trace	10YR4/2			10		-	39	39				*III*	3a	**NonAg**		
		25	45	SCL	slight	10YR5/2	Fe	com	10		good	34	34	y							
		45	65	oC	mod	10YR3/2	Fe	many		10	poor	34	43	y	y						
		65	80	mCL	mod	10YR5/2	Fe	many	8			14	7	y							
		80	120	mCL	mod	10YR3/1	grey	many	8		poor	26	0	y	y						
						Remade					Total	**146**	**124**		Tall grass and with trees						
						land?					MB	34	18		Groundwater					3b	
									Droughtiness grade (DR)			1	1								
14	T	0	33	SL-	n	7.5YR4/2			8		-	52	52				*I*	1	**3a**	DR	
		33	50	LS		10YR6/6	OM	com	8		good	19	19								
		50	80	LS		7.5YR6/8			8			17	17	LfS?							
		80	120	mS		7.5YR7/8			15			17	0								
						Fine					Total	**105**	**88**		Stubble						
						stone					MB	-7	-19								
						80-120			**Droughtiness grade (DR)**			3a	3a								
Pit A	T	0	25	SL	n	7.5YR4/2			8		-	39	39				*I*	1	**3a**	DR	
	T	25	35	SL		7.5YR4/2			10			15	15								
		35	70	LmS		7.5YR6/6	OM		10			23	29								
		70	100	mS		2.5Y7/8	Fe	com	5			14	0	y							
		100	120	fSst					0			6	0								
											Total	**98**	**83**		Gradient				1o	NE	
											MB	-14	-23		Stubble						
									Droughtiness grade (DR)			3a	3a								

15	T	0	37	SL	n	7.5YR4/2			8		-	58	58			*I*	1	**3a**	DR
		37	50	SL		7.5YR6/8	OM	com	8			18	18						
		50	75	LS		7.5YR6/8			8			14	17						
		75	120	fS		10Y7/1	Fe	com	8		poor	50	0	y					
											Total	**140**	**93**		Stubbe				
											MB	28	-13						
											Droughtiness grade (DR)	2	3a						
16	T	0	40	SL-	n	7.5YR4/2			10		-	62	62			*I*	1	**3a**	DR
		40	50	SL		7.5YR4/3	OM		10		good	15	15						
		50	60	LS		5YR4/6			10			5	8	y					
		60	110	LS		2.5Y5/2	Fe	com	10			27	8	y					
		110	120	SL		7.5GY7/1	Fe	many	5		m/poor	9	0	y					
											Total	**118**	**93**		Gradient Stubble (footslope)			1o	N
											MB	6	-13						
											Droughtiness grade (DR)	2	3a						
17	T	0	30	hSCL	n	10YR4/3			10		-	46	46			*III*	3a	**3a**	WE DR
		30	45	SC		2.5Y6/4	Fe	many	10		m/poor	19	19	y					
		45	70	C	n	2.5Y6/4	Fe	many	10		poor	19	30	y	y				
		70	80	SL		7.5YR6/8	grey	com	10			10	0	y					
		80	100	C	very	10YR5/2	Fe	many	10	10	poor	13	0	y	y				
		100	120			v.dense					poor	0	0	y	y				
											Total	**106**	**95**		Stubble				
											MB	-6	-11						
											Droughtiness grade (DR)	3a	3a						
18	T	0	37	hSCL	n	2.5Y4/3			8		-	58	58			*II*	2	**2**	WE DR
		37	75	hSCL		2.5Y6/4	red	com	10		m/poor	37	42	y					
		75	90	C	very	N6/1	Fe	many	10	15	poor	10	0	y	y				
		90	120	MSt							poor	15	0						
						Red &					Total	**120**	**100**		Gradient Deep ploughed			1o	S
						OM					MB	8	-6						
											Droughtiness grade (DR)	2	2						

19	T	0	35	hSCL	n	2.5Y4/3			4		-	57	57				*II*	2	**2**	WE DR
	T	35	45	LC		2.5Y4/4	OM		10			15	15							
		45	65	C	n	2.5Y7/4	Fe	many	10		poor	15	24	y	y					
		65	90	C	very	N6/1	Fe	many	10	15	poor	16	6	y	y					
		90	120	MSt		v.dense					poor	15	0							
											Total	**119**	**102**		Gradient			1o	S	
											MB	7	-4		Deep ploughed					
											Droughtiness grade (DR)	2	2							
20	T	0	42	hSCL	n	2.5Y4/3			8		-	66	66				*II*	2	**2**	WE DR
		42	80	LC	n	2.5Y6/4	Fe	com	8		poor	29	32	y	y					
		80	120	hCL	n	2.5Y6/4	red	many	8		m/poor	31	0	y						
											Total	**126**	**98**		Gradient			1o	S	
											MB	14	-8		Deep ploughed					
											Droughtiness grade (DR)	2	2							
21	T	0	35	hSCL	n	2.5Y4/3			8		-	55	55				*II*	2	**3a**	DR
Pit B	T	35	45	LC		2.5Y4/4	OM		8			16	16							
		45	65	C	n	2.5Y6/4	Fe	com	10		poor	15	24	y	y					
		65	80	C/CL	very	N6/1	Fe	many	10	15	poor	10	5	y	y					
		80	120	MSt		v.dense					poor	20	0							
											Total	**116**	**100**		Gradient			1o	S	
											MB	4	-6		Deep ploughed					
											Droughtiness grade (DR)	3a	2							
22	T	0	38	SCL	n	10YR4/3			8		-	60	60				*II*	2	**2**	WE DR
		38	65	LC		10YR5/3	Fe	com	8		m/poor	28	36	y						
		65	80	mCL		5YR4/6	grey	many	12			13	7	y						
		80	120	LS/SL					50			18	0							
											Total	**119**	**103**		GR. Gradient			1o	S	
											MB	7	-3		Deep ploughed					
											Droughtiness grade (DR)	2	2							
23	T	0	40	SL+	n	10YR4/3			10		-	62	62				*I*	1	**2**	DR
		40	70	SL-		10YR6/3	Fe	com	25			28	35	y						

		70	120	SL		5YR4/6	grey	many	10			50	0	y							
											Total	**140**	**96**		Ploughed						
											MB	28	-10								
									Droughtiness grade (DR)			2	2								
24	T	0	38	SL	n	10YR4/3			10		-	59	59			*I*	1	**3a**	DR		
		38	54	SL		10YR4/2	Fe	few	10		good	23	25								
		54	70	mS		10R4/4			20			7	9								
		70	120	LS					55			15	0								
											Total	**103**	**92**		Ploughed						
											MB	-9	-14								
									Droughtiness grade (DR)			3a	3a								
25	T	0	42	SCL	n	10YR4/3			10		-	65	65			*II*	2	**2**	DR WE		
		42	74	SL		10YR6/4	red	com	20			31	34	y							
		74	80	C	n	2.5Y6/2	Fe	com	10		poor	4	0	y	y						
		80	100	C	very	N6/1	Fe	many	10	15	poor	13	0	y	y						
		100	120			v.dense					poor	10	0	y	y						
											Total	**122**	**99**		Gradient			1o	S		
						or SL+					MB	10	-7		Ploughed						
						topsoil			**Droughtiness grade (DR)**			2	2								
26	T	0	40	SL-	n	10YR4/3			8		-	63	63			*I*	1	**2**	DR		
		40	70	LS		10YR4/4	OM		8		good	27	33								
		70	120	fS		2.5Y8/3	Fe	com	5			57	0	y							
											Total	**147**	**96**		Ploughed						
											MB	35	-10								
									Droughtiness grade (DR)			1	2								
27	T	0	25	SL-	n	7.5YR4/3			8		-	39	39			*I*	1	**3a**	DR		
	T	25	38	SL-		7.5YR4/3			15			19	19								
		38	50	LS		10YR6/8	OMFe	com	8		good	13	13								
		50	70	mS		10YR7/8	OM	com	5		good	10	13	y							
		70	95	LfS		7.5YR6/8	grey	com	5			31	0	y							
		95	120	fSst					0			8	0								

										Total	**120**	**85**		Stubble					
										MB	8	-21							
									Droughtiness grade (DR)		2	3a							
28	T	0	25	SL-	n	7.5YR4/3			8	-	39	39			/	1	**2**	DR	
	T	25	37	SL-		7.5YR4/3			12		18	18							
		37	65	LfS		7.5YR7/8	OMFe	com	5		37	40	(y)						
		65	88	fS		10YR8/2	Fe	com	5		26	7	y						
		88	120	fSst					0		10	0							
										Total	**130**	**104**		Stubble					
										MB	18	-2							
									Droughtiness grade (DR)		2	2							
29	T	0	25	SL	n	10YR4/3			10	-	38	38			/	1	**3a**	DR	
	T	25	35	SL		10YR4/3			15		15	15							
		35	50	SL-		10YR5/4	OMFe	com	25	good	20	20	y						
		50	80	LS					60		8	8	y						
		75	120	SL/SCL					20	m/poor	33	0	y						
										Total	**113**	**80**		Stubble					
										MB	1	-26							
									Droughtiness grade (DR)		3a	3a							
Pit C	T	0	37	SL	n	10YR4/2			12	-	56	56			/	1	**3a**	DR	
		37	45	SL-		10YR5/3	OMFe	com	25	good	10	10	y						
		45	75	LS		10YR5/4	OMFe		60		9	11	y						
		75	120	SL/SCL		2.5Y6/3			15	m/poor	35	0	y						
										Total	**110**	**77**		Stubble					
										MB	-2	-29							
									Droughtiness grade (DR)		3a	3a							
30	T	0	35	SL	n	10YR4/2			12	-	53	53			/	1	**3a**	DR	
		35	50	SL-		10YR4/6			25	good	20	20							
		50	80	LS					60		8	8							
		80	120	SL/SCL					15	m/poor	31	0							
										Total	**111**	**81**		Grass ley					

										MB	-1	-25							
									Droughtiness grade (DR)		3a	3a							
31	T	0	32	SL	n	10YR4/3			6	-	51	51			*II*	1	**2**	DR	
		32	40	SL		10YR5/3	Mn	com	5		11	11	y						
		40	65	SL		2.5Y6/2	Fe	com	5		30	36	y						
		65	105	C	n	7.5GY7/1	Fe	many	5	poor	27	6	y	y					
		105	120	Mst						poor	8	0	y	y					
										Total	**127**	**105**		Gradient			1o	S	
										MB	15	-1		Stubble					
									Droughtiness grade (DR)		2	2							
32	T	0	44	SL+	n	10YR4/3			4	-	41	72			*I*	1	**2**	DR	
		44	70	LfS		7.5YR7/8	OMFe	com	5		37	37							
		70	95	fS		10YR8/2	Fe	com	0		23	0	y						
		95	120	fSst					0		11	0							
						or LmS				Total	**130**	**109**		Gradient			1o	S	
						USS				MB	18	3		Maize (tall)					
									Droughtiness grade (DR)		2	2							
33	T	0	20	SL	n	10YR5/3			4	-	33	33			*II*	1	**2**	DR	
	T	20	40	SL		10YR5/3			10		31	31							
		40	50	SL		10YR6/4	red	many	10		14	14	y						
		50	80	SCL	n	10YR7/2	Fe	com	8	m/poor	25	26	y	y					
		80	120	SCL/SL		10YR7/1	Fe	com	8	poor	30	0	y	y					
										Total	**132**	**103**		Gradient			1o	S	
										MB	20	-3		Maize (tall). Rutted					
									Droughtiness grade (DR)		2	2							
34	T	0	38	SL	n	10YR4/2			10	-	59	59			*I*	1	**2**	DR	
		38	65	SL		10YR5/2	OMFe	com	10	good	36	42	y						
		65	78	LS		10YR5/3	OMFe	com	15		7	4	y						
		78	108	LS					60		8	0							
		108	120	SL/SCL					15	m/poor	9	0							
										Total	**119**	**104**		Gradient			1o	S	

										MB	7	-2		Maize (tall)						
								Droughtiness grade (DR)			2	2								
35	T	0	28	SL-	n	10YR4/3			8	-	44	44			*II*	1	**2**	DR		
	T	28	37	SL-		10YR4/3			12		14	14								
		37	70	LfS		7.5YR6/8	grey	many	15		39	43	y							
		70	100	SC	n	5YR6/8	grey	many	5	poor	23	0	y	y						
		100	120	SCL		5YR6/8	grey	many	5	poor	15	0	y	y						
						or LmS				Total	**135**	**100**		Gradient			2o	S		
						USS				MB	23	-6		Maize (tall)						
								Droughtiness grade (DR)			2	2								
36	T	0	28	SL-	n	10YR4/3			8	-	44	44			*I*	1	**2**	DR		
	T	28	36	SL-		10YR4/3			12		12	12								
		36	50	SL-		10YR5/4	OM		10	good	22	22								
		50	65	SL-		10YR6/3	red	com	20		13	18	y							
		65	95	LS					60		8	2								
		95	120	SL/SCL					15	m/poor	19	0								
										Total	**118**	**98**		Cultivated ridged						
										MB	6	-8								
								Droughtiness grade (DR)			2	2								
37	T	0	37	SL	n	10YR5/3	Mn	few	8	-	58	58			*III*	2	**2**	DR	WE	
		37	55	SL		10YR6/4	Fe	com	8		23	25	y							
		55	95	SC	n	2.5Y6/2	Fe	many	8	poor	30	18	y	y						
		95	120	C		10GY7/1	Fe	many	5	poor	17	0	y	y						
										Total	**128**	**101**		Cultivated ridged (cloddier)						
										MB	16	-5								
								Droughtiness grade (DR)			2	2								
38	T	0	37	SL+	n	10YR5/3	Mn	few	8	-	58	58			*III*	2	**2**	DR	WE	
		37	58	SCL		2.5Y6/2	Fe	many	8		25	29	y		*or II*					
		58	75	SC/SCL	n	7.5YR7/8	grey	many	8	m/poor	14	16	y	(y)						
		75	100	SCL/SL		10YR6/2	Fe	many	8	poor	19	0	y	y						
		100	120	LS					60		5	0	y	y						

											Total	**122**	**103**		Cultivated ridged (cloddy)						
											MB	10	-3								
										Droughtiness grade (DR)		2	2								
39	T	0	40	SL	n	10YR4/2			8		-	63	63			*III*	2	**2**	DR	WE		
		40	55	SL		10YR5/3	FeOM	com	12		good	21	23	y								
		55	65	C		2.5Y6/4	Fe	many	5		poor	7	12	y	(y)							
		65	55	SCL		2.5Y6/4	Fe	many	10		m/poor	-8	-13	y								
		55	100	SC	very	2.5Y6/2	Fe	com	10	15	poor	32	17	y	y							
		100	120	SC					30			14	0	y	y							
											Total	**128**	**102**		Cultivated ridged						
											MB	16	-4								
										Droughtiness grade (DR)		2	2								
40	T	0	35	SL	n	10YR4/3			12		-	53	53			*I*	1	**3a**	DR			
		35	45	SL		10YR5/4	OM		12		good	15	15									
		45	57	SL-		10YR5/4			20			12	15									
		57	87	LS					60			8	5									
		87	120	SL/SCL					15		m/poor	25	0									
											Total	**114**	**88**									
											MB	2	-18		Cultivated ridged							
										Droughtiness grade (DR)		3a	3a									
41	T	0	37	SL	n	10YR4/3			4		-	61	61			*I*	1	**3a**	DR			
		37	50	SL		10YR5/3	Fe	com	20		good	18	18	y								
		50	80	LS					55			9	9									
		80	120	SL/SCL					15		m/poor	31	0									
											Total	**118**	**88**		Gradient			1o	S			
						Mn at					MB	6	-18		Cultivated ridged							
						45cm				**Droughtiness grade (DR)**		2	3a									
Pit D	T	0	37	SL	n	10YR4/3			8		-	58	58			*II*	1	**3a**	DR			
		37	55	SL-		10YR5/4	Fe	com	8		good	26	28	y								
		55	80	SL		10YR6/2	Fe	many	15			24	19	y								
		80	120	SL/SCL		5Y6/8	grey	many	15		m/poor	31	0	y	y							

											Total	**139**	**106**		Gradient				1o	S
											MB	27	0		Cultivated ridged					
									Droughtiness grade (DR)			2	2							
42	T	0	35	SL	n	10YR5/3			12		-	53	53			*III*	1	**2**	DR		
		35	50	C	mod	2.5Y5/4	Fe	com	5	5	m/poor	20	20	(y)		*or II*					
		50	100	SC	mod	2.5Y5/3	Fe	com	15		m/poor	39	24	y	(y)						
		100	120	SC					30		poor	12	0	y	y						
											Total	**123**	**97**		Gradient				1o	S	
											MB	11	-9		Cultivated ridged						
									Droughtiness grade (DR)			2	2								
43	T	0	30	hCL	mod	2.5Y5/3	Fe	com	8	2	-	49	49	y		*III*	3b	**3b**	WE		
		30	50	hCL	n	2.5Y5/3	Fe	com	10		poor	22	22	y	y			remade			
		50	65	SL		2.5Y6/2	Fe	com	10			15	20	y				land			
		65	120	SL		10Y7/2	Fe		10			55	7	y							
											Total	**141**	**98**		Groundwater		?				
						Compact					MB	29	-8		Set Aside						
						topsoil			**Droughtiness grade (DR)**			2	2								
44	T	0	20	SL	mod	10YR4/2			10	2	-	31	31			*?*		**3b**	DR		
		20	40	SL	mod	10YR4/2			25		poor	17	17					remade			
		40	70	LS					35			14	19					land			
		70	120	SL/SCL					15		m/poor	39	0								
											Total	**100**	**66**		Gradient				1o	NE	
						Compact					MB	-12	-40		Set Aside						
						topsoil			**Droughtiness grade (DR)**			3a	3b								
45	T	0	40	SL	n	10YR4/2			8		-	63	63			*II*	1	**2**	DR		
		40	50	SL		10YR5/3	FeOM	com	25		good	13	13	y							
		50	75	SL		10YR6/8	grey	many	15			24	26	y							
		75	102	SCL	n	10YR7/8	Fe	com	10		m/poor	22	0	y	y						
		102	120	LS					60			5	0								
											Total	**126**	**102**		Cultivated ridge						
											MB	14	-4								

									Droughtiness grade (DR)		2	2						
46	T	0	28	SL	n	10YR4/3			6	-	45	45			*I*	1	**3a**	DR
	T	28	35	SL		10YR4/3			10		11	11	y					
		35	50	SL-		10\YR5/3	Fe	com	10	good	23	23	y					
		50	98	LS	n	5YR5/6	grey	com	15		25	16	y					
		98	120	SL		2.5Y7/8	Fe	many	10		22	0	y					
										Total	**126**	**94**		Cultivated ridged				
										MB	14	-12						
									Droughtiness grade (DR)		2	3a						
Pit E	T	0	30	SL	n	10YR4/3			8	-	47	47			*I*	1	**3a**	DR
	T	30	40	SL		10YR4/3			12		15	15						
		40	50	SL		10YR4/2	OM		10	good	15	15						
		50	65	LS	n	10YR5/3	OMFe	com	10		8	12	y					
		65	100	mS		2.5Y7/8	Fe	many	20		14	3	y					
		100	120	LS					35		8	0	y					
										Total	**108**	**93**		Cultivated ridged				
										MB	-4	-13						
									Droughtiness grade (DR)		3a	3a						
47	T	0	30	SL	n	10YR4/3			8	-	47	47			*I*	1	**3a**	DR
	T	30	40	SL		10YR4/3			12		15	15						
		40	50	SL		10YR4/2	OM		10	good	15	15						
		50	70	LS	n	10YR4/2	grey	com	20	good	15	20	y					
		70	100	mS		2.5Y7/8	Fe	many	20		12	0	y					
		100	120	LS					30		8	0	y					
										Total	**113**	**97**		Cultivated ridged				
										MB	1	-9						
									Droughtiness grade (DR)		3a	2						

Appendix 3: Pit Descriptions and Photographs

Pit A		Description (cereal stubble)
Ap	0- 35 cm	Brown (7.5YR4/2) medium sandy loam. 2.5% SOM. Very friable subangular fragments and granular. Larger weak blocks at base. Small stones (< 8% by volume), non-calcareous. Wavy boundary.
Bw	35-70cm	Reddish yellow (7.5YR6/6) loamy medium sand. Common organic matter coats. Weak fine subangular blocks breaking to loose material on spade. Estimated 5-10% stone.
Cu	70-100 cm	Yellow (2.5Y7/8) mottled medium sand with fine stones.

Geology: Head on Mintlyn sand

Comment: well drained profile (Wetness Class I) and well rooted but sandy textures in subsoil limit available water to Subgrade 3a (drought). Newport series.

Pit A (yellow marker is 30cm depth)

Structures (reassembled).

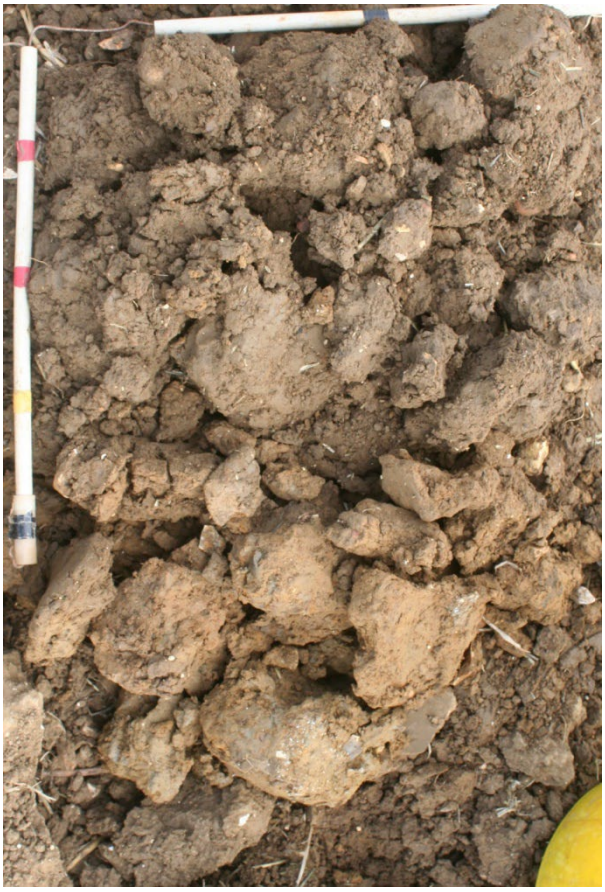
Pit B		Description (deep ploughed, surface levelled underfoot)
Ap	0-40 cm	Brown (2.5Y4/3 and 4/4) heavy sandy clay loam (27% clay). 3% SOM. Unmottled. Mixture of firm coarse angular blocks and friable medium and fine fragments. Incorporated stubble. Flinty layer at base with wavy lower boundary. Non-calcareous with occasional chalk stones.
Btg	38/42-60cm	Light brownish yellow (2.5Y6/3) clay with common iron and manganese mottles and some darker organic coats. Moderately developed firm coarse angular blocky structure. <0.5% biopores. Some flints, non-calcareous.
BCg	60-80 cm	Clay; light brownish grey (10Y6/2) with many iron and manganese mottles. Weak very firm coarse blocky or prismatic. Chalk stones and flints. Very calcareous.

Geology: Glacial Till

Comment: slowly permeable subsoil at 40cm puts WC on cusp of II and III [1]. The latter is 3b if non-calcareous. Assessment is land should be graded 3a, on evidence that it can be successfully deep ploughed (aided by underdrains and deep ditches) and in some places (e.g. 18, 22) the profiles contain deeper pockets of more permeable loamier material.

Pit B (black marker is 40cm depth)

Structures (reassembled).



Pit C		Description (cereal stubble)
Ap	0- 37 cm	Brown (7.5YR4/2) light medium sandy loam. 2.6% SOM. Very friable weak fine subangular fragments and granular material. Stonier (or denser) below 25cm.
B(g)	37-45cm	Brown (10YR5/3) light sandy loam with common iron mottles. Moderately stony loose soil.
Cu	45-75 cm	Loamy medium sand (10YR5/4 mottled). Very stony - many large and medium flints.
Cg	75-120 cm	Less stony light brownish grey (2.5Y6/3) sandy loam and sandy clay loam. Mottled.

Geology: Mintlyn Sand (no superficial drift shown on BGS maps)
Comment: mottling is due to historical groundwater and WC is I if land drains are functioning. Stones were measured as 12% by volume 0-25cm and 54% in a 35-60cm sample. Thin gravel layers as found here were common in other places, and constitute a drought limitation to Subgrade 3a for shallow rooted crops, though may be less limiting for crops that can root deeper into the less stony, less sandy material beneath.

Pit C (yellow marker is 30cm depth)

Structures (reassembled).

Pit D		Description (ridged land levelled underfoot)
Ap	0- 37 cm	Brown (10YR4/3) medium sandy loam. 1.9% SOM. Friable fine subangular fragments and some larger clods. Low stone.
Eb(g)	37-55 cm	Brown (10YR5/4) light sandy loam with common iron and manganese mottles and organic coats. Weak platy and angular blocky. 5-10% stone.
Btg	55-80 cm	Light brownish grey (10YR6/2) sandy loam with many iron mottles. At least 10% stones. Friable weak subangular blocky structure.
Cg	80-120 cm	Reddish-yellow (5YR6/8) sandy clay and sandy clay loam with many grey mottles. Dense, slowly permeable.

Geology: Mintlyn Sand (no superficial drift shown on BGS maps)
Comment: WC is II but if drains are functioning does not affect grade because topsoil is <18% clay. Compaction in upper subsoil is remediable. Lack of sandy or gravely layers in the profile reduce droughtiness for shallow and deep rooted crops and set ALC as Grade 2.

Pit D (black marker 40cm depth)

platy at top of subsoil, grey in lower subsoil

Pit E		Description (ridged land levelled underfoot)
Ap	0- 40 cm	Brown (7.5YR4/2) medium sandy loam. 2.6% SOM. Weak platy and subangular fragments and granular material. Stonier (or denser) below 30cm with some lime fragments.
Bg	40-50 cm	Brown (10YR5/3) light sandy loam with common iron and organic mottles. About 10% stone.
Bg2	50-75 cm	Grey loamy medium sand with many bright red (5YR5/6) and some organic mottles.
Cug	75-100 cm	Yellow (2.5Y7/8) medium sand with many bright red and manganese mottles. Many fine stones. Impenetrable at 100cm.

Geology: Tottenhill gravel (over Kimmeridge Clay)
Comment: mottling is due to historical groundwater and WC is I if land drains are functioning. The sandy or gravely subsoil constitutes a drought limitation to Subgrade 3a for shallow or deep rooted crops.

Pit E structures reassembled

Structures (topsoil and lower subsoil.

Location 14 80-100cm, yellowish-red medium sand	Pit C 80-100cm less stony dense sandy (clay) loan	Pit D 80-100cm dense sandy clay / sandy clay loam	Location 45 80-100cm, sandy clay loam
			

Location 2. Set Aside (on spring line at junction of Greensand and Clay). Subgrade 3b land

Location 11 to 10. Large healthy sugar beet crop (Grade 2 land)

Location 13 (clearing with wood on east)

Location 12 (clearing leading to A47)

Location 21-25 (deep ditch). Heavier land (Subgrade 3a) on right, deep sandy loams (Grade 2) on left.

Location 34 (south of). Tall maize crop (Grade 2 land).

Location 38. Cloddier topsoil (Grade 2)

Location 43 to 44, disused, disturbed (?) land.

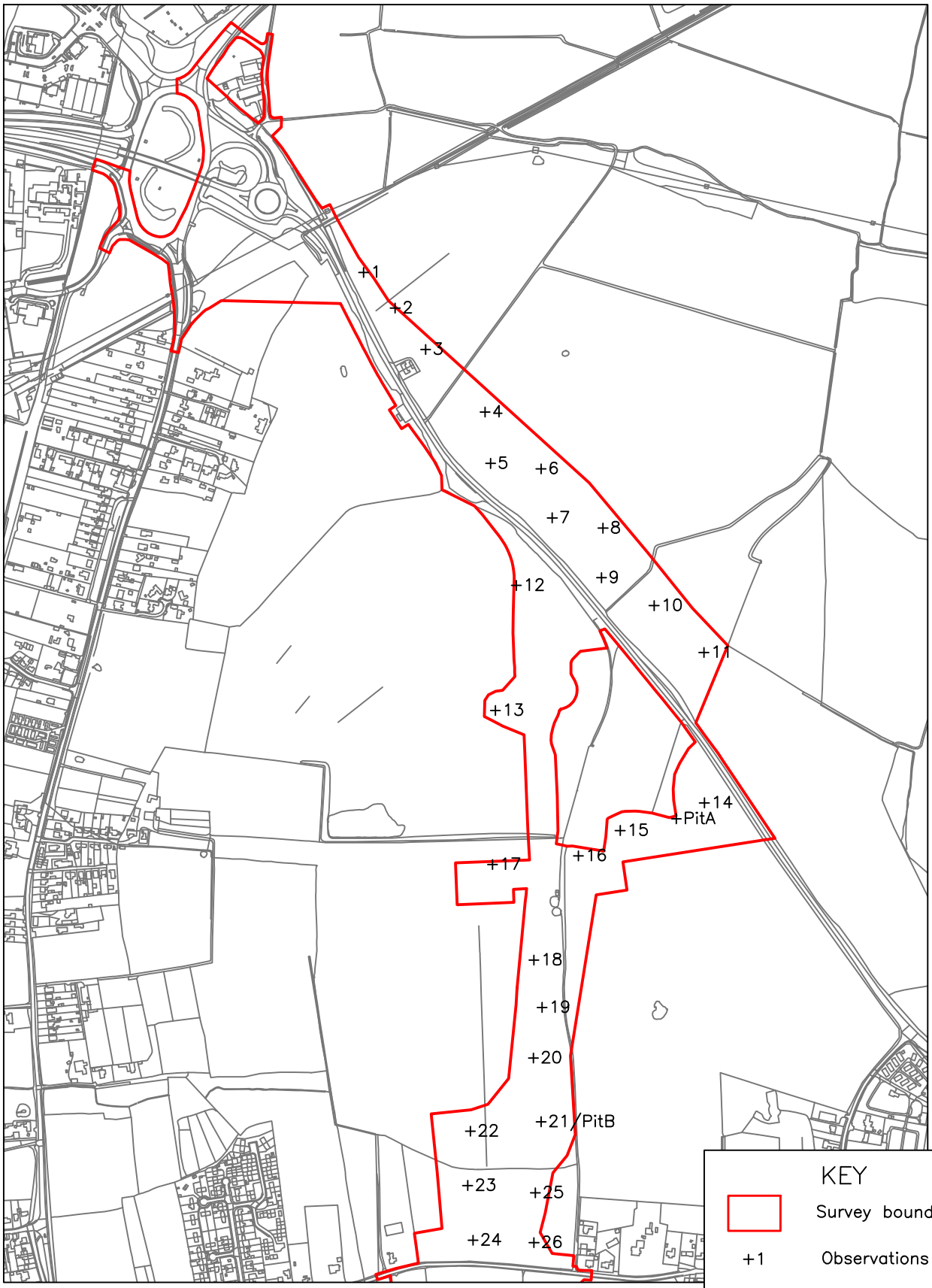
Location A. Soil surface

Location B. Deep ploughed (Subgrade 3a)

Location 46 (prepared by ridging)

Location D: ridged soil

Pit C. Few stones visible on surface 	Pit C. Medium (>2cm) stones sieved out, 4.6% by volume. Flints with some cemented ironstone. 
Topsoil 7.2% small (<2cm) stones, flint and ironstone. 	Subsoil: 37% 2-6cm stones (angular flint) plus 17% <2cm stones (rounded ironstone and flint shards) 



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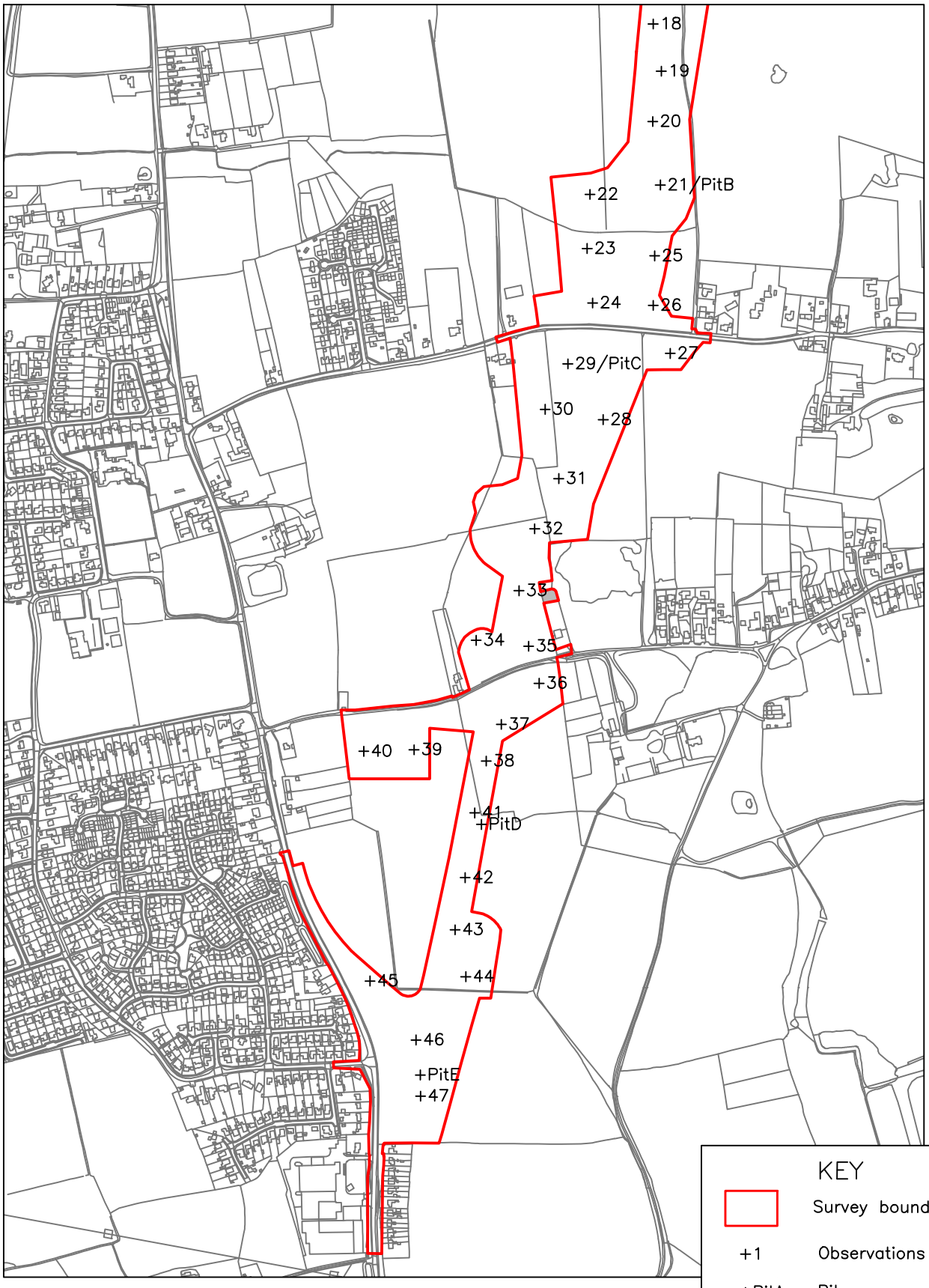

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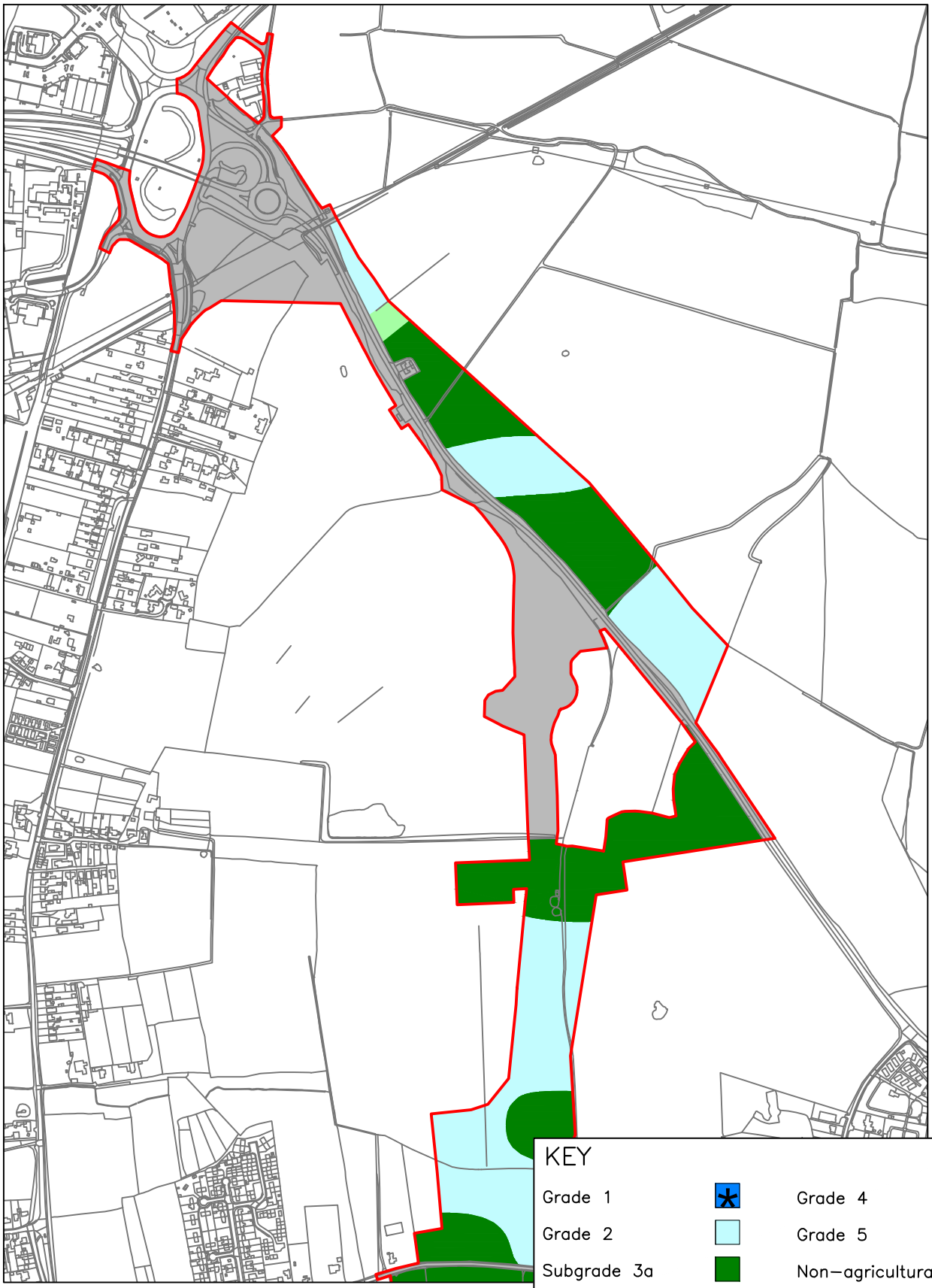

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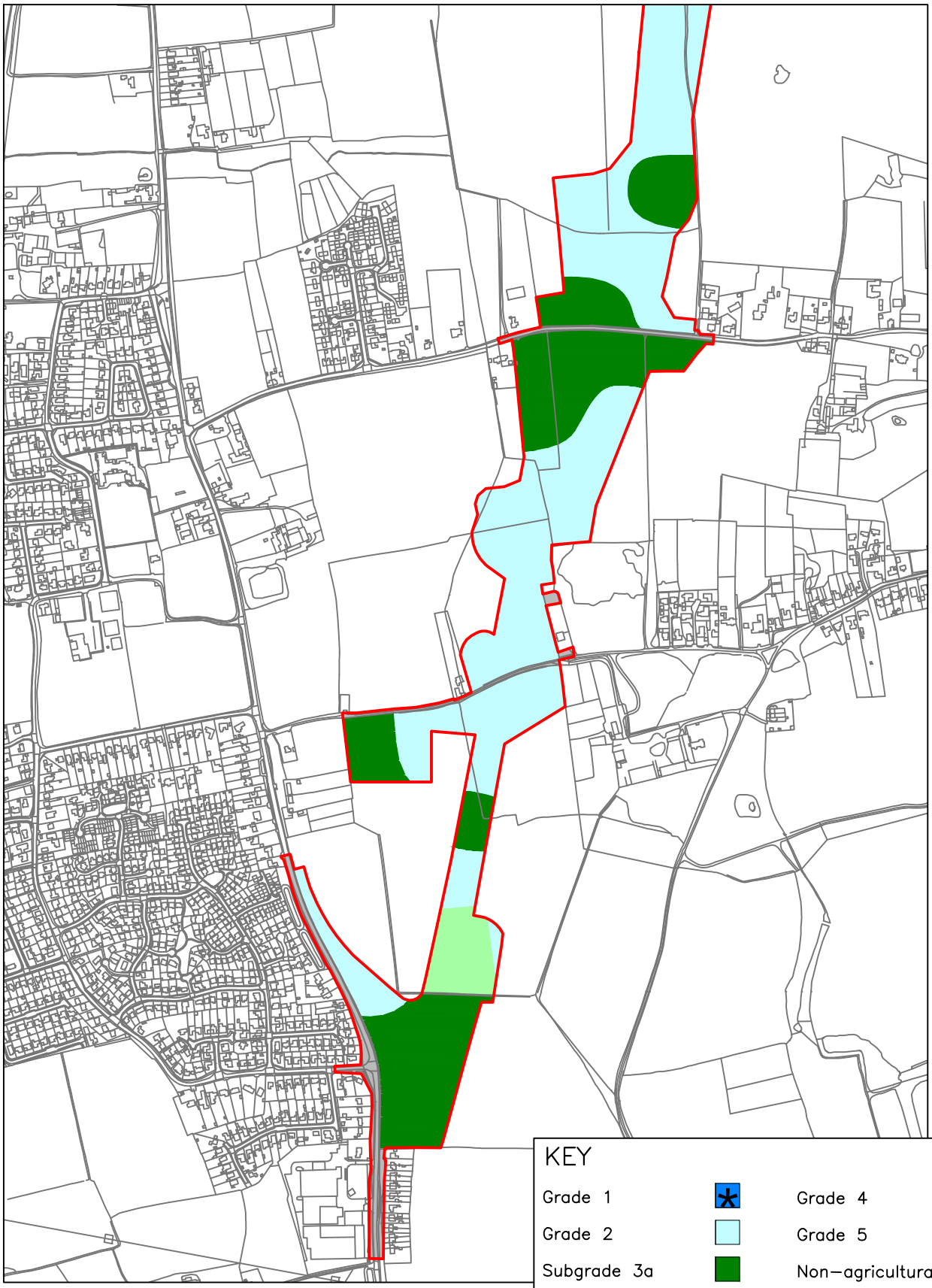

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